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 protection. The status of natural communities reflects the documented number and acreages of each community type in the state:

- Critically Imperiled communities typically have 5 or fewer documented good sites or have very few remaining acres in the state.
- Imperiled communities typically have 6-20 good sites or few remaining acres in the state.
- Vulnerable communities typically have 21-100 good sites or limited acreage across the state.
- Secure communities typically have over 100 sites or abundant acreage across the state; however, excellent examples are identified as Core Habit to ensure continued protection.

In 2005 the Massachusetts Division of Fisheries and Wildlife completed a comprehensive State Wildlife Action Plan (SWAP) documenting the status of Massachusetts wildlife and providing recommendations to help guide wildlife conservation decision-making. SWAP includes all the wildlife species listed under the Massachusetts Endangered Species Act (MESA), as well as more than 80 species that need conservation attention but do not meet the requirements for inclusion under MESA. The SWAP document is organized around habitat types in need of conservation within the Commonwealth. While the original BioMap focused primarily on rare species protected under MESA, BioMap2 also addresses other Species of Conservation Concern, their habitats, and the ecosystems that support them to create a spatial representation of most of the elements of SWAP.

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>
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<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>
</tr>
<tr>
<td>Fish</td>
<td>10</td>
<td>17</td>
</tr>
<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...
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.

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/.

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.
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

Fall River 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.

Fall River at a Glance

- Total Area: 24,668 acres (38.5 square miles)
- Human Population in 2010: 88,857
- Open space protected in perpetuity: 10,082 acres, or 40.9% percent of total area*
- BioMap2 Core Habitat: 9,658 acres
- BioMap2 Core Habitat Protected: 6,754 acres or 69.9%
- BioMap2 Critical Natural Landscape: 14,018 acres
- BioMap2 Critical Natural Landscape Protected: 9,833 acres or 70.1%.

BioMap2 Components

Core Habitat
- 5 Exemplary or Priority Natural Community Cores
- 6 Forest Cores
- 14 Wetland Cores
- 13 Aquatic Cores
- 1 Vernal Pool Core
- 5 Species of Conservation Concern Cores**
  - 1 bird, 1 reptile, 2 amphibians, 1 insect, 1 mussel, 6 plants

Critical Natural Landscape
- 1 Landscape Block
- 11 Wetland Core Buffers
- 10 Aquatic Core Buffers
- 1 Coastal Adaptation Area

* 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 Fall River

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/nhesp.
Species of Conservation Concern, Priority and Exemplary Natural Communities, and Other Elements of Biodiversity in Fall River

Mussels
- Eastern Pondmussel (Ligumia nasuta), SC

Insects
- Moths
  - Barrens Buckmoth (Hemileuca maia), SC

Amphibians
- Marbled Salamander (Ambystoma opacum), T
- Four-toed Salamander (Hemidactylium scutatum), Non-listed SWAP

Reptiles
- Eastern Box Turtle (Terrapene carolina), SC

Birds
- Bald Eagle (Haliaeetus leucocephalus), T

Plants
- Weak Rush (Juncus debilis), E
- Rigid Flax (Linum medium var. texanum), T
- Climbing Fern (Lygodium palmatum), SC
- Philadelphia Panic-grass (Panicum philadelphicum ssp. philadelphicum), SC
- Plymouth Gentian (Sabatia kennedyana), SC
- Long-leaved Panic-grass (Panicum rigidulum ssp. pubescens), T

Priority Natural Communities
- Coastal Atlantic White Cedar Swamp, S2
- Sandplain Heathland, S1

Exemplary Natural Communities
- Forest Seep Community
  - Ridgetop Chestnut Oak Forest/Woodland

Other BioMap2 Components
- Forest Core
- Aquatic Core
- Wetland Core
- Vernal Pool Core
- Landscape Block
- Aquatic Core Buffer
- Wetland Core Buffer
- Coastal Adaptation Area
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 Fall River

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 Fall River. The elements listed here may not occur within the bounds of Fall River.

**Core 220**
- Wetland Core
- Aquatic Core
- Species of Conservation Concern
  - Eastern Pondmussel
  - *Ligumia nasuta* SC

**Core 351**
- Wetland Core

**Core 357**
- Forest Core
- Wetland Core

**Core 362**
- Wetland Core

**Core 448**
- Aquatic Core
- Species of Conservation Concern
  - Philadelphia Panic-grass
  - *Panicum philadelphicum ssp. philadelphicum* SC
  - Plymouth Gentian
  - *Sabatia kennedyana* SC
  - Bald Eagle
  - *Haliaeetus leucocephalus* T

**Core 517**
- Forest Core
- Wetland Core

**Core 550**
- Forest Core
- Wetland Core
- Aquatic Core
- Vernal Pool Core
- Priority & Exemplary Natural Communities
  - Coastal Atlantic White Cedar Swamp S2
  - Forest Seep Community
  - Oak - Holly Forest / Woodland S1
Ridgetop Chestnut Oak Forest/Woodland
Sandplain Heathland

Species of Conservation Concern

- Climbing Fern: Lygodium palmatum (SC)
- Long-leaved Panic-grass: Panicum rigidulum ssp. pubescens (T)
- Philadelphia Panic-grass: Panicum philadelphicum ssp. philadelphicum (SC)
- Plymouth Gentian: Sabatia kennedyana (SC)
- Rigid Flax: Linum medium var. texanum (T)
- Weak Rush: Juncus debilis (E)
- Coastal Swamp Amphipod: Syncrassula chamberlaini (SC)
- Barrens Buckmoth: Hemileuca maia (SC)
- Four-toed Salamander: Hemidactylium scutatum (Non-listed SWAP)
- Marbled Salamander: Ambystoma opacum (T)
- Eastern Box Turtle: Terrapene carolina (SC)
- Smooth Green Snake: Opheodrys vernalis (Non-listed SWAP)

**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: Hemidactylium scutatum (Non-listed SWAP)

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).
<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name</th>
<th>Status</th>
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<tbody>
<tr>
<td>Eastern Box Turtle</td>
<td><em>Terrapene carolina</em></td>
<td>SC</td>
</tr>
<tr>
<td>Eastern Ribbon Snake</td>
<td><em>Thamnophis sauritus</em></td>
<td>Non-listed SWAP</td>
</tr>
<tr>
<td>Northern Black Racer</td>
<td><em>Coluber constrictor</em></td>
<td>Non-listed SWAP</td>
</tr>
<tr>
<td>Northern Red-bellied Cooter</td>
<td><em>Pseudemys rubriventris</em></td>
<td>E</td>
</tr>
<tr>
<td>Spotted Turtle</td>
<td><em>Clemmys guttata</em></td>
<td>Non-listed SWAP</td>
</tr>
<tr>
<td>Wood Turtle</td>
<td><em>Glyptemys insculpta</em></td>
<td>SC</td>
</tr>
<tr>
<td>Atlantic Sturgeon</td>
<td><em>Acipenser oxyrinchus</em></td>
<td>E</td>
</tr>
<tr>
<td>Bridle Shiner</td>
<td><em>Notropis bifrenatus</em></td>
<td>SC</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td><em>Haliaetus leucocephalus</em></td>
<td>T</td>
</tr>
<tr>
<td>Barn Owl</td>
<td><em>Tyto alba</em></td>
<td>SC</td>
</tr>
<tr>
<td>Grasshopper Sparrow</td>
<td><em>Ammodramus savannarum</em></td>
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</tr>
<tr>
<td>Least Bitter</td>
<td><em>Ixobrychus exilis</em></td>
<td>E</td>
</tr>
<tr>
<td>Northern Parula</td>
<td><em>Parula americana</em></td>
<td>T</td>
</tr>
</tbody>
</table>
Core Habitat Summaries

Core 220

A 439-acre Core Habitat featuring Wetland Core, Aquatic Core, and a 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.

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.

Core 351

A 29-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 357

A 1,318-acre Core Habitat featuring Forest Core, Wetland Core.

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.

Core 362

A 13-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 448**

A 2,002-acre Core Habitat featuring Aquatic Core and Species of Conservation Concern.

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.

Philadelphia Panic-grass, a member of the Grass family, is a slender, hairy, herbaceous, annual grass with yellow-green leaves. Philadelphia Panic-grass subspecies *philadelphicum* grows primarily on sandy shores of lakes and streams.

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.

Bald Eagles nest in tall trees along large lakes and rivers. The bulk of their diet consists of fish. Large lakes and rivers also support important winter congregations of Bald Eagles.

**Core 517**

An 809-acre Core Habitat featuring Forest Core, Wetland Core.

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.

**Core 550**

A 12,771-acre Core Habitat featuring Forest Core, Wetland Core, Aquatic Core, Vernal Pool Core, Priority Natural Communities, 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.
This important 3,118-acre Forest Core is the largest in the ecoregion, is among the largest 20% of Forest Cores statewide. A second 2,221-acre Forest Core is the fourth largest in the ecoregion and they are together part of a nearly contiguous cluster of five Forest Cores. The larger Core is fully protected and the second Core is largely protected both by the Southeast Massachusetts BioReserve. They are part of an important and intact eastern Massachusetts Landscape Block.

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.

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.

Coastal Atlantic White Cedar Swamps are acidic, low-nutrient basin swamps dominated by Atlantic white cedar in the overstory and a mixture of species in the understory. This community type typically occurs in basins on the Atlantic Coastal Plain. Two examples of Coastal Atlantic White Cedar Swamp here are relatively large, have good structural diversity, and are well buffered by naturally vegetated land.

Forest Seeps are in areas on wet slopes in hardwood forests where groundwater seeps out of the earth. The overstory is similar to that of the surrounding forest, but many typical wetland ferns, herbs, and shrubs occur as well. Two examples of Forest Seep are found here, including one that is moderate-sized and mature, with good structural and species diversity, and is well buffered by natural vegetation. It is also free of human disturbances, including exotic species.

Oak-Holly Forest/Woodland or Maritime Oak-Holly Forest Communities are mixed deciduous/evergreen forests within the coastal salt spray zone. Vegetation growth here is stunted by winds and salt spray, resulting in short trees (less than 30 feet). This example of Oak-Holly Forest occurs within a mosaic of other significant coastal natural communities, which are all somewhat degraded by recreational use and development.

Ridgetop Chestnut Oak Forests are open forests of dry ridgetops, dominated by chestnut oak with an often dense shrub understory. This community often occupies dry upland sites with thin soil over acidic bedrock on ridges and slopes. This example of Ridgetop Chestnut Oak Forest is unusual in the southeast, and has good species diversity and a good-sized buffer of natural vegetation.
Sandplain Heathlands are open, shrub dominated, coastal communities. They share many species with Sandplain Grasslands, but also have many plants from the Heath family. They often have sparse clumps of plants with bare soil or lichen between them. This small example of Sandplain Heathland was created by regular mowing, which mimics the fire or grazing this uncommon community type requires to persist.

Climbing Fern does not have the characteristic overall shape of most ferns. Instead, it is an evergreen, ivy-like plant which sprawls over the ground or climbs clockwise short distances up shrubs and coarse herbs. Climbing Fern grows in moist pine-oak-maple woods with an open understorey, in moist thickets, and along stream margins. This plant prefers acidic soils that are sandy and rich in humus, but nutrient-poor.

Long-leaved Panic-grass, a slender-stemmed perennial of the Grass family, grows in dense tufts. Habitats include an open, peaty border of a small basin marsh, a very shallow fresh water pond, a seasonally wet, peaty depression under powerlines, and a disturbed, former sand-extraction area that is seasonally inundated by groundwater.

Philadelphia Panic-grass, a member of the Grass family, is a slender, hairy, herbaceous, annual grass with yellow-green leaves. Philadelphia Panic-grass subspecies *philadelphicum* grows primarily on sandy shores of lakes and streams.

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.

In New England, Rigid Flax typically inhabits sparsely vegetated mineral soils of clearings, fields, roadsides, and rights-of-way; soil moisture ranges from very dry to wet or seasonally flooded. It requires periodic disturbance to reduce competition and shading by woody plants, and possibly to expose mineral soil for improved germination and seedling establishment.

In Massachusetts, the Weak Rush has typically been found in open, unshaded habitat in seasonally wet, sandy, peaty or mucky substrate along the coastal plain, especially boggy depressions that are inundated in spring but may dry out later in the season.

Coastal Swamp Amphipods are small (up to about 1 cm or about 1/2 in.), orange, green-tinged crustaceans that looks like small, flat shrimp. They live in heavily vegetated, low-gradient outlet streams flowing from freshwater coastal wetlands.

Barrens Buckmoths inhabit xeric, open habitats with extensive scrub oak thickets, especially sandplain pitch pine–scrub oak barrens and maritime shrublands. The larval host plant is primarily scrub oak (*Quercus ilicifolia*), very rarely other oaks; wandering late-instar larvae are occasionally found on other hosts.

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 Massachusetts 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.

Adult and juvenile Marbled Salamanders inhabit upland forests during most of the year, where they reside in small-mammal burrows and other subsurface retreats. Adults migrate during late summer or early fall to breed in dried portions of vernal pools, swamps, marshes, and other predominantly fish-free wetlands. Eggs are deposited under logs, leaf-litter, or grass tussocks and hatch after being inundated by fall rains. Larvae metamorphose during late spring, whereupon they disperse into upland forest.

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.

A small to medium-sized snake, adult Smooth Green Snakes are 14-20 inches long with a uniform light green back and yellow to white venter. The Smooth Green Snake is found in moist open or lightly forested habitat where grasses and shrubs are abundant (edges of marshes, wet meadows, fields, and forest edges or open forests, grasslands, blueberry barrens, pine barrens) and prefers to forage on the ground with activity in the daytime. Smooth Green Snake overwinter in rodent burrows, ant mounds and rock crevices, either singly or communally.

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.
BioMap2 Critical Natural Landscape in Fall River

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 Fall River. The elements listed here may not occur within the bounds of Fall River.

**CNL 117**
- Aquatic Core Buffer
- Wetland Core Buffer

**CNL 302**
- Aquatic Core Buffer

**CNL 361**
- Aquatic Core Buffer
- Landscape Block
- Wetland Core Buffer

**CNL 468**
- Aquatic Core Buffer
- Coastal Adaptation Area
- Landscape Block
- Tern Foraging Area
Critical Natural Landscape Summaries

CNL 117

A 494-acre Critical Natural Landscape featuring Aquatic Core Buffer and Wetland Core Buffer.

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.

CNL 302

A 1-acre Critical Natural Landscape featuring Aquatic Core Buffer.

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.

CNL 361

A 38,292-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 38,087 acres, this Landscape Block is the largest in the ecoregion and the fourth largest Landscape Block statewide. Unlike Landscape Blocks in much of the state that are dominated by upland forests, this Block includes both upland forest and a relatively high percentage of forested wetlands and other habitats. 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 moderately well protected through the entities making up the Southeastern Massachusetts Bioreserve.

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.

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 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.
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Please contribute on your Massachusetts income tax form or directly to the Natural Heritage & Endangered Species Fund.

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