

# Association to Preserve Cape Cod Critical Habitats Atlas

## Atlas Overview

“A myriad of habitats combine to form the Cape Cod environment. Many of these habitats are globally uncommon, and the species that dwell within them are correspondingly rare.” – Cape Cod Critical Habitats Atlas, 1990

This online map is intended to provide a one-stop source for information about Cape Cod’s most critical habitats. It is designed to aid in planning and conservation decisions, as well as to provide community members with a greater understanding of our natural environment.

Users have the ability to choose which Cape Cod habitat data to view by selecting unique layer combinations. Included among the many data layers are the Cape’s natural communities, which are unique assemblages of plant and animal species that have been identified and ranked according to a standardized system established by the state’s Natural Heritage and Endangered Species Program (NHESP). Documentation of the Cape’s heretofore largely unmapped natural communities is an ongoing process being undertaken by APCC, and future updates of the atlas will reflect further documentation of this region’s high priority natural communities.

The project was made possible through generous support from the following:

Mary-Louise and Ruth N. Eddy Foundation of Brewster

Massachusetts Bays National Estuary Program

APCC member dues and donations

References:

[NHESP natural community descriptions](#)

[BioMap2](#)

[MassGIS](#)

OLIVER/[MORIS](#)

## Instructions for using the Atlas

Use these instructions to find your way around the map. These instructions are available as a PDF to easily reference while using the map.

### Left side panel



Click the "hamburger" icon to expand the left side panel.



The About section contains a description of the Atlas and pre-set map views.



In the Legend section view the symbology of each category. The legend for some layers will only show up once you have zoomed in enough to see the layer on the map.



In the Layers section, choose the categories to view in your map. Not all checked layers are immediately visible because some are only visible when you zoom in.

### Navigation

Use the buttons overlaid on the map to navigate the map of Cape Cod:



+/- zoom in and out



The viewfinder icon will zoom to your current location if allowed.



The house button returns to the default view of the entire Cape. More pre-set views are available in the About section.



Click and drag the map to move the view to other locations.

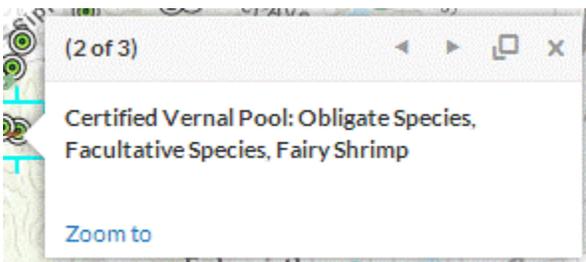


Use the search bar to the right of the title to zoom to an address (e.g. Meetinghouse Rd, Mashpee). You cannot search for features in the mapped layers, such as natural communities or fish runs.



In the About section, there are pre-set map views for the Cape regions so you can zoom to upper, mid, lower, or outer Cape.

### Pop-ups, basemap, and sharing



Clicking on most of the mapped features will produce an informational “pop-up box.” When more than one feature is near the point you clicked, the top bar will

say for example (1 of 2). Use the arrows to the right to view information for the overlapping features.



"Basemap" refers to the reference map that persists below the selectable layers; the default basemap is a topographic map. At any point, you can switch the background from the topo map to "Hybrid" satellite imagery.



Share the map using the network icon next to the search bar. However, anyone who follows your share link must reselect your layers to view the same map.

### **Suggested tours**

On the left panel in Layers, check the box next to Priority Habitats and notice that most of the Cape, especially the marine environment, is considered a priority conservation habitat. Un-check the layer.

Check the boxes next to all three natural community types. Check on any other layers you are interested in, for instance Anadromous Fish Runs and Certified Vernal Pools. We recommend that you display no more than four layers at once for clean display. Keep in mind that some features and their entry in the legend only display at close zoom levels. For example, although Vernal Pools are selected, they are not visible at the default view of the entire Cape. Switch to the Legend section where you will see the headings of the three layers you selected in the Layers section: Natural Communities, Anadromous Fish Runs, and Certified Vernal Pools. A symbology key is listed below each heading. Some layer headings are only visible when you zoom in. This is evident when you zoom in to a Cape region while viewing the Legend. The legend expands to list each natural community by type and detailed shapes appear on the map.

Identify your town and pick one natural community of interest (some layers add slower than others, so click once and give the map a chance to load). Click and drag to center the map on the feature and then click the plus button to zoom in. Now, you can click the area for more information about the natural community in your neighborhood. When you click on the shape, the outline is highlighted and a "pop-up" box appears with information about the natural community site, including: name, priority rank, acreage, ownership, documenting organization, a brief description and sometimes a photo.

The pop-up also offers the option to "Zoom to," which zooms to the extent of the selected feature. Click Zoom to and then select the Hybrid basemap in the upper right corner. Look at the details in the imagery to interpret more information, such as the level of development in the area or the patchiness of vegetation. Remember that the imagery is not necessarily recent.

### **Data Sources**

Data are displayed for Barnstable County as distributed from the source. However, APCC does eliminate all features beyond Barnstable County's offshore boundaries.

## **MassGIS**

Most of the data on the map are distributed by MassGIS, otherwise known as the Office of Geographic Information for the Commonwealth of Massachusetts, and are a “comprehensive, statewide database of geospatial information.” In its capacity as a geodata repository, it provides high-quality standardized statewide data from various sources for use and download. MassGIS staff consult with all sectors (government, industry, non-profit, and academia) to provide a comprehensive database. The MassGIS data can be found on the [Datalayers](#) page of MassGIS. These descriptions of data layers are paraphrased excerpts from the data distribution pages. More information about the data layers can be found via the links in the About tab, located in the panel to the left of the map. BioMap2, anadromous fish runs, and special, sensitive or unique species data were obtained from MassGIS.

## **Natural Heritage & Endangered Species Program (NHESP)**

The Massachusetts [Natural Heritage & Endangered Species Program](#) (NHESP) is part of the NatureServe Network. It is responsible for all plant and animal species that are considered fishery, game, or agriculture and prioritizes protection of the most vulnerable species. Toward the goal of protecting “the state’s wide range of native biological diversity”, NHESP conducts field surveys and research, education campaigns, ecological restoration projects, species regulation, land protection and education. The NHESP developed BioMap2, a conservation plan that incorporates natural heritage data into a planning tool. NHESP carries out a habitat classification known as Natural Communities.

## **Coastal Zone Management (CZM)**

The [Massachusetts Office of Coastal Zone Management](#) (CZM) is a part of the [Executive Office of Energy and Environmental Affairs](#) (EEA). CZM's mission is to balance the impacts of human activity with the protection of coastal and marine resources. As a networked program, CZM works with other state agencies, federal agencies, local governments, academic institutions, nonprofit groups, and the general public to promote sound management of the Massachusetts coast. CZM is funded primarily through the [Commonwealth of Massachusetts](#), the [National Oceanic and Atmospheric Administration](#) (NOAA), and the [U.S. Environmental Protection Agency](#) (EPA).

## **Department of Environmental Protection (DEP)**

The DEP’s Wetlands Conservancy Program delineates wetland boundaries as well as eelgrass beds using aerial imagery and automated image classification techniques and state-of-the-art field validation. Among the many responsibilities of the Department of Environmental Protection is the preservation of wetlands and coastal resources. “Coastal wetlands are directly adjacent to the ocean and include beaches, salt marshes, dunes, coastal banks, rocky intertidal shores, and barrier beaches. Inland wetlands are areas where water is at or just below the surface of the ground. Although these wetlands can appear dry during some seasons, they contain enough water to support certain plants and soils. Inland wetlands include marshes, wet meadows, bogs, and swamps. Wetlands that border on ponds, lakes, rivers, and streams are called bordering vegetated wetlands... Wetlands protect our health, safety, and property, as well as provide habitat for a variety of wildlife.” The DEP [Wetlands Protection](#) page has a wealth of documents and links about wetlands data and protection.

## Cape Cod Commission

The GIS department of the [Cape Cod Commission](#) maintains an associated repository at the Cape Cod level. It provides some of the MassGIS data clipped to the Cape Cod region.

## Map Layers

The following layers or groups of layers are presented in the order in which they can be found in the legend. That order was designed for usability and is based on the following order: layers unique to the Cape Cod Critical Habitats Atlas (e.g. Natural Communities), point locations (Vernal Pools), broad environmental designations (e.g. ACECs), BioMap2 layers, specific conservation layers (e.g. Roseate Tern Breeding Habitat), and finally contextual layers (e.g. Streams).

Remember that layers can always be toggled off or on using the check boxes in the Layers section of the side panel. Links to further information and data sources can be found in the Data Sources section above.

### Natural Communities

*APCC, NHESP*

Natural Communities are areas with characteristic assemblages of plant and animal species, according to Natural Heritage and Endangered Species Program (NHESP) definitions. Each community has a rank between S1 and S5 that reflects its state-wide conservation priority. For example, S1 communities are the most rare and/or sensitive species assemblages in the state. S1–S3 communities are considered priority.

This APCC data set merges natural communities documented by NHESP with those surveyed by APCC in collaboration with NHESP. In addition to the state priorities, the data identifies communities that are rare and/or threatened on the Cape. APCC refrained from categorical assessments of community condition, leaving such designations to NHESP. Please note that this data layer is not complete. Many priority natural communities on the Cape have yet to be documented and do not appear on the map. If conservation land or private is not indicated, the ownership is undocumented. If the survey date is not included, it is unknown but collected before 2011 by NHESP.

For information from the source, view NHESP's natural community [overview](#), [classification methods](#), and [community fact sheets](#).

### Anadromous Fish

*APCC, DMF*

Anadromous Fish Runs represents semi-annual fish migration paths between inland ponds and the ocean. The Runs are based on the Anadromous Fish Presence, which were locations of known fish presence based on surveys by the Massachusetts Division of Marine Fisheries (DMF). These data are based on survey points from the DMF, knowledge of local experts, stream data and satellite imagery. Of these fish, [river herring](#) receive the most attention. The run sites evolve as restoration projects develop

and progress.

### **Vernal Pools, Certified:**

*NHESP*

Vernal pools are small, shallow ponds characterized by a lack of fish and annual or semi-annual periods of dryness. They are critical habitats for a variety of wildlife species, including some amphibians that breed in them exclusively and organisms such as fairy shrimp that spend their entire life cycles in them. Certified vernal pools have been certified by the NHESP using field data and the official “Guidelines for the Certification of Vernal Pool Habitat.” They are protected as critical wetland resources.

[MassGIS Data - NHESP Certified Vernal Pools](#)

### **Vernal Pools, Potential**

*NHESP*

Potential vernal pools were interpreted from aerial photographs, and many have not been identified due to unfavorable conditions or confounding landscape settings, such as wetlands. Unlike certified vernal pools, potential vernal pools do not fall under wetlands protection laws.

[MassGIS Data - NHESP Certified Vernal Pools](#)

### **ACECs**

*DCR, CZM*

ACECs (Areas of Critical Environmental Concern) 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 EEA Secretary. 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.

### **Priority and Estimated Habitats of Rare Species**

*NHESP, effective 2008*

Priority Habitats polygons represent the geographic extent of habitat of state-listed rare species in Massachusetts. Estimated Habitats of Rare Wildlife are subsets of the Priority Habitats based on occurrences of rare wetland wildlife. Both data sets are based on the last 25 years of observations catalogued by the NHESP. Priority Habitat polygons are the filing trigger for project proponents, municipalities, and all others for determining whether or not a proposed project or activity must be reviewed by the NHESP for compliance with the Massachusetts Endangered Species Act (MESA) and its implementing regulations.

### **BioMap2**

*NHESP, Nature Conservancy Massachusetts*

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.

### [MassGIS Data - BioMap2](#)

#### **BioMap2 Core Habitat**

Core Habitat is critical to the long-term persistence of rare species and other Species of Conservation Concern, as well as a wide diversity of natural communities and intact ecosystems across the Commonwealth. Specifically, it is the combined extents of the Forest, Wetland, Aquatic, and Vernal Pool Cores, Species of Conservation Concern, and Priority Natural Communities, which are also included.

#### **BioMap2 Critical Natural Landscape**

Critical Natural Landscape complements Core Habitat and includes large natural landscape blocks that provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience; and includes buffering uplands around coastal, wetland, and aquatic Core Habitats to ensure their long-term integrity. The Coastal Adaptation Analysis indicates areas with high potential to support inland migration of salt marsh and other coastal habitats over the coming century.

#### **Barrier Beaches**

*MassDEP*

Coastal Features includes barrier beaches and coastal barriers. The state **barrier beach** data layer and the **coastal barrier resource units** (designated by the U.S. Fish and Wildlife Service) data layer were compiled by the Resource Mapping Project staff at the University of Massachusetts, Amherst for the [Massachusetts Coastal Zone Management Program](#). The designations show barrier beaches and the associated aquatic habitat.

#### **National Seashore Vegetation Communities**

*National Park Service*

The [Cape Cod National Seashore](#) provided a land cover classification map of vegetation communities. APCC condensed each vegetation community into one feature for every vegetation community. This is visible in the attribute table or when a feature of the layer is selected – all the polygons of the same vegetation community will also be selected.

#### **Roseate Tern and Arctic Least Common Tern**

*DFW, NHESP*

Roseate Tern and Arctic Least Common Tern core habitat is determined by the confluence of breeding, staging, and foraging areas. Breeding and staging areas were identified and mapped by biologists and buffered 0.3 nautical miles. The original perimeters were converted to a grid for consistent comparison of a variety of datasets.

#### **Colonial Waterbirds Important Nesting Habitat**

*DFW, NHESP*

Colonial Waterbirds Important Nesting Habitat shows important nesting sites for colonial nesting waterbirds, based on a dataset that originated from the [Massachusetts Division of Fisheries and Wildlife](#) Natural Heritage and Endangered Species Program (DFW/NHESP). These sites represent areas where more than 100 pairs of the following species of colonial nesting waterbirds were observed during surveys in 1994 and 2006: Common Terns, Least Terns, Roseate Terns, Arctic Terns, Leach's Storm-Petrels, Double-crested Cormorants, Herring Gulls, Great Black-backed Gulls, Laughing Gulls, Black Skimmers, Great Egrets, Snowy Egrets, Cattle Egrets, Little Blue Herons, Black-crowned Night Herons, and Glossy Ibis. The important habitat areas are the nesting sites buffered 0.3 nautical miles.

## **Wetlands**

*MassDEP*

The wetlands layer outlines environments such as salt marsh, open water, tidal flats, and barrier beaches. Classification was performed from 1:12,000 scale on aerial photographs by UMASS Amherst and field checked by [Massachusetts Department of Environmental Protection](#) (DEP) Wetlands Conservancy Program (WCP). Lines were generalized to facilitate display. The DEP's Wetlands Conservancy Program delineates wetland boundaries using aerial imagery and automated image classification techniques.

## **Eelgrass**

*MassDEP*

Seagrass beds are critical wetlands components of shallow marine ecosystems. The beds provide food and cover for many important fauna and their prey and the leaf canopy calms the water, filters suspended matter and stabilizes sediment. These data were mapped in 1995 and 2001 using remote sensing and field-checked with underwater video data. In 2014, they remain the most complete layer of the Cape Cod coast.

[MassGIS Data - MassDEP Eelgrass Mapping Project](#)

## **Agriculture**

*MassGIS*

Active Agriculture indicates lands actively used for agricultural purposes based on the 2005 Massachusetts Land Use dataset. The Land Use dataset used 2005 imagery with a minimum mapping unit of 1 acre. Cranberry Bogs show bogs that were known and active as of May 2013.

## **Streams**

*Cape Cod Commission*

This geodatabase intends to represent the hydrography within Barnstable County (Cape Cod). The lines represent inland water body shore lines and riverine features.

## **Watersheds**

*Cape Cod Commission*

This layer includes watershed boundaries for all of Cape Cod (Barnstable County). GIS and Water Resources staff at the Cape Cod Commission merged the geodata for individual watersheds. The layer is named Embayments in the Cape Cod Commission web map server.