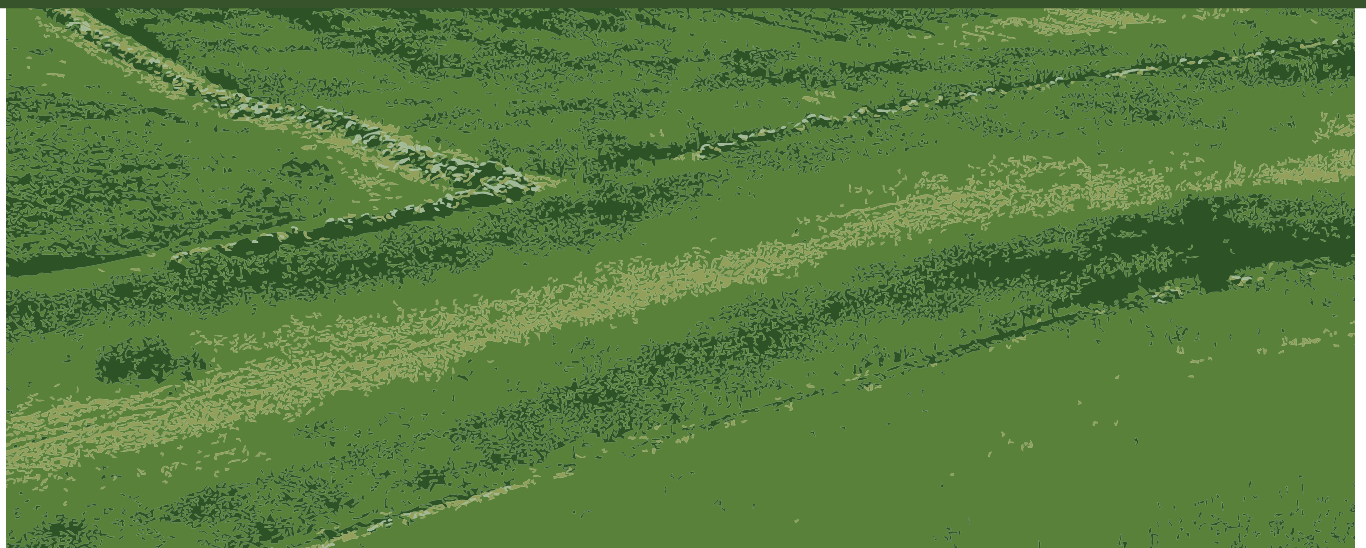


SECTION 3

DARTMOUTH'S LANDSCAPE



Chapter 7 | Natural and Cultural Resources

An inventory of natural and cultural resources. Stewardship strategies.

Chapter 8 | Open Space and Recreation

An inventory of open space and recreation lands. Goals for future preservation.

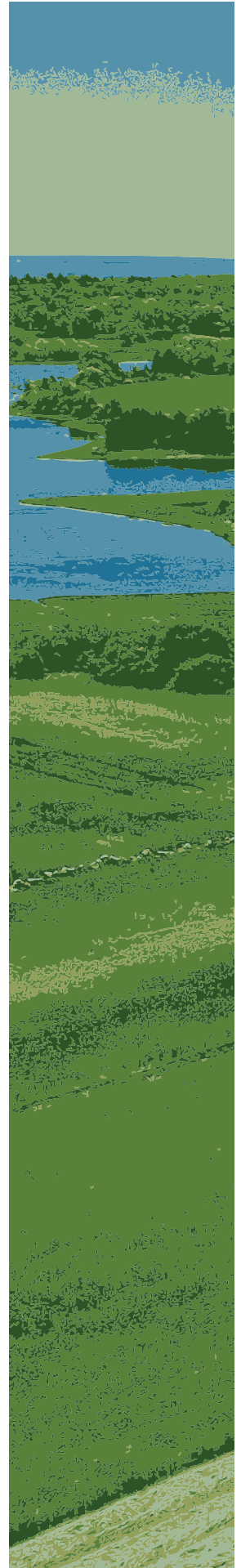


CHAPTER 7

NATURAL & CULTURAL RESOURCES

Dartmouth, like every community, is fundamentally built on top of a natural landscape. While technology has advanced and allowed new techniques for building and development in challenging locations, our human communities are still fundamentally tied to natural resources for drinking water, raw materials, food production and clean air. Our communities are also deeply affected by natural phenomenon like hurricanes, intense storms, and drought. Climate change, which is addressed in greater detail in Chapter 11, and all of its attendant consequences are layered on, expanding the scale and magnitude of natural variation in the future.

This Master Plan Chapter considers Dartmouth's natural resources, and the elements of it that our human communities alter with development. Working with the inherent resilience built into nature is beneficial to both the human and natural communities upon which we rely. Dartmouth's history and culture have evolved within these natural landscapes, which continuously shape the town through today. This element recognizes those connections and examines Dartmouth's cultural and historical resources, together with its natural resources.





KEY NATURAL & CULTURAL RESOURCES PLANNING DATA

Dartmouth's Land Features

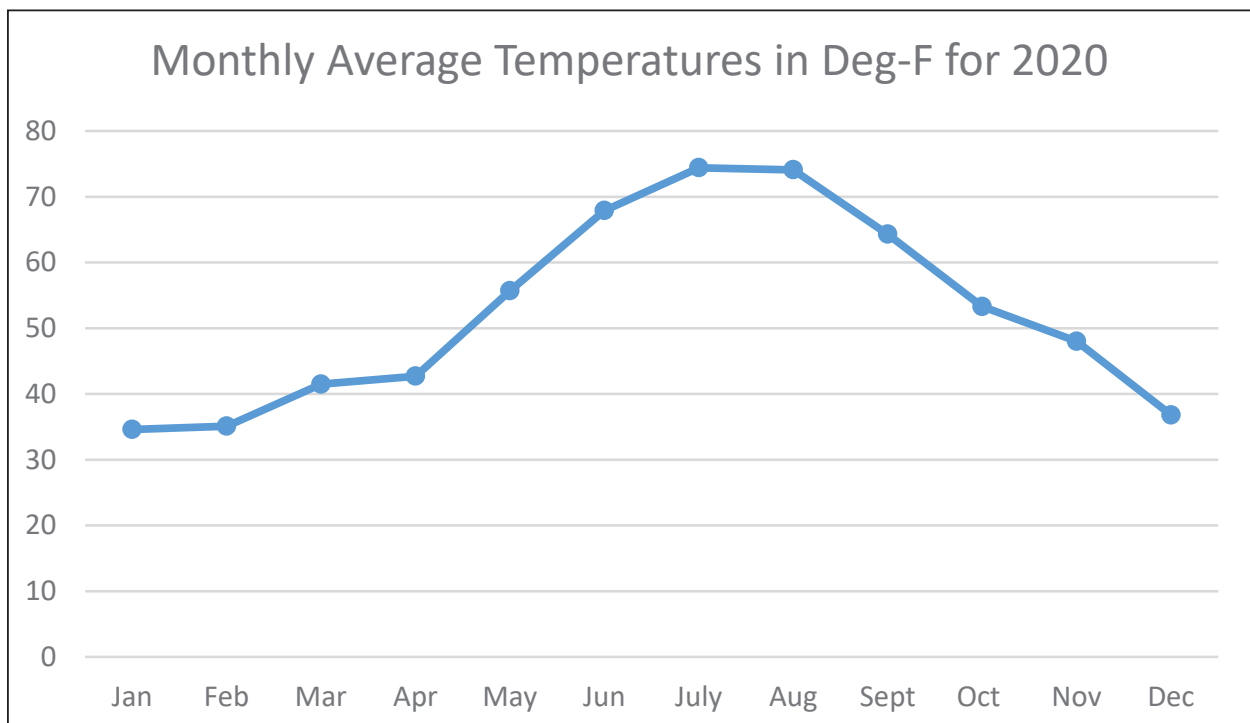
Geology & Topography

Dartmouth occupies a land area of 61.53 square miles with elevations ranging from 252 feet at Yellow Hill in the northwest corner of the Town to sea level on the 47 miles of tidal shoreline along Buzzards Bay. This topography is typical of southeastern Massachusetts in that it is a mixture of gentle slopes, flat areas with rich agricultural soils, and a continually-evolving coastline.

Climate & Rainfall

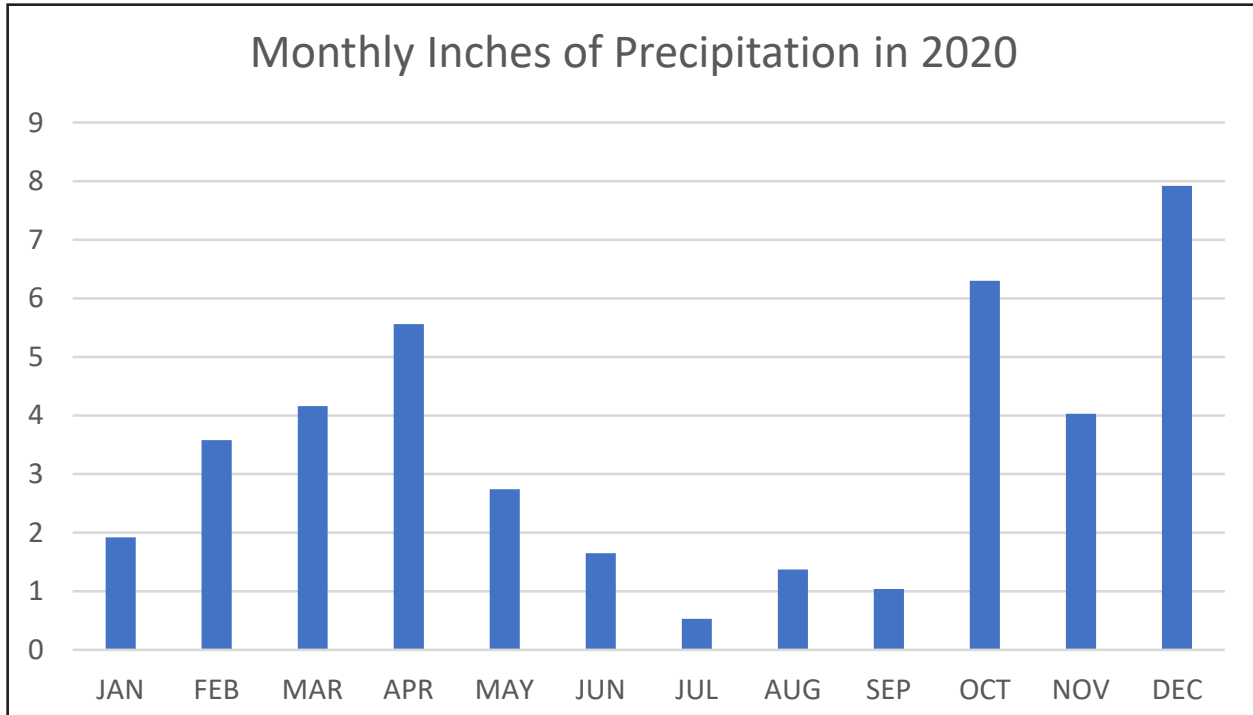
Dartmouth's climate is moderated by its coastal location. In recent centuries, Dartmouth has experienced distinctive seasons, with warm summers and cold winters. Most precipitation has historically fallen in the spring and winter, with warmer periods in the summer and fall seasons receiving less precipitation. In 2020, monthly average temperatures (including nighttime temperatures) were at a low in the month of January at 34.6°F, and at a high in July at 74.4°F. A total of 40.8" of precipitation fell in 2020, with particularly large amounts of precipitation in December, October and April. July saw only half an inch of rainfall.

Figure 7.1: Monthly Average Temperatures in Degrees Fahrenheit, 2020



Source: www.weatherwx.com

Figure 7.2: Monthly Inches of Precipitation, 2020



Source: www.weatherwx.com

General Soils

Dartmouth's soils generally consist of the Paxton-Woodbridge-Whitman association. They are characterized by nearly-level to moderately-steep slopes that are well-drained, moderately-well-drained, and very-poorly-drained on glacial uplands. In addition, there are large areas of wetlands containing Freetown and Swansea soils. This soil is mucky, poorly-drained, level, and deep: a more in depth analysis of Dartmouth's wetlands are described below).

Soil characteristics influence an area's suitability for different uses. The soil's porosity, erodibility and even its depth invariably dictate whether or not a site may be appropriate for construction of homes, infrastructure, agriculture, preservation, or recreation. In some undeveloped areas of Dartmouth, soil conditions may, themselves, prohibit development. Other remaining upland areas of Dartmouth will probably support today's new Title V septic systems. The remaining undeveloped areas are probably limited by bedrock, wetlands, coastal dunes, barrier beaches, seasonal high water tables, and perched water tables. Outdoor recreational facilities could be sited on some of these areas using composting toilets and non-nitrogen loading soil additives. Passive recreation-nature trails, swimming, boating and fishing could be encouraged.



Soils of Unique Importance

Agricultural activity remains a prominent feature of life in Dartmouth, and is supported by an active Agricultural Commission as well as a Right-to-Farm bylaw within the Town's general bylaw. The practice of agriculture in Dartmouth is made possible by the presence of soils that support the growth of agricultural products. The Natural Resources Conservation Service (NRCS), an agency of the federal government, has prepared soils maps across the country, and as part of that effort, classified those soils that are of primary importance to supporting agriculture and food production.

In Dartmouth, 14,711 acres of land across the town have been identified as soils of prime farmland or as farmland of statewide importance. However, this mapping considers the quality of soils only, and does not automatically incorporate what is currently constructed overtop of it. Of the 14,711-acres of soils significant for agriculture in Dartmouth, 2,883 are covered with impervious surfaces like roads, buildings, and pavement. Of the remaining 11,828 acres, only 18% (2,135 acres) are contained within parcels that are assessed as active agricultural food productive uses.

Water Resources

Watersheds

A watershed is an area of land that drains to a common waterbody. Much like the peak of a roof of a house directs rainfall that falls on either side of it to a specific gutter and downspout, watershed extents are defined by peaks and topography of the land that causes water to drain in a specific direction, toward a specific lake, river, and ultimately, ocean. Watersheds occur at different scales. A major watershed for a large waterbody, such as Buzzards Bay, contains multiple sub-watershed land areas that drain to specific waterbodies within the major watershed.

The entirety of Dartmouth is located in the Buzzards Bay major watershed, meaning that water flowing through all the land in town ultimately drains into Buzzards Bay. The Buzzards Bay watershed encompasses all or part of 13 municipalities and drains approximately 432 square miles of land, including lakes, rivers, streams, wetlands, and groundwater.

There are significant portions of seven sub-watersheds within the Town of Dartmouth:

1. The Allens Pond / Westport River watershed;
2. The Shingle Island / Noquochoke watershed;
3. Outlet draining directly to Buzzards Bay;
4. Acushnet River;
5. The Apponagansett Bay watershed - at 5,342 acres in size, it is over 80% developed;
6. The Little River watershed - at 1,842 acres, contains a great deal of undeveloped land, much of which is permanently protected through Conservation Restrictions, DNRT and Conservation Commission ownership, and Agricultural Preservation Restrictions; and

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7. The Slocums River/Paskamansett watershed, which is among the largest of the embayment watersheds to Buzzards Bay, encompassing 23,636 acres. Upper parts of the Slocums River/Paskamansett watershed are located within New Bedford and Freetown. Much of the watershed is forestland, despite its central region being dominated by heavy commercial development along State Road / Route 6.

The Little River, Slocums, and Apponagansett watersheds have a direct impact on the water quality of Apponagansett Bay, Little River and Slocums River and Buzzards Bay as a whole. Nutrient overloading within the watershed can cause poor watershed health through a process called eutrophication. Eutrophication occurs when there are excess amounts of nutrients, mainly nitrogen, which stimulates the growth of plants (algae and phytoplankton). Too much algae blocks sunlight to eelgrass, reducing the area of valuable nursery habitat and feeding ground and creating low oxygen conditions. Poor water clarity, bad odors, stressed marine organisms and fish kills are all symptoms of eutrophic conditions.

While they may seem remote from end-point receiving waters, the characteristics and quality of upland land areas that drain water through the watershed influence watershed health. Natural resource preservation in key areas helps with several essential watershed functions. For example, protecting vegetation in a watershed preserves the porosity of the soil, which increases water infiltration into the ground. Water that is able to infiltrate immediately generally carries less pollutants that runoff over impervious surfaces, thus maintaining cleaner water for aquatic organisms. Good infiltration rates also recharge town wells, especially in mapped aquifer recharge areas. Dartmouth has several regulations in place that help to maintain watershed health, including the Aquifer Protection Overlay District, and town stormwater regulations for new development. Further protection of open space and implementation of smart growth management measures within sub-watershed areas will complement and enhance these existing regulations, protecting Dartmouth's water supply and improving the condition of Apponagansett Bay, Little River and Slocums River.

Buzzards Bay and Other Coastal Features

Buzzards Bay is a moderately large estuary approximately 228 square miles in size located in Southeastern Massachusetts between the western most portions of Cape Cod and Narragansett Bay in Rhode Island. This unique estuarine environment provides habitat for numerous plant and animal species. The Bay's 280 miles of coastline offers a wealth of diverse habitat, including salt marsh, eelgrass beds, and tidal flats, which are essential to the marine life in and around the bay. Ironically, the bay itself was named after a large bird, identified as a "buzzard", which the early colonists saw frequenting the shoreline along the bay. In actuality, the large "buzzard" was really an Osprey. Buzzards Bay was designated "estuary of national significance" in 1988.

Along the Buzzards Bay shore is the Nonquitt Marsh, an extensive saltwater marsh entirely protected by the Dartmouth Natural Resources Trust (DNRT) and the Incorporated Proprietors of Nonquitt. With funding from the New Bedford Harbor Trustees Council, the Nonquitt Marsh Restoration Project restored tidal flushing to the more than 87 acres of marsh located in Nonquitt through the replacement of undersized culverts with three large box culverts. The restoration greatly increased the habitat value, species diversity, and biological productivity of the marsh and is helping to restore the natural exchange of nutrients between the marsh and Buzzards Bay.



In the southwestern corner of Dartmouth is an exceptionally and environmentally sensitive area known as Allens Pond. Allens Pond is recognized by the US Fish & Wildlife Service as one of the most significant coastal habitats in Southern New England. Dartmouth’s Wetland Zoning provisions and the Massachusetts Audubon Society protect the surrounding saltmarsh and barrier beach, but additional steps, including the acquisition of more land, will have to be pursued if this valuable basin is to be retained in its natural state. To that end, in 2017, DNRT in partnership with Round the Bend Farm and the Buzzards Bay Coalition acquired the 60-acre Ocean View Farm Reserve, which is on Allens Pond adjacent to The MassAudubon Wildlife Sanctuary.

One consistent data source for water quality in these and other coastal waters in and around Dartmouth comes from the Buzzards Bay Coalition’s Baywatcher’s Program. Volunteers regularly sample and collect data from saltwater harbors, coves, salt ponds, and tidal rivers throughout Buzzards Bay. Each waterway is assigned a score between 100 and 0, with 0 representing severe nitrogen pollution, low dissolved oxygen, poor water clarity, and/or high algal pigments, and 100 representing pristine water. The Bay Health Index is only calculated when there is data for at least three of five indicators, and only for saltwater waterbodies.

There are 23 sampling stations across Dartmouth. The following chart shows the current water quality rating at each of the salt water stations where adequate data is available at present:

Figure 7.3: BBC Baywatcher Program Water Quality Score for Waterbodies in Dartmouth

| Waterbody | Bay Health Index Score (5-Year Average) |
|--------------------------|---|
| Allens Pond | 41 = fair, representing some improvement |
| Inner Apponagansett Bay | 29 = poor, consistent over time (since 1992) |
| Middle Apponagansett Bay | 48 = fair, consistent over time |
| Outer Apponagansett Bay | 54 = fair, consistent over time |
| Inner Clarks Cove | 65 = fair, decrease from over 80 in 1995 but now up trend |
| Outer Clarks Cove | 66 = good, decrease from over 80 in 1995 but now up trend |
| Inner Little River | 34 = poor, small improvement over time |
| Outer Little River | 45 = fair, declines in recent years |
| Nonquitt Marsh | 50 = fair, improvement since 2004 when score below 10 |
| Salters Pond | 30 = poor, steady since 2016 |
| Inner Slocums River | 30 = poor, steady over time |
| Outer Slocums River | 55 = fair, some improvement |
| Slocums River - Head | 8 = poor, high of 20 in 2014 but down again since |

Source: Buzzards Bay Coalition Baywater Program Website: <https://www.savebuzzardsbay.org/about-us/programs-workshops/baywatchers/>

APPONAGANSETT BAY

Apponagansett Bay serves as the Town’s harbor for commercial and recreational boating. It is divided by the Padanaram causeway and bridge, which dates back to 1830. These structures have the effect of dividing the bay in two – the inner bay to the

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north of the causeway, and the outer bay to the south. The waters of the inner bay are confined by the causeway structures, with less opportunity for “flushing,” also referred to as the natural water exchange that would occur between Apponagansett Bay and Buzzards Bay. This limited exchange of water between the inner and outer portions of Apponagansett Bay caused it to be one of the most nutrient overloaded embayments in Buzzards Bay.

A 2015 report, “Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Thresholds for the Apponagansett Bay Estuary, Dartmouth, MA,” written by the Massachusetts Estuaries Project (MEP) with local, state and federal agency contributions, found that each acre of estuary receives contributing nutrients from 15 acres of land area. With substantial nitrogen inputs, one major ecological threat to the inner bay is eutrophication resulting from nutrient over-enrichment. The nutrient issue in Apponagansett Bay results from a combination of factors. The MEP report lists four principal sources: onsite disposal of wastewater in areas not served by the municipal wastewater systems of Dartmouth and New Bedford; storm water runoff containing nitrogen; residential and agricultural fertilizer use; and atmospheric deposition of nitrogen compounds on the land and water surface.

Aside from nutrient overloading described in the paragraph above, the Bay faces polluting influences from bacteria. The major freshwater inflow to Apponagansett is from Buttonwood Brook, which is the primary surface water transport of fecal coliform into the inner bay, possibly stemming from uses upstream such as the Buttonwood Park Zoo and other wastewater related factors. This contamination causes shellfishing beds to be closed within the inner bay.

Because the Apponagansett watershed is over 80% developed, nitrogen management options focus on cleaning up Buttonwood Brook, improving existing wastewater and storm water management systems that discharge to the bay, and managing tidal exchange. The MEP report referenced above was developed in order to help establish a formal designation for controlling nitrogen loads into the Bay called a Total Maximum Daily Load (TMDL), which, once developed by MassDEP, sets a target threshold and implementation actions for reducing the amount of a target pollutant entering a designated waterbody. A TMDL issuance from MassDEP had yet to be developed (see the section below on impaired waterbodies for additional details).

CLARKS COVE

The Clarks Cove area similarly contributes to Dartmouth’s shoreline resources. This cove, lying between New Bedford and Dartmouth, was very badly polluted until recently when pollution levels dropped and New Bedford and Dartmouth were both able to reopen their shellfish beds. Heavy rains have an adverse effect on water quality in the cove resulting in closure to both shellfishing and swimming activities. The Conservation Commission received grant money from the Buzzards Bay Project to perform a storm water remediation study and design for fecal coliform pollutants within the Rogers Street storm drain.

Dartmouth’s wetlands, both coastal and inland, are protected by the Massachusetts Wetlands Protection Act (MGL c.131 sec. 40) and the Dartmouth Wetland Protection By-Law. Key wetland areas include Deerfield Swamp, Acushnet Cedar Swamp, Shingle Island Swamp, Allens Pond, and Apponagansett Swamp. Most of the inland (fresh water) wetlands in Dartmouth, including Shingle Island and Apponagansett Swamp, border the town’s major rivers and streams, including the Paskamansett River,



Destruction Brook, Shingle Island River and the Copicut River. The undeveloped swamps and forests along these inland rivers and streams together form two broad and nearly continuous green belts extending northward from Buzzards Bay to the Fall River and New Bedford borders.

Rivers

THE PASKAMANSETT RIVER

The Paskamansett River is one of the most valuable of all the local natural resources. It begins at Turner's Pond, adjacent to the State-owned Acushnet Cedar Swamp in New Bedford. It then flows southerly through broad wetland areas to an old mill pond in the Smith Mills commercial area. The river then follows a well-defined channel for about a mile before flowing into a large wooded swamp for two more miles. Between Russells Mills Road and a second mill pond in Russells Mills village, the stream is again well defined, with patches of white-water rapids. South of Russells Mills, the stream becomes subject to tidal action, and is known as Slocums River.

The Paskamansett River has historically supported a population of river herring. In October of 2000, the Dartmouth Conservation Commission completed the Paskamansett River Fishway Restoration Project to correct design flaws to the fishway at the dam near the head of the tide at Russell's Mills. In 2001, many more herring were observed entering the ladder than had been observed prior to the restoration.

THE SLOCUMS RIVER

The Slocums River estuary flows nearly three miles through sparsely developed farm and woodlands. At its entrance into Buzzards Bay the Little River, another tidal estuary of similar scenic beauty, joins it. The Destruction Brook is a significant tributary to the Slocums River. This short but scenic stream originates in Deerfield Swamp, and flows through undeveloped farmlands and woodlands past an abandoned grain mill to join the Slocums near the Town Park in Russells Mills. Destruction Brook supports extensive wildlife and was once Dartmouth's only fresh water hatchery for Alewife. Water quality is exceptionally high in this brook. In 2009 and 2013, DNRT acquired a 29-acre parcel on Slocum's River at the mouth of Peter's Creek – the Peter's Creek Reserve. The Reserve contains three habitats (salt marsh, small islands and riparian forest) identified by the Commonwealth's Division of Fish and Game's State Wildlife Action Plan as being in the "greatest need of conservation," and builds on a network of adjacent and cross-river conservation land at the Hawes-Wadsworth, Grosswendt, and Slocum's River Reserves.

SHINGLE ISLAND—COPICUT RIVER SYSTEM

The Single Island – Copicut River system drains most of the northern half of Dartmouth. This system includes the Copicut and Shingle Island Rivers, 1200 acres of wetlands and Lake Noquochoke, into which they drain. The Copicut River flows south from Copicut Swamp and Reservoir in Fall River to Cornell Pond on Old Fall River Road in Dartmouth, then merges with the Shingle Island River. Shingle Island River flows from the Freetown line south to Lake Noquochoke. The whole system is very valuable to Dartmouth for its water and recreational needs.

BUTTONWOOD BROOK

The Buttonwood Brook watershed is extensively developed. The brook is significant for water quality in Apponagansett Bay. Though degraded in many parts of its

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northern drainage due to the degree of urbanization, Buttonwood Brook provides a riparian corridor along the western side of New Bedford and then southward through Dartmouth.

Ponds and Lakes

LAKE NOQUOCHOKE

Lake Noquochoke is the largest fresh water pond in the Town, encompassing 165 acres. The lake is intensively developed with cottages along its eastern shore. With a grant from the Massachusetts Lakes and Ponds Program, a report was completed to propose a management strategy for the control of aquatic nuisance vegetation at Lake Noquochoke, called the Lake Noquochoke Aquatic Nuisance Vegetation Project. The study showed that phosphorus coming from Shingle Island watershed was causing the vegetative bloom in the lake. An attempt to address the phosphorus and nitrogen problems has been implemented to date by the installation of Town Sewer to all the neighborhoods surrounding the lake.

The City of Fall River owns the lake along with a one-foot strip of land along the lake's perimeter. This fact impacts the surrounding land uses and the amount of flexibility Dartmouth maintains over these systems. There are two dams that currently impound water in Lake Noquochoke – an upper and a lower dam. In 2021, Fall River pursued action for the permitting of the removal of the upper dam, which is anticipated to drain a small reservoir above the lake when the dam is removed, but the lake should remain unaffected. A breach of the lower dam would drain the lake and return the area to wetlands. Fall River has previously considered a breach of the lower dam as there are currently costly maintenance issues with the dam, and because the impoundment is no longer needed for the City's uses.

CEDAR DELL POND

Cedar Dell Pond, like Lake Noquochoke, has intensely developed shores, especially on its south and west sides, which are crowded with small houses and cottages. The extended lawn of the University of Massachusetts and a few small houses dominate its east side. Presently the University of Massachusetts owns much of the land surrounding the pond. It should be preserved solely for its value as one of the few freshwater ponds in Dartmouth and as an attractive open space.

TEAL POND

Teal Pond, located off Little River Road between Mishaum Point and Little River, covers only a few acres but is of great value to wildlife. It is a coastal pond characterized by fresh water and protective barrier beach. A large rock outcrop adds to its aesthetic value. Teal Pond provides a nesting place and feeding area for herons, sandpipers, egrets, swans, and migrating Canada geese. Similar coastal ponds are located off the beach between Mishaum and Salter's Point.

TURNER POND

Turner Pond is on the New Bedford/Dartmouth municipal line. It consists of 55 acres, most of which falls within the City of New Bedford's boundaries, and borders the Acushnet Cedar Swamp. Turner Pond is the headwaters of the entire Paskamansett-Slocums River system and is near the end of the main runway for the New Bedford Regional Airport. The Massachusetts Department of Natural Resources owns the swamp and the eastern shore, but not the pond itself.



CORNELL POND

Cornell Pond is a fresh water manmade pond on the Copicut River. The pond is approximately 10 acres in size and is surrounded by undeveloped land that is part of the New Bedford Rod and Gun Club parcel. Fishing is popular on the pond, however, catches must be released and not consumed. The pond is influenced by a formerly contaminated site and was the site of an environmental monitoring fishing derby in 2011, through which participants caught fish to be analyzed by the EPA for PCB content. EPA requires fish to be monitored biannually in Cornell Pond for PCB concentrations. The soil and sediment remedy for the ReSolve, Inc., Superfund Site was completed in 1994, and EPA anticipates that the PCB concentrations in fish will decline over time.¹ Landside, a community of dedicated volunteers regularly pursues projects to improve Cornell Pond. In 2020, the Cornell Pond Advisory Committee replaced a wooden bridge and conducted trail maintenance. The Committee has plans to construct additional bridges to connect with existing trail on DNRT's neighboring Howland Reserve.² In 2022, the Dartmouth Rotary Club assisted neighbors in the annual Cornell Pond Cleanup on Old Fall River Road.

Wetlands

Dartmouth's Wetland Bylaw was enacted at Special Town Meeting in November 1986. The adoption and continued utilization of this bylaw communicates the seriousness with which the town approaches wetland conservation as a critical element of preserving key ecosystem services such as flood abatement. The local bylaw identifies additional interests which combined with the State's regulations covers areas of flood control, storm damage, prevention of pollution, public or private water supply, groundwater, marine fisheries, shellfish, wildlife, erosion, recreation and aesthetics.

Both coastal and inland wetlands serve as flood protection barriers. They act as giant sponges in times of flood, absorbing a tremendous quantity of water that would otherwise inundate built up areas, causing property damage and threats to safety. Barrier beaches, tidal flats and sand dunes provide a protective barrier from damage by hurricanes and excessively high tides. There is indeed good reason to protect wetlands from development. Ultimately by protecting Dartmouth's open spaces including its wetland systems, the Town protects itself from the likelihood of flooding.

Aquifer Protection Zones

Dartmouth depends on town wells for most of its water supply, and consequently, prioritizes aquifer protection areas. State-designated aquifer protection zones were determined by a computer model factoring in topography, soil conditions, and well infrastructure.

Dartmouth was the first Town in Massachusetts to adopt aquifer protection zoning in September 1980. The Aquifer Protection Overlay District was most recently updated at Spring Town Meeting in 2021 in order to remain current and increase protections. The Town has been diligent in acquiring land and enforcing aquifer protection. These land acquisitions are part of an overall strategy to protect environmentally important portions of town, as well as to enhance the Town's water supply protection.

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Habitats and Unique Ecosystems

Vegetation

Dartmouth contains numerous natural communities that are typical for southeastern Massachusetts and a few which are less common. The combination of Dartmouth's size and varied land use history have endowed the Town with a rich diversity of flora and fauna. The wise stewardship and preservation of these many resources will not only preserve the Town's character, but also have regional, national and even global significance in preserving biodiversity by protecting habitats. Protection of a green infrastructure network linking forest lands and wildlife habitats will help promote preservation throughout the Town of Dartmouth and beyond.

Forest Land and Vegetation General Inventory

Numerous large tracts of woodlands may be found throughout the Town, for example, between Horseneck and Division Roads, Slades Corner and Fisher Road, Woodcock Road and Deerfield Swamp, and High Hill Road and the New Bedford line. Expansive woodland areas are also found throughout the Shingle Island River Watershed.

The majority of Dartmouth's forests are dominated by oaks (*Quercus*). Mixed stands of White Oak (*Quercus alba*), Red Oak (*Quercus rubra*), Black Oak (*Quercus velutina*), and Scarlet Oak (*Quercus coccinea*) are common on upland. Swamp White Oak (*Quercus bicolor*) are found in wetlands with especially huge trees (5' trunk diameter) in the Paskamansett River floodplain. In the central coastal area, Hickory (*Carya*) and Ash (*Fraxinus*) becomes co-dominant with Oak. White Pine (*Pinus strobes*) forms extensive stands in the northern and western parts of Town particularly on sandy glacial outwash deposits. The only other native Pine, the Pitch Pine (*Pinus rigida*), tends to favor gravel and ledge areas, but is also found in sandy swamps. Various blueberries (*Vaccinium* sect. *Cyanococcus*) dominate the understory. American Holly (*Ilex opaca*) approaches its northern limit of growth here. Holly trees with trunk diameters of 8"-12" and 30 feet tall are locally common. On the many cool eastern facing slopes, American Beech, (*Fagus grandifolia*) associates with Yellow Birch (*Betula alleghaniensis*) and Maple (*Acer*) to resemble forests found in mountainous New England; this is largely possible due to the cool maritime summer climate. In the northwest away from the salt spray of the coast, Hemlock groves are found with Black Birch (*Betula lenta*) - other mountainous New England tree species. An uncommon tree is the Sycamore (aka Buttonwood) tree (*Platanus occidentalis*) which only grows in the wild as isolated specimens along Buttonwood Brook in the eastern part of Town.

The forests of Dartmouth change from distinctive low growing (30' -40') open canopied woodlands along the coast to towering dense forests 80' tall on the cool east slopes. These rich, cool east slope forests are located far enough inland to be somewhat protected from salt spray but close enough to the bay to benefit from the damp fogs. Most forests in Dartmouth tend to be windswept because of the constant southwest summer winds that force tree growth to lean towards the northeast. An example of this northeast leaning is best observed through the White Pines (*Pinus strobus*), which act as a reliable natural compass pointing most of their branches away from the southwest wind.

Wooded wetlands, dominated by Red Maple (*Acer rubrum*) are common throughout the Town. In addition, the Black Gum or Tupelo tree (*Nyssa sylvatica*) is also partial to wet sites and is very tolerant of salt spray and the coastal winds. Atlantic White Cedar (*Chamaecyparis thyoides*) swamps, a habitat recognized as globally restricted by the



State’s Natural Heritage and Endangered Species Program [NHESP], may be found throughout the Lake Noquochoke/Shingle Island River Wetland system and to a lesser degree along the Paskamansett River and Flag Swamp wetland systems. A common wetland understory shrub noted for its summer fragrance is the Sweet Pepperbush (*Clethra alnifolia*). When in bloom the fragrance is noticeable when driving along roads near wetlands and contribute to the unique ambiance of the Town. Northern Arrowwood (*Viburnum* spp.) is also a common wetland shrub.

Small but biologically important are the acid fens, bogs, shrub swamps and vernal ponds that are scattered throughout the Town. Vernal pool certification aids in the protection of these important natural resources that give life to rare vegetation and wildlife.

Dartmouth has numerous salt marsh systems, including those associated with Little and Slocums River, Allens Pond, Apponagansett Bay, Nonquitt Marsh, and Meadow Shores. Vegetation here is typical of other salt marsh systems found throughout the State with certain rare exceptions. These salt marshes are in many cases accompanied by dune and barrier beach habitat.

Dartmouth has a strong agricultural past and much of its vegetation today is characteristic of such use. Pastures, hay fields, and corn and other vegetable fields may be found in similar frequencies.

Rare Vegetation Species

Dartmouth’s numerous natural communities support a diversity of rare plants. The activity of the Lloyd Center for Environmental Studies within the Town has helped to identify many of them. Additionally, the Natural Heritage and Endangered Species Program (NHESP) delineates areas a Priority Habitats that represent the geographic extent of habitats of state-listed rare species in Massachusetts based on documented observations. Priority Habitats are the filing trigger for determining whether or not a proposed project or activity must be reviewed by the NHESP for compliance with the Massachusetts Endangered Species Act. NHESP has identified the presence of a total of 22 species of vascular plants in Dartmouth that are listed as threatened, endangered, or of special concern.

Figure 7.4: Vascular Plants in Dartmouth

| Common Plant Name | Scientific Name | Listing Status | Last Observed |
|--------------------------|---|----------------|---------------|
| Linear-leaved Milkweed | <i>Asclepias verticillata</i> | T | 1904 |
| Tiny-fruited Spike-sedge | <i>Eleocharis microcarpa</i> var. <i>filiculmis</i> | E | 2013 |
| Purple Cudweed | <i>Gamochaeta purpurea</i> | E | 1889 |
| Weak Rush | <i>Juncus debilis</i> | E | 1999 |
| New England Blazing Star | <i>Liatris scariosa</i> var. <i>novae-angliae</i> | SC | 2017 |
| Rigid Flax | <i>Linum medium</i> var. <i>texanum</i> | T | 2006 |
| Gypsywort | <i>Lycopus rubellus</i> | E | 2000 |
| Green Adder’s Mouth | <i>Malaxis unifolia</i> | T | 1904 |
| Pinnate Water-milfoil | <i>Myriophyllum pinnatum</i> | SC | 2016 |
| Lion’s Foot | <i>Nabalus serpentarius</i> | E | 1903 |



| | | | |
|--------------------------------|--|----|------|
| Violet Wood-sorrel | Oxalis violacea | E | 2013 |
| Philadelphia Panic-grass | Panicum philadelphicum ssp. philadelphicum | SC | 1999 |
| Long-leaved Panic-grass | Panicum rigidulum ssp. pubescens | T | 2010 |
| Pale Green Orchis | Platanthera flava var. herbiola | T | 1923 |
| Sea-beach Knotweed | Polygonum glaucum | SC | 2013 |
| Algae-like Pondweed | Potamogeton confervoides | T | 1889 |
| Plymouth Gentian | Sabatia kennedyana | SC | 2017 |
| Sea Pink | Sabatia stellaris | E | 1988 |
| Long's Bulrush | Scirpus longii | T | 2011 |
| Tall Nut-sedge | Scleria triglomerata | E | 1888 |
| Bristly Foxtail | Setaria parviflora | SC | 2017 |
| Grass-leaved Ladies' - tresses | Spiranthes vernalis | T | 2014 |

The Lake Noquochoke/Shingle Island River Wetland system supports a great diversity of rare plants, including Long's bullrush (*Scirpus longii*), long-leaved panic grass (*Panicum longifolium*), tiny fruited spike-rush (*Eleocharis microcarpa*), rigid flax (*Linum medium*). Tiny fruited spike sedge, sea pink and Long's bullrush are all classified as endangered by
Source: Mass.gov Rare Species Viewer

the NHESP, requiring the highest level of protection. The Noquochoke wetlands support one of the world's largest Long's bullrush populations. Every effort should be made to protect these rare populations from infringement brought upon by development or inappropriate recreational activities.

It should be pointed out here that the Town has a lengthy history of gravel extraction that has left behind numerous abandoned gravel sites. Many of these sites within the Noquochoke/Shingle Island wetlands mimic coastal plain pond shores, a second rare habitat home to globally rare species including the flowering perennial herb Plymouth gentian (*Sabatia kennedyana*). Plymouth gentian may also be found around Cedar Dell Pond.

Barney's Joy and Allens Pond also support rare plants including heart-leaf tway blade (*Listera cordata*), sea pink (*Sabatia stellaris*), crested yellow orchis (*Platanthera cristata*) and New England blazing star (*Laetris borealis*). Much of this land is protected already through the efforts of the Massachusetts Department of Environmental Management, the Massachusetts Audubon Society and the DNRT. However, further protection should be sought to protect this resource.

Other species of concern to the NHESP which are found in Dartmouth include Bushy Rockrose (*Helianthemum dundsum*) Pinate Water Milfoil (*Myriophyllum pinnarum*) and grass-leaved ladies' tresses (*Spiranthes vernalis*). The Massachusetts NHESP has identified the estimated habitat of rare species in Dartmouth, as shown in the NHESP Priority Habitats of Rare Species and the NHESP/TNC BioMap2 Core and Critical Habitat Area Maps. Every effort should be made to protect the habitats identified by NHESP, with the protection of the Noquochoke/Shingle Island Wetlands, Allens Pond, and the Paskamansett River wetlands among the top priorities.



While not listed as rare or endangered on a state or national level, locally rare wild plants include Painted Trillium (*Trillium undulatum*) in the northern Hemlock forests; Round Leaved Yellow Violet (*Viola rotundifolia*) growing on old uprooted tree root mounds in the east slope forests; Mayflower (*Epigaea repens*), in gravelly soils near the Slocums River; Pink Ladyslipper (*Cypripedium acaule*) in Pine, Hemlock, and Oak Woods; White Fringed Orchis (*Platanthera blephariglottis*) in meadows and bogs; Columbine (*Aquilegia*) on coastal ledges; Christmas Fern (*Polystichum acrostichoides*) in the cool east slope woods; and the insectivorous Pitcher Plant (*Nepenthes*) in the Noquochoke/Shingle Island wetlands. Additional unique plants include Bladderwort (*Huttonia Inflata*) that are present in vernal pools; Butterfly Weed (*Asclepias tuberosa*) found in coastal open fields; and Cardinal Flower (*Lobelia cardinalis*) located in stream banks and wetlands. These plants may not be of state or national significance but certainly are of town-wide importance and should be protected for future generations. At the very least selected sites with populations of these plants should be preserved lest we face their irrevocable loss.

Fisheries And Wildlife

General Inventory

Dartmouth's diversity of habitat types support an equally diverse array of fauna. Its upland forests support an abundance of forest dwelling avian species, as well as typical small mammals, e.g. northern flying squirrel (*glaucomys*) and eastern chipmunks (*lamias*). The large amount of land that supports agricultural activities or sparse suburban dwellings, creates abundant habitat for species which benefit from "edge" and field habitats. Specifically, white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes fulva*), grey fox (*Urocyon dnereoargemeus*), coyote (*Canis latrans*), and assorted smaller mammals may be found throughout the Town in varying abundances.

Wood (Aix sponsa), mallard (*Anas platyrhynchos*) and black ducks (*Anas rubripes*), Canada geese (*Branra Canadensis*), mute swan (*Cygnus olor*) osprey (*Pandion haliaetus*) and gadwall (*Anas strepera*) are among the avian species which breed and feed in the wetland habitats of Dartmouth.

Dartmouth's aquatic species include those that are commercial harvested and fished. Clarks Cove is a very productive area and is managed by New Bedford and Dartmouth. Apponagansett Bay is also an excellent shellfish resource, however, shellfishing has been limited due to water quality issues. Little River and Slocums River have less important shellfish value on average. Dartmouth issues between 500 and 600 shellfish licenses annually.

In recent years, Dartmouth's Harbor Master has taken part in programs to restock Dartmouth's waters with quahogs, using a relay method for transplanting mature shellfish from other waterbodies and the installation of "upwellers" – floating nurseries for quahogs. A settlement associated with the Bouchard oil spill, which released 98,000 gallons along nearly 100 miles of Buzzards Bay coastline in 2003, funds some of these projects. Blue crabs (*Callinectes sapidus*) are fished in the Little and Slocums Rivers. Lobster traps are set in the Slocums River embayment, Apponagansett Bay and Clarks Cove. In total this marine shellfish industry employs many people and generates significant annual revenue.

Many individuals fish in Buzzards Bay for bluefish, striped bass, flounder, scup and tautog. Every effort should be made to preserve Dartmouth's estuarine systems that contribute to the breeding and raising grounds of these fish species. Fresh water fishing

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is common from Dartmouth-owned park land abutting Cornell Pond (fish is inedible due to contamination) and in Noquochoke Lake. Yellow perch, sunfish, bass, bullheads and pickerel are all common catches. A few alewife continue to migrate annually up the Slocums River and Destruction Brook to the Deerfield Swamp. The Town of Dartmouth must continue to respect the environmental wealth of Buzzards Bay and carefully labor toward the preservation of this indispensable natural resource.

Dartmouth’s wetlands serve as important habitat for migrating birds. The coastal estuaries, salt marshes, and associated wetlands feed and provide resting habitat for dozens of bird species migrating in spring and fall. Allens Pond is perhaps the most important of such places, being an important link along the Atlantic Coast flyway. Allens Pond is utilized by more than 25 species of waterfowl and 35 species of shore birds. Among the species which use the resource during migration are the federally endangered peregrine falcon (*Falco peregrinus*) and roseate tern (*Sterna dougallii*), state-listed endangered short ear owl (*Asio flammeus*) and the state-listed threatened pied-billed grebe (*Podilymbus podiceps*) and king rail (*Rallus elegans*).

To a certain degree, much of Dartmouth, especially to the north, south and west has developed in a low-density form that enables private lands to act as a local corridor for wildlife movement. Route 6 (State Road) and I-195 present a formidable barrier for non-flying species.

Rare Fisheries and Wildlife Species

The Massachusetts Natural Heritage & Endangered Species Program (NHESP) and The Nature Conservancy’s Massachusetts Program developed BioMap2 in 2010 as a conservation plan to protect the state’s biodiversity. BioMap2 is designed to guide strategic biodiversity conservation in Massachusetts over the next decade by focusing land protection and stewardship on the areas that are most critical for ensuring the long-term persistence of rare and other native species and their habitats, exemplary natural communities, and a diversity of ecosystems.

The BioMap2 dataset includes two essential habitat types. Core Habitat identifies specific areas necessary to promote the long-term persistence of Species of Conservation Concern (those listed under the Massachusetts Endangered Species Act as well as additional species identified in the State Wildlife Action Plan), exemplary natural communities, and intact ecosystems. Critical Natural Landscape refers to identify intact landscapes that also support ecological processes and a wide array of species and habitats over time. The NHESP/TNC BioMap2 Core and Critical Habitat Areas Map shows the locations of these lands in Dartmouth.

NHESP has identified 31 rare animal and insect species sighted in Dartmouth. It is of course likely that other, unidentified species occur. A strategy which protects the known rare species may have unseen benefits by protecting such unidentified species.

Figure 7.5: Rare animal and insect species sighted in Dartmouth

| Common Plant Name | Scientific Name | Listing Status | Last Observed |
|-----------------------|--------------------|----------------|---------------|
| Marbled Salamander | Ambystoma opacum | T | 2017 |
| Cow Path Tiger Beetle | Cicindela purpurea | SC | 2001 |



| | | | |
|----------------------------|---------------------------------|----|------|
| Grasshopper Sparrow | <i>Ammodramus savannarum</i> | T | 1993 |
| Piping Plover | <i>Charadrius melodus</i> | T | 2018 |
| Northern Harrier | <i>Circus cyaneus</i> | T | 1987 |
| Least Bittern | <i>Ixobrychus exilis</i> | E | 1993 |
| Vesper Sparrow | <i>Poocetes gramineus</i> | T | 1993 |
| King Rail | <i>Rallus elegans</i> | T | 1988 |
| Roseate Tern | <i>Sterna dougallii</i> | E | 2006 |
| Common Tern | <i>Sterna hirundo</i> | SC | 2015 |
| Least Tern | <i>Sternula antillarum</i> | SC | 2015 |
| Barn Owl | <i>Tyto alba</i> | SC | 1966 |
| Coastal Heathland Cutworm | <i>Abagrotis nefascia</i> | SC | 2012 |
| Drunk Apamea Moth | <i>Apamea inebriata</i> | SC | 1983 |
| Hessel's Hairstreak | <i>Callophrys hesseli</i> | SC | 2013 |
| Frosted Elfin | <i>Callophrys irus</i> | SC | 2005 |
| Waxed Sallow Moth | <i>Chaetagnaea cerata</i> | SC | 1986 |
| Chain Dot Geometer | <i>Cingilia catenaria</i> | SC | 1999 |
| Imperial Moth | <i>Eacles imperialis</i> | T | 1986 |
| Pale Green Pinion Moth | <i>Lithophane viridipallens</i> | SC | 2011 |
| Coastal Swamp Metarranthis | <i>Metarranthis pilosaria</i> | SC | 1988 |
| Chain Fern Borer Moth | <i>Papaipema stenocelis</i> | T | 2011 |
| Spartina Borer Moth | <i>Photodes inops</i> | SC | 2007 |
| Pink Sallow Moth | <i>Psectraglaea carnososa</i> | SC | 1992 |
| Dune Noctuid Moth | <i>Sympistis riparia</i> | SC | 2013 |
| American Clam Shrimp | <i>Limnadia lenticularis</i> | SC | 1985 |
| Coastal Swamp Amphipod | <i>Synurella chamberlaini</i> | SC | 2001 |
| Attenuated Bluet | <i>Enallagma daeckii</i> | T | 2004 |
| Scarlet Bluet | <i>Enallagma pictum</i> | T | 2004 |
| Diamond-backed Terrapin | <i>Malaclemys terrapin</i> | T | 2013 |
| Eastern Box Turtle | <i>Terrapene carolina</i> | SC | 2017 |

Source: mass.gov Rare Species Viewer

Dartmouth contains an abundance of barrier beach and dune habitat from Demarest Lloyd State Park south then west to its border with Westport. This habitat and its associated salt marsh and surrounding uplands provides breeding and/or summer feeding grounds for rare avian species. Similar habitat occurs less abundantly further north, between Mishaum Point and Round Hill and east of Nonquitt Marsh.

Dartmouth's numerous riparian corridors and associated seasonally flooded lands support a number of wetland amphibian and reptile species, some of which are rare.

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The most important of such wetlands are the Paskamansett River wetlands and the Noquochoke Lake/Shingle Island River wetland systems.

Atlantic white cedar swamps are located throughout the Town but are most common in the Lake Noquochoke/Shingle Island and the Paskamansett River headwaters. Adjacent open fens support rare moths. Ponds and associated wetlands support two rare blue damselflies. State-listed species of special concern also occur throughout Dartmouth's grassland, upland shrub and wooded swamp habitats.

Much of the land which supports Dartmouth's most rare and threatened animal populations are the same as those that support rare plant populations (Noquochoke/Shingle Island wetlands, Paskamansett River wetlands, and Allens Pond). These dynamic systems require a proactive strategy to ensure that growth in Dartmouth does not compromise their natural integrity.

State Identified Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACECs) are places in Massachusetts that receive special recognition because of the quality, uniqueness and significance of their natural and cultural resources. These areas are identified and nominated at the community level and are reviewed and designated by the state's Executive Office of Energy and Environmental Affairs Secretary. The ACEC Program is administered by the Department of Conservation and Recreation (DCR) on behalf of the Secretary of Environmental Affairs. ACEC designation creates a framework for local and regional stewardship of these critical resource areas and ecosystems. ACEC designation also requires stricter environmental review of certain kinds of proposed development under state jurisdiction within the ACEC boundaries. There are no designated ACECs within the Town of Dartmouth.

Green Infrastructure Network

Based on the many values of natural systems, there is an increasing recognition of the role of "Green Infrastructure" (GI) in land use and open space conservation planning. As described in Mass Audubon's 2020 Losing Ground report, Green Infrastructure is defined as "a network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas that support native species, maintain natural ecological processes, sustain air and water resources, and contribute to health and quality of life."

GI plays important roles in the resilience of both natural and human communities, with intact GI landscapes often performing multiple functions simultaneously, such as cleaning air and water while providing the benefits of contiguous habitat and carbon sequestration, among others. Consider a stream corridor, for example, protecting and restoring forested areas along the stream provides habitat for both fish and wildlife and accommodates their movement through the landscape, while also reducing flood risks to downstream communities.

In 2017 conservation and research partners at Manomet, a nonprofit environmental organization based in Plymouth, developed a model called the Green Infrastructure Network (GIN) that identified the highest-priority unprotected and undeveloped natural areas of the Taunton Watershed. Components of this model, combined in a Geographic Information System (GIS), include:

- **RESILIENT LAND:** Areas of "above average" resilience (> 0.5 standard deviation) according to The Nature Conservancy's Resilient Landscapes dataset (specifically, a higher-resolution 90m version generated by The Nature



Conservancy for Mass Audubon).

- **IMPORTANT HABITAT:** BioMap2 Core and Critical Natural Landscape areas.
- **RIPARIAN BUFFERS:** Land within 100 feet of surface waters and wetlands (based on features in National Wetlands Inventory V2) and areas within 100 feet of 100-year flood areas and high-risk coastal flood areas (as defined by the National Flood Hazard Layer).
- **AREAS VULNERABLE TO SEA LEVEL RISE:** Land < 4m elevation.

The team at Mass Audubon was able to expand this model from its initial geographic scope to cover the entire state of Massachusetts. GIS layers demonstrate where the above four criteria converge to form the state's Green Infrastructure Network. The GIN dataset is a promising tool for local communities in identifying high priority natural resource preservation objectives, especially in light of climate change impacts.

Environmental Challenges

Impaired Waterbodies

The federal Clean Water Act was enacted to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. As one step toward meeting this goal each state must administer a program to monitor and assess the quality of its surface waters and provide periodic status reports to the U.S. Environmental Protection Agency. Section 305(b) of the Clean Water Act codifies the process whereby waters are evaluated with respect to their capacity to support specific uses that are defined in the Massachusetts Surface Water Quality Standards. These uses include aquatic life, fish consumption, drinking water, shellfish harvesting, primary (e.g., swimming) and secondary (e.g., boating) contact-recreation, and aesthetics. The 305(b) process entails assessing each of these uses, where applicable, for rivers, lakes and coastal waters using all readily available data. Each evaluated waterbody or portion thereof on the list is referred to as an assessment unit (AU), and assigned to one of the following categories:

- Category 1 = Unimpaired and not threatened for all designated uses.
- Category 2 = Unimpaired for some uses and not assessed for others.
- Category 3 = Insufficient information to make assessments for any uses.
- Category 4A = Impaired for one or more designated uses but does not require the development of a TMDL: TMDL has been completed.
- Category 4B = Impaired for one or more designated uses but does not require the development of a TMDL: Other pollution control requirements are reasonably expected to result in the attainment of designated uses.
- Category 4C = Impaired for one or more designated uses but does not require the development of a TMDL: Impairment is not caused by a pollutant.
- Category 5 = Impaired for one or more uses and requiring a TMDL (impairment due to pollutant(s) such as nutrients, metals, pesticides, solids and pathogens).

A Category 5 designation is given if available data and/or information indicate that

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at least one designated use is not being supported or is threatened and a TMDL is needed. Waters listed in Category 5 constitute the “303(d)” list, the final version of which must be approved by the EPA. Once a water body is identified as impaired by a pollutant and added to the 303(d) list, MassDEP is required to develop a pollutant limit designed to restore the health of the impaired water body.

The process of developing the pollutant limit, generally referred to as a Total Maximum Daily Load (TMDL), includes identifying the cause (type of pollutant) and source (where the pollutant comes from), determining how much of the pollutant is from direct discharges (point sources) or indirect discharges (non-point sources), determining the maximum amount of the pollutant that can be discharged to a specific water body and still meet water quality standards, and developing a plan to meet that goal. The plan must identify the required activities to achieve the allowable load to meet the allowable loading target, the time line for those activities to take place, and reasonable assurances that the actions will be taken.

As can be seen in the Integrated Waters by Impairment Category Map, several waterbodies in Dartmouth are classified as impaired in Category 5, requiring the development of a TMDL. These include Cornell Pond, the upper Copicut River, the Paskamansett River, the Shingle Island River, Lake Noquochoke, Slocums River, Apponagansett Bay, and Clarks Cove.

The only waterbody within Dartmouth with an established TMDL is Buttonwood Brook. Currently, the Town of Dartmouth is partnering with the Buzzards Bay Coalition (BBC) and the City of New Bedford along with other partners in the 5-year Buttonwood-to-Bay Restoration Project. The BBC was awarded funding in 2021 from the US Environmental Protection Agency’s Southeast New England Program (SNEP). This project tackles water quality issues in Padanaram Harbor and its major tributary, Buttonwood Brook, by bringing a diverse group of local stakeholders together to reduce sources of pollution.

For the first two years of the project, the BBC and its partners are conducting field studies to sample water quality, evaluate the brook’s physical condition and identify potential sources of pollution. In year three, project partners will use that information to identify and prioritize sites for pollution cleanup or brook restoration projects. Finally, in years four and five, BBC and its partners will work with specialists in stormwater management and stream restoration to implement targeted interventions that reduce pollution from runoff and restore natural flows to the most impaired sections of Buttonwood Brook.

Household and Hazardous Waste Sites

The Town of Dartmouth closed its landfill on Russells Mills Road for commercial and municipal waste. In place of Russells Mills landfill, the Town of Dartmouth and the City of New Bedford through the Greater New Bedford Regional Refuse Management District constructed the Crapo Hill Landfill in 1995. The Crapo Hill Landfill provides Dartmouth with a cost-effective and environmentally sound way to dispose of its solid waste. Located in the Town of Dartmouth’s northeast corner, the site is approximately 150 acres in area and is bounded by the Freetown line to the north and Conduit Road to the southeast. The landfill and its related site facilities are located in an industrial zone and access to the landfill is through the New Bedford Industrial Park, portions of which are in Dartmouth. In 2000, ten additional acres were cleared in preparation for Phase II of the landfill. The Greater New Bedford Regional Refuse Management District also manages the public education effort for the recycling program and the household hazardous waste collections.



The Massachusetts Department of Environmental Protection's (Mass DEP) most recent spatial dataset shows 23 designated hazardous waste sites listed within the Town of Dartmouth. However, the majority of these do not constitute serious hazards to public health. Most of the properties identified on the DEP list reflect minimal leaks of fuel oil and gasoline. In some instances, these sites are remediated but cannot be fully cleaned to the point of returning the location to safe use for all activities. These sites must obtain an Activity and Use Limitation (AUL) from MassDEP, which provides notice of the presence of oil and/or hazardous material contamination remaining at the location after a cleanup has been conducted pursuant to Chapter 21E and specifies activities and uses of the property that may and may not occur. Eleven sites in Dartmouth have an AUL in place.

Cultural Resources

Archeological Sites

The Town of Dartmouth is one of the oldest and largest towns in the Commonwealth of Massachusetts. Archaeological evidence documents the presence of humans in the area for a period of 10,000 years. An archaeological reconnaissance survey of the Town in 2002, conducted by the Public Archeology Laboratory, documented 50 previously unrecorded archaeological sites, both prehistoric and historic.³ The Town has been identified as an area with high archaeological sensitivity.

The areas with greatest prehistoric sensitivity are to be found along the major wetland margins. The Town could expect to find prehistoric sites along Apponegansett Bay, near the Slocums, Paskamansett, and Shingle Island Rivers, and along streams, swamps and ponds. Historic sites would most likely be found near the historic villages of the Town (Hixville, Smith Mills, Padanaram, Russells Mills, and Bliss Corner) and on some of the farms that have existed for more than 300 years.

The protection of these sites will need the active participation of Town agencies such as the Historical Commission, Planning Board, Conservation Commission, local and regional preservation and planning advocates, landowners, Indigenous Peoples groups and the general public. The Historical Commission can continue to collect and update information on archaeological resources, so that information can be recorded with the state. Town might consider an archaeological site protection program by-law to protect known sites. In some cases, acquisition of open space would be the best means of preserving and protecting areas of cultural and historical resources. In other cases, a property owner might be encouraged to put a preservation restriction on their property; that action may qualify as a charitable deduction for federal tax purposes.

Historic Sites: Colonial Period to the Present

The National Park Service administers the National Register of Historic Places. The National Register is the official Federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. National Register properties have significance to the history of their community state, or the nation. Nominations for listing historic properties come from State Historic Preservation Officers, from Federal Preservation Officers for properties owned or controlled by the United States Government, and from Tribal Historic Preservation

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Officers for properties on Tribal lands. Private individuals and organizations, local governments, and American Indian tribes often initiate this process and prepare the necessary documentation. A professional review board in each state considers each property proposed for listing and makes a recommendation on its eligibility.

The Town of Dartmouth has four Historic Districts, two individual building, and one individual site that are listed on the National Register of Historic Places. They are:

- Padanaram Village Historic District – listed 9/5/1985, 166 contributing buildings
- Russells Mills Village Historic District – listed 9/5/1985, 37 contributing buildings, three contributing sites, and one contributing structure
- Tucker Farm Historic District – listed 8/25/1988, five contributing buildings
- Apponegansett Meeting House (individual building) – listed 3/14/1991, two contributing buildings, two contributing sites, and one contributing structure
- Hixville Village Historic District – listed 6/17/1991, four contributing buildings, one contributing site
- The Russell Garrison Site (individual site) – listed 8/6/2018
- The Hill School (individual building) – listed 4/11/1980, within the Padanaram Village Historic District

Under Federal Law, the listing of a property in the National Register places no restrictions on what a non-federal owner may do with their property up to and including destruction, unless the property is involved in a project that receives Federal assistance, usually funding or licensing/permitting. If federal monies are attached to the property, any changes to the property must allow the Advisory Council on Historic Preservation to comment on the project.⁴ At the state and local level, there may be preservation laws that apply to historic properties.

At the state level, the Massachusetts Historical Commission (MHC), office of the Massachusetts State Historic Preservation Office (SHPO), administers several programs created by the National Historic Preservation Act of 1966 (NHPA).

- Review of properties nominated for the National Register of Historic Places
- Federal Reinvestment Tax Incentive Program (income-producing historic structures can receive 20% of qualified rehabilitation costs as a federal income tax credit)
- State Historic and Archeological Sites Records Management
- Federal Project Review under Section 106 of the NHPA, and
- The Certified Local Government Program, providing grants to municipalities that have passed historic preservation ordinances and established local historic preservation commissions (Dartmouth is not a certified local government).⁵

MHC's Massachusetts Cultural Resource Information System (MACRIS) provides tabular and mapped data of the state's inventoried and designated historic resources. As with the federal designation, listings in the MACRIS database does not afford these properties protection from demolition, nor does it ensure their historical integrity. However, it is a positive step in creating a local historic district or pursuing individual



property listings on the National Register. Further, if state or federal funds are utilized in renovation of the properties, they must go through a design review process with the Massachusetts Historical Commission.

The most stringent historical protections are not afforded by National or State listing, but through the application of a Historic Preservation Restriction through a deed easement. Because they serve the public interest and can be perpetual, Historic Preservation Restrictions must be held by an organization that has historic preservation as part of its recognized mission. Non-profit corporations that have been recognized as 501(c)(3) charities that exist to promote historic preservation meet this requirement, as do governmental agencies that promote and regulate historic preservation.

The database includes 1,276 potentially historic assets in Dartmouth, 342 of which are located within the National Register Historic Districts or Local Historic Districts, or which have a Historic Preservation Restriction applied, and 934 additional "inventoried" buildings without designation.

The MACRIS mapper shows the following historical resources:

- National Register sites: Padanaram Village Historic District, Russells Mills Village Historic District, Tucker Farm Historic District, Hixville Village Historic District, and The Russell Garrison.
- In addition to the Russells Mills Village Historic District on the National Register, there is a Russells Mills Village Local Historic District (designated in 1998), with slightly different boundaries. Both the Local and National Districts contain two properties with Historic Preservation Restrictions: Russells Mills Village School and Russell-Elkstrom House. Properties within the Local Historic District that are listed must comply with the Russells Mills Historic District Committee site plan review process.
- Apponegansett Meeting House, on the National Register, is also shown as having a Historic Preservation Restriction applied to the property, as well as to the Apponegansett Friends Meeting House and the Apponegansett Meeting Burial Ground.
- The Stone Barn Farm at Allens Pond Wildlife Sanctuary, while not on the Federal Register, is shown as having a Historic Preservation Restriction applied to the property, and specifically to the Main House, the Stone Barn, and the Tractor Barn.
- Outside of Historic Districts, there are several properties with Historic Preservation Restrictions: Allen's Grist Mill, the Elihu Akin House, and the Ezra Winslow House.
- The MHC database (October 2022) also contains several districts that have been inventoried as potential historic districts, but that remain undesignated: Jacob Tomkiewicz Farm, University of Massachusetts Dartmouth, Gulf Hill Farm Dairy (this area includes a Preservation Restriction on the Gulf Hill Dairy Barn), Slocum – Motha Farm, Barney's Joy Farm, Nonquitt, Slaters Point, and Mishaum Point.

Dartmouth's rich history is preserved in its many cultural and historic resources. Those areas need to be protected by various means to maintain the history and character of the town.

Scenic Roads

Dartmouth has a Scenic Roads Bylaw that also protects street trees and stonewalls. The bylaw states that: “The following roads in the Town of Dartmouth are hereby designated Scenic Roads under the provisions of Section 15C, Chapter 40 of the General Laws. Any repair, maintenance, reconstruction, or paving work done with respect thereto shall not involve or include the cutting or removal of trees, or the tearing down or destruction of stone walls or portions thereof, except with the prior written consent of the Planning Board, after a public hearing duly advertised...” The bylaw designated the following scenic roads:

- Allens Neck Road
- Bakerville Road
- Barney’s Joy Road
- Collins Corner Road
- Flag Swamp Road
- Gaffney Road
- Gidley Town Road
- Gulf Road
- Hixville Road
- Horseneck Road
- Jordan Road
- Little River Road
- Lucy Little Road
- North Hixville Road
- Old Fall River Road (from Hixville Road to the New Bedford line)
- Potomska Road
- Reed Road (North of Limited Industrial District)
- Rock O Dundee Road
- Slades Corner Road
- Smith Neck Road
- Tucker Road

Several public and private stakeholder groups in Dartmouth are actively and enthusiastically engaged in historic preservation efforts, collecting, and disseminating information about the history of the town itself, as well as the larger south coast region. The Dartmouth Historical Commission, an official town committee, conducts research on places of historic value, cooperates with the state archaeologist, and reviews development proposals for recommendations related to historic elements.



The DNRT, in conjunction with the Waterfront Historic Area League (WHALE; a state-certified Community Development Corporation non-profit) rebuilt the historic Allen Grist Mill at the Destruction Brook property on Slades Corner Road. The Dartmouth Historical Commission and The Dartmouth Heritage Preservation Trust (DHPT; a private non-profit group) continue working on the preservation of the historic Elihu Akin House at 762 Dartmouth Street (the intersection of Dartmouth and Rockland Streets. This house is one of the oldest existing residences in the Town, dated to 1762. In 2008, Community Preservation Funds were awarded to the DHPT to restore the property to be used as an architectural, historic preservation and cultural educational tool. The DHPT's ultimate vision is for this site to become a Cultural Heritage Center. DHPT is also the holder of two Historic Preservation Restrictions, one for the Russell's Mills Schoolhouse, a significant contributing building in the only 40C local historic district Dartmouth, Russell's Mills Village; and the "Y Barn," an integral structure of the Gulf Hill Dairy Farm complex on scenic Gulf Road, owned by the SouthCoast YMCA. DHPT's role is to ensure compliance with the terms and conditions of the applicable Historic Preservation Restriction agreements.

Another organization, the Dartmouth Historical and Arts Society (DHAS), has focused its efforts on amassing a remarkable archive of historical research and documentation about Dartmouth and the surrounding south coast region, and on disseminating this information by organizing lecture events, and through the easily accessible and navigable Dan Socha memorial Digital Library, which includes historical maps, Colonial Era records, Quaker Meeting transcripts, genealogy documents, photographs, and more.

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ROADMAP TO THE FUTURE

Recent and Ongoing Planning Work

A significant planning effort that must be acknowledged and incorporated into this Master Plan Natural and Cultural Resources Chapter is the creation and implementation of the Padanaram Harbor Management Plan (PHMP). In 2019, after a lengthy public process, the town adopted the PHMP. The PHMP includes recommendations to address known issues and advance opportunities to improve the upper and lower harbor and its adjacent shores, which include the active village commercial center. After plan adoption, the Harbor Management Plan Implementation Committee (HMPIC), was appointed by the Select Board in February 2021 to address and facilitate the implementation of the PHMP. The HMPIC consists of a five-member board, the members of which include former Harbor Plan Citizen Advisory Committee members and members of the Dartmouth Waterways Committee and Conservation Commission.

The role of the Committee is to engage, discuss and understand, from all the stakeholders in Town, any impediments or issues in implementing the Padanaram Harbor Plan, a detailed multifaceted document. While the HMPIC is tasked with addressing the goals and objectives set forth in the PHMP, it does not set policy for others. Instead, the group engages others to work together as a team to identify issues and strategies. The HMPIC regularly reports its progress to the Select Board, who provide guidance on priorities and implementation strategies.

Without listing each recommendation contained in the PHMP, this Master Plan integrates the PHMP and the work of the HMPIC through general reference in the Master Plan strategy actions. For example, in the strategies for Natural and Cultural Resources, there is included strategy **NC-4A: Implement the water quality recommendations developed in the Padanaram Harbor Management Plan**. In the PHMP, these include recommendations 2-1 through 2-12.

Community Goals and Objectives for Natural and Cultural Resource Preservation in Dartmouth

Natural and Cultural Resources Master Plan Public Meeting

Natural and Cultural Resource protection goals were coupled with a discussion of Open Space and Recreation objectives in the third Master Plan public workshop, which took place at the Dartmouth Town Hall on Wednesday, January 29, 2020. The logistics of this workshop are summarized in the Open Space and Recreation Master Plan chapter.

Workshop Outcomes and Community Supported Policies

Workshop participants identified a total of 31 ideas for natural and cultural resource improvements and protections.



| Comment | 1 | 2 | 3 | Map Code |
|---|---|---|---|----------|
| Cornell Pond - preserve the cultural aspects - ensure permanent protection of the New Bedford Rod and Gun Club | x | | x | NC1 |
| Save the John George Farm | x | x | x | NC2 |
| Preserve Alderbrook farm | x | x | x | NC3 |
| Save the Vincent Farm | x | x | x | NC4 |
| Tavares farm – preserve | x | x | x | NC5 |
| Save the Flying Carrot farm | x | | | NC6 |
| Continuous land, Collins land potential form combining parcels if purchased for protection | x | | | NC7 |
| Preserve open land near bread and cheese brook | x | | | NC8 |
| Preserve Double S farm | x | | x | NC9 |
| Preserve the McLaughlin Property | x | | | NC10 |
| Cedar Dell Pond concerned about municipal wells overpumping and drying out | x | | x | NC11 |
| Deerfield Swamp concerned about municipal wells overpumping and drying out | x | x | x | NC12 |
| Open space to house historic buildings and assets | x | | | - |
| Acquire / permanently protect parcel adjacent to the Acushnet Sawmill Wildlife Management Area, Washburn Reserve and Slocum River Reserve | | x | | NC13 |
| Aquifer concerns with over pumping | | x | | NC14 |
| Protect salt marsh | | x | | NC15 |
| Protect Atlantic White Cedar Forest | | x | | NC16 |
| Protect the saltmarsh at the cow yards | | x | | NC17 |
| Protect Paskamansett River Corridor watershed and riverine habitat areas | | x | | - |
| Protect Shingle Island River Corridor | | x | | - |
| Farmland preservation APR at Wainer Farm | | | x | NC18 |
| Weinshell farm preservation | | | x | NC19 |
| Roundhill Beach Restoration project (salt marsh) | | | x | NC20 |
| Acquire chapter land to add to Audubon land | | | x | NC21 |
| Ecological connections to the bioserve | | | x | NC22 |
| GWOZDZ Farm – save APR | | | x | NC23 |
| Expand Little River road – conservation easement coverage | | | x | NC24 |
| Prioritize list of ag preservation targets developed by Con Comm/Ag Preservation Commission/Select Board/DNRT | | | x | - |
| Replenish agricultural preservation trust fund | | | x | - |
| Townwide aquifer protection | | | x | - |
| Dart conservation commission – more staff and other proactive activities | | | x | |

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Natural and Cultural Resource Preservation Goals and Strategies

Natural and Cultural Resources Goal 1: Pursue the long-term preservation of Dartmouth’s historical and cultural features.

Why Dartmouth / Why Now?

As Dartmouth faces development pressures, it can consider proactively those particular structures and facilities that preserve the town’s connection to its past, as well as the cultural practices that have defined Dartmouth for centuries.

| Key Strategies for Action | | | |
|---------------------------|---|---|------------|
| Strategy | | Responsible Party | Time frame |
| NC-1A | Work with grass roots groups focused on historical preservation and coordinate historic preservation efforts across town. Support the Historical Commission in reviewing development applications and proposed alterations to historic structures and in historic districts. | Historical Commission; Planning Board | on-going |
| NC-1B | Continue to develop, install, and maintain a system of signs, plaques and street furnishings to mark historic resources , cemeteries, and village centers. | Historical Commission, CPC | on-going |
| NC-1C | Preserve the Smith Mills library through repair and reuse at a permanent location. | Historical Commission, Town Admin. | 5 years |
| NC-1D | Identify, preserve, protect, and respect Native American historical sites . Maintain awareness of these historical assets within the overall community, where appropriate. | Historical Commission, Local Tribes | on-going |
| NC-1E | Create more opportunities to connect Dartmouth residents with the town’s historical character . Specifically, develop a Public Service Announcement Style Program to Run on DCTV that shows historical photographs of the town. | Historical Commission, DCTV, Cultural Council/ Center | 1-2 years |
| NC-1F | Support the efforts of the Agricultural Commission to identify farmland on the cusp of being slated for development, and create proactive plans for the preservation of farms that are especially valued by the community. | Agricultural Commission, Planning Board, Assessor | on-going |



Natural and Cultural Resources Goal 2:

Prioritize the conservation of lands that have inherent climate resilience value.

Why Dartmouth / Why Now?

In a world facing more and more challenges from climate change, it is essential to preserve natural resources that actively work to assist in climate change mitigation by performing inherently beneficial functions, like improving air quality, cooling, filtering pollutants, and absorbing floodwaters. The Green Infrastructure Network is a ready-made dataset for communities to reference of these hard-working lands with resilience built into their nature that can be used as a tool for action.

Key Strategies for Action

| ID | Strategy | Responsible Party | Time frame |
|-------|---|---|------------|
| NC-2A | Build the GIN dataset into open space planning and MVP action grant development as a tool for prioritizing lands that perform essential functions and that maintain connected green infrastructure corridors. | OSRP Steering Committee, Town Admin., Conservation Commission, staff grants writers | 1-2 Years |
| NC-2B | Develop Forest Management Plans for town-owned properties that assess wildfire and pest vulnerabilities, species diversity, regular maintenance, and cleanup plans. Start with Town Forest and the Interchurch Land at Noquochoke. | Conservation Commission | on-going |
| NC-2C | Prioritize the preservation of natural resources that are vulnerable to total loss or failure from climate change impacts , in particular, Dartmouth's coastal salt marshes that face threats from sea level rise. | Conservation Commission, non-profit partners | 1-5 Years |
| NC-2D | Prioritize the protection of Dartmouth's aquifers against pollution and over-pumping. Ensuring consistent adequate water supply is more essential than ever in the face of more regular drought periods. | Conservation Commission, Water Dept. | on-going |
| NC-2E | Prioritize actions in the town's MVP plan that have positive benefits for both natural and human communities. | Planning Board, Select Board, Town Admin. | 5 Years |
| NC-2F | Preserve farmland soils , including through the promotion of regenerative farming practices that retain healthy soils, as the town's farms play a critical role in local and regional food security,. | Agricultural Commission, farmers, MDAR, SEMAP, NRCS | on-going |

Natural and Cultural Resources Goal 3:

Continue relationships with local agencies focused on natural resource preservation.

Why Dartmouth / Why Now?

Dartmouth benefits from the presence of groups with local expertise and the interest and ability to partner with the town in developing necessary datasets, plans, and studies of Dartmouth’s natural communities. The town should continue these relationships and leverage the efforts and knowledge of these groups.

| Key Strategies for Action | | | |
|---------------------------|---|---|------------|
| Strategy | | Responsible Party | Time frame |
| NC-3A | Partner with UMass Dartmouth faculty and research groups and Buzzards Bay Coalition to generate additional data on existing conditions of natural communities. | Town Admin, Conservation Committee, UMass Dartmouth, Buzzards Bay Coalition | on-going |
| NC-3B | Partner with UMass Dartmouth to preserve land around Cedar Dell Pond. | Town Admin., Conservation Commission, UMass Dartmouth | on-going |
| NC-3C | Partner with the Lloyd Center to continue generating data on significant rare species and natural communities in Dartmouth, and to share this information with the public. | Town Admin, Conservation Commission | on-going |
| NC-3D | Partner with MassAudubon on furthering their preservation work at the Allen’s Pond sanctuary. | Select Board, Conservation Commission | on-going |
| NC-3E | Partner with state agencies and neighboring cities and towns to take a comprehensive management approach in Buzzards Bay. | Water Resources Committee (not yet established) | on-going |
| NC-3F | Continue to collaborate with and support the efforts of the Dartmouth Natural Resource Trust. | Town Admin, Select Board | on-going |
| NC-3G | Continue to work with the Massachusetts Historical Commission on preparing National Historic Register nominations. | Historical Commission | on-going |



Natural and Cultural Resources Goal 4:

Protect the quality and quantity of the town's water supply, surface water, and groundwater resources.

Why Dartmouth / Why Now?

As the Integrated Waters list map shows, a number of waterways in Dartmouth have been proven to have significant enough water quality issues to benefit from the development of pollutant TMDLs. Recent work has been done on this issue with the Massachusetts Estuary Program and the Harbor Management Plan.

| Key Strategies for Action | | | |
|---------------------------|--|--|------------|
| Strategy | | Responsible Party | Time frame |
| NC-4A | Implement the water quality recommendations developed in the Padanaram Harbor Management Plan . | Town Admin, Select Board, Harbor Master, HMPIC | 5-7 Years |
| NC-4B | Work with the state and local non-profits to accomplish TMDL's for class 5 identified waterbodies that are known to be impaired and require TMDLs. | Conservation Commission, Town Admin, HMPIC | 1-3 Years |
| NC-4C | Preserve riparian zones and wetlands along waterways. Continue to have strict requirements for wetland protection in town | Conservation Commission | on-going |
| NC-4D | Implement and expand on stormwater regulations. | Town Admin., DPW, Town Meeting | on-going |
| NC-4E | Pursue solutions, including stormwater infrastructure retrofits, that will improve water quality in Buttonwood Brook. | Buzzards Bay Coalition, DPW, Conservation Commission, Waterways Committee, HMPIC | 2-5 years |
| NC-4F | Organize regular volunteer cleanings of the Paskamanset River. | Town Commissions, Schools, Environmental Non-profits | on-going |
| NC-4G | Continue to enforce and update as new data is available the town's Aquifer Protection Overlay District. | Planning Board, Select Board, Town Meeting | on-going |
| NC-4H | Seek land preservation opportunities that also achieve crediting under the town's Water Management Act permit managing public water supply withdrawals. | Town Administrator, DPW, Conservation Commission, DPW Board | on-going |

Natural and Cultural Resources Goal 5:

Provide extra protection to the town's most fragile and vulnerable natural resources.

Why Dartmouth / Why Now?

Dartmouth's rich natural landscape contains pockets and expanses of locally, regionally, and even globally rare species. While other recommendations focus on restoring lands that were previously degraded, this set of actions focuses on protecting habitats of rare species in town that are still intact.

| Key Strategies for Action | | | |
|---------------------------|--|---|------------|
| Strategy | | Responsible Party | Time frame |
| NC-5A | Create a plan to support salt marsh migration as these lands are submerged by sea level rise into tidal flats. | Town Admin., Planning Department, Conservation Commission, BBC, MassAudubon, UMass/ other consultants | 3 years |
| NC-5B | Evaluate potential vernal pools for certification and protections. | Conservation Commission, Volunteers | on-going |
| NC-5C | Protect wildlife migration corridors, especially those that allow for movement as species react to climate changes. | Conservation Commission, Planning Department, DNRT, BBC, MassAudubon | on-going |
| NC-5D | Preserve Priority Habitats of Rare Species and areas of town that have identified areas of high ecological integrity (NHESP/ BioMap, CAPS identified areas). | Conservation Commission, Planning Department, DNRT, BBC, MassAudubon | on-going |
| NC-5E | Evaluate amending the town's wetland protection bylaw to recognize and include allowable WMA protections for coldwater fisheries drainage areas. | Conservation Commission, Select Board, Town Meeting | 2 years |
| NC-5F | Preserve additional areas adjacent to Destruction Brook Woods that would fill in missing links along a cohesive greenway corridor in this area of town. | Conservation Commission, DNRT, other conservation non-profits | 2-4 years |



Natural and Cultural Resources Goal 6:

Pursue Natural Resource preservation through low-impact development options and by undertaking the necessary physical/structural improvements to infrastructure and facilities that impact the quality of the town’s natural resources.

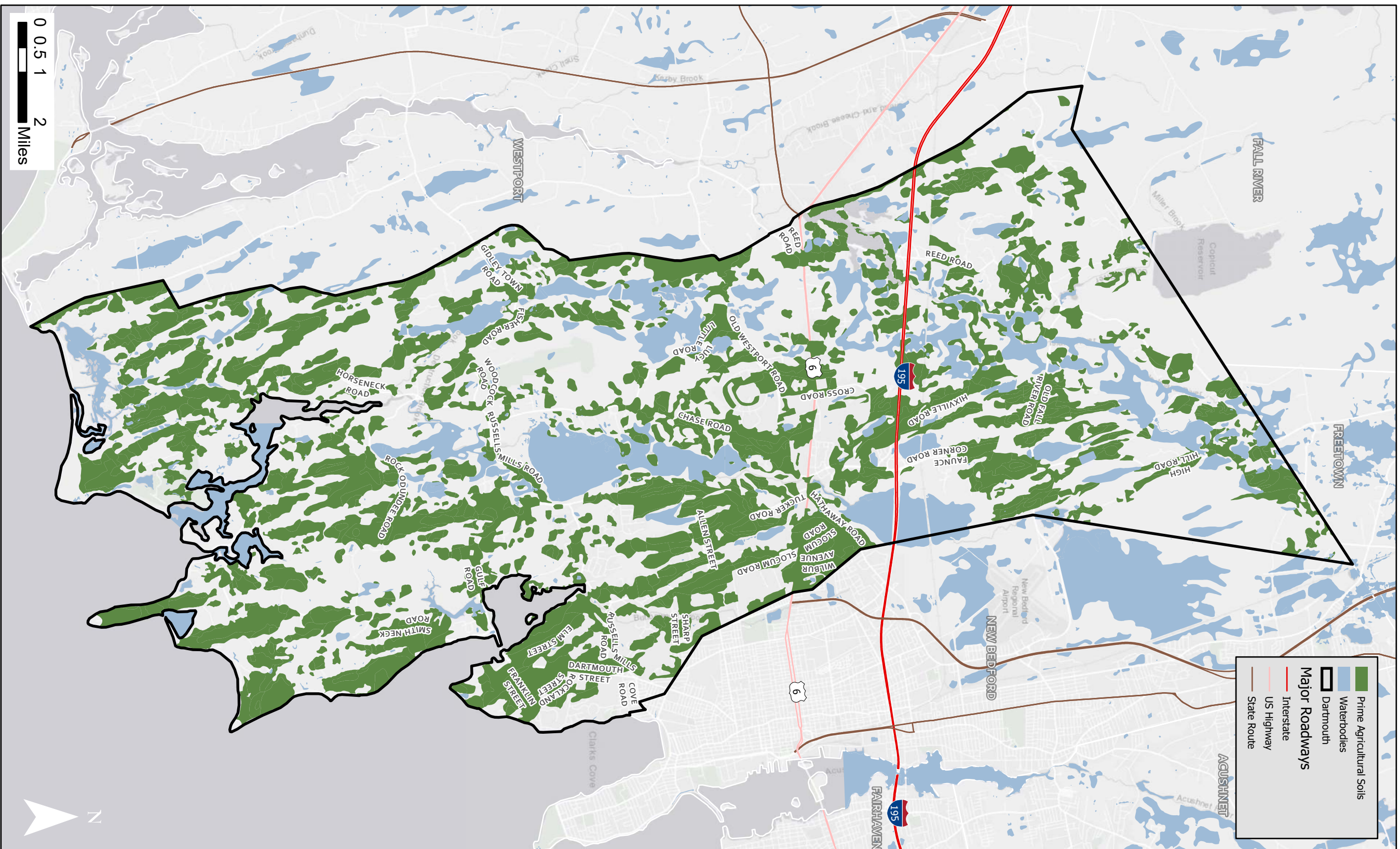
Why Dartmouth / Why Now?

Dartmouth residents cited the town’s natural resources as an essential pillar of community character. The town can influence the development that does occur to be undertaken in away that consumes land efficiently and has least impact to natural resources as possible.

| Key Strategies for Action | | | |
|---------------------------|--|---|------------|
| Strategy | | Responsible Party | Time frame |
| NC-6A | Incentivize the use of the town’s OSRD bylaw. | Planning Board, Town Meeting | 1 Year |
| NC-6B | Perform a zoning, subdivision, and site plan review by-law audit in order to find places where low impact development regulations (reduced impervious cover, increased water infiltration, decreased vegetation removal, etc) can be included as preferred development options. | Planning Board | 1 Year |
| NC-6C | Evaluate the potential for dam removals along the Paskamanset River and Buttonwood Brook. | Waterways Management Commission, BBC, DNRT | 3 years |
| NC-6D | Develop a plan for an alternative waste landfill site upon the closing of the Crapo Hill Landfill in 2027 that minimizes harm to the environment. | Town Administrator, Select Board, DPW and DPW Board | 3-5 years |
| NC-6E | Meet the town’s MS4 requirements and upgrade the stormwater system with retrofits that use current Best Management Practices for mitigating pollutants from runoff. | DPW and DPW Board | on-going |

Prime Agricultural Soils Map

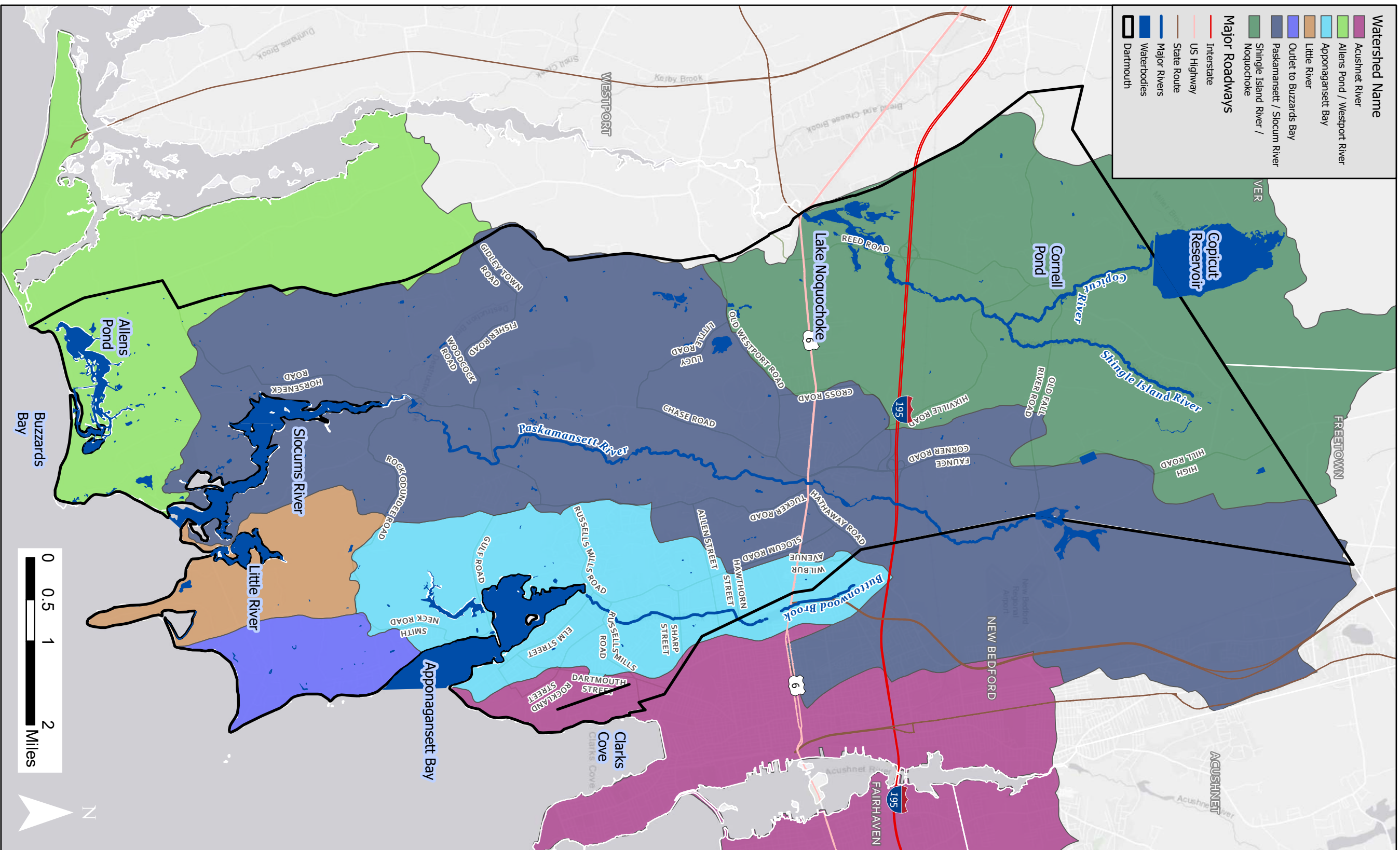
Source: MassGIS, Esri, HERE, Garmin, INCREMENT P, USGS, EPA, MassGIS, NRCS





Sub-Watershed Map

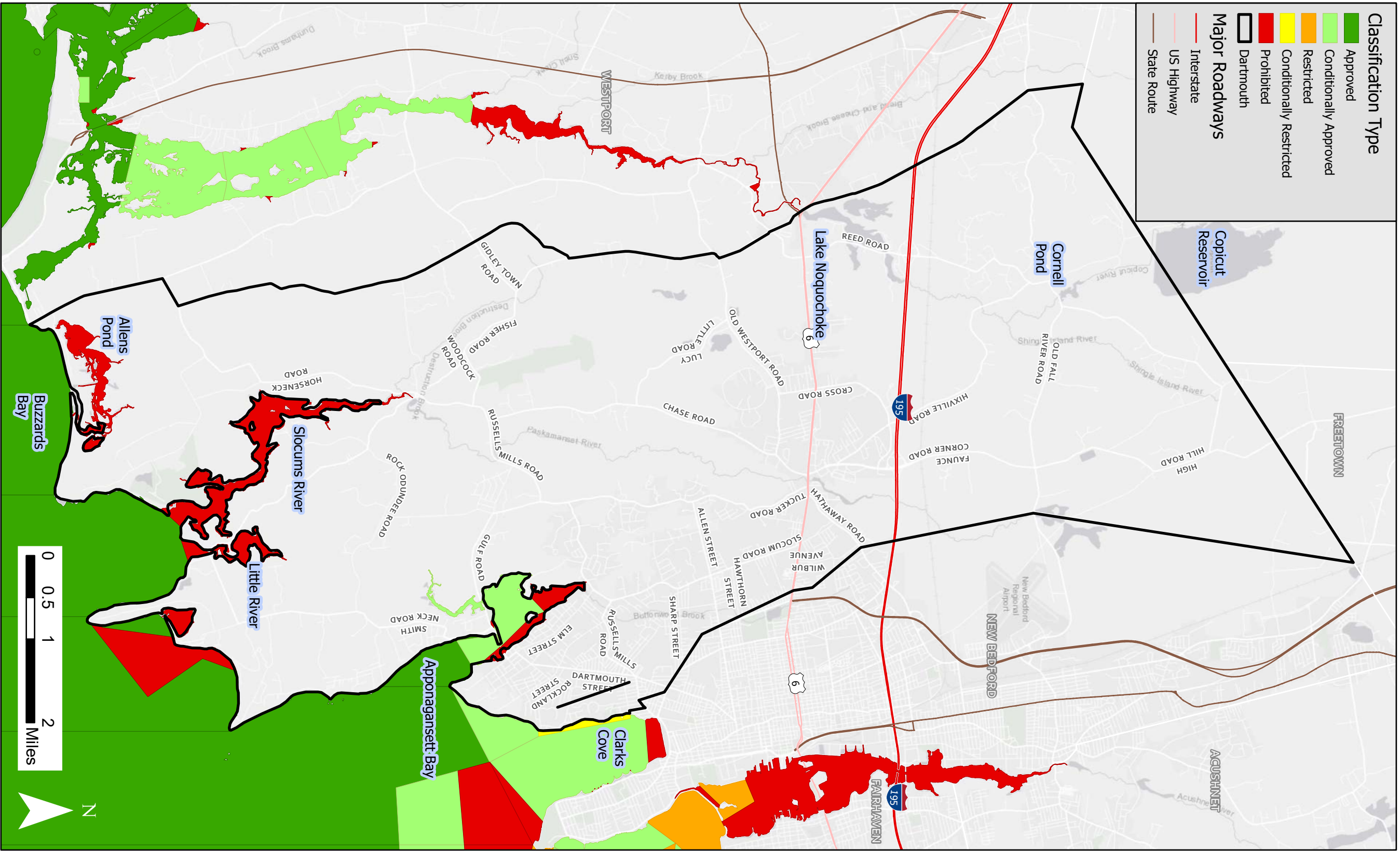
Source: MassGIS, Esri, HERE, Garmin, USGS, EPA, NPS, MassGIS





Designated Shellfish Growing Areas Map

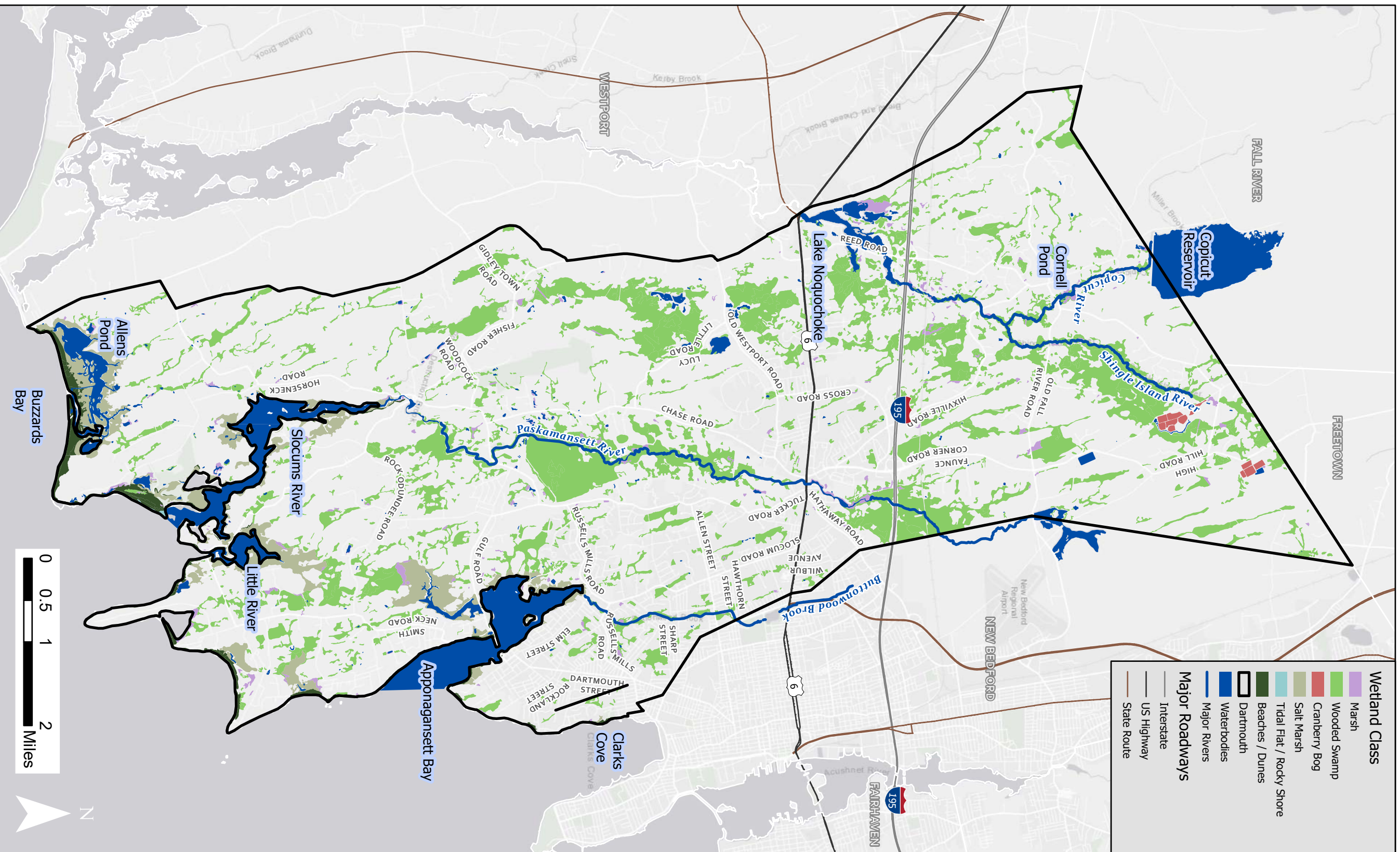
Source: MassGIS, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA, MassGIS





Wetlands Map

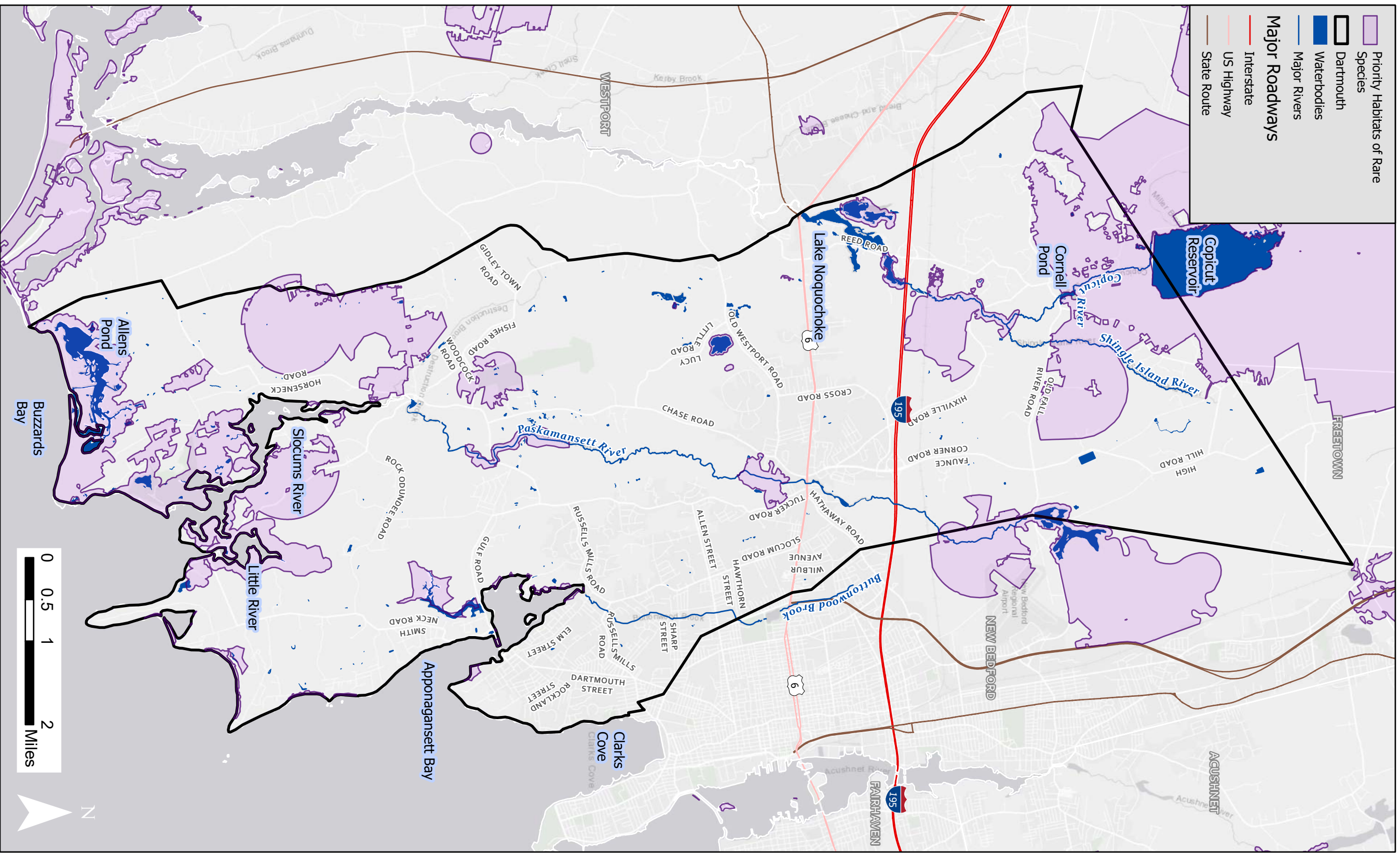
Source: MassGIS, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA, MassGIS





NHESP Priority Habitats of Rare Species Map

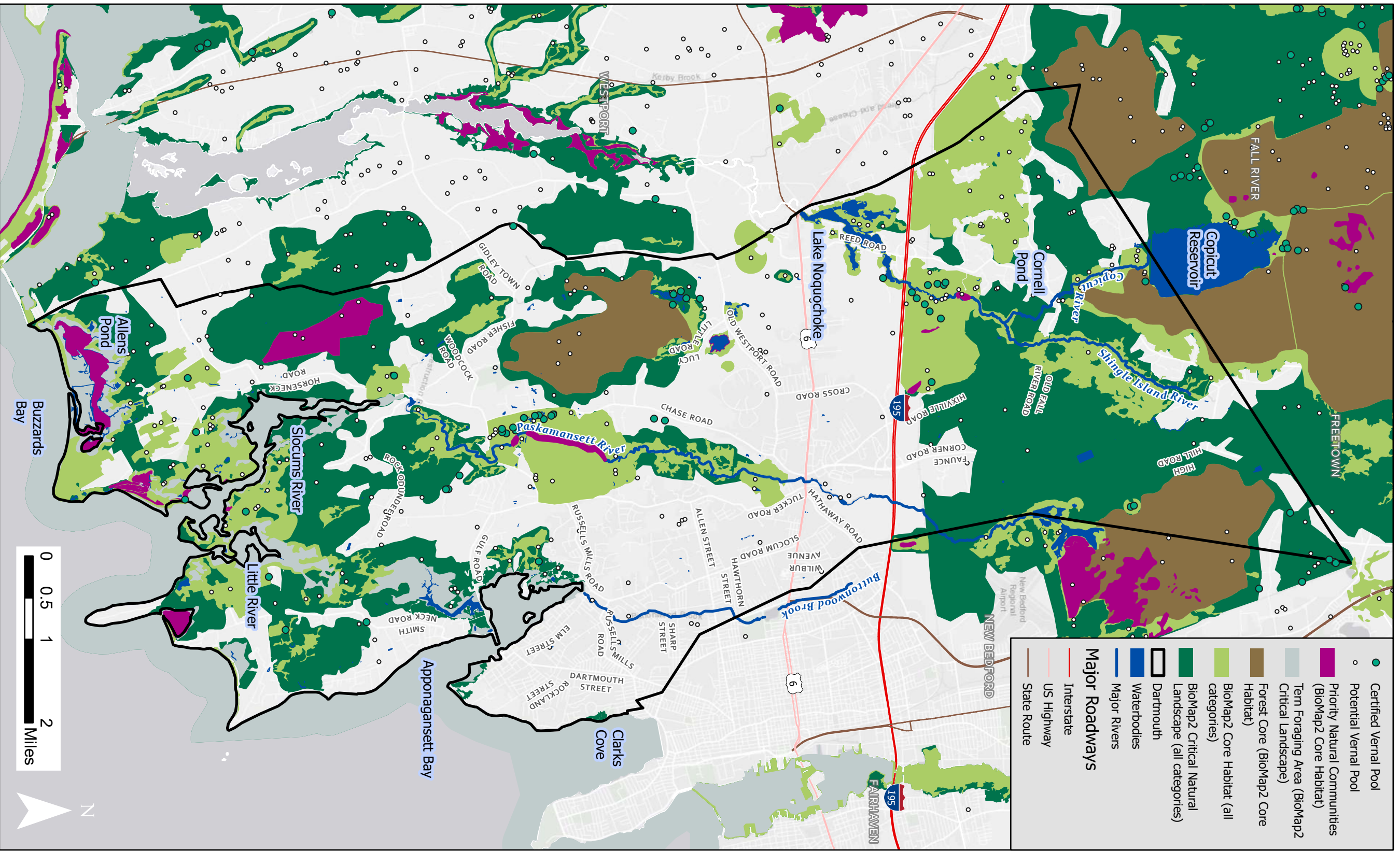
Source: MassGIS, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA, MassGIS, NHESP/TNC





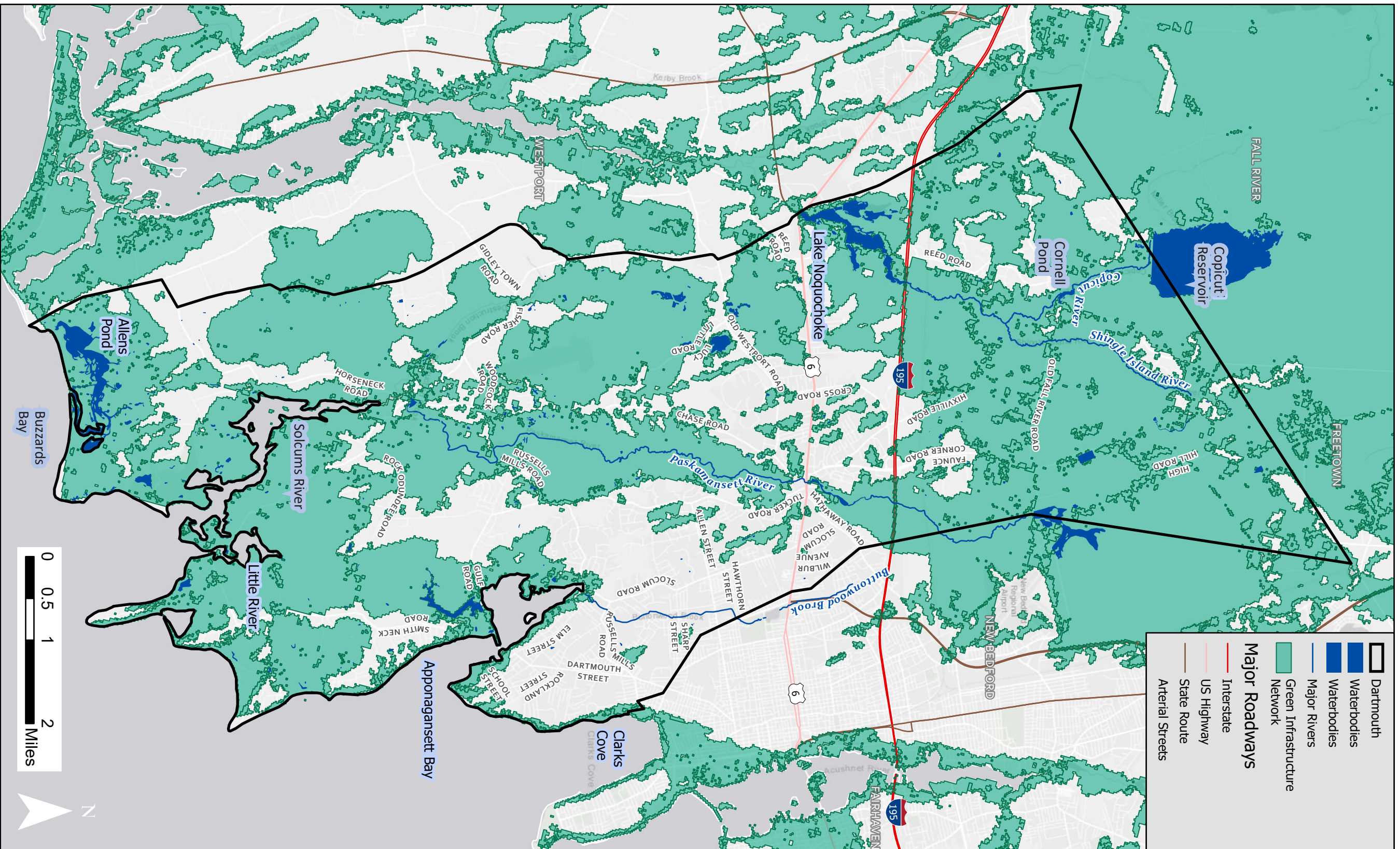
NHESP/TNC BioMap2 Core and Critical Habitat Area Map

Source: MassGIS, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA, MassGIS, NHESP/TNC





Green Infrastructure Map

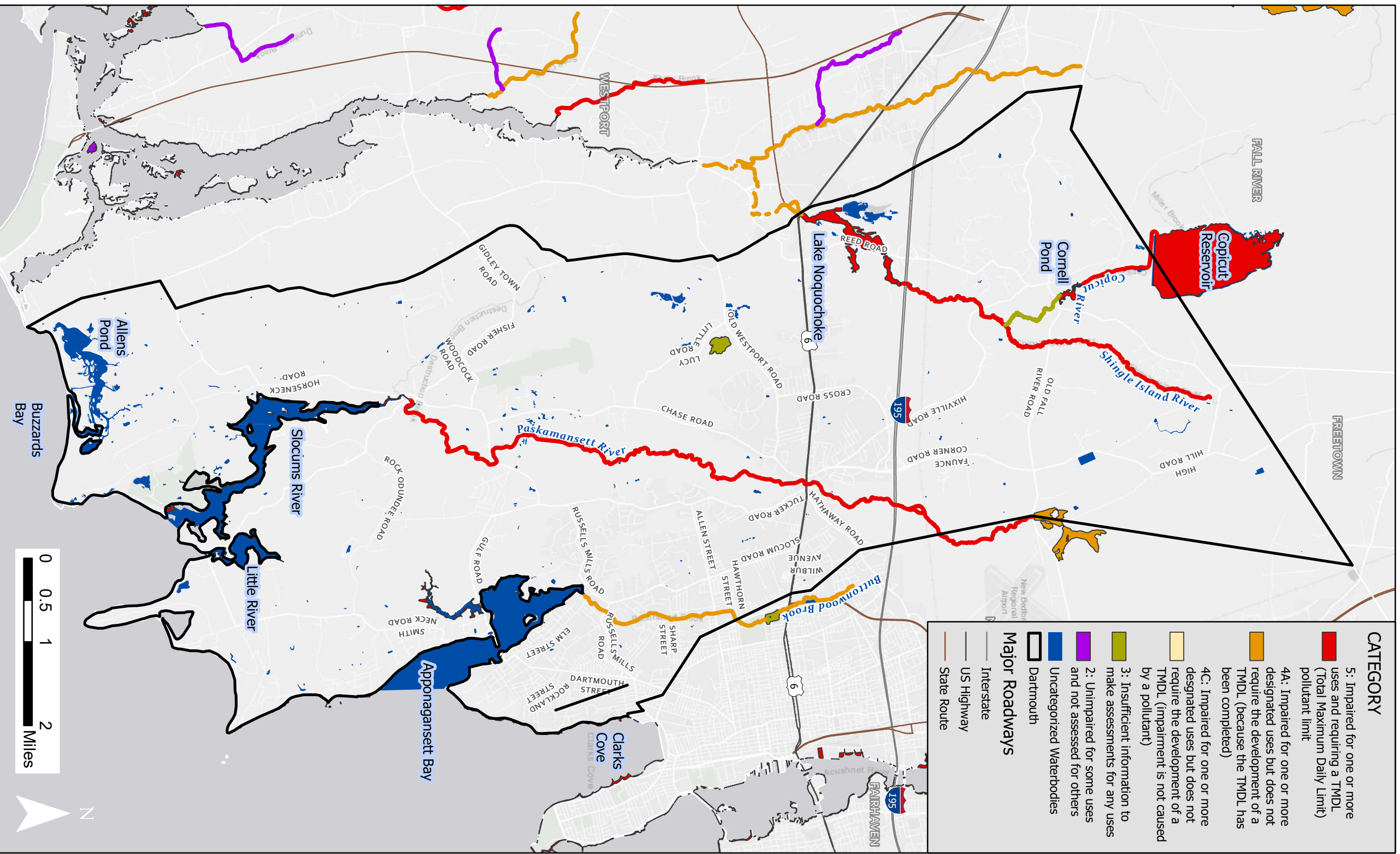


Source: MassGIS, Esri, HERE, Garmin, USGS, EPA, NPS, MassAudubon Green Infrastructure Mapping 2017.



Integrated Waters by Impairment Category

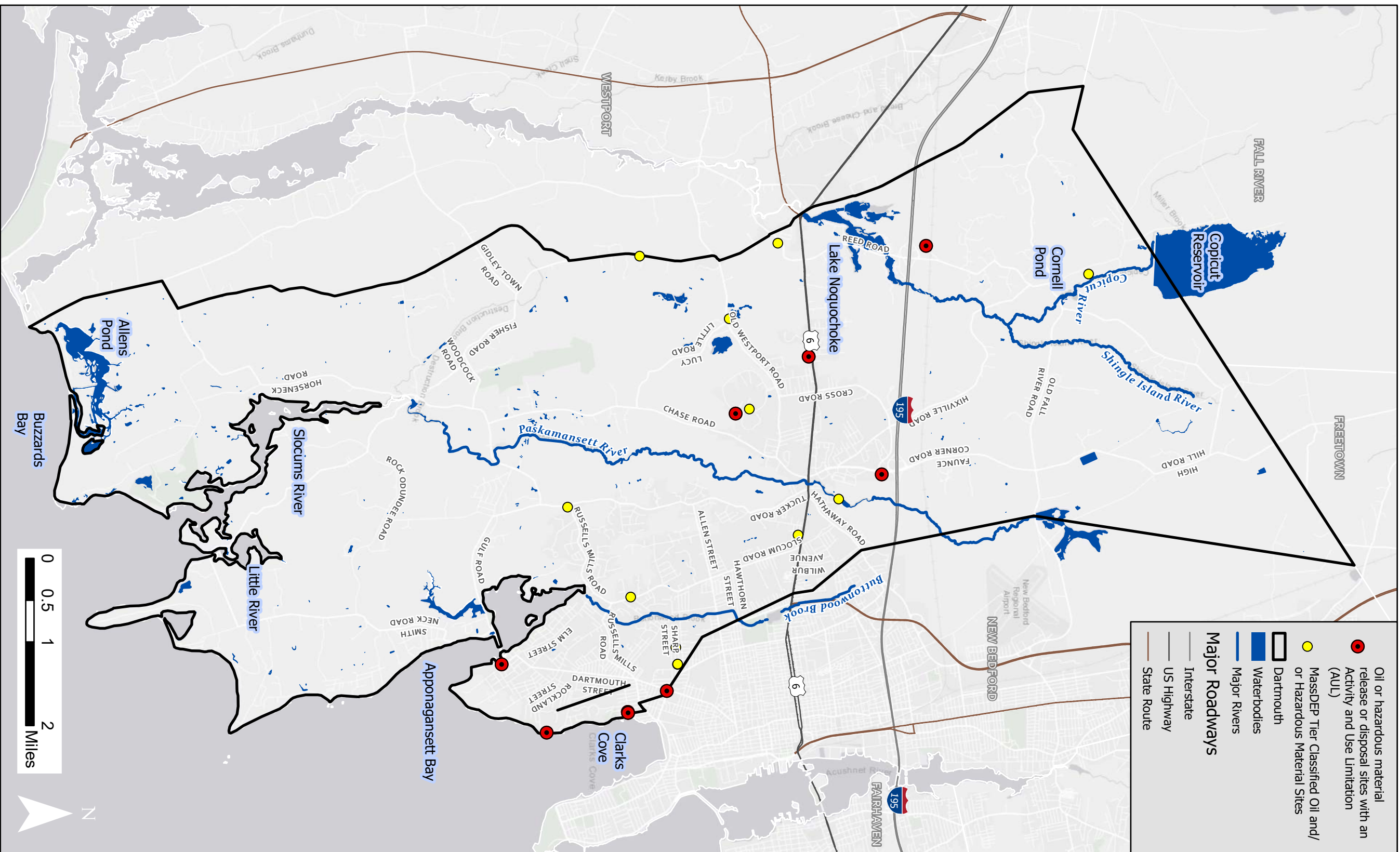
Source: MassGIS, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA, MassGIS





21E Hazardous Materials Sites Map

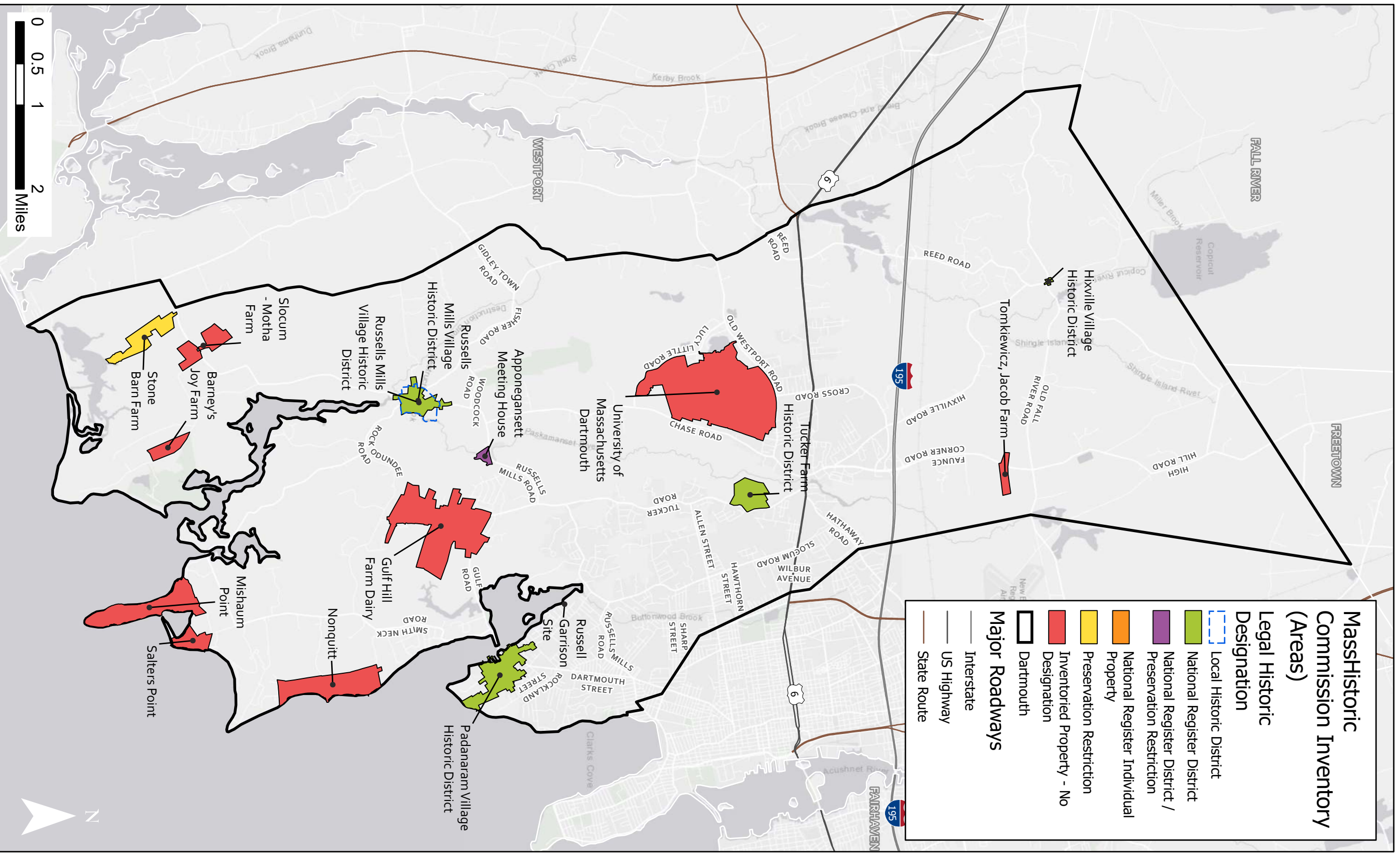
Source: MassGIS, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, EPA, MassGIS





Historic Features Map

Source: MassGIS, Esri, HERE, Garmin, USGS, EPA, NPS, MassGIS MHC Historic Inventory Datalayer, February 2022



MassHistoric Commission Inventory (Areas)

- National Register District
- National Register District / Preservation Restriction
- National Register Individual Property
- Preservation Restriction
- Inventoried Property - No Designation
- Dartmouth

Major Roadways

- Interstate
- US Highway
- State Route

Legal Historic Designation

- Local Historic District

