This report and associated map provide information about important sites for biodiversity conservation in your area.

This information is intended for conservation planning, and is not intended for use in state regulations.
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Introduction

The Massachusetts Department of Fish & Game, through the Division of Fisheries and Wildlife’s Natural Heritage & Endangered Species Program (NHESP), and The Nature Conservancy’s Massachusetts Program developed BioMap2 to protect the state’s biodiversity in the context of climate change.

BioMap2 combines NHESP’s 30 years of rigorously documented rare species and natural community data with spatial data identifying wildlife species and habitats that were the focus of the Division of Fisheries and Wildlife’s 2005 State Wildlife Action Plan (SWAP). BioMap2 also integrates The Nature Conservancy’s assessment of large, well-connected, and intact ecosystems and landscapes across the Commonwealth, incorporating concepts of ecosystem resilience to address anticipated climate change impacts.

Protection and stewardship of BioMap2 Core Habitat and Critical Natural Landscape is essential to safeguard the diversity of species and their habitats, intact ecosystems, and resilient natural landscapes across Massachusetts.

What Does Status Mean?

The Division of Fisheries and Wildlife determines a status category for each rare species listed under the Massachusetts Endangered Species Act (MESA), M.G.L. c.131A, and its implementing regulations 321 CMR 10.00. Rare species are categorized as Endangered, Threatened or of Special Concern according to the following:

- Endangered species are in danger of extinction throughout all or a significant portion of their range or are in danger of extirpation from Massachusetts.
- Threatened species are likely to become Endangered in Massachusetts in the foreseeable future throughout all or a significant portion of their range.
- Special Concern species have suffered a decline that could threaten the species if allowed to continue unchecked or occur in such small numbers or with such restricted distribution or specialized habitat requirements that they could easily become Threatened in Massachusetts.

In addition NHESP maintains an unofficial watch list of plants that are tracked due to potential conservation interest or concern, but are not regulated under the Massachusetts Endangered Species Act or other laws or regulations. Likewise, described natural communities are not regulated by any law or regulations, but they can help to identify ecologically important areas that are worthy of...
Core Habitat identifies key areas that are critical for 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. Protection of Core Habitats will contribute to the conservation of specific elements of biodiversity.

Critical Natural Landscape identifies large natural Landscape Blocks that are minimally impacted by development. If protected, these areas will provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience to natural and anthropogenic disturbances in a rapidly changing world. Areas delineated as Critical Natural Landscape also include buffering upland around wetland, coastal, and aquatic Core Habitats to help ensure their long-term integrity.

The long-term persistence of Massachusetts biological resources requires a determined commitment to land and water conservation. Protection and stewardship of both Critical Natural Landscapes and Core Habitats are needed to realize the biodiversity conservation vision of BioMap2.

Components of Core Habitat

Core Habitat identifies specific areas necessary to promote the long-term persistence of rare species, other Species of Conservation Concern, exemplary natural communities, and intact ecosystems.

Rare Species

There are 432 native plant and animal species listed as Endangered, Threatened or Special Concern under the Massachusetts Endangered Species Act (MESA) based on their rarity, population trends, and threats to survival. For
Table 1. Species of Conservation Concern described in the State Wildlife Action Plan and/or included on the MESA List and for which habitat was mapped in BioMap2. Note that plants are not included in SWAP, and that marine species such as whales and sea turtles are not included in BioMap2.

<table>
<thead>
<tr>
<th>Taxonomic Group</th>
<th>MESA-listed Species of Conservation Concern</th>
<th>Non-listed Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammals</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Birds</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>Reptiles</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Amphibians</td>
<td>4</td>
<td>3</td>
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<tr>
<td>Fish</td>
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<td>17</td>
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<tr>
<td>Invertebrates</td>
<td>102</td>
<td>9</td>
</tr>
<tr>
<td>Plants</td>
<td>256</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>413</strong></td>
<td><strong>62</strong></td>
</tr>
</tbody>
</table>

BioMap2, NHESP staff identified the highest quality habitat sites for each non-marine species based on size, condition, and landscape context.

Other Species of Conservation Concern

In addition to species on the MESA List described previously, the State Wildlife Action Plan (SWAP) identifies 257 wildlife species and 22 natural habitats most in need of conservation within the Commonwealth. BioMap2 includes species-specific habitat areas for 45 of these species and habitat for 17 additional species which was mapped with other coarse-filter and fine-filter approaches.

Priority Natural Communities

Natural communities are assemblages of plant and animal species that share a common environment and occur together repeatedly on the landscape. BioMap2 gives conservation priority to natural communities with limited distribution and to the best examples of more common types.

Vernal Pools

Vernal pools are small, seasonal wetlands that provide important wildlife habitat, especially for amphibians and invertebrate animals that use them to breed. BioMap2 identifies the top 5 percent most interconnected clusters of Potential Vernal Pools in the state.

Forest Cores

In BioMap2, Core Habitat includes the best examples of large, intact forests that are least impacted by roads and development, providing critical habitat for numerous woodland species. For example, the interior forest habitat defined by Forest Cores supports many bird species sensitive to the impacts of roads and development, such as the Black-throated Green Warbler, and helps maintain ecological processes found only in unfragmented forest patches.

Wetland Cores

BioMap2 used an assessment of Ecological Integrity to identify the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

Aquatic Cores

To delineate integrated and functional ecosystems for fish species and other aquatic systems.
Species of Conservation Concern, beyond the species and exemplary habitats described above, BioMap2 identifies intact river corridors within which important physical and ecological processes of the river or stream occur.

**Components of Critical Natural Landscape**

Critical Natural Landscape identifies intact landscapes in Massachusetts that are better able to support ecological processes and disturbance regimes, and a wide array of species and habitats over long time frames.

**Landscape Blocks**

BioMap2 identifies the most intact large areas of predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes.

**Upland Buffers of Wetland and Aquatic Cores**

A variety of analyses were used to identify protective upland buffers around wetlands and rivers.

**Upland Habitat to Support Coastal Adaptation**

BioMap2 identifies undeveloped lands adjacent to and up to one and a half meters above existing salt marshes as Critical Natural Landscapes with high potential to support inland migration of salt marsh and other coastal habitats over the coming century.

The conservation areas identified by BioMap2 are based on breadth and depth of data, scientific expertise, and understanding of Massachusetts’ biodiversity. The numerous sources of information and analyses used to create Core Habitat and Critical Natural Landscape are complementary, and outline a comprehensive conservation vision for Massachusetts, from rare species to intact landscapes. In total, these robust analyses define a suite of priority lands and waters that, if permanently protected, will support Massachusetts’ natural systems for generations to come.

**Legal Protection of Biodiversity**

BioMap2 presents a powerful vision of what Massachusetts would look like with full protection of the land most important for supporting the Commonwealth’s biodiversity. While BioMap2 is a planning tool with no regulatory function, all state-listed species enjoy legal protection under the Massachusetts Endangered Species Act (M.G.L. c.131A) and its implementing regulations (321 CMR 10.00). Wetland habitat of state-listed wildlife is also protected under the Wetlands Protection Act Regulations (310 CMR 10.00). The Natural Heritage Atlas contains maps of Priority Habitats and Estimated Habitats, which are used, respectively, for regulation under the Massachusetts Endangered Species Act and the Wetlands Protection Act. For more information on rare species regulations, and to view Priority and Estimated Habitat maps, please see the Regulatory Review page at http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/.

BioMap2 is a conservation planning tool that does not, in any way, supplant the Estimated and Priority Habitat Maps which have regulatory significance. Unless and until the BioMap2 vision is fully realized, we must continue to protect our most imperiled species and their habitats.
Understanding Core Habitat Summaries

Following the Town Overview, there is a descriptive summary of each Core Habitat and Critical Natural Landscape that occurs in your city or town. These summaries highlight some of the outstanding characteristics of each Core Habitat and Critical Natural Landscape, and will help you learn more about your city or town’s biodiversity. You can find out more information about many of these species and natural communities by looking at specific fact sheets at www.mass.gov/nhesp.

Additional Information

For copies of the full BioMap2 report, the Technical Report, and an interactive mapping tool, visit the BioMap2 website via the Land Protection and Planning tab at www.mass.gov/nhesp. If you have any questions about this report, or if you need help protecting land for biodiversity in your community, the Natural Heritage & Endangered Species Program staff looks forward to working with you.

Contact the Natural Heritage & Endangered Species Program

By phone 508-389-6360
By fax 508-389-7890
By email natural.heritage@state.ma.us
By Mail 100 Hartwell Street, Suite 230
West Boylston, MA 01583

The GIS datalayers of BioMap2 are available for download from MassGIS at www.mass.gov/mgis.
**Town Overview**

Halifax lies within the Bristol Lowland/Narragansett Lowland Ecoregion, an area of flat, gently rolling plains. Forests are mostly central hardwoods and some elm-ash-red maple and red and white pine. There are numerous wetlands, some cropland/pasture, and many cranberry bogs. Many rivers drain this area.

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**Halifax at a Glance**

- **Total Area:** 11,127 acres (17.4 square miles)
- **Human Population in 2010:** 7,518
- **Open space protected in perpetuity:** 2,188 acres, or 19.7% percent of total area*
- **BioMap2 Core Habitat:** 3,208 acres
- **BioMap2 Core Habitat Protected:** 867 acres or 27.0%
- **BioMap2 Critical Natural Landscape:** 6,773 acres
- **BioMap2 Critical Natural Landscape Protected:** 1,798 acres or 26.5%.

**BioMap2 Components**

**Core Habitat**
- 15 Wetland Cores
- 4 Aquatic Cores
- 1 Vernal Pool Core
- 7 Species of Conservation Concern Cores**
  - 5 birds, 2 reptiles, 1 fish, 2 insects, 3 mussels,

**Critical Natural Landscape**
- 3 Landscape Blocks
- 7 Wetland Core Buffers
- 5 Aquatic Core Buffers

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* Calculated using MassGIS data layer “Protected and Recreational Open Space—March, 2012”.

** See next pages for complete list of species, natural communities and other biodiversity elements.
BioMap2 Core Habitat and Critical Natural Landscape in Halifax

BioMap2 Core Habitat
BioMap2 Critical Natural Landscape

1 Mile

For more information on rare species and natural communities, please see our fact sheets online at www.mass.gov/nheosp.
Species of Conservation Concern, Priority and Exemplary Natural Communities, and Other Elements of Biodiversity in Halifax

Mussels

- **Tidewater Mucket**, (*Leptodea ochracea*), SC
- **Eastern Pondmussel**, (*Ligumia nasuta*), SC
- **Triangle Floater**, (*Alasmidonta undulata*), Non-listed SWAP species

Insects

- **Damsselflies**
  - **New England Bluet**, (*Enallagma laterale*), Non-listed SWAP species

- **Dragonflies**
  - **Umber Shadowdragon**, (*Neurocordulia obsoleta*), SC

Fishes

- **Bridle Shiner**, (*Notropis bifrenatus*), SC

Reptiles

- **Eastern Box Turtle**, (*Terrapene carolina*), SC

- **Eastern Hognose Snake**, (*Heterodon platirhinos*), Non-listed SWAP

Birds

- **Upland Sandpiper**, (*Bartramia longicauda*), E
- **American Bittern**, (*Botaurus lentiginosus*), E
- **Common Moorhen**, (*Gallinula chloropus*), SC
- **King Rail**, (*Rallus elegans*), T
- **Sora**, (*Porzana carolina*), Non-listed SWAP

Other BioMap2 Components

- **Aquatic Core**
- **Wetland Core**
- **Vernal Pool Core**
- **Landscape Block**
- **Aquatic Core Buffer**
- **Wetland Core Buffer**

E  = Endangered
T  = Threatened
SC = Special Concern
S1  = Critically Imperiled communities, typically 5 or fewer documented sites or very few remaining acres in the state.
S2  = Imperiled communities, typically 6-20 sites or few remaining acres in the state.
S3  = Vulnerable communities, typically have 21-100 sites or limited acreage across the state.
**BioMap2 Core Habitat in Halifax**

Core IDs correspond with the following element lists and summaries.
Elements of BioMap2 Cores

This section lists all elements of BioMap2 Cores that fall entirely or partially within Halifax. The elements listed here may not occur within the bounds of Halifax.

Core 798

Forest Core
Wetland Core
Aquatic Core
Species of Conservation Concern

Water-willow Stem Borer                 Papaipena sulphurata        T
Four-toed Salamander                    Hemidactylus spectabilis     Non-listed SWAP
Eastern Box Turtle                      Terrapene carolina           SC
Eastern Hognose Snake                   Heterodon platirhinos        Non-listed SWAP
Bridle Shiner                           Notropis bifrenatus          SC
American Bitter                          Batrachoseps attenuatus     E
Common Moorhen                          Gallinula chloropus          SC
King Rail                                Rallus elegans               T
Pied-billed Grebe                       Podilymbus podiceps           E
Sora                                     Porzana carolina             Non-listed SWAP
Upland Sandpiper                        Bartramia longicauda          E
Vesper Sparrow                          Poecetes gramineus           T

Core 800

Wetland Core

Core 807

Wetland Core

Core 811

Wetland Core
Aquatic Core
Species of Conservation Concern

Plymouth Gentian                        Sabatia kennedyana            SC
Eastern Box Turtle                      Terrapene carolina            SC

Core 817

Wetland Core

Core 818

Wetland Core
Core 820
Wetland Core

Core 821
Wetland Core

Core 823
Forest Core
Wetland Core
Aquatic Core
Vernal Pool Core

Priority & Exemplary Natural Communities
Alluvial Atlantic White Cedar Swamp S2
Alluvial Red Maple Swamp S3
Coastal Plain Pondshore S2
Kettlehole Level Bog S2

Species of Conservation Concern
Dwarf Bulrush    Lipocarpha micrantha T
Gypsywort       Lycopus rubellus E
Long-leaved Panic-grass    Panicum rigidulum ssp. pubescens T
Long’s Bitter-cress Cardamine longii E
Long’s Bulrush Scirpus longii T
Pale Green Orchis Platanthera flava var. herbiola T
Philadelphia Panic-grass Panicum philadelphicum ssp. philadelphicum SC
Plymouth Gentian Sabatia kennedyana SC
Pondshore Knotweed Persicaria puritanorum SC
Round-fruited False-loosestrife Ludwigia sphaerocarpa E
Three-angled Spike-sedge Eleocharis tricostata E
Eastern Pondmussel Ligumia nasuta SC
Tidewater Mucket Leptodea ochracea SC
Triangle Floater Alasmidonta undulata Non-listed SWAP
Water-willow Stem Borer Papaipema sulphurata T
Pine Barrens Bluet Enallagma recurvatum T
Four-toed Salamander Hemidactylus scutatum Non-listed SWAP
Eastern Box Turtle Terrapene carolina SC
Eastern Ribbon Snake Thamnophis sauritus Non-listed SWAP
Northern Black Racer Coluber constrictor Non-listed SWAP
Northern Red-bellied Cooter Pseudemys rubriventris pop. 1 E
Spotted Turtle Clemmys guttata Non-listed SWAP
Wood Turtle Glyptemys insculpta SC
Atlantic Sturgeon Acipenser oxyrinchus E
Bridle Shiner Notropis bifrenatus SC
Bald Eagle Haliaeetus leucocephalus T

For more information on rare species and natural communities, please see our fact sheets online at www.mass.gov/nhep.
Barn Owl  Tyto alba  SC
Grasshopper Sparrow  Ammodramus savannarum  T
Least Bittern  Ixobrychus exilis  E
Northern Parula  Parula americana  T

Core 826

Wetland Core

Core 827

Wetland Core

Core 833

Wetland Core
Species of Conservation Concern
New England Bluet  Enallagma laterale  Non-listed SWAP

Core 836

Wetland Core

Core 858

Wetland Core

Core 859

Wetland Core

Core 865

Wetland Core
Aquatic Core
Species of Conservation Concern
Eastern Pondmussel  Ligumia nasuta  SC
Tidewater Mucket  Leptodea ochracea  SC
Umber Shadowdragon  Neurocordulia obsoleta  SC
Eastern Hognose Snake  Heterodon platirhinos  Non-listed SWAP

Core 877

Aquatic Core
Species of Conservation Concern
Eastern Pondmussel  Ligumia nasuta  SC
Tidewater Mucket  Leptodea ochracea  SC
Spotted Turtle  Clemmys guttata  Non-listed SWAP

Core 892

Wetland Core
Core Habitat Summaries

Core 798

A 4,678-acre Core Habitat featuring Forest Core, Wetland Core, Aquatic Core, and Species of Conservation Concern.

Forest Cores are the best examples of large, intact forests that are least impacted by roads and development. Forest Cores support many bird species sensitive to the impacts of roads and development and help maintain ecological processes found only in unfragmented forest patches.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

Aquatic Cores are intact river corridors within which important physical and ecological processes of the river or stream occur. They delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern.

The Water-willow Stem Borer is a yellowish moth with purple-brown shading that inhabits shallow portions of coastal plain wetlands where water-willow grows. It is endemic to southeastern Massachusetts.

Four-toed Salamanders live in forested habitats surrounding swamps, bogs, marshes, vernal pools, and other fish-free waters that are used as breeding sites. Most breeding sites in MA are characterized by pit-and-mound topography with significant sphagnum-moss cover. Eggs are typically laid in mounds or patches of sphagnum moss that overhang water. Upon hatching, the larvae wriggle through the moss and drop into the water, where they will develop for several weeks prior to metamorphosis.

The Eastern Box Turtle is a terrestrial turtle, inhabiting many dry and moist woodland and early successional habitat. Development, roads, collection, and disease are the primary conservation concerns.

Eastern Hognose Snakes are shy, slow-moving, thick-bodied snakes that specialize in feeding on toads, although they eat other amphibians or other small animals as well. They require sandy soils in their habitat; both wooded and open habitats are known.

Bridle Shiners are small (<5 cm) minnows that are found in clear water in slack areas of streams and rivers and are also found in lakes and ponds.

American Bitterns are heron-like birds that nest primarily in large cattail, tussock or shrub marshes and are very sensitive to disturbance.
Common Moorhens are fowl-like marshbirds that typically nest in dense cattail beds adjacent to open water.

King Rails are secretive marshbirds of large cattail beds, tussock marshes, and occasionally shrub marshes.

Pied-billed Grebes are secretive marshbirds that typically nest in dense cattail beds adjacent to open water. They are very sensitive to disturbance and changes in water levels.

Soras are secretive marshbirds that typically nest in dense cattail marshes with interspersed open water.

Upland Sandpipers require very large, unbroken tracts of grassland, and in Massachusetts are now relegated mostly to anthropogenic habitats such as airports. They are very sensitive to changes in plant composition and respond well to the effects of well-planned fire management and thoughtful mowing regimes.

Vesper Sparrows typically nest in large open, dry sites with a mixture of short herbaceous vegetation and bare ground. They have become rare breeders in Massachusetts despite being attracted to anthropogenic landscapes for breeding, such as potato fields, abandoned sandpits, and the disturbed margins of airports.

Core 800

A 75-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

Core 807

A 225-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

The 214-acre Wetland Core is among the largest 20% of Wetland Cores statewide and in this ecoregion.

Core 811

A 2,860-acre Core Habitat featuring Wetland Core, Aquatic Core, and Species of Conservation Concern.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are
most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

The 337-acre Wetland Core is among the largest 20% of Wetland Cores statewide and in this ecoregion.

Aquatic Cores are intact river corridors within which important physical and ecological processes of the river or stream occur. They delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern.

Plymouth Gentian is a globally rare, showy perennial herb of the gentian family, with striking pink and yellow flowers and opposite lance-shaped leaves. It inhabits the sandy and peaty shorelines of coastal plain ponds.

The Eastern Box Turtle is a terrestrial turtle, inhabiting many dry and moist woodland and early successional habitat. Development, roads, collection, and disease are the primary conservation concerns.

**Core 817**

A 16-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

**Core 818**

A 17-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

**Core 820**

A <1-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

**Core 821**

An 8-acre Core Habitat featuring Wetland Core.
Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

**Core 823**

A 24,260-acre Core Habitat featuring Forest Core, Wetland Core, Aquatic Core, Vernal Pool Core, Priority Natural Communities, and Species of Conservation Concern.

A long and convoluted Core Habitat snakes through southeastern Massachusetts. The Assawompsett Ponds complex empties northward through the Nemasket River to the Taunton River, which flows southwest to Mount Hope Bay on the Rhode Island border. To the south, the Assawompsett Ponds have been diverted to drain through Squam Brook and the Acushnet River to New Bedford Harbor on Buzzards Bay. Twenty-six rare and uncommon species make their homes in this Core Habitat, including a few federally Endangered Atlantic Sturgeon in the lower reaches of the Taunton. An exceptional number of globally rare species are found in this Core, including Long’s Bitter-cress, Pine Barrens Bluet damselfly, Tidewater Mucket freshwater mussel, Bridle Shiner, Water-willow Borer Moth, Pondshore Knotweed, Plymouth Gentian, Long’s Bulrush, and the federally Endangered Northern Red-bellied Cooter.

Alluvial Atlantic White Cedar Swamps occur along smaller rivers and ponds where Atlantic white cedar is co-dominant with red maple. They receive annual flooding, making them more mineral-rich than other Atlantic white cedar wetlands. This example of Alluvial Atlantic White Cedar Swamp, though small, is an interesting variant that is strongly influenced by groundwater seepage, which results in greater floristic diversity.

Alluvial Red Maple Swamps are a type of red maple swamp that occurs in low areas along rivers and streams. Regular flooding enriches the soil with nutrients, resulting in an unusual set of associated trees and plants. Four examples of Alluvial Red Maple Swamp generally have good floristic diversity. One is in excellent condition, with minimal anthropogenic disturbances and a large, naturally vegetated buffer. Others show negative impacts of recreational use and have exotic invasive species present.

Coastal Plain Pondshores are globally rare herbaceous communities of exposed pondshores with a distinct coastal plain flora. Water levels change with the water table, typically leaving an exposed shoreline in late summer where many rare species grow. This Core has two examples of Coastal Plain Pondshore which are in excellent condition, but one is threatened by illicit off-road vehicle traffic.

Kettlehole Level Bogs are acidic dwarf-shrub peatlands with little water input or outflow that form in circular depressions left by melting ice blocks in sandy glacial outwash. The vegetation in Kettlehole Level Bogs usually grows in rings. This small example of Kettlehole Level Bog is in good condition, and is part of a larger mosaic of acidic wetland ecosystems. It is well buffered by natural vegetation.
Forest Cores are the best examples of large, intact forests that are least impacted by roads and development. Forest Cores support many bird species sensitive to the impacts of roads and development and help maintain ecological processes found only in unfragmented forest patches.

Wetlands Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

Aquatic Cores are intact river corridors within which important physical and ecological processes of the river or stream occur. They delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern.

Vernal pools are small, seasonal wetlands that provide important wildlife habitat, especially for amphibians and invertebrate animals that use them to breed. BioMap2 identifies the top 5 percent most interconnected clusters of Potential Vernal Pools in the state.

**Core 826**

A 46-acre Core Habitat featuring Wetland Core.

**Core 827**

An 18-acre Core Habitat featuring Wetland Core.

**Core 833**

A 174-acre Core Habitat featuring Wetland Core and a Species of Conservation Concern.
New England Bluets are damselflies whose habitat includes coastal plain ponds, open water in swamps, and other ponds and lakes. It occurs only in the northeastern United States and is most common from eastern Massachusetts into Connecticut.

**Core 836**

A 16-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

**Core 858**

A 73-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

**Core 859**

A 26-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

**Core 865**

A 1,596-acre Core Habitat featuring Wetland Core, Aquatic Core, and Species of Conservation Concern.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

The 648-acre Wetland Core is among the largest 20% of Wetland Cores statewide and in this ecoregion.

Aquatic Cores are intact river corridors within which important physical and ecological processes of the river or stream occur. They delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern.
Eastern Pondmussels, large freshwater mussels, are most abundant in southeastern Massachusetts. They inhabit streams, rivers, and small to large lakes and ponds; they show no preference for substrate, depth, or flow conditions. As sedentary filter feeders they are vulnerable to the alterations of water bodies.

In Massachusetts, the Tidewater Mucket, a freshwater mussel, prefers natural coastal freshwater ponds of several acres in size with clear, clean water and sandy substrates. It almost always occurs near the seacoast.

Umber Shadowdragons are dragonflies that are found on lakes with rocky shores and medium to large rivers that have relatively little aquatic vegetation. Shadowdragons fly only at dusk when they feed and mate in a frenzy of activity.

Eastern Hognose Snakes are shy, slow-moving, thick-bodied snakes that specialize in feeding on toads, although they eat other amphibians or other small animals as well. They require sandy soils in their habitat; both wooded and open habitats are known.

Core 877
An 841-acre Core Habitat featuring Aquatic Core and Species of Conservation Concern.

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Strong populations of Spotted Turtles in good habitat - large, unfragmented, protected open space - continue to be of interest for the conservation of this species. This small, dark-colored turtle with yellow spots on its carapace inhabits a variety of wetlands year-round and nests in nearby uplands during spring. Road and collection are the primary conservation concerns.

Core 892
A 306-acre Core Habitat featuring Wetland Core.

Wetland Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

For more information on rare species and natural communities, please see our fact sheets online at [www.mass.gov/nhesp](http://www.mass.gov/nhesp).
The 306-acre Wetland Core is among the largest 20% of Wetland Cores statewide and in this ecoregion.
BioMap2 Critical Natural Landscape in Halifax

Critical Natural Landscape IDs correspond with the following element lists and summaries.
Elements of BioMap2 Critical Natural Landscapes

This section lists all elements of BioMap2 Critical Natural Landscapes that fall *entirely or partially* within Halifax. The elements listed here may not occur within the bounds of Halifax.

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Critical Natural Landscape Summaries

CNL 465

A 21,067-acre Critical Natural Landscape featuring Aquatic Core Buffer, Wetland Core Buffer and Landscape Block.

A variety of analyses were used to identify protective upland buffers around wetlands and rivers. One, the variable width buffers methodology, included the most intact areas around each wetland and river, by extending deeper into surrounding unfragmented habitats than into developed areas adjacent to each wetland. Other upland buffers were identified through the rare species habitat analysis. In this way, the conservation of wetland buffers will support the habitats and functionality of each wetland, and also include adjacent uplands that are important for many species that move between habitat types.

Landscape Blocks, the primary component of Critical Natural Landscapes, are large areas of intact predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, were also included since they provide habitat and connectivity for many species. Collectively, these natural cover types total 3.6 million acres across the state. An Ecological Integrity assessment was used to identify the most intact and least fragmented areas. These large Landscape Blocks are most likely to maintain dynamic ecological processes such as buffering, connectivity, natural disturbance, and hydrological regimes, all of which help to support wide-ranging wildlife species and many other elements of biodiversity.

In order to identify critical Landscape Blocks in each ecoregion, different Ecological Integrity thresholds were used to select the largest intact landscape patches in each ecoregion while avoiding altered habitat as much as possible. This ecoregional representation accomplishes a key goal of BioMap2 to protect the ecological stages that support a broad suite of biodiversity in the context of climate change. Blocks were defined by major roads, and minimum size thresholds differed among ecoregions to ensure that BioMap2 includes the best of the best in each ecoregion.

At 21,015 acres, this Landscape Block is the third largest in the ecoregion and among the largest 20% of all Blocks statewide. Unlike Landscape Blocks in much of the state that are dominated by upland forests, this Landscape Block includes both upland forest and a relatively high percentage of forested wetlands and other habitats. The Block is largely unprotected. These large landscapes provide invaluable wildlife habitat and other ecosystem values such as clean drinking water and absorbing carbon from the atmosphere. This Block has very little protected land.

CNL 468

A 64,735-acre Critical Natural Landscape featuring Aquatic Core Buffer, Landscape Block, Coastal Adaptation Area, and Tern Foraging Area.

A variety of analyses were used to identify protective upland buffers around wetlands and rivers. One, the variable width buffers methodology, included the most intact areas around each wetland and river, by extending deeper into surrounding unfragmented habitats than into developed areas adjacent to each wetland. Other upland buffers were identified through the rare species habitat analysis. In this way, the
conservation of wetland buffers will support the habitats and functionality of each wetland, and also include adjacent uplands that are important for many species that move between habitat types.

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At 36,331 acres, this Landscape Block is the second largest in the ecoregion and the seventh largest in Massachusetts. This Landscape Block includes a rich mosaic of important habitats including extensive upland forest and a relatively high percentage of forested and open wetlands, lakes, and ponds, including a portion of the Assawompset Pond Complex. These large landscapes provide invaluable wildlife habitat and other ecosystem values such as clean drinking water and absorbing carbon from the atmosphere. This Block is only partially protected.

The coastal habitats of Massachusetts are particularly vulnerable to potential sea-level rise in the next century, which many estimates suggest is likely to exceed one meter. Therefore, in addition to prioritizing current coastal habitats, the creators of BioMap2 examined the landward side of salt marshes to determine where these habitats might move to as sea levels rise. Undeveloped lands adjacent to and up to one and a half meters above existing salt marshes were identified, and included as Critical Natural Landscapes with high potential to support inland migration of salt marsh and other coastal habitats over the coming century.

Terns range widely from their breeding colonies to forage. While the breeding and staging areas for Roseate, Arctic, Common, and Least Terns were included in the Species of Conservation Concern Core Habitat for BioMap2, tern foraging areas were included in BioMap2 as part of Critical Natural Landscape. The extent of foraging habitat for Arctic, Common, and Roseate Terns depends on the size of the breeding colony. For Least Tern, all shallow marine and estuarine waters within 2 miles of recent colony sites and up to 1 mile offshore were mapped as foraging habitat.

**CNL 473**

A 198-acre Critical Natural Landscape featuring Aquatic Core Buffer.

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by extending deeper into surrounding unfragmented habitats than into developed areas adjacent to each wetland. Other upland buffers were identified through the rare species habitat analysis. In this way, the conservation of wetland buffers will support the habitats and functionality of each wetland, and also include adjacent uplands that are important for many species that move between habitat types.

**CNL 474**

A 230-acre Critical Natural Landscape featuring Wetland Core Buffer.

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**CNL 487**

A 162-acre Critical Natural Landscape featuring Wetland Core Buffer.

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**CNL 494**

A 814-acre Critical Natural Landscape featuring Aquatic Core Buffer.

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**CNL 498**

A 3,128-acre Critical Natural Landscape featuring Aquatic Core Buffer, Wetland Core Buffer and Landscape Block.

A variety of analyses were used to identify protective upland buffers around wetlands and rivers. One, the variable width buffers methodology, included the most intact areas around each wetland and river, by extending deeper into surrounding unfragmented habitats than into developed areas adjacent to each wetland. Other upland buffers were identified through the rare species habitat analysis. In this way, the conservation of wetland buffers will support the habitats and functionality of each wetland, and also include adjacent uplands that are important for many species that move between habitat types.
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Help Save Endangered Wildlife!

Please contribute on your Massachusetts income tax form or directly to the

Natural Heritage &
Endangered Species Fund

To learn more about the Natural Heritage & Endangered Species Program
and the Commonwealth’s rare species, visit our web site at www.mass.gov/nhesp.