



NATURAL RESOURCES

CHARLESTOWN COMPREHENSIVE PLAN

A description of Charlestown's natural environment and conservation lands, issues and opportunities related to its protection and management, and recommendations to achieve the goals of natural resource protection and environmental sustainability.

Maps

- NR-1 Soil Constraints to Development**
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Cover Photo: Frances Topping

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CHARLESTOWN COMPREHENSIVE PLAN
CHAPTER 2. NATURAL RESOURCES
Planning Commission Final Draft; December 2019

INTRODUCTION

Charlestown's abundant natural resources shape the town's rural character while providing a high quality of life for its residents and a source of great attraction for its visitors.

Its beaches and coastal ponds, and rivers, streams and many freshwater ponds provide habitat for fish and shellfish and many recreational opportunities. Its wetlands provide unique ecosystems and flood control. Its forested lands provide clean air and water, and ecological diversity as well as habitats for birds and animals and trails for hiking. Its valuable farmland soils provide food for sustenance and wood for fuel. Its aquifers provide the only source of drinking water. Its dark skies protect wildlife and human health and are an astronomical resource.

In conjunction with these resources, Charlestown's scenic and rural landscapes complete the fabric of the town and provide a sense of place. Protection and enhancement of natural resources is critical to sustaining the vitality of the community as well as its tourist and recreation based economy. Charlestown is fortunate in that many of its natural resources are owned and managed by other entities such as US Fish and Wildlife, RI Department of Environmental Management, The Nature Conservancy, Charlestown Land Trust and Audubon Society. The Settlement Lands of the Narragansett Indian Tribe also contain valuable natural resources. Over generations, this has led to a shared vision for Charlestown as a place to celebrate its outdoors and its history, and to plan for a future that relies on the protection of the natural environment rather than growth or overdevelopment to sustain the economy.

RELATIONSHIP TO OTHER CHAPTERS

This chapter complements a number of others:

Recreation Chapter and Economic Opportunity Chapter

Recreational programs and assets are described in the Recreation chapter, with an emphasis on outdoor activities that rely on Charlestown's exceptional and varied natural resources. The main source of economic activity in Charlestown is tourism, which is directly tied to the natural environment and the recreational activities it supports – boating, swimming, fishing, hiking, cross-country skiing, bird watching, stargazing and sight-seeing. The tourist economy is described in detail in the Economic Opportunity chapter.

Services and Facilities Chapter

Charlestown depends upon its groundwater to provide drinking water and its soils to treat wastewater. A priority of this plan is to ensure an adequate long-term supply of high quality drinking water, whose only source in Charlestown is groundwater. Drinking water and other necessary community resources are described in the Services and Facilities chapter.

Energy Chapter

Energy production and use in Charlestown is inexorably tied with natural resources; all forms of energy require use of and/or have an impact on natural resources. Planning for future energy needs is discussed in the Energy chapter, with an emphasis on achieving energy goals and managing the impacts of climate change in a manner that also protects the natural environment.

Natural Hazards Chapter

The vulnerability of natural resources to natural hazards, particularly forecasted sea level rise and more frequent and severe storms as a result of climate change, is an essential component of this plan. The potential effects of natural hazards on Charlestown's coastal and inland riverine resources and the manner in which the community is planning for these eventual changes are contained in the Natural Hazards chapter.

EXISTING CONDITIONS

Geology and Landscape

Long before humans made their mark on the landscape, geologic forces created Charlestown's most notable features and shaped its topography, soil characteristics, water bodies and drainage patterns. When the last glacier advanced and retreated over New England, it pushed up a broad moraine alongside what is now Route 1, holding back the water of the Pawcatuck River basin. Charlestown's landscape is divided by this glacial recessional moraine, a ridge of steeply rolling hills on the north side of Route 1 that run east to west parallel to the coast (see Figure NR-1). The flat sandy coastal plain extends southward from the moraine to Block Island Sound, where barrier beaches were formed across coastal embayments, creating the salt ponds. North of the moraine, the land is characterized by a series of north-south ridges between which lie large wetlands such as Indian Cedar Swamp and open water bodies such as Watchaug, Schoolhouse and Pasquisset Ponds. The northern boundary of the town is defined by the Pawcatuck River.

A description of Charlestown's physical geography, from south to north:

Barrier beaches – long and narrow beaches that run parallel to the coastline and are separated from the mainland by lagoons, and have elevations below 20 feet

Coastal headlands – knolls of outwash or till, reaching elevations between 20 and 30 feet

Coastal ponds – brackish and estuarine waters impounded by the barrier beaches

Coastal outwash plain – areas of glacial outwash between the ponds and the moraine, spotted with kettle holes and reaching elevations of approximately 50 feet at the base of the moraine

Moraine – a ridge of accumulated glacial debris (soil and rock) with numerous steep slopes, also containing kettle holes, and reaching elevations at the top from approximately 100 feet in the west to over 200 feet in the east

Interior lowlands – flat low-lying areas north of the moraine, generally poorly drained, that contain major ponds and wetland areas and drain either northwest to the Pawcatuck River or very slowly southward under the moraine

Interior uplands – generally bedrock high points that are covered by thin layers of till and which may occur with kame terraces, level step-like outwash features with steeply sloping sides

Pawcatuck River – main drainage pathway for lands north of the recessional moraine

All of these landforms were vital to shaping the history and culture of Charlestown. The inland lakes, rivers, streams and springs, the forests and farmland, and the salt ponds and beaches help make Charlestown the special place that it is today.

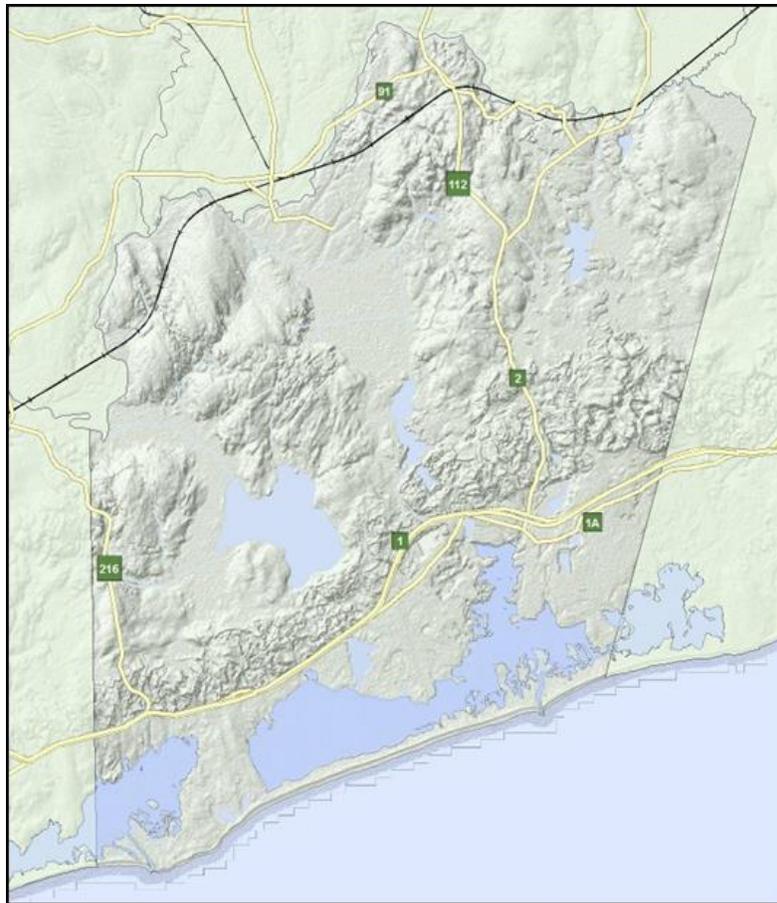


Figure NR-1 Topography of Charlestown Source: ESRI

Soils

Charlestown's soils were formed over a landscape of glacial till and outwash. Differences in soil types can be attributed to the physical and chemical properties of these underlying materials as affected by weathering. The Soil Survey of Rhode Island, with soils mapped by the Soil Conservation Service of the US Department of Agriculture in the 1970s, provides a detailed inventory of soils throughout the state, including the potentials and limitations of each soil type in general terms. Although on-site investigation is necessary to determine precise soil types when locating hydric soils or wetlands, establishing septic system design parameters, and assessing overall suitability for development, the survey is still very useful for planning purposes.

Map NR-1 *Soils Constraints to Development*, indicates the areas of Charlestown with moderate constraints to development, with seasonal high water table and with ledge and slopes over 15%. It also identifies those areas with hydric and subaqueous soils, as well as those with rock or sand, including the entire barrier beach. Areas with these soils are considered to be areas with severe constraints to development.



Frances Topping

Charlestown Farm Scene

Soils suited for agricultural purposes are discussed in the Economic Opportunity chapter; Map EO-1 shows the location of prime farmland soils, soils of statewide importance and active farmland in Charlestown. Most of this active farmland is north of the moraine where the glacier deposited finer soils, while much of the best farmland soil in Charlestown has been developed for housing, especially south of Route 1.

Groundwater

Groundwater and soils are inextricably connected, as the water holding capacity of soil is directly linked to particle size and porosity. The best supplies of groundwater are found in the glacial sand and gravel deposits above the bedrock. The thickness of this deposit varies greatly, but generally provides an abundance of water for low-density development.

The land surrounding Pasquiset Pond and to the northwest of the Indian Cedar Swamp contain a large percentage of excessively drained soils, providing deep aquifer deposits, replenished by rainfall and streams, that are capable of yielding large volumes of groundwater for water supply use; see Map NR-2 *Groundwater*. The presence of these aquifer deposits makes Charlestown relatively water rich as compared with other Rhode Island communities and protecting these aquifer deposits is critical for the future of the community.

South of the moraine in the outwash plain, groundwater is primarily recharged by local rainfall. The depth to bedrock is shallow, less than 30 feet. This groundwater is the water source for a dense population, particularly the Quonochontaug peninsula and the area around Charlestown Beach Road (4 or more houses per acre) and is subject to pollution and saltwater intrusion.

The Pawcatuck River Aquifer, designated as a sole source aquifer by the US Environmental Protection Agency in 1988 (see Figure NR-2), provides the source for much of the wells in Charlestown and surrounding communities (southwest Rhode Island). Further discussion on Charlestown's drinking water is contained in the Services and Facilities chapter.

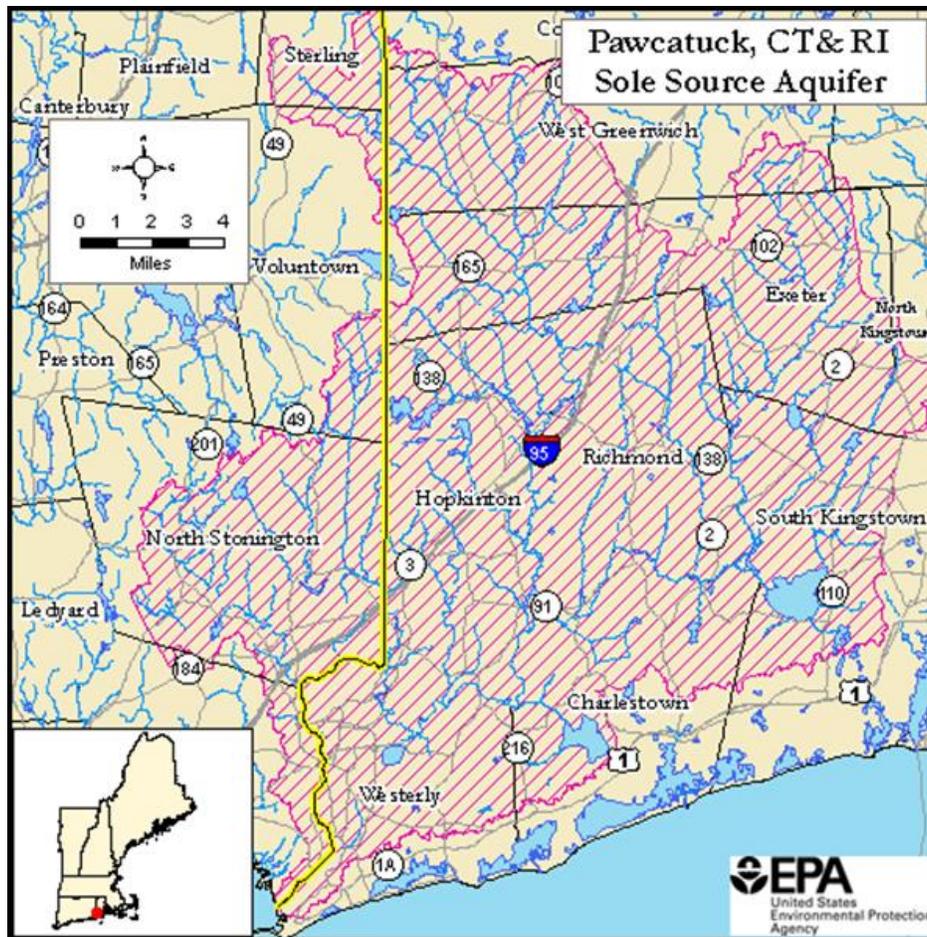


Figure NR-2 Pawcatuck Sole Source Aquifer Source: EPA

Wetlands

The groundwater and wetlands of the town are also connected, especially where wetlands overlie the glacial outwash deposits. In these areas, groundwater alternately discharges into streams, or is recharged by surface water entering the outwash deposits through the wetlands. The level of groundwater (water table) influences the conditions of the wetlands, and the wetlands filter material out of water entering the outwash.

Wetlands are found in small and large depressions throughout the town, as well as along the edges of rivers, streams and open bodies of water. Wetland soils have high water tables or at least seasonally high water tables. While the soil survey and GIS data do not provide a definitive depiction of wetland boundaries on specific properties, they do provide general locations of wetlands within the town that are useful for planning purposes. Map NR-3 *Surface Water and Wetlands* shows the general location of wetlands in Charlestown.

The northern border of the town is defined by the Pawcatuck River. This river receives water from three broad freshwater wetland systems located within the central portion of the town – Watchaug Pond wetlands, Indian Cedar Swamp and Pasquiset Pond/Pasquiset Brook wetlands. The Pawcatuck River and extensive inland wetland systems serve valuable functions in terms of providing flood storage, water quality maintenance, wildlife habitat and recreational opportunities.

Both forested and shrub wetlands are prominent in Charlestown. They are distributed throughout the town, but can be found in greatest concentrations in association with the largest ponds and groundwater aquifer areas. The majority of the forested wetlands are dominated by deciduous trees such as red maple. However, the town does contain several white cedar swamps, notably the Indian Cedar Swamp. Cedar swamps are unique; they provide diversity of habitat and they are important overwintering areas for white-tailed deer. Shrub swamps occur primarily in open areas along the river or in association with forested wetlands where soils are too wet to sustain trees. Some are the result of prior disturbance of forested wetland and represent vegetation in earlier successional stages.

The receding glacier also left many small depressions that often contain wetlands and small ponds, especially along the moraine. Many of these dry up seasonally. These areas, known as vernal pools, are important habitat for species that can only live or breed successfully where there are no fish. Most vernal pool species also require undeveloped land around the ponds to survive when they are not using the ponds.



Frances Topping Vernal Pool

The southern border of the town is defined by Block Island Sound, which adjoins the barrier beaches and coastal headlands. The coastal ponds created by the barrier beaches receive freshwater input from groundwater recharged by rain and several small wetland systems that drain south from the glacial moraine. As a result, the town is provided with several unique brackish and coastal wetland systems. These systems are valued as sources of seafood, as wildlife habitats and bird migratory sites, and as commercial and public recreational assets.

Pawcatuck River and Freshwater Streams

The predominant riverine system is the Pawcatuck River, which serves as Charlestown’s entire border with the Towns of Richmond and Hopkinton. The river flows southwesterly from Worden’s Pond, which lies within the Great Swamp Management Area in adjoining South Kingstown, entering Block Island Sound at Watch Hill in Westerly. From Worden's Pond and its confluence with the Usquepaug River at the South Kingstown / Richmond / Charlestown border,

to its confluence with the Wood River at the Richmond / Hopkinton / Charlestown border, and through much of Westerly, it is a river with high habitat values and good water quality. The nearly 18 miles of river in Charlestown flows through the historic mill villages of Kenyon, Shannock, Carolina and Burdickville. It has been designated by Congress as a Wild and Scenic River, a federal designation for rivers with outstanding natural, cultural and recreational value.

The Pawcatuck River Basin also comprises a major riverine system within the state. Combined with the Wood River Basin, the Wood-Pawcatuck Watershed covers approximately 300 square miles. Approximately two thirds of the Town of Charlestown is located within the Pawcatuck River Basin. It is a valuable resource in terms of its contribution to the aesthetic and recreational quality of the town, as well as for the wildlife habitat and groundwater recharge that it provides.

The extensive wetlands systems and freshwater ponds and springs are fed by numerous streams, including Perry Healy Brook and Poquiant Brook (feeding Watchaug Pond), Cedar Swamp Brook (feeding Indian Cedar Swamp and Schoolhouse Pond) and Pasquiset Brook (feeding Pasquiset Pond). See Map NR-3.

Freshwater Ponds

Charlestown’s Geographic Information System (GIS) identifies nearly 90 freshwater ponds within the town. The three largest are Watchaug, School House and Pasquiset Ponds. Watchaug Pond is mostly surrounded by protected open space as part of Burlingame State Park and Management Area. The land around School House Pond is either part of the Narragansett Indian Settlement Lands, or is public, including the town’s School House Pond Preserve. Pasquiset Pond is surrounded by privately held land, although The Nature Conservancy (TNC) holds a 200 acre parcel nearby (Pasquiset Pond Preserve). Among the many smaller ponds in Charlestown are Deep Pond, Saw Mill, Hanna Clarkin, Cross Mills (Mill Pond), King Tom, Perry Pond and Maple Lake. With the exception of Cross Mills Pond, which is adjoined by 76 acres of land owned by the Charlestown Land Trust, and TNC property as well, these ponds have either limited or no public access. See Map NR-3. Most of the ponds, even if private, provide recreation opportunities, contribute to the aesthetic quality of Charlestown, and have value as wildlife habitat and groundwater recharge.



Jane Weidman Wooded Trail to Watchaug Pond

Forested Lands

Much of Charlestown's undeveloped land is forest. In addition to its habitat value, forests provide recreational opportunities such as hiking and hunting, and are important for quality of life, a healthy environment and maintaining water quality. The Burlingame State Park and Management Area, a contiguous forested tract located around Watchaug Pond, is known to be a movement corridor for wildlife. The forested areas of Burlingame, Indian Cedar Swamp, Francis C. Carter Memorial Preserve and other properties provide residents and visitors with open space, trails and scenic views. The value of these parcels as conservation lands are described in detail below.

Salt Ponds

Charlestown's salt ponds are coastal lagoons which lie on the glacial outwash plain of the south shore (see Figure NR-3). They represent an ecosystem of diverse habitats consisting of barrier beaches, salt marshes, intertidal flats, lagoons and adjacent shorelines with tributary streams and ponds. The salt ponds within the Town of Charlestown include the eastern portion of Quonochontaug Pond, all of Ninigret Pond and a very small part of Green Hill Pond (Allen Cove and inlet).

The relatively shallow salt ponds are fed by freshwater from springs and streams, and by seawater through narrow breachways. This confined area and relatively slow flushing keeps the salt and nutrient concentrations ideal for salt marshes, eelgrass and phytoplankton, which in turn support the spawning and growth of a variety of fish and shellfish sheltered from being swept out to sea. It also makes the salt ponds vulnerable to water quality and habitat degradation from human uses, including contamination from sewage, and use of chemicals in the ponds or their watersheds.

Ninigret Pond is the largest of the salt ponds along the south shore of Rhode Island. It measures over 3 miles long, yet is less than a mile at its widest point, with a total surface area of 1,647 acres. Two main tributaries flow into Ninigret Pond from the north, both entering Fort Neck Cove – one drains Cross Mills Pond north of Route 1 and the other drains King Tom Pond, which is connected hydrologically to Deep Pond and Schoolhouse Pond. With the exception of Ninigret National Wildlife Refuge, and the protected portions of the barrier beaches, much of the surrounding areas are residential. There are three marinas and several canoe/kayak launching areas that provide direct boating access to the pond. Ninigret Pond has a long history of supporting local fisheries, both commercial and recreational, and is actively used for boating, both motorized and non-motorized.

Quonochontaug Pond, which Charlestown shares with the Town of Westerly, is smaller and deeper than Ninigret Pond, having a total surface area of 745 acres. Two main tributaries flow into the pond – Ninigret Cove Brook and Harmonic Brook, both on the Westerly side of the pond. Residential communities surround the pond. There are no commercial marinas, but there are two

small yacht clubs on opposite ends of the pond and a state boat launch near the Quonochontaug Breachway. Motor boating, sailing and fishing are the most common uses of the pond.

Green Hill Pond is principally within the Town of South Kingstown; only Allen Cove is located in Charlestown. Green Hill is connected to Ninigret Pond by a very shallow channel under Creek Bridge. Teal and Factory Brooks, two streams that flow into the northeast end of the pond, both contribute significantly to the bacterial loading due to the developed nature of its watershed. Once one of the last natural oyster producers in the state, shell fishing has been prohibited due to high bacterial levels.

The salt ponds are local and regional attractions, with a popularity due to abundant fish and shellfish resources, great beauty and a long history of both commercial and recreational use. They are critical to Charlestown’s tourist economy. The salt ponds are discussed in great detail, including their history, environment and current uses, in the Charlestown Harbor Management Plan, adopted September 2017.



Figure NR-3 Salt Ponds of Charlestown Source: Charlestown GIS

Beaches

The salt ponds, marshes, tidal flats and their ecosystems would not exist without the barrier beaches. There are nearly six miles of sandy beaches backed by a dune system along the south

shore of Charlestown. In addition to being a major recreation resource and tourist attraction, the barrier beaches provide essential habitat, allowing the salt ponds to function as nursery grounds for finfish and shellfish. The barrier beach – salt marsh habitats are important stop-over sites for migratory birds, part of the US Fish and Wildlife Service Mid-Atlantic Flyway, a major migratory bird corridor along the East Coast. A number of endangered and federally regulated species are present, including the salt marsh sparrow, and the piping plover, which nests and rears its young along the barrier beaches from April to September. The beaches are also the first line of defense, protecting the mainland side of the ponds from ocean swells and storms.

Dark Skies

From space one sees bright lights along the East Coast between New York and Boston, but also an exceptionally dark spot in Rhode Island. Charlestown’s dark skies are a valuable natural resource, and in 2010, the town enacted a commercial lighting ordinance¹ to protect its dark skies for purposes of astronomy, tourism and general enjoyment; to protect residents and wildlife and the surrounding environment from the effects of light pollution; to promote energy efficient and sustainable lighting practices; and to minimize adverse off-site impacts from new lighting installations, while permitting reasonable uses of outdoor lighting for security, productivity and commerce.



John Repoza Starry Night at Ninigret Park

Natural Habitats

The natural resources of Charlestown represent some of the most significant habitat areas in the state. The RI Natural Heritage Program (NHP), a comprehensive inventory of the state’s rarest and most vulnerable species and natural communities has identified several areas within the town that contain rare plant and animal species and represent unique habitat types. The NHP inventory was initiated by RI DEM and The Nature Conservancy (TNC) in 1979. Today, representatives from the RI Natural History Survey, DEM, TNC and the URI Environmental Data Center work together to maintain the inventory, which serves as a resource for management and stewardship needs, and identification of threats to critical areas. Areas identified in Charlestown, which are indicated on Map NR-4 *Natural Heritage Areas*, include (portions of) the following:

¹ <https://ecode360.com/16099584>

- Deep Pond/Schoolhouse Pond Complex
- Shumankanuc Hill
- Kings Factory Road/Power Line Right of Way
- Ninigret and Quonochontaug Ponds
- Great Swamp/Kingston Pine Barrens

Deep Pond/Schoolhouse Pond Complex

The NHP considers the coastal plain pond shore habitat surrounding Deep Pond and Schoolhouse Pond as some of the best in the state. Habitats of this type are found almost exclusively in Washington County, north of the recessional moraine. The habitat is characterized by widely fluctuating water levels, sandy substrate and gently sloping shorelines. This habitat supports six species of rare plants, most of which are considered regionally rare.

Shumankanuc Hill

The area west of Shumankanuc Hill includes a variety of habitats that support three state endangered plant species, as well as a number of other unique species. Habitat types in this area include coastal plain quagmire and wet meadow. Quagmires are usually associated with wooded swamps, primarily those dominated by Atlantic white cedar. They are similar in many respects to the coastal plain pond habitats, except that the water levels are fairly stable.

Kings Factory Road/Power Line Right of Way

A high-voltage power line that crosses the northern portion of Charlestown serves a surprising alternate purpose; in the area to the west of where the power line crosses under Kings Factory Road (about a third of a mile south of where the road crosses the Pawcatuck River) this power line right-of-way provides a maintained wet meadow habitat. This area includes several plants listed by the state as rare. It is also identified in the State Guide Plan as a “State Green Way”. Power lines can act as wildlife corridors to facilitate movement and mating activities, but can also allow predators and invasive species easy access and should be monitored, if possible.

Ninigret and Quonochontaug Ponds

Two areas within Quonochontaug Pond and one within Ninigret Pond have been identified by the NHP as significant habitat sites. The areas include the Quonochontaug Breachway and tidal flats located to the east of the breachway, and the freshwater wetlands and ponds (West and Garden Ponds) located between Quonochontaug and Ninigret Ponds. The third area is roughly defined as the southern part of the Ninigret National Wildlife Refuge.

The Great Swamp/Kingston Pine Barrens

These two sites identified by the NHP are located largely within the Town of South Kingstown, but their proximity makes them significant natural resources for consideration in the Charlestown Comprehensive Plan. The areas known as the “Great Swamp” and the “Kingston Pine Barrens” are considered high-priority areas for protection in the region. Land within Charlestown, lying adjacent to these two areas, provides valuable buffers from encroaching development.

The Great Swamp comprises the largest wetland complex in the state, and contains a multitude of unique habitat types. Wetlands located in Charlestown and just south of the Pawcatuck River, though not contained within the Great Swamp Management Area, are a valuable portion of that wetland system. Sixty-one acres in Charlestown were added to the Great Swamp Management Area in 1999; 55 acres are in state ownership, and the remaining 6 acres in private ownership with a conservation easement owned by the state. There is an additional 140 acres in private ownership with an easement held by the Charlestown Land Trust that is contiguous with both the Great Swamp Management Area in Charlestown and the Pawcatuck River (see Map NR-5).

The Kingston Pine Barrens is one of the few remaining scrub oak/pitch pine habitats in the area. This type of habitat is suitable for a variety of rare plants and animals, including invertebrates specifically adapted to the presence of scrub oak. This area is located in the vicinity of Shannock Road on the border of Charlestown and South Kingstown.

Other Natural Habitats

Additional areas identified by the NHP include the western shore of Watchaug Pond, which receives inflow from one stream (Healy Brook), and serves as the headwaters of another (Poquiant Brook). Also identified is the area northwest of Shumankanuc Hill, north of the railroad tracks, and a large area of pitch pine habitat northwest of the former United Nuclear site on Narragansett Trail, which is now part of the Francis C. Carter Memorial Preserve.

Conservation and Open Space Lands

Much of the land area in Charlestown is protected from development or limited to passive recreation use through ownership or conservation easement. These sites are shown on Map NR-5 *Conservation and Open Space Areas*. The major publicly owned or accessible sites are described below by ownership. The recreation potential of these sites is described in more detail in Appendix REC-2 of the Recreation chapter.

Town Conservation and Open Space Land

The Town of Charlestown has a number of protected open space parcels set aside specifically for conservation, some of which also provide for public access and passive activities such as hiking, nature study and bird watching. These include the Charlestown Moraine Preserve, Richard Trails, School House Pond Preserve, South Farm Preserve and the most recent acquisition, the Patricia Sprague Forest Preserve.

Charlestown Moraine Preserve:

This 78-acre parcel on the north side of Route 1 has been owned by the town since it was purchased in 2013 with town open space bond funds. The property serves as an important forested wildlife corridor between the Natural Heritage areas of Watchaug Pond and the School House Pond/Deep Pond complex. The forest is dominated by oak with some white pine, and a thick understory of mountain laurel and huckleberry and supports a diversity of wildlife. The unfragmented forest, a stream draining School House Pond, and the rapidly draining soils work together to protect the water quality of the coastal ponds. The trail system is accessed off of Kings Factory Road.



Karen Jarrett Trail at Sprague Preserve

Richard Trails:

This 96-acre property off Route 2 has been owned by the town since 2002, purchased with funding from The Nature Conservancy. It is contiguous with a portion of the Ninigret National Wildlife Refuge on the north side of Route 1 (the Lewis Trail Unit), which forms part of a nearly 500-acre parcel of land protected for conservation, wildlife protection and passive recreation. A hiking trail through the property follows an old Native American trail.

School House Pond Preserve:

This 93.5-acre parcel has been owned by the town since 1991, purchased with funding from The Nature Conservancy, RI DEM and town open space bond funds. It lies across Kings Factory Road

from the state-owned Burlingame Wildlife Management Area. The property consists of undeveloped frontage on pristine School House Pond and hiking trails through hardwood and pine forest that connect to a trail in Burlingame.

South Farm Preserve:

This 87-acre property has been owned by the town since 2002, purchased with funding from RI DEM and town open space bond funds. The property, which consists of approximately 2,700 feet of undeveloped frontage on Old Coach Road, is mainly forested, but also contains two large meadows, a reconstructed sheep barn and historical cemetery, a small pond (vernal pool) and other wetlands. Together with The Nature Conservancy land and Pasquisset Preserve, on the opposite side of the road, it provides an over 300-acre complex for conservation, wildlife and passive recreation.

Patricia Sprague Forest Preserve:

This property of nearly 28 acres along the Pawcatuck River in the Village of Carolina has been owned by the town since 2016. It was purchased with a DEM open space grant and town open space bond funds. Both the DEM and the Charlestown Land Trust hold conservation easements on the land. The property contains vernal pools, fertile meadows, open fields, forest and spectacular views from 1,700 feet of riverfront. Hiking trails lead to and along the river, where one can walk to the water's edge or to bluffs overlooking the river, and pass through two fields and a forested area.

Charlestown Land Trust

Mill Pond Preserve:

The Mill Pond Preserve, accessed by a dirt road off of Route 2 near the Route 1 intersection, is nearly 80 acres of woodland and wetland around the western perimeter of Mill Pond. Originally this land was owned by the American Fish Culture who operated a fish hatchery. The springs feeding the pond produce 200 gallons per minute at a steady temperature of 48 degrees year round, providing the perfect environment for raising trout. By 1995 the decline in the private hatchery business led to the donation of the property to The Nature Conservancy, who later transferred title to the Charlestown Land Trust. It also abuts a 47-acre irregularly shaped parcel of land owned by The Nature Conservancy that connects the pond to Narrow Lane to the east. Mill Pond is part of Charlestown's history with the remnants of the once-thriving trout hatchery found on the property. It has springs that are up to forty feet deep and ten feet wide. There are trails set in a woodland on the edge of the pond.



Frances Topping

Mill Pond Preserve

State of Rhode Island Conservation and Open Space Land

The State of Rhode Island owns several large tracts of land within the town's borders, which include the following owned and managed by the Department of Environmental Management: Burlingame State Park and Management Area, East Beach and Ninigret Conservation Area, the Great Swamp Wildlife Management Area (55 acres in Charlestown) and the Kimball Wildlife Refuge. In addition, the state has conservation and forestry easements over several properties, and owns agricultural development rights on others.

Burlingame State Park and Management Area:

The largest amount of open space and conservation land available for public access north of Route 1 in Charlestown is found in the Burlingame State Park and Management Area. This state park resulted from the acquisition of woodland around Watchaug Pond and adjacent parcels, either by direct purchase or through condemnation. Burlingame, which consists of 3,100 acres of rocky woodland, opened in 1934.

In addition to an active campground with over 700 camp sites, the park includes a large area, north of Buckeye Brook Road and abutting the Pawcatuck River, which is primarily used for hiking and hunting. Part of the Management Area also extends to the Pawcatuck River although the site currently does not provide direct access to the river.

East Beach and Ninigret Conservation Area:

This 231-acre conservation area consisting of undeveloped barrier beach with access to both Block Island Sound and Ninigret Pond, adjoins land owned by US Fish and Wildlife Service (part of the Ninigret National Wildlife Refuge described below). This 3-mile stretch of barrier beach is the longest in Rhode Island. East Beach is home to piping plovers and other birds; during piping plover nesting season, the nest areas close to the dune grass are roped off to protect the eggs.

Great Swamp Wildlife Management Area:

While the great majority of the 3,000± acre Great Swamp Wildlife Management Area is in South Kingstown, a portion, 55 acres, lies in Charlestown. As described above, it is listed in the RI Natural Heritage Program as a valuable habitat area; the Great Swamp comprises the largest wetland complex in the state, and contains a multitude of unique habitat types. The land is managed for both wildlife protection and hunting. There is a trailhead at Biscuit City Road.

Kimball Wildlife Refuge:

This 29-acre refuge, owned by Rhode Island Audubon until 2015, abuts Burlingame State Park and is now part of Burlingame, although it remains a separate entity. The property is located on the south shore of Watchaug Pond. It is accessed by car from Sanctuary Road, or by foot from inside Burlingame State Park and from the US Fish and Wildlife Kettle Pond Visitor Center.

US Fish and Wildlife – Ninigret National Wildlife Refuge

The US Fish and Wildlife Service owns four critical parcels in Charlestown as part of its Ninigret National Wildlife Refuge: the Kettle Pond Unit, the Lewis Trail Unit, the Salt Pond Unit and the Barrier Beach Unit. All were acquired with federal funds.

Kettle Pond Unit:

This parcel, 115 acres on the north side of Route 1 where the Kettle Pond Visitor Center is located, is referred to as the headquarters unit. The forested uplands are home to pitch and white pines, black and white oaks, blueberry shrubs, sweet fern and princess pine club moss. Hiking along the trails offers a chance to see visual reminders of the great ice sheet and seasonal changes in a vernal pool, and appreciate views of Watchaug Pond.

Lewis Trail Unit:

This parcel, acquired in two parcels in 2000 and 2003 with funding also from The Nature Conservancy and town open space bond funds, is 365 acres and is accessed from Lewis Trail, off

Route 2. The large irregularly shaped parcel extends as far south as Route 1. The forested uplands are home to pitch and white pines, black and white oaks, blueberry shrubs, sweet fern and princess pine club moss. This parcel is contiguous along Lewis Trail with the 96-acre Richard Trails property owned by the town, and forms part of a nearly 500-acre parcel of land protected for conservation, wildlife protection and passive recreation.

Salt Pond Unit:

The Salt Pond Unit, 380 acres that abut the town-owned Ninigret Park off Route 1, has been a wildlife refuge since 1979. It consists of diverse upland and wetland habitats including grasslands, shrub lands, wooded swamps and freshwater ponds, as well as approximately 2 miles along the shoreline on Ninigret Pond, and associated coastal wetlands which support a large diversity of marine life such as blue crab, bay scallop and winter flounder.

Once part of a WW II-era naval air training base, the land that is now the national wildlife refuge is unique ecologically and important for migratory songbirds and nesting shorebirds. The refuge protects federally threatened and state endangered species and is part of the Mid-Atlantic Flyway, a major migratory bird pathway.

Barrier Beach Unit:

This unit consists of 27 acres of undeveloped barrier beach, acquired in 1942. It lies between the state-owned East Beach and Ninigret Conservation Area and private land holdings along the long expanse of undeveloped barrier beach on the west side of the Charlestown Breachway, with direct access to both Ninigret Pond and the ocean. The barrier beach is home to piping plovers and other birds.



Frances Topping Migratory Shorebirds

Narragansett Settlement Lands in Conservation

As described in detail in the Land Use chapter, the Narragansett Settlement Lands comprise 1,800 acres of land within Charlestown. As the result of a 1978 out-of-court settlement of a tribal land claim suit, half of this area was acquired from public lands, and the other half from privately owned parcels. The 900 acres of public settlement lands came from the state-owned land of the Indian Cedar Swamp Management Area, the Indian Burial Hill and the Deep Pond area and is to remain permanently as conservation land. Of the 900 acres of private settlement land, 675 acres are to remain conservation, with certain limited activities such as agriculture permitted, and 225 acres can be developed. The location of the developable acres is not specifically identified, but would be based on the land capability analysis contained in the *Land Use Plan for the Narragansett Indian Land Claim Settlement Area for the Narragansett Indian Tribe* prepared in 1986 by the RI Office of State Planning in cooperation with the Narragansett Indian Tribe.

The state has reserved access to Deep Pond and the Pawcatuck River, while the tribe retains a 45-foot wide right of way through state land in order to access Watchaug Pond from Kings Factory Road. As a result of the settlement, 1,575 acres of tribal land are to remain in conservation or limited conservation.

The Nature Conservancy

Francis C. Carter Memorial Preserve:

The Francis C. Carter Memorial Preserve is a 1,112 acre preserve, almost all of which (1,032.5 acres) are in Charlestown, which includes the rocky uplands of the moraine and a portion of the sandy floodplain of the Pawcatuck River. Acquired in two different segments in 2001 and 2014, the preserve protects a variety of natural features including rare pitch pine/scrub oak barrens, vernal pools and a grassland of approximately 70 acres, as well as some unique plants and animals. The Nature Conservancy is restoring and maintaining wildlife habitat at the preserve, to help reverse the decline in the number of grassland- and shrub-nesting birds. The preserve joins several thousand acres of near contiguous forest, and contributes to an 11-mile corridor of open space extending from the Ninigret National Wildlife Refuge to the RI DEM Carolina Management Area in Richmond.

Pasquisset Pond Preserve:

This parcel, now totaling 255 acres, was acquired by The Nature Conservancy in two phases, 200 acres in 2000, with some funding from the town, and an adjoining 55 acres in 2018 with half of the purchase price from town open space bond funds. The preserve is located along Old Coach Road and lies opposite the town-owned South Farm Preserve. To the south it also connects with the open space set aside for a residential cluster development (private). The land includes wetlands

that support the rare ringed boghaunter dragonfly and an Atlantic white cedar swamp. The Narragansett Trail, an old Native American trail, runs through the property passing by numerous wetlands, mountain laurel and a field. Together with the South Farm Preserve, nearly 350 acres are protected for conservation.



Jane Weidman

Carter Preserve in Autumn

Multiple Ownership

Maple Lake Conservation Area:

The Maple Lake Conservation Area consists of private land surrounding Maple Lake (60 acres) and two other adjoining privately owned parcels (totaling 114 acres) which have conservation easements held by The Nature Conservancy, Charlestown Land Trust or the town. Together with a nearly 24 acre parcel owned by the land trust, which also has frontage on Shannock Road, this conservation area encompasses almost 200 acres of protected land in the northeast corner of Charlestown. Maple Lake is an important habitat for dragonflies and damselflies.

Summary

There are now several thousand acres of contiguous forest that contributes to an 11-mile corridor of open space running from the Francis C. Carter Preserve south to the Ninigret National Wildlife Refuge Salt Pond Unit. This area has become a focus of land acquisitions by The Nature Conservancy, RI DEM, the Charlestown Land Trust and others. The purpose of these acquisitions is to build an ever-larger unfragmented area of wildlife habitat, to make open space connections to the Pawcatuck River, and to create an ever-richer experience for the public who use these lands

for passive recreation. The Town of Charlestown highlights this forested corridor in its promotion of ecotourism.

As of 2019, a total of 10,602 acres or approximately 45% of the land area within the borders of Charlestown, are identified as conservation or open space land. The ownership of this land, indicated on Map NR-5, is shown in Table NR-1.

**Table NR-1
Conservation and Open Space Land Ownership in Charlestown**

Ownership Entity	Approx. Acreage
Town of Charlestown	709 acres
State: Department of Environmental Management and Department of Transportation	4,461 acres
Federal: US Fish and Wildlife	875 acres
Narragansett Indian Tribe: protected settlement lands	1,575 acres
Private conservation organizations: Charlestown Land Trust, The Nature Conservancy, Audubon Society of Rhode Island, and others	1,708 acres
Private lands in conservation easement: individually granted easements and common open space of cluster subdivisions	1,319 acres
Total	10,647 acres

Note: The Town of Charlestown has approximately 23,552 acres of land area, excluding water bodies

Great Thicket National Wildlife Refuge

In response to a decline in habitat for wildlife species dependent on young forests and shrublands, in 2016 the US Fish and Wildlife Service established a new refuge, the Great Thicket National Wildlife Refuge. Portions of the refuge are located within the States of Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut and New York; it encompasses up to 15,000 acres, including approximately 3,200 acres in southern Rhode Island (see Figure NR-4). The new refuge is a system of focus areas dedicated to managing shrubland habitat for wildlife and enjoyment by

visitors wherever possible. The locations of the focus areas were based on a detailed conservation assessment for the New England cottontail, a species that was recently considered for listing under the Endangered Species Act. Establishment of the new refuge also benefits over 64 other species, including the high density of migratory songbirds that occupy southern Rhode Island in the fall.

Within the focus area in Rhode Island the refuge establishes a boundary within which the US Fish and Wildlife Service will be allowed, based on funding availability and willing sellers, to acquire lands in fee title, through conservation easements, or in some cases, under leases. It builds upon the refuge lands in Charlestown and South Kingstown, specifically the Ninigret National Wildlife Refuge, and the Trustom Pond Wildlife Refuge, respectively.

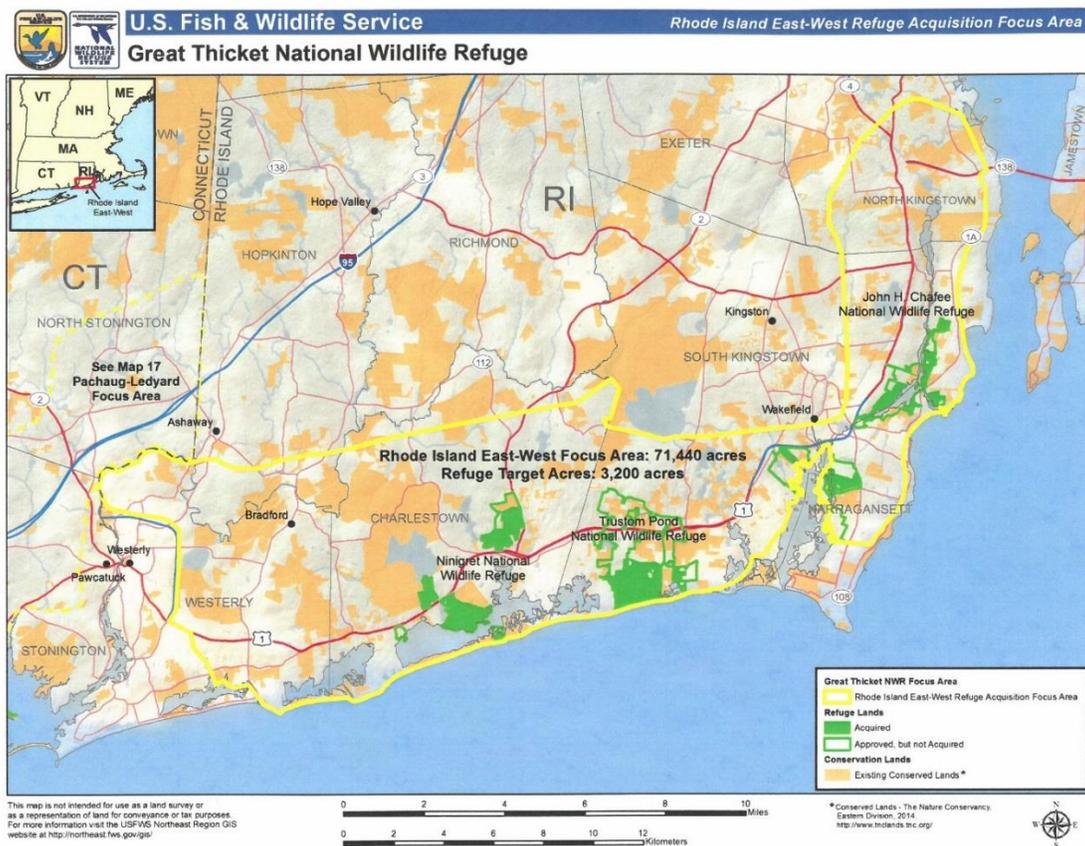


Figure NR-4 Great Thicket RI East-West Focus Area Source: US Fish & Wildlife

NATURAL RESOURCES: ISSUES AND OPPORTUNITIES

Much of Charlestown’s land area – its forested tracts, freshwater ponds, streams, wetlands, salt ponds and barrier beach system, and natural habitats – is conservation, protected open space or recreation land. Whether the land is owned by a federal or state agency, the town, a private conservation organization or is part of the Narragansett Settlement Lands, the large portions of

Charlestown that are protected through ownership and/or use is a cause for celebration. However, there remain challenges in terms of managing the development that does occur, ensuring proper stewardship of the natural resources that are under public control or regulation, and being prepared to address unexpected events that can happen due to outside forces. These challenges fall under the following issue areas:

- **Mitigation of Negative Environmental Impacts**
- **Proper Management of Natural Resources**
- **Regulation of New Development**
- **Prevention of Inappropriate Development**

Mitigation of Negative Environmental Impacts

As with many rural communities, Charlestown works to manage growth and to control the impacts of development and change in a way that protects the town's most precious natural resources. Charlestown has identified a number of ongoing environmental issues, described below.

Groundwater Quality

In Charlestown, the quality of groundwater is generally good except where it is influenced by discharge from septic systems or the use of fertilizer, road salt and the like. Groundwater in the coastal areas is also impacted by saltwater intrusion.

As described in more detail in the Service and Facilities chapter, all households and businesses in Charlestown rely solely on local soils for treatment and dispersal of wastewater through the use of On Site Wastewater Systems (OWTS). Properly functioning OWTS are very effective at eliminating pathogens from wastewater, but not as effective at removing chemicals such as nitrates and phosphates or pharmaceuticals. In areas of town where housing densities are greater than 1 house per acre, nitrate levels in the groundwater are known to be elevated, greater than 5 ppm. Depending upon actual housing density and levels of occupancy, these groundwater nitrate levels can sometimes exceed the EPA drinking water limit of 10 ppm. The elimination of cesspools and substandard OWTS, and the progressive upgrade of conventional OWTS to denitrification systems over time will reduce nitrate loadings if housing occupancy levels do not increase.

In Charlestown, OWTS are the largest contributor of nitrogen to the groundwater, particularly in the salt ponds watershed, which is the limiting nutrient in coastal environments and which has significant water quality and health implications. Models developed by the University of Rhode Island (URI) indicate that in the densely developed areas of Charlestown, approximately 80% of groundwater nitrogen is attributable to OWTS discharge. As a result, RI DEM mandates the use of nitrogen (N)-reducing septic systems in the salt ponds watershed for all new OWTS installations

or for systems that require an upgrade. N-reducing OWTS are designed to lower the wastewater effluent total nitrogen concentration by 50%.

Similar to the nitrogen from septic systems, nitrogen and other nutrients from fertilizers and other chemicals enter the groundwater, surface water bodies and the salt ponds. This can occur by both stormwater runoff directly into surface water bodies, and by infiltration into the groundwater.

Near the shore, fresh groundwater often occurs as a lens riding over the denser saltwater. Wells along the coast tap into this freshwater lens. Excessive withdrawal of freshwater from the lens can result in saltwater intrusion and degrade the quality of coastal groundwater, a situation which will only be exacerbated by sea level rise. As a result, seawater intrusion is a problem for many of the homes on the barrier beaches, as well as some homes around the perimeter of the salt ponds. These homes generally use cisterns to supplement their water supply.

Development Impacting the Salt Ponds

The watershed of the salt ponds as mapped has been used for policy development and regulation by the Rhode Island Coastal Resources Management Council (CRMC) as the Salt Ponds Region Special Area Management Plan (SAMP), and by the RI DEM as the South Shore Salt Ponds Critical Resource Area. Within the watershed are three CRMC land use classifications, as shown in Figure NR-5 and described in the 2004 SAMP.

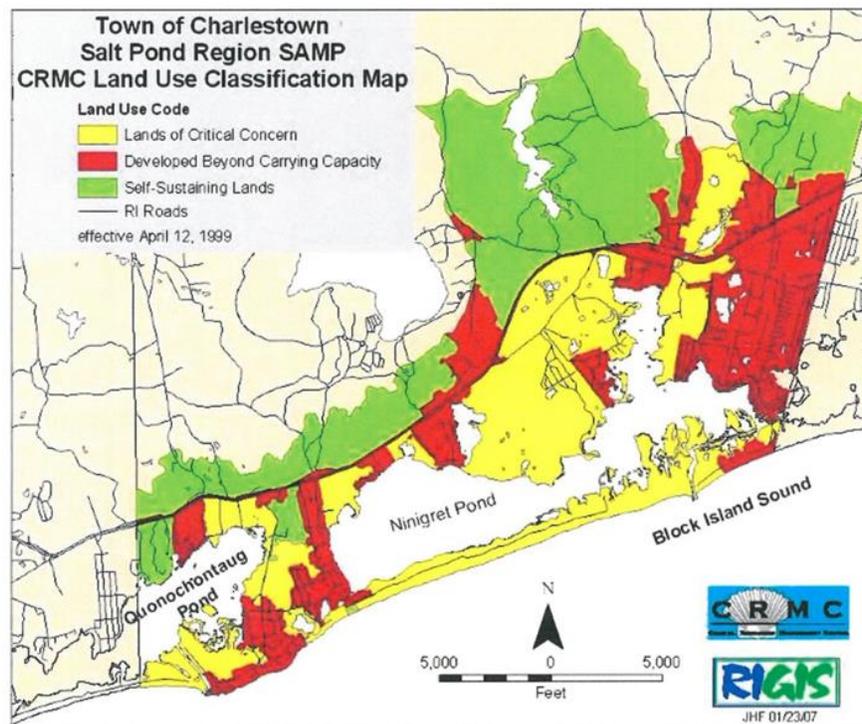


Figure NR-5 SAMP Land Use Classifications

Source: CRMC, RIGIS

- Self-Sustaining Lands (green) – lands that were undeveloped or developed at a density of not more than 1 residential unit per 2 acres. This low density is expected to keep nutrients released to the groundwater sufficiently diluted to maintain potable drinking water.
- Lands of Critical Concern (yellow) – lands that were undeveloped or developed at a density of not more than 1 residential unit per 2 acres and abut sensitive salt pond areas or aquifer recharge areas and are susceptible to impacts of pollution (eutrophication or contamination)
- Lands Developed Beyond Carrying Capacity (red) – lands that are developed at densities above carrying capacity, typically at 1 residential or commercial unit per 1/8 to ½ acre. These densely developed areas are the major source of contamination to groundwater and the salt ponds.

Although the salt ponds watershed comprises only 28% of Charlestown’s land area, it contains over 63% of all developed parcels, and includes the town’s most densely developed areas. There are 3.7 square miles of lands classified as Developed Beyond Carrying Capacity in Charlestown, most of which are south of Route 1. The largest such area is the Charlestown Beach area along the border with South Kingstown and adjoining Green Hill Pond and the easterly portion of Ninigret Pond.

Development within the salt ponds watershed can have a long-term impact on the ponds’ water quality and habitat value. Water quality is impacted by nutrients and other pollutants entering the salt ponds through both groundwater and surface water runoff; these pollutants originate from a variety of sources associated with development and use of land around the ponds, including on-site wastewater treatment systems, fertilizer use, stormwater runoff and animal waste.

Stormwater runoff from large areas of impervious cover, including roadways, parking lots, driveways, rooftops and similar surfaces within the densely developed areas surrounding the salt ponds and in the watershed, discharges to the salt ponds either by direct runoff (nonpoint source) or storm drains (point sources). This runoff can be the source of a variety of contaminants including nutrients, pathogens, organic matter, road salt, oil and even heavy metals. Excess nutrients promote algae and plant growth, which in turn depletes the water of oxygen when they decay, a condition known as eutrophication, and which can eventually lead to fish kills.

Development also has an impact on habitats. Within the pond buffer zones, succession from open field habitat to shrub habitat, or conversion of open fields to other land uses, reduces the available nesting, migratory resting and refueling habitat for some bird species, threatening these species’ populations.

The Salt Ponds Coalition, a private non-profit advocacy group whose purpose is to protect and enhance the health of the coastal ponds from Watch Hill in Westerly to Point Judith in Narragansett, has monitored water quality in the coastal ponds since the late 1980s. It monitors various indicators of pond health including dissolved oxygen, nutrients, bacteria concentration, water clarity and temperature. During this time the water quality in Ninigret Pond has declined. The eastern portion of the pond is closed to shellfish harvesting due to excessive bacteria. High nutrient concentrations, primarily from nitrates have increased eutrophication. Areas away from the breachway are the most impacted. Tidal flushing through the breachway dilutes the nutrient levels, clears the water and supports healthy eelgrass beds within a half-mile of the channel.

Development Impacting Freshwater Ponds and Lakes

As with the salt ponds, Charlestown's freshwater bodies are at risk from runoff from nearby development that affects water quality, and stimulates algal blooms and contributes to eutrophication. Invasive species also impact the waters and shore areas.

The delicate balance of the coastal plain pond habitat of Deep Pond and Schoolhouse Pond makes it particularly vulnerable to degradation of water quality from nutrient overloading and household chemicals. Erosion of the shoreline, and consequently siltation, are also destructive to this type of habitat. Removal of native vegetation, either through hand collection or by extensive impact to the shoreline from walking or recreational vehicles, significantly reduces the populations of rare plant species in these ponds. Additionally, manipulation of the water levels of the ponds eliminates the fluctuating conditions necessary to the life cycle of the plant species. Protection of these areas as open space would help prevent these potential problems.

Ecological Risks to Forested Lands

Forest greenway corridors provide the large territories needed by many species, and allow for the exchange of genetic material. Predation and invasive species can be introduced from linear disturbances such as powerlines. Noxious pests (e.g. gypsy moths) and diseases that affect trees are also liable to increase with climate warming and spread from adjacent states. Increased storms and insect damage are felling mature trees. After several years of gypsy moth infestation and other stresses, large swaths of oaks have died in 2018. This changes the make-up of the forest as well as creating safety issues relating to fire and falling trees along roadways and trails. Removal costs may be an unanticipated burden on both public and private finances.

Overpopulations of deer destroy some of the herbaceous layer depleting the biodiversity of the area; over browsing prevents new sapling trees from growing, and deer are also a vector for the transport of disease-causing ticks from mice to people and other animals. The Great Thicket National Wildlife Reserve may affect the forest density by creating successional scrubland.

Sea Level Rise and Climate Change

A more complete discussion of climate change and its potential impacts on Charlestown is contained in the Natural Hazards chapter. In general, the Northeast can expect warmer temperatures, more extreme weather events, shorter winters and longer summers, less snowfall and more rainfall, and accelerated rates of sea level rise, as well as a more acidic ocean.

Rhode Island's coastal ecosystems have already been impacted by a change in fish species due to warming waters, and other ecological changes. Future impacts include erosion, inundation, or migration of coastal habitats such as beaches and salt marshes. Of particular concern to Charlestown is that accelerated sea level rise and increased intensity of storms will likely lead to increased erosion of the south shore coastal barriers and headlands. As the beach dunes recede, the marsh borders will also move back which will affect both habitat and housing. The salt ponds are currently being affected by sea level rise, with increasing salt content and saltwater intrusion into potable drinking water sources. Dune preservation is necessary to protect the salt ponds and marshes.

Proper Management of Natural Resources

Conservation Lands

For lands that are set aside for conservation purposes, or are protected by means of a conservation or open space easement, monitoring by the responsible agency, owner or easement holder is necessary to ensure that the lands are managed properly and remain in good ecological health. As described in the Existing Conditions section of this chapter, the town owns a number of valuable conservation and open space parcels. The town also holds conservation easements on numerous parcels that are privately owned that consist of open space areas set aside as part of cluster subdivisions. A natural resources manager would ensure proper maintenance of valuable natural resources under town control. Such a person could also maintain an inventory of Charlestown's natural resources that would enable better decisions to be made when purchasing land or reviewing developments.

Communication and cooperation between the town and other agencies and organizations with conservation land in Charlestown is also needed, to ensure compatible land use goals and a means to address common problems, whether it be invasive species or inappropriate uses.

Groundwater

As stated in the Existing Conditions section of this chapter, Charlestown has deep aquifer deposits that are capable of yielding large volumes of groundwater for water supply use. In 2015 the RI Water Resources Board purchased land in the Cross Mills section of Charlestown with state bond

money to “land bank” it as a possible future water supply source. If developed, this public water supply could potentially be used for other towns in Washington County. In 2017, the Town of Charlestown was also confronted with the possibility that groundwater from one of the aquifer deposits could be removed, trucked out of town and sold as a commodity. This possibility resulted from an agreement that members of the Narragansett Indian Tribe made with a company proposing to build a natural gas power plant in the Town of Burrillville to supply cooling water in the event that the agreement with the principal water supplier could not be executed.

Protecting land from development that may or may not someday become a source for public water is supported by the town, with conditions. One condition is that any such water drawn from the aquifer be returned to the groundwater (by means of on-site septic systems) and not transferred out of Charlestown and the watershed. This condition should be applied town-wide to prevent any property owner, public or private, from utilizing the groundwater as a commodity.

Another concern with the availability of public water is that it allows for greater densities than that with private wells; the presence of public water lines puts development pressure on the land areas that could connect to the water supply.

Wildlife and Plant Protection

Areas from the moraine to the beaches are also important nesting, feeding and resting areas for migratory songbirds, especially juveniles in the fall which require stopover areas before moving on. Migration of the barrier beaches impacts endangered nesting birds such as the piping plover and the least tern, as well as the shorebirds that feed there, especially during migration. Loud noise, bright lights and other intrusions can inhibit birds, and other species, from migrating, feeding, nesting and reproducing.

Fragmentation of habitat affects wildlife movement, reproduction and feeding. Wildlife corridors help to ameliorate this. Planning for such corridors is needed as future development removes or threatens habitat areas.

Invasive plants and diseases affect biodiversity and health. Planting native species that are more resilient and better adapted to local climate and soils helps to maintain food, shelter and habitat for wildlife. Monitoring of invasives is necessary to combat outbreaks.



Frances Topping Bird's Foot Violet

Narragansett Settlement Lands

The large majority of the Narragansett Settlement Lands is undeveloped or sparsely developed and includes the large wetland systems associated with Indian Cedar Swamp, Schoolhouse Pond and Deep Pond. Although 1,575 acres is to remain in conservation, the location of the 225 acres (25% of the private settlement area) that could potentially be developed has not been identified.

The land use plan developed in 1986 by what is now the RI Division of Planning was based upon an analysis of the environmental and infrastructure characteristics of the land and its suitability for development, including both residential and commercial, and for agriculture and conservation. The plan did not delineate actual development areas, only those areas suitable for development based on the land capability analysis. Implementation of the plan would require that the development area boundaries be specifically determined with site design and development standards developed, based on the objectives and preferences of the tribe, with the consent of the town. Cooperation and communication is needed between the town and the tribe to ensure that uses are compatible between both jurisdictions.

Regulation of New Development

Buffers for Wetlands and Water Bodies

In 2016, the Rhode Island Legislature approved a bill, signed by the governor, which required that municipalities include wetland buffers (the perimeter wetland) in the calculation of minimum lot area and in the area of a parcel when calculating the maximum number of lots (overall density) for the parcel. This means that municipalities which require that new lots have an area of suitable land, or land free from constraints, equivalent to the minimum lot area under zoning, can no longer require that wetland buffers be excluded from that minimum lot area. This bill was strongly opposed by Charlestown and a number of other towns that consider wetland buffers to be constrained land which should not be counted towards minimum lot area and density. The practical effect of the legislation is to allow additional development on certain parcels of land, specifically those parcels that have large areas of wetland. It also removed an aspect of local autonomy in determining residential density.

While development within a wetland buffer, or perimeter wetland, is still prohibited without state permit approval, this legislation draws attention to the need to continue to be vigilant in protecting natural features from development (see Land Use chapter). Buffers are needed to prevent runoff from entering streams and rivers, and to maintain water temperatures required by native aquatic species. Setbacks and buffers around vernal pools, in particular, are required to ensure survival of wetland species, ensuring longevity and viability when migration takes place.

Protection of the Dark Skies

Charlestown is protective of its dark skies, which are a special kind of natural resource, a rare spot of darkness along the New England coast. Its Dark Sky Lighting ordinance that regulates the installation of commercial outdoor lighting is intended to protect Charlestown's unique dark skies for astronomy purposes, and to protect residents, wildlife and the surrounding environment from the effects of light pollution. New lighting fixtures and installations compliant with the standards of the International Dark Sky Association are required.

Charlestown must continue to be sensitive to its dark skies; this includes staying abreast of the best lighting types that minimize light pollution and monitoring different wavelengths for their impacts on wildlife and people. It is also important to educate homeowners about the use of Dark Sky compliant fixtures and luminaires.

Regulation of Extractive Industries

Extraction operations can encompass a number of activities, including mining, quarrying, and the commercial extraction of loam, sand, gravel, stone or other earth materials, as well as the storage, stockpiling and sale of extracted earth material. It can involve use of equipment for crushing and processing procedures such as screening, sorting, washing, conveyance and loading.

New extractive industries are a prohibited use in the Town of Charlestown but there are a number of grandfathered sites in town that could have potentially negative impacts on the surrounding areas. Impacts that can affect people and wildlife and groundwater quality include truck traffic, dust and noise and stormwater runoff. There is a desire on the part of the town to mitigate the impact of active extraction sites on the environment and the quality of life of the neighbors, and to ensure proper restoration of the sites upon the completion of operations. In 2017 the town adopted an updated soil and earth removal ordinance, which applies to construction activities as well as sand and gravel extraction operations, and which addresses soil erosion control and stormwater management on these sites. The Town Council had also requested enabling legislation from the state legislature that would allow the town to regulate some activities at active extraction sites without adversely affecting current operations.

Conservation Design and Protections

Subdivision design that incorporates protection of open space and ensures maintenance of rural character is vital. Development plans should also take into account the constraints of available water, effluent disposal and natural resource protection, in addition to the constraints of the land itself with respect to blasting, clearing, slopes, wetland proximity and cultural and historic aspects. As development pressures increase, existing regulations may need to be re-evaluated, or new

regulations requiring alternate development techniques considered, so as to protect the environment and retain rural character.

Incorporating conservation design in the zoning and subdivision regulations that set standards for the protection of important site features and natural resources, and that contribute to an interconnected network of open space linking resource areas in adjoining subdivisions and/or providing vegetative buffers between new development and sensitive lands or developed neighborhoods, is needed. Natural resource protection should be a primary concern.



Frances Topping

Charlestown Farm with Land in Conservation Easement

Conservation easements are a method of maintaining land in open space or agricultural use by obtaining the rights to development. A land trust, conservation organization or municipality holds the development rights with future development prohibited by deed restriction. The organization that holds the conservation easement monitors the property and in some cases manages it as wildlife habitat, as farmland, for wood lots, etc. Conservation easements should identify all restrictions and address the placement of structures related to permitted uses, such as signage, nature blinds, accessory farm buildings, and even alternative energy facilities like wind turbines and solar panels.

Transfer of development rights (TDR) allows higher densities on receiving properties in compensation for lower densities (or no development at all) on donor sites. Transfer of development rights must be applied cautiously in Charlestown to avoid creating densities on receiving sites that exceed the carrying capacity of the land. These techniques are discussed in more detail in the Land Use chapter.

Prevention of Inappropriate Development

The environmental impacts of subdivisions and other developments allowed by zoning or state law are cumulative and can be measured town-wide only on a timescale of decades. Those impacts may go unnoticed in the short term unless one is an abutter to the development. Charlestown has experienced other, much more dramatic development proposals, where the potential negative environmental and social impacts have been easy for citizens to visualize. Three examples have come out of federal laws or actions: a nuclear power plant proposed for the shore of Ninigret Pond in the 1970's on surplus Navy land; a gambling casino proposed by the Narragansett Indian Tribal government in the 1990's; and most recently, a rail bypass proposed through the northern part of Charlestown by the Federal Railroad Administration in 2016. Each of these proposals have been about twenty years apart, but the threats to the environment has affirmed for each new generation that Charlestown is a town rich in natural and cultural resources and its citizens care very deeply about their protection.

Northeast Corridor Rail Improvement Project

In late 2016, the Town of Charlestown was made aware of a proposed long-range plan to upgrade the Northeast Corridor rail line by the Federal Railroad Administration. Within this corridor from Washington DC to Boston, the upgrades would have included an “Old Saybrook to Kenyon Bypass” consisting of new track that would realign and straighten the route from Old Saybrook, Connecticut, to the Kenyon area of Charlestown, with the stated goal of saving intercity commuter travel time.

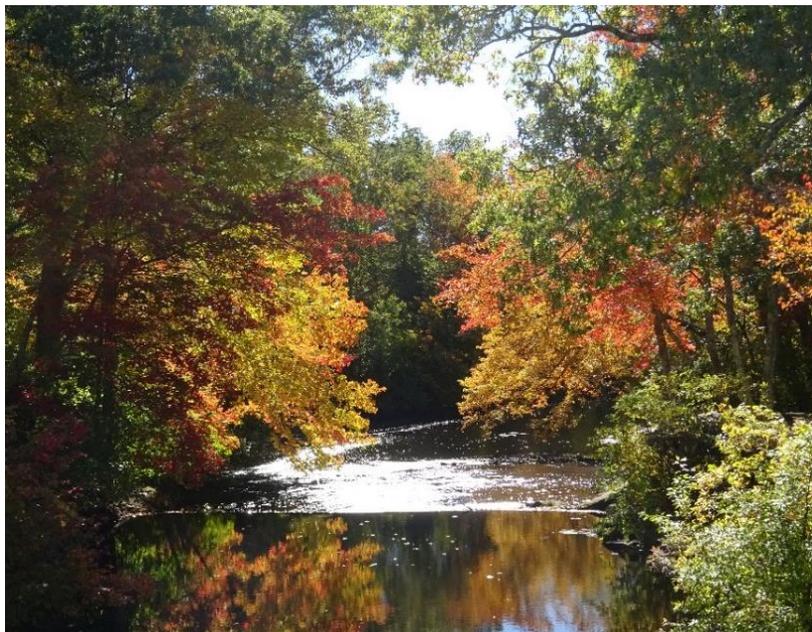
While maintaining the existing track, the bypass would have required 5.6 miles of new railroad track in Charlestown. Within this proposed rail corridor in Charlestown are the following: dozens of homes; three historic mill villages, including Burdickville (in Hopkinton), Columbia Heights and Kenyon; active and historic farms, including the Amos Greene Farm and Stoney Hill Farm; Narragansett Settlement Lands; 17 private open space properties; the Francis C. Carter Memorial Preserve owned by The Nature Conservancy; and an archived Superfund site which was once the location of a nuclear processing facility.

The proposed rail bypass would pass through an east-west corridor of open space that spans nearly the width of Charlestown. This section is part of an 11 mile north-south corridor of open space that extends from the Ninigret National Wildlife Refuge at the ocean, north through the state-owned Burlingame Management Area and Narragansett Settlement Lands, through the Francis C. Carter Memorial Preserve, and then connecting with the Carolina Wildlife Management Area in Richmond, RI. The east-west corridor also provides more wildlife and potential recreation access to the Pawcatuck River. The proposed bypass would impact the wildlife corridor from the Atlantic Ocean to Richmond and beyond.

In addition, the bypass would cross the Pawcatuck River, designated by Congress as a Wild and Scenic River, and lie entirely within the land management area of the recently established US Fish and Wildlife Great Thicket National Wildlife Refuge and the EPA designated Wood-Pawcatuck Sole Source Aquifer.

Opposition to the bypass was overwhelming in both Connecticut and Rhode Island. Opposition in Rhode Island included the governor, the entire congressional delegation, the Narragansett Indian Tribe, officials in all neighboring towns and others in a number of towns throughout the state, numerous conservation and cultural organizations, and hundreds of individual property owners and citizens. As a result, the Federal Railroad Administration released a Record of Decision in July 2017 withdrawing the proposed bypass project. However, the original proposal shows the willingness of some federal agencies to transform the community in direct conflict with the goals and policies of the comprehensive plan, in particular those related to protection of natural resources.

To protect farms, forests and open spaces from future proposals such as the rail bypass and other actions, Charlestown needs to make its open space and conservation information more public and place it more prominently. Parcels such as the Francis C. Carter Memorial Preserve, and all state- and town-protected lands should appear on state maps where they can be indexed by search engines such as Google and Bing. The Wild and Scenic River designation for the Pawcatuck River should also be identified as such on state maps. As the town creates maps of open space, river and shoreline access points, and historic buildings and sites, it should work to get this same data included in other public databases such as those maintained by Google and others.



Frances Topping Wild and Scenic Pawcatuck River

NATURAL RESOURCES: GOALS, POLICIES AND ACTIONS

GOALS

- Goal 1** Permanently protect critical natural resources.
- Goal 2** Ensure that Charlestown’s natural resources will sustain the community for the foreseeable future.
- Goal 3** Create a network of corridors and greenways that will preserve natural resources, protect scenic landscapes and shape growth.

POLICES AND ACTIONS

The following policies and actions have been developed to implement the goals and objectives of this chapter.

- Goal 1** Permanently protect critical natural resources.

Charlestown desires to protect the natural resources that define its character and way of life. These include wetlands, rivers, streams, lakes and ponds, forested lands, aquifers, wildlife habitats, native plant communities, dark skies, scenic vistas and the salt ponds.

- Policy 1.1** Continue to acquire and protect open space areas that preserve important natural resources.

- Action 1** Identify and rank open space land that provides for critical resource and habitat protection.
- Action 2** Assess the value of municipal property and tax sale parcels as permanent open space or conservation areas.
- Action 3** Continue to collaborate/partner with various agencies and organizations such as US Fish and Wildlife Service, RI Department of Environmental Management, The Nature Conservancy, Rhode Island Audubon Society and private developers (through the land development process) regarding open space acquisition and conservation.

- Policy 1.2:** Protect natural resources through zoning and subdivision regulations and the development review process.

Action 1 Make use of flexible land use management tools to provide alternatives to conventional development in a manner that protects important natural resources such as water bodies, significant vegetation and wildlife habitats, from potentially negative development impacts:

- a. Allow for conservation design and development as an alternative to, or in addition to, mandatory cluster;
- b. Revise the zoning and subdivision regulations to ensure that impractical lots are not created, and that impacts on wetlands and other natural features are avoided or minimized by reviewing and strengthening lot design standards; and
- c. Require the installation or preservation of vegetative buffers or increased setbacks.

Action 2 Provide for the permanent protection of wetlands as part of the land development and subdivision review process:

- a. Require peer review for all major developments, particularly those involving new road construction, on parcels with significant areas of wetlands;
- b. Require minimum areas of contiguous upland when creating new lots on parcels with significant areas of wetlands or other severe constraints;
- c. Require wetland and buffer areas to be within protected open space areas to the extent possible;
- d. Demarcate wetland edges with permanent markers to protect the wetland resource area from alteration/use and incremental deterioration; and
- e. Require that restrictions on use of wetland resource areas be included on the deeds to the new or impacted parcels.

Action 3 Preserve the Pawcatuck River corridor as both a scenic resource and wildlife habitat area through the establishment of zoning regulations to control the placement and scale of development along the river.

The Pawcatuck River is now designated as a Wild and Scenic River. However, federal designation does not prohibit development or otherwise control private property along the river. Following the completion of a management plan by the

National Park Service, the town should establish development controls, in the form of a zoning overlay district.

Action 4 Periodically review all town regulations that are in place to protect natural resources in order to ensure effectiveness and that all standards are up to date. These include but are not limited to:

- a. Dark sky ordinance;
- b. On-Site Wastewater Management System (OWTS) regulations;
- c. Groundwater protection district;
- d. Soil erosion and sedimentation control ordinance;
- e. Energy siting regulations; and
- f. Noise ordinance, particularly as it relates to protecting wildlife

In particular the Dark Sky Lighting ordinance should be reviewed to ensure that it reflects current scientific understanding of the impacts of blue light on both humans and wildlife, and includes recommended lighting standards to mitigate these impacts.

Action 5 Consider adoption of a transfer of development rights (TDR) ordinance to provide for the conservation of land in rural and undeveloped areas of town while encouraging appropriate density of development in village centers, including Cross Mills, Carolina, and Shannock.

Goal 2 **Ensure that Charlestown’s natural resources will sustain the community for the foreseeable future.**

Policy 2.1 **Provide long-term preservation and conservation of natural resources through proper management by town administration.**

Action 1 Consider establishing a position in town to monitor and manage protected open space, either as an employee or person or entity under contract.

A Charlestown Land Steward or Natural Resources Manager could assist in the long term protection of natural resources by undertaking the following duties, in conjunction with appropriate town departments, state agencies and land owners:

- a. Developing and updating management plans for town open space and conservation areas;
- b. Regular monitoring of publicly owned natural resource sites;

- c. Regular review and inspection of private areas on which the town has easements for the purposes of protecting open space, managing habitat and maintaining stormwater systems;
- d. Developing a system to monitor DEM and CRMC permits, both wetland and stormwater permits, so as to identify areas of wetland disturbance and stormwater impacts, and to provide awareness regarding compliance with local and state approvals and conditions; and
- e. Keeping up to date on state regulations regarding land development and constraints, and advocating for the preservation of local land use control.

Action 2 Maintain a current database of all critical natural resource areas, including a listing of parcels and GIS maps of the following:

- a. All conservation lands and protected open space areas;
- b. Critical habitats of federal- and state-listed rare, threatened and endangered species, both plant and animal;
- c. Wetland areas, including forested, shrub and emergent; and
- d. Any other significant natural resource areas.

Action 3 Review state maps and other databases to ensure that all publicly-owned protected lands, river and shoreline access points, and historic buildings and sites appear on the maps and in databases.

Action 4 Consider the establishment of a water source protection ordinance which requires that water drawn from aquifers within Charlestown remain within the watershed and prohibits the withdrawal and sale of groundwater as a commodity.

Policy 2.2: **Work with state and federal agencies, and private conservation organizations, and with neighboring communities and the Narragansett Indian Tribe to protect shared natural resources and achieve compatibility in open space acquisitions and land use decisions.**

Action 1 Support efforts by other agencies and organizations to monitor, evaluate and implement programs to improve water quality and habitat in the fresh water bodies and salt ponds of the town. These include:

- a. The University of Rhode Island Watershed Watch Program in monitoring phosphate/potassium contamination from septic systems;
- b. The Wood-Pawcatuck Watershed Association water quality monitoring at freshwater sites in the watershed;
- c. The Salt Ponds Coalition surface water quality sampling from the salt ponds;
- d. The US Army Corps of Engineers, RI DEM and RI CRMC to oversee and fund dredging of the breachways to ensure adequate flushing of the salt ponds; and
- e. US Fish and Wildlife Service, US Army Corps of Engineers, and RI DEM to restore habitats and water quality of the salt ponds.

Action 2 Coordinate land acquisition efforts, including identifying priorities and sharing information and resources, and funding, with the Charlestown Land Trust, RI DEM and The Nature Conservancy.

Action 3 Work with the Narragansett Indian Tribe and the neighboring communities to protect shared natural resources.

These resources include not only open spaces and forests, but the aquifers that provide potable water to both the tribe and the residents of Charlestown. Use of these common resources should be based on open communication and mutual understanding.

Policy 2.3 Promote appreciation for and proper use of natural resources by residents and visitors through public education.

Action 1 Educate those who enjoy the town’s abundant open space areas on appropriate use in order to protect natural resources and habitats by developing and distributing public informational brochures.

Action 2 Publicize forested and natural areas in town that are available for passive recreation and nature study through various organizations and media, including the Chamber of Commerce and the town website.

Action 3 Maintain and update town efforts, specifically under its Stormwater and Wastewater Management Programs, to educate homeowners on the following:

- a. Proper septic system maintenance;

- b. Proper use of fertilizers in general, to lessen impact on water bodies throughout town, but particularly in the salt ponds watershed;
- c. Ecologically sensitive landscaping; and
- d. Managing pet waste

Goal 3 **Create a network of corridors and greenways that will preserve natural resources, protect scenic landscapes and shape growth.**

Policy 3.1 **Integrate efforts related to acquisition of land, allocation of funds and review of land developments to achieve this network of open space and conservation areas.**

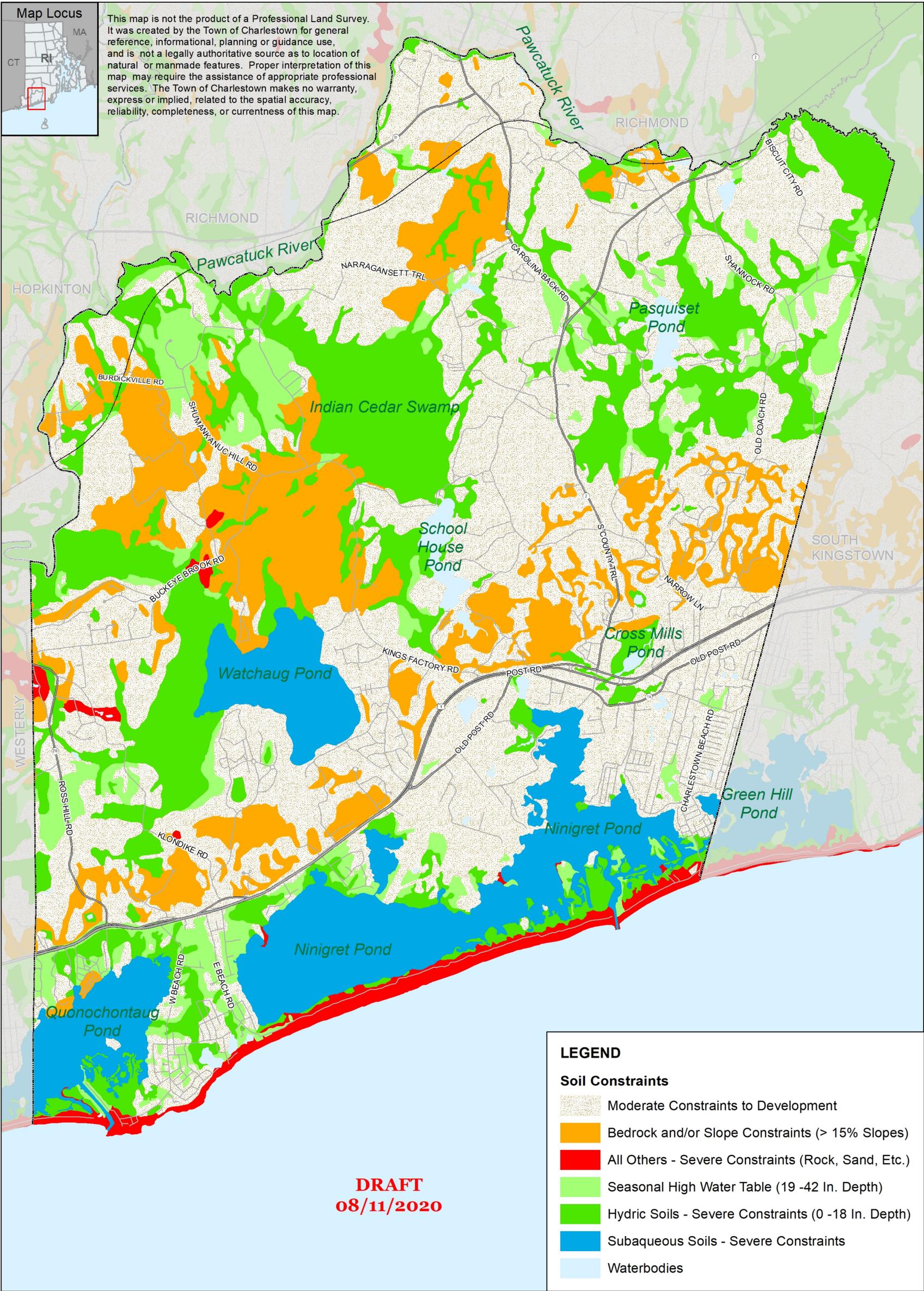
Action 1 Make an interconnected network of conservation land a priority in protection and conservation of open space.

Action 2 Apply for grants from potential federal, state and private sources to acquire, promote access to and educate the public regarding Charlestown's natural resources and habitat areas.

Action 3 Maintain a natural resources map, develop plans and undertake site visits to identify resources that should be permanently protected from development.



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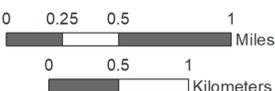
DRAFT
08/11/2020

LEGEND

Soil Constraints

-  Moderate Constraints to Development
-  Bedrock and/or Slope Constraints (> 15% Slopes)
-  All Others - Severe Constraints (Rock, Sand, Etc.)
-  Seasonal High Water Table (19 -42 In. Depth)
-  Hydric Soils - Severe Constraints (0 -18 In. Depth)
-  Subaqueous Soils - Severe Constraints
-  Waterbodies

Map Sources:



TOWN OF CHARLESTOWN
RHODE ISLAND



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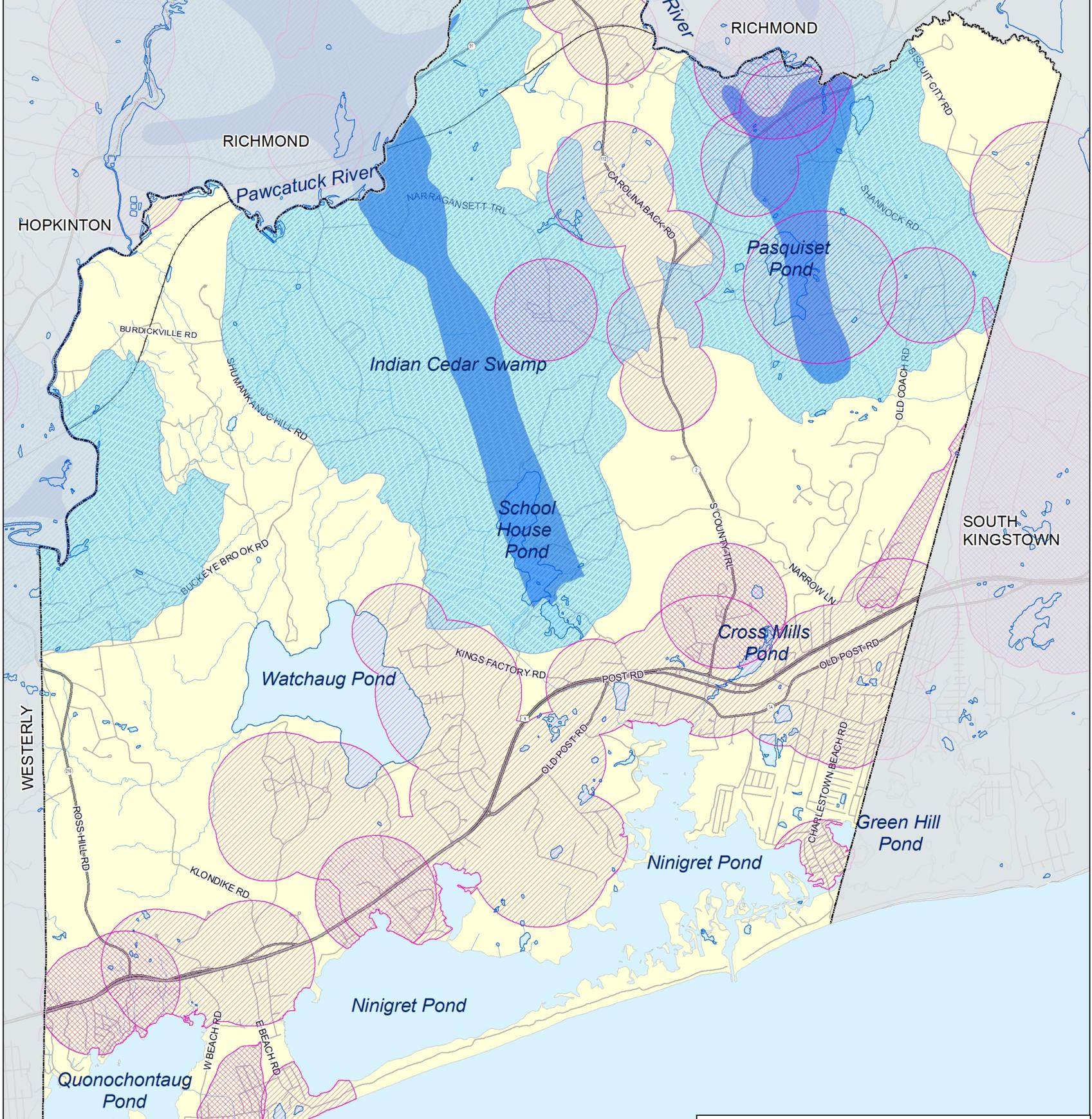
COMPREHENSIVE PLAN, 2020

**SOIL CONSTRAINTS
TO DEVELOPMENT**

MAP NR-1



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LEGEND	
	Groundwater Reservoirs
	Groundwater Recharge Areas
	Community Wellhead Protection Areas
	Non-Community Wellhead Protection Areas
	Lakes & Ponds
	Rivers & Streams

Map Sources:



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GROUNDWATER



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LEGEND

- Major Watershed Boundary
- Light Blue Box: Lakes & Ponds (A, B = Water Quality Class)
- Blue Line: Rivers & Streams (A, B = Water Quality Class)
- Light Blue Box: Wetlands

Coastal Resources Management Council (CRMC)
Water Use Types:

- 1 Conservation Area
- 2 Low Intensity Use
- 4 Multi-Purpose Water

Map Sources:



0 0.25 0.5 1 Miles

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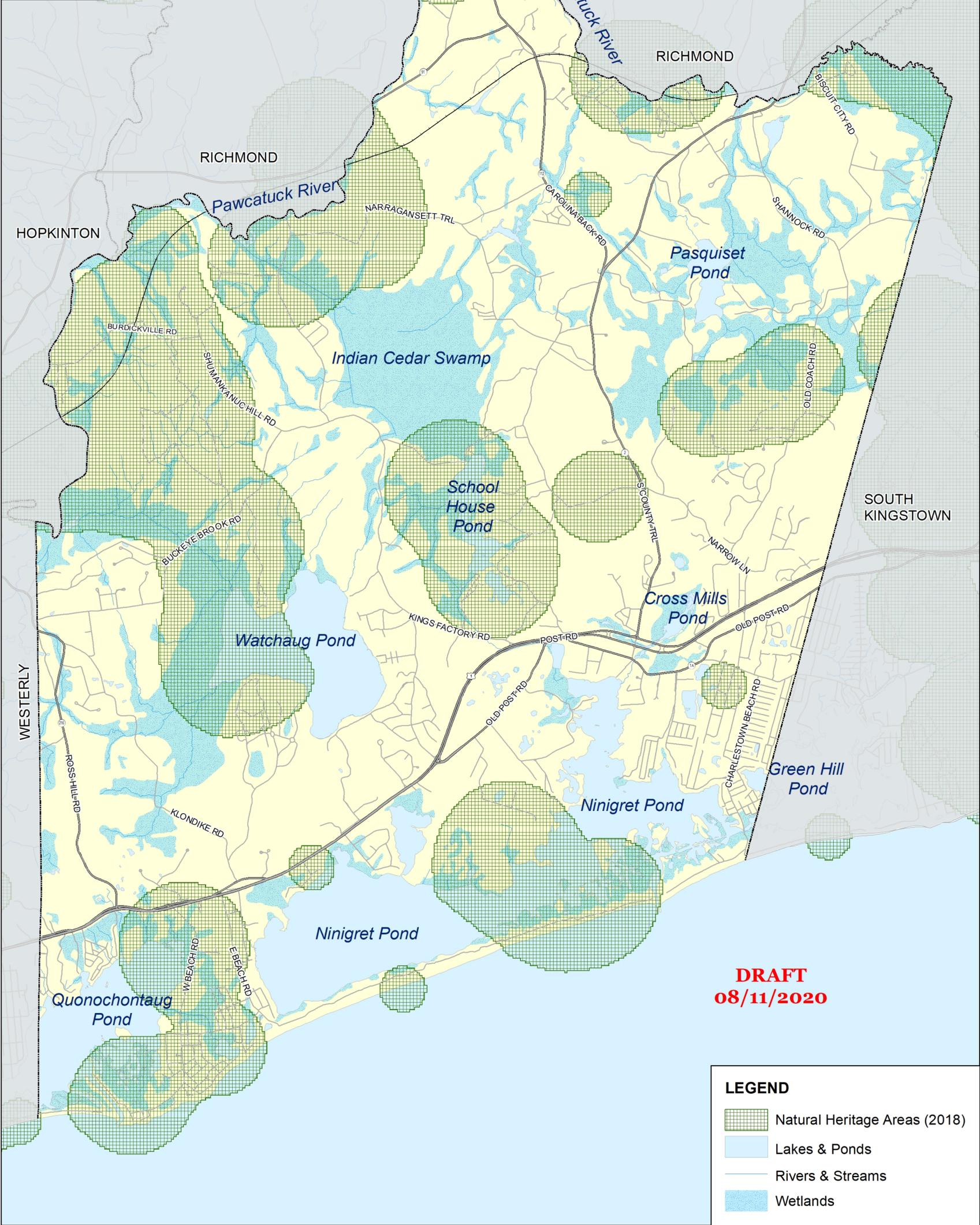
COMPREHENSIVE PLAN, 2020

**SURFACE WATER
AND WETLANDS**

MAP NR-3



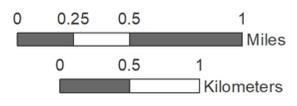
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LEGEND	
	Natural Heritage Areas (2018)
	Lakes & Ponds
	Rivers & Streams
	Wetlands

Map Sources:



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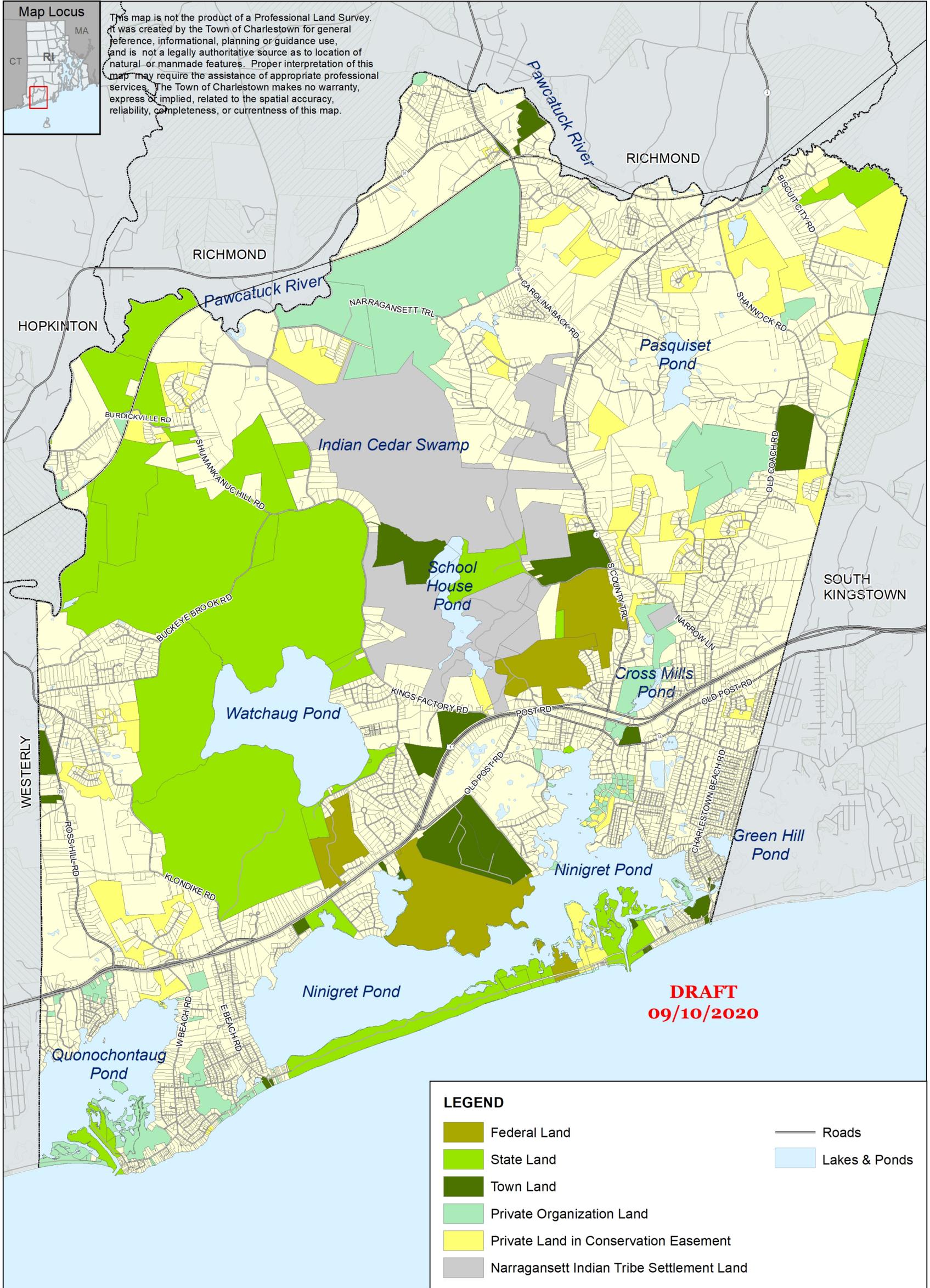
COMPREHENSIVE PLAN, 2020

**NATURAL HERITAGE
AREAS**

MAP NR-4



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DRAFT
09/10/2020

LEGEND

- Federal Land
- State Land
- Town Land
- Private Organization Land
- Private Land in Conservation Easement
- Narragansett Indian Tribe Settlement Land
- Roads
- Lakes & Ponds

Map Sources:



0 0.25 0.5 1 Miles

TOWN OF CHARLESTOWN
RHODE ISLAND



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COMPREHENSIVE PLAN, 2020
CONSERVATION
AND
OPEN SPACE AREAS

MAP NR - 5