Harwich
Produced in 2012

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.
Table of Contents

Introduction

What is BioMap2 – Purpose and applications

One plan, two components

Understanding Core Habitat and its components

Understanding Critical Natural Landscape and its components

Understanding Core Habitat and Critical Natural Landscape Summaries

Sources of Additional Information

Harwich Overview

Core Habitat and Critical Natural Landscape Summaries

Elements of BioMap2 Cores

Core Habitat Summaries

Elements of BioMap2 Critical Natural Landscapes

Critical Natural Landscape Summaries
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

Get your copy of the BioMap2 report! Download from www.mass.gov/nhesp or contact Natural Heritage at 508-389-6360 or natural.heritage@state.ma.us.

Massachusetts Division of Fisheries and Wildlife
1 Rabbit Hill Road, Westborough, MA 01581
phone: 508-389-6360 fax: 508-389-7890

For more information on rare species and natural communities, please see our fact sheets online at www.mass.gov/nhesp.
BioMap2
Conserving the Biodiversity of Massachusetts in a Changing World

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.

BioMap2: One Plan, Two Components

BioMap2 identifies two complementary spatial layers, Core Habitat and Critical Natural Landscape.

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

For more information on rare species and natural communities, please see our fact sheets online at www.mass.gov/nhesp.
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</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>
</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

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).
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.

For more information on rare species and natural communities, please see our fact sheets online at www.mass.gov/nhesp.
Town Overview

Harwich lies within the Cape Cod and Islands Ecoregion, an area formed by three advances and retreats of the Wisconsin Ice Sheet. The resulting terminal moraines, outwash plains, and coastal deposits characterize the area with their sandy beaches, grassy dunes, bays, marshes, and scrubby oak-pine forests. There are numerous kettle hole ponds, swamps, and bogs. Much of the surface water is highly acidic.

Harwich at a Glance

- Total Area: 14,401 acres (22.5 square miles)
- Human Population in 2010: 12,243
- Open space protected in perpetuity: 2,171 acres, or 15.1% percent of total area*
- BioMap2 Core Habitat: 2,651 acres
- BioMap2 Core Habitat Protected: 483 acres or 18.2%
- BioMap2 Critical Natural Landscape: 3,677 acres
- BioMap2 Critical Natural Landscape Protected: 791 acres or 21.5%.

BioMap2 Components

Core Habitat
- 4 Wetland Cores
- 11 Aquatic Cores
- 29 Species of Conservation Concern Cores**
  - 2 birds, 1 reptile, 5 insects, 8 plants

Critical Natural Landscape
- 1 Landscape Block
- 2 Wetland Core Buffers
- 10 Aquatic Core Buffers
- 20 Coastal Adaptation Areas
- 1 Tern Foraging 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 Harwich
Species of Conservation Concern, Priority and Exemplary Natural Communities, and Other Elements of Biodiversity in Harwich

Insects

Moths

Water-willow Stem Borer, (Papaipema sulphurata), T

Damselflies

Scarlet Bluet, (Enallagma pictum), T
Pine Barrens Bluet, (Enallagma recurvatum), T
New England Bluet, (Enallagma laterale), Non-listed SWAP species
Little Bluet, (Enallagma minusculum), Non-listed SWAP

Reptiles

Eastern Box Turtle, (Terrapene carolina), SC

Birds

Piping Plover, (Charadrius melodus), T
Least Bittern, (Ixobrychus exilis), E

Plants

Bushy Rockrose, (Crocanthemum dumosum), SC
Commons’s Panic-grass, (Dichanthelium ovale ssp. pseudopubescens), SC
Redroot, (Lachnanthes caroliana), SC
Pondshore Knotweed, (Persicaria puritanorum), SC
Plymouth Gentian, (Sabatia kennedyana), SC
Terete Arrowhead, (Sagittaria teres), SC
Nantucket Shadbush, (Amelanchier nantucketensis), recently de-listed
Resupinate Bladderwort, (Utricularia resupinata), T

Other BioMap2 Components

Aquatic Core
Wetland Core
Landscape Block
Aquatic Core Buffer
Wetland Core Buffer
Coastal Adaptation Area
Tern Foraging 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 Harwich

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

#### Core 266

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Charadrius melodus</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piping Plover</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 272

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Charadrius melodus</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piping Plover</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 290

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Papaipema sulphurata</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-willow Stem Borer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 292

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Papaipema sulphurata</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-willow Stem Borer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 310

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Papaipema sulphurata</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-willow Stem Borer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 312

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Papaipema sulphurata</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-willow Stem Borer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 316

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Papaipema sulphurata</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-willow Stem Borer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 317

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Papaipema sulphurata</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-willow Stem Borer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Core 319

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
<th>Papaipema sulphurata</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-willow Stem Borer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Core 333

<table>
<thead>
<tr>
<th>Aquatic Core</th>
<th>Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth Gentian</td>
<td><em>Sabatia kennedyana</em> SC</td>
</tr>
<tr>
<td>Redroot</td>
<td><em>Lachnanthes caroliana</em> SC</td>
</tr>
<tr>
<td>Pine Barrens Bluet</td>
<td><em>Enallagma recurvatum</em> T</td>
</tr>
</tbody>
</table>

Core 337

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pine Barrens Bluet</td>
</tr>
</tbody>
</table>

Core 355

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>New England Bluet</td>
</tr>
<tr>
<td>Scarlet Bluet</td>
</tr>
</tbody>
</table>

Core 358

<table>
<thead>
<tr>
<th>Aquatic Core</th>
<th>Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth Gentian</td>
<td><em>Sabatia kennedyana</em> SC</td>
</tr>
</tbody>
</table>

Core 365

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bushy Rockrose</td>
</tr>
</tbody>
</table>

Core 367

<table>
<thead>
<tr>
<th>Aquatic Core</th>
<th>Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plymouth Gentian</td>
<td><em>Sabatia kennedyana</em> SC</td>
</tr>
<tr>
<td>Pondshore Knotweed</td>
<td><em>Persicaria purpuranorum</em> SC</td>
</tr>
<tr>
<td>Redroot</td>
<td><em>Lachnanthes caroliana</em> SC</td>
</tr>
<tr>
<td>Resupinate Bladderwort</td>
<td><em>Utricularia resupinata</em> T</td>
</tr>
<tr>
<td>New England Bluet</td>
<td><em>Enallagma laterale</em> Non-listed SWAP</td>
</tr>
<tr>
<td>Scarlet Bluet</td>
<td><em>Enallagma pictum</em> T</td>
</tr>
</tbody>
</table>

Core 371

<table>
<thead>
<tr>
<th>Species of Conservation Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commons’s Panic-grass</td>
</tr>
</tbody>
</table>
### Core 373

**Species of Conservation Concern**
- New England Bluet *Enallagma laterale* Non-listed SWAP
- Pine Barrens Bluet *Enallagma recurvatum* T

### Core 379

**Aquatic Core**
**Species of Conservation Concern**
- Plymouth Gentian *Sabatia kennedyana* SC

### Core 385

**Species of Conservation Concern**
- New England Bluet *Enallagma laterale* Non-listed SWAP
- Pine Barrens Bluet *Enallagma recurvatum* T

### Core 387

**Aquatic Core**
**Species of Conservation Concern**
- Redroot *Lachnanthes caroliana* SC

### Core 400

**Wetland Core**
**Aquatic Core**
**Species of Conservation Concern**
- Plymouth Gentian *Sabatia kennedyana* SC
- Redroot *Lachnanthes caroliana* SC
- Little Bluet *Enallagma minusculum* Non-listed SWAP
- New England Bluet *Enallagma laterale* Non-listed SWAP
- Pine Barrens Bluet *Enallagma recurvatum* T
- Scarlet Bluet *Enallagma pictum* T

### Core 444

**Wetland Core**
**Aquatic Core**
**Species of Conservation Concern**
- Commons’s Panic-grass *Dichanthelium ovale ssp. pseudopubescens* SC
- Plymouth Gentian *Sabatia kennedyana* SC
- Pondshore Knotweed *Persicaria puritanorum* SC
- Redroot *Lachnanthes caroliana* SC
- Terete Arrowhead *Sagittaria teres* SC
- Water-willow Stem Borer *Papaipema sulphurata* T
- Little Bluet *Enallagma minusculum* 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).
New England Bluet   
Enallagma laterale   
Non-listed SWAP
Pine Barrens Bluet   
Enallagma recurvatum   
T
Scarlet Bluet   
Enallagma pictum   
T
Least Bittern   
Ixobrychus exilis   
E

Core 509

Wetland Core
Aquatic Core
Priority & Exemplary Natural Communities
Coastal Plain Pondshore   
S2
Species of Conservation Concern
Adder's-tongue Fern   
Ophioglossum pusillum   
T
Commons's Panic-grass   
Dichanthelium ovale ssp. pseudopubescens   
SC
Long-beaked Bald-sedge   
Rhynchospora scirpoides   
SC
Mitchell's Sedge   
Carex mitchelliana   
T
New England Blazing Star   
Liatris scariosa var. novae-angliae   
SC
Plymouth Gentian   
Sabatia kennedyana   
SC
Redroot   
Lachnanthes carolina   
SC
Resupinate Bladderwort   
Utricularia resupinata   
T
Salt Reedgrass   
Spartina cynosuroides   
T
Terete Arrowhead   
Sagittaria teres   
SC
Wright's Panic-grass   
Dichanthelium wrightianum   
SC
Water-willow Stem Borer   
Papaipema sulphurata   
T
Little Bluet   
Enallagma minusculum   
Non-listed SWAP
New England Bluet   
Enallagma laterale   
Non-listed SWAP
Pine Barrens Bluet   
Enallagma recurvatum   
T
Scarlet Bluet   
Enallagma pictum   
T
Comet Darner   
Anax longipes   
SC
Eastern Box Turtle   
Terrapene carolina   
SC
Common Tern   
Sterna hirundo   
SC
Northern Parula   
Parula americana   
T
Piping Plover   
Charadrius melodus   
T
Roseate Tern   
Sterna dougallii   
E
Core Habitat Summaries

Core 266

A 22-acre Core Habitat featuring a Species of Conservation Concern.

Piping Plovers on the East Coast nest on sandy coastal beaches and relatively flat dunes with sparse vegetation. They typically lay their eggs in the narrow area of land between the high tide line and the foot of the coastal dunes. They can be particularly sensitive to anthropogenic disturbance, but the state’s population has responded very well to coordinated management.

Core 272

A 60-acre Core Habitat featuring a Species of Conservation Concern.

Piping Plovers on the East Coast nest on sandy coastal beaches and relatively flat dunes with sparse vegetation. They typically lay their eggs in the narrow area of land between the high tide line and the foot of the coastal dunes. They can be particularly sensitive to anthropogenic disturbance, but the state's population has responded very well to coordinated management.

Core 290

A <1-acre Core Habitat featuring a 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.

Core 292

A <1-acre Core Habitat featuring a 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.

Core 310

A <1-acre Core Habitat featuring a 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.
Core 312

A 3-acre Core Habitat featuring a 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.

Core 316

A 3-acre Core Habitat featuring a 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.

Core 317

A 141-acre Core Habitat featuring a 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.

Core 319

A 1-acre Core Habitat featuring a 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.

Core 333

A 90-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.

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.

Redroot, a slender, erect perennial in the bloodroot family, inhabits the exposed sandy to peaty shores of Coastal Plain ponds. It is usually found in linear bands along the middle to upper margins of the shore or in coves.
Pine Barrens Bluets, small damselflies, are restricted to coastal plain ponds and similar wetlands.

Core 337
A 65-acre Core Habitat featuring 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.

Scarlet Bluets are small (just over an inch long) damselflies with red eyes and orange bodies. They inhabit acidic sandy ponds with floating vegetation.

Core 358
A 40-acre Core Habitat featuring Aquatic Core and a 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.

Core 367
A 98-acre Core Habitat featuring Aquatic Core and 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.

Core 337
A 65-acre Core Habitat featuring 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.

Scarlet Bluets are small (just over an inch long) damselflies with red eyes and orange bodies. They inhabit acidic sandy ponds with floating vegetation.

Core 358
A 40-acre Core Habitat featuring Aquatic Core and a 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.

Core 367
A 98-acre Core Habitat featuring Aquatic Core and 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.
Pondshore Knotweed is a globally rare, trailing, annual wildflower of the Buckwheat family, found on the upper shores of coastal plain ponds in the Northeast. In Massachusetts, Pondshore Knotweed inhabits the sandy, peaty, or cobble upper shores of acidic, low-nutrient, coastal plain ponds. It requires pronounced water level fluctuation, acidic, nutrient-poor water and substrate, and an open, exposed shoreline, free from major soil disturbance.

Redroot, a slender, erect perennial in the bloodroot family, inhabits the exposed sandy to peaty shores of Coastal Plain ponds. It is usually found in linear bands along the middle to upper margins of the shore or in coves.

Resupinate Bladderwort is a small carnivorous aquatic plant. It bears "upside-down" flowers that are strongly tilted backwards. Its pink blooms can be seen in late July to August. This species grows in shallow ponds and on muddy shores.

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.

Scarlet Bluets are small (just over an inch long) damselflies with red eyes and orange bodies. They inhabit acidic sandy ponds with floating vegetation.

Core 371

A 10-acre Core Habitat featuring a Species of Conservation Concern.

Commons’s Panic-grass grows in dry, sandy fields and barrens on the coastal plain. It is also found in dry pitch pine-oak woods, colonizing openings and disturbed soil where there is little or no leaf litter.

Core 373

A 15-acre Core Habitat featuring 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.

Pine Barrens Bluets, small damselflies, are restricted to coastal plain ponds and similar wetlands.

Core 379

A 3-acre Core Habitat featuring Aquatic Core and a 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.

For more information on rare species and natural communities, please see our fact sheets online at www.mass.gov/nhesp.
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.

Core 385

A 75-acre Core Habitat featuring 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.

Pine Barrens Bluets, small damselflies, are restricted to coastal plain ponds and similar wetlands.

Core 387

A 32-acre Core Habitat featuring Aquatic Core and a 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.

Redroot, a slender, erect perennial in the bloodroot family, inhabits the exposed sandy to peaty shores of Coastal Plain ponds. It is usually found in linear bands along the middle to upper margins of the shore or in coves.

Core 400

A 268-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.

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.

Redroot, a slender, erect perennial in the bloodroot family, inhabits the exposed sandy to peaty shores of Coastal Plain ponds. It is usually found in linear bands along the middle to upper margins of the shore or in coves.
The Little Bluet, a very small damselfly, inhabits ponds with sparse emergent or aquatic vegetation and a sandy substrate.

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.

Pine Barrens Bluets, small damselflies, are restricted to coastal plain ponds and similar wetlands.

Scarlet Bluets are small (just over an inch long) damselflies with red eyes and orange bodies. They inhabit acidic sandy ponds with floating vegetation.

**Core 444**

A 2,403-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 199-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.

Commons's Panic-grass grows in dry, sandy fields and barrens on the coastal plain. It is also found in dry pitch pine-oak woods, colonizing openings and disturbed soil where there is little or no leaf litter.

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.

Pondshore Knotweed is a globally rare, trailing, annual wildflower of the Buckwheat family, found on the upper shores of coastal plain ponds in the Northeast. In Massachusetts, Pondshore Knotweed inhabits the sandy, peaty, or cobble upper shores of acidic, low-nutrient, coastal plain ponds. It requires pronounced water level fluctuation, acidic, nutrient-poor water and substrate, and an open, exposed shoreline, free from major soil disturbance.

Redroot, a slender, erect perennial in the bloodroot family, inhabits the exposed sandy to peaty shores of Coastal Plain ponds. It is usually found in linear bands along the middle to upper margins of the shore or in coves.

Terete Arrowhead is a perennial emergent aquatic plant of the water-plantain family, which grows in shallow water along the muddy, sandy, or peaty margins of coastal plain ponds.
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.

The Little Blue, a very small damselfly, inhabits ponds with sparse emergent or aquatic vegetation and a sandy substrate.

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.

Pine Barrens Bluets, small damselflies, are restricted to coastal plain ponds and similar wetlands.

Scarlet Bluets are small (just over an inch long) damselflies with red eyes and orange bodies. They inhabit acidic sandy ponds with floating vegetation.

Least Bitterns are heron-like birds that typically nest in cattail marshes interspersed with open water and are very sensitive to disturbance.

Core 509

A 3,260-acre Core Habitat featuring Wetland Core, Aquatic Core, Priority Natural Communities, and Species of Conservation Concern.

A large Core Habitat in western Brewster and neighboring towns stretches from the Millponds and other nearby ponds northward to the mouth of Quivett Creek. This complex landscape is home to 20 rare and uncommon species, including the globally rare Scarlet Bluet, Pine Barrens Bluet, New England Bluet, New England Blazing Star, Water-willow Borer Moth, Plymouth Gentian, and Terete Arrowhead. Many of these globally rare species inhabit the scattered Coastal Plain Ponds in this Core. An occasional pair of the federally Threatened Piping Plover has been known to nest on the bay shore, while federally Endangered Roseate Terns forage and stage for migration along the bay.

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 including one that is in excellent condition and has a large naturally vegetated buffer, but is threatened by municipal water withdrawals from the groundwater.

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.

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).
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.
BioMap2 Critical Natural Landscape in Harwich

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

- CNL 176
  - Coastal Adaptation Area
- CNL 179
  - Coastal Adaptation Area
- CNL 185
  - Coastal Adaptation Area
- CNL 189
  - Coastal Adaptation Area
- CNL 193
  - Coastal Adaptation Area
- CNL 194
  - Coastal Adaptation Area
- CNL 200
  - Coastal Adaptation Area
- CNL 201
  - Coastal Adaptation Area
- CNL 202
  - Coastal Adaptation Area
- CNL 209
  - Coastal Adaptation Area
- CNL 218
  - Aquatic Core Buffer
- CNL 228
  - Aquatic Core Buffer
- CNL 234
  - Aquatic Core Buffer
- CNL 246
  - Aquatic Core Buffer
- CNL 248
  - Aquatic Core Buffer
- CNL 251
Wetland Core Buffer

CNL 255
Aquatic Core Buffer

CNL 275
Aquatic Core Buffer

CNL 350
Aquatic Core Buffer
Landscape Block
Wetland Core Buffer

CNL 558
Aquatic Core Buffer
Coastal Adaptation Area
Landscape Block
Tern Foraging Area
Critical Natural Landscape Summaries

CNL 176
A 6-acre Critical Natural Landscape featuring Coastal Adaptation Area.
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.

CNL 179
A 27-acre Critical Natural Landscape featuring Coastal Adaptation Area.
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.

CNL 185
A 22-acre Critical Natural Landscape featuring Coastal Adaptation Area.
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.

CNL 189
A 10-acre Critical Natural Landscape featuring Coastal Adaptation Area.
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.
high potential to support inland migration of salt marsh and other coastal habitats over the coming century.

CNL 193
A 9-acre Critical Natural Landscape featuring Coastal Adaptation Area.

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.

CNL 194
A 89-acre Critical Natural Landscape featuring Coastal Adaptation Area.

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.

CNL 200
A 6-acre Critical Natural Landscape featuring Coastal Adaptation Area.

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.

CNL 201
A 48-acre Critical Natural Landscape featuring Coastal Adaptation Area.

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.
CNL 202
A 12-acre Critical Natural Landscape featuring Coastal Adaptation Area.

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.

CNL 209
A 136-acre Critical Natural Landscape featuring Coastal Adaptation Area.

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.

CNL 218
A 7-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 228
A 60-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 234
A 104-acre Critical Natural Landscape featuring Aquatic Core Buffer.

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).
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 246
A 3-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 248
A 46-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 251
A 27-acre Critical Natural Landscape featuring 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 255
A 46-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 275
A 51-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 350
A 3,146-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.

CNL 558
A 97,955-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 6,182 acres, this Landscape Block is the sixth largest in the ecoregion and is especially important in the fragmented landscapes of Cape Cod. Unlike Landscape Blocks in much of the state that are dominated by upland forests, this coastal Landscape Block is dominated by unique and important salt marsh and barrier beach habitats, much of which is protected by the town of Barnstable.

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.
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.