



# BioMap2

CONSERVING THE BIODIVERSITY OF  
MASSACHUSETTS IN A CHANGING WORLD

## Oak Bluffs

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.**





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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.

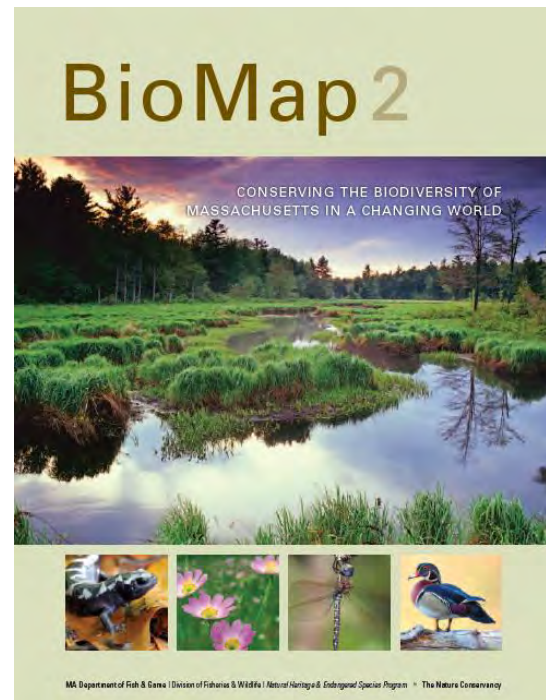
*BioMap2* combines NHESP's 30 years of rigorously documented rare species and natural community data with spatial data identifying wildlife species and habitats that were the focus of the Division of Fisheries and Wildlife's 2005 State Wildlife Action Plan (SWAP). *BioMap2* also integrates The Nature 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.



Get your copy of the *BioMap2* report! Download from [www.mass.gov/nhesp](http://www.mass.gov/nhesp) or contact Natural Heritage at 508-389-6360 or [natural.heritage@state.ma.us](mailto:natural.heritage@state.ma.us).

- 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



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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 Habitats 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





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*.

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

*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.

### 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

### 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.***

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/nhosp](http://www.mass.gov/nhosp).

## 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/nhosp](http://www.mass.gov/nhosp). 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](mailto: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](http://www.mass.gov/mgis).





## Town Overview

Oak Bluffs 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.



## Oak Bluffs at a Glance

- Total Area: 4,740 acres (7.4 square miles)
- Human Population in 2010: 4,527
- Open space protected in perpetuity: 653 acres, or 13.8% percent of total area\*
- BioMap2 Core Habitat: 1,782 acres
- BioMap2 Core Habitat Protected: 443 acres or 24.9%
- BioMap2 Critical Natural Landscape: 403 acres
- BioMap2 Critical Natural Landscape Protected: 85 acres or 21.1%.

## BioMap2 Components

### Core Habitat

- 1 Aquatic Core
- 10 Species of Conservation Concern Cores\*\*
  - 6 birds, 14 insects, 8 plants

### Critical Natural Landscape

- 2 Landscape Blocks
- 1 Aquatic Core Buffer
- 6 Coastal Adaptation Areas
- 5 Tern Foraging Areas

\* Calculated using MassGIS data layer "Protected and Recreational Open Space – March, 2012".

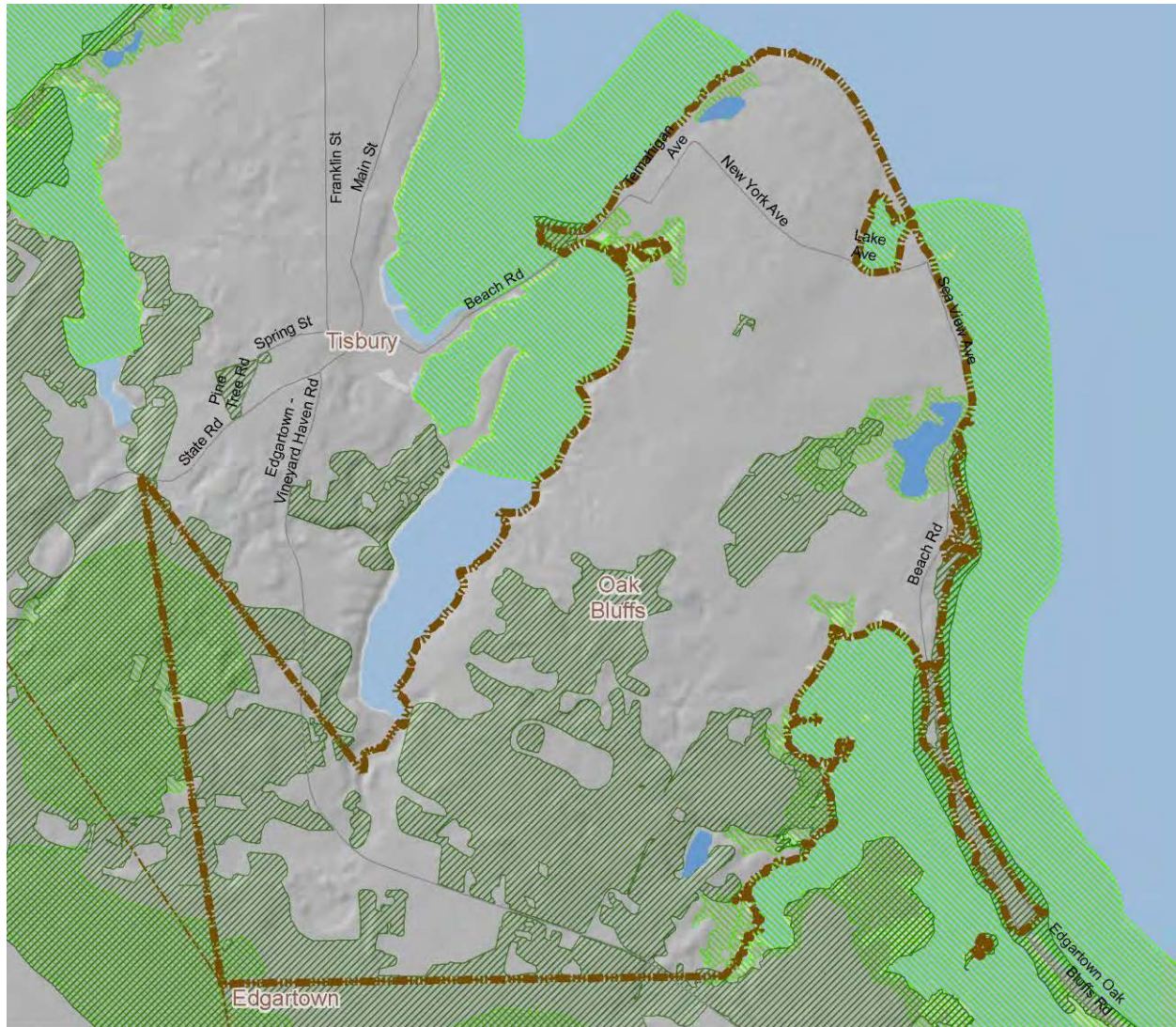
\*\* See next pages for complete list of species, natural communities and other biodiversity elements.







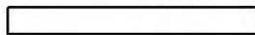


### BioMap2 Core Habitat and Critical Natural Landscape in Oak Bluffs



-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape

1 Mile





**Species of Conservation Concern, Priority and Exemplary Natural Communities,  
and Other Elements of Biodiversity in Oak Bluffs**

**Insects**

**Moths**

- [Coastal Heathland Cutworm](#), (*Abagrotis nefascia*), SC
- [Barrens Daggermoth](#), (*Acronicta albarufa*), T
- [Gerhard's Underwing](#), (*Catocala herodias gerhardi*), SC
- [Imperial Moth](#), (*Eacles imperialis*), T
- [Barrens Buckmoth](#), (*Hemileuca maia*), SC
- [Pink Sallow Moth](#), (*Psectraglaea carnosae*), SC
- [Pine Barrens Zale](#), (*Zale lunifera*), SC
- [Barrens Metarranthus](#), (*Metarranthus apiciaria*), E
- [Dune Noctuid Moth](#), (*Sympistis riparia*), SC
- [Faded Gray Geometer](#), (*Stenoporpia polygrammaria*), T
- [Sandplain Euchlaena](#), (*Euchlaena madusaria*), SC
- [Unexpected Cynia](#), (*Cynia inopinatus*), T

**Butterflies**

- [Oak Hairstreak](#), (*Satyrium favonius*), SC

**Beetles**

- [Purple Tiger Beetle](#), (*Cicindela purpurea*), SC

**Birds**

- [Piping Plover](#), (*Charadrius melodus*), T
- [Common Tern](#), (*Sterna hirundo*), SC
- [Roseate Tern](#), (*Sterna dougallii*), E
- [Least Tern](#), (*Sternula antillarum*), SC
- [Barn Owl](#), (*Tyto alba*), SC
- [Eastern Whip-poor-will](#), (*Caprimulgus vociferus*), SC

**Plants**

- [Purple Needlegrass](#), (*Aristida purpurascens*), T
- [Sandplain Flax](#), (*Linum intercursum*), SC
- [Papillose Nut-sedge](#), (*Scleria pauciflora*), E
- [Bristly Foxtail](#), (*Setaria parviflora*), SC
- [Sandplain Blue-eyed Grass](#), (*Sisyrinchium fuscatum*), SC
- [Lion's Foot](#), (*Nabalus serpentarius*), E
- [Nantucket Shadbush](#), (*Amelanchier nantucketensis*), recently de-listed
- [Northern Gama-grass](#), (*Tripsacum dactyloides*), E





**Other BioMap2 Components**

[Aquatic Core](#)

[Landscape Block](#)

[Aquatic 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.

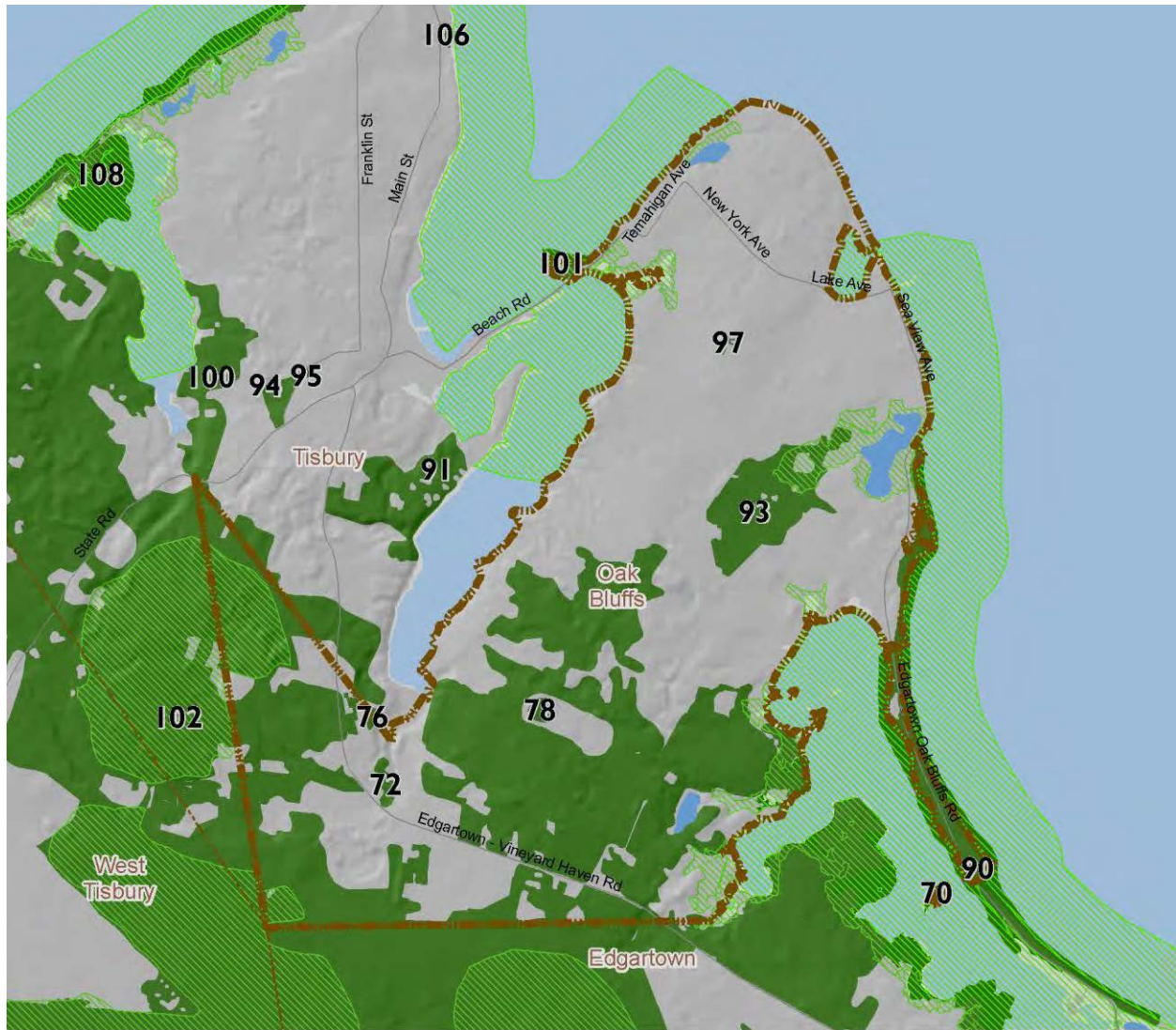
S3 = Vulnerable communities, typically have 21-100 sites or limited acreage across the state.








### BioMap2 Core Habitat in Oak Bluffs

Core IDs correspond with the following element lists and summaries.



-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape

1 Mile  




Elements of BioMap2 Cores

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

**Core 70**

## Species of Conservation Concern

Barn Owl	<i>Tyto alba</i>	SC
Common Tern	<i>Sterna hirundo</i>	SC
Roseate Tern	<i>Sterna dougallii</i>	E

**Core 72**

## Species of Conservation Concern

Coastal Heathland Cutworm	<i>Abagrotis nefascia</i>	SC
Dune Noctuid Moth	<i>Sympistis riparia</i>	SC

**Core 76**

## Species of Conservation Concern

Coastal Heathland Cutworm	<i>Abagrotis nefascia</i>	SC
Dune Noctuid Moth	<i>Sympistis riparia</i>	SC

**Core 78**

## Species of Conservation Concern

Faded Gray Geometer	<i>Stenoporpia polygrammaria</i>	T
Gerhard's Underwing Moth	<i>Catocala herodias gerhardi</i>	SC
Pine Barrens Zale	<i>Zale lunifera</i>	SC
Oak Hairstreak	<i>Satyrrium favonius</i>	SC

**Core 90**

## Species of Conservation Concern

Barn Owl	<i>Tyto alba</i>	SC
Common Tern	<i>Sterna hirundo</i>	SC
Least Tern	<i>Sternula antillarum</i>	SC
Piping Plover	<i>Charadrius melodus</i>	T

**Core 93**

## Species of Conservation Concern

Purple Needlegrass	<i>Aristida purpurascens</i>	T
Sandplain Blue-eyed Grass	<i>Sisyrinchium fuscatum</i>	SC
Imperial Moth	<i>Eacles imperialis</i>	T
Purple Tiger Beetle	<i>Cicindela purpurea</i>	SC



**Core 97**

Species of Conservation Concern

Sandplain Blue-eyed Grass

*Sisyrinchium fuscatum*

SC

**Core 100**

Species of Conservation Concern

Imperial Moth

*Eacles imperialis*

T

**Core 101**

Species of Conservation Concern

Least Tern

*Sternula antillarum*

SC

Piping Plover

*Charadrius melodus*

T

**Core 102**

Forest Core

Wetland Core

Aquatic Core

Priority &amp; Exemplary Natural Communities

Estuarine Subtidal: Coastal Salt Pond

S2

Species of Conservation Concern

Sandplain grassland

S1

Bayard's Green Adder's-mouth

*Malaxis bayardii*

E

Bristly Foxtail

*Setaria parviflora*

SC

Bushy Rockrose

*Crocanthemum dumosum*

SC

Canadian Sanicle

*Sanicula canadensis*

T

Cranefly Orchid

*Tipularia discolor*

E

Grass-leaved Ladies'-tresses

*Spiranthes vernalis*

T

Hairy Agrimony

*Agrimonia pubescens*

T

Lion's Foot

*Nabalus serpentarius*

E

New England Blazing Star

*Liatris scariosa* var. *novae-angliae*

SC

Northern Gama-grass

*Tripsacum dactyloides*

E

Papillose Nut Sedge

*Scleria pauciflora*

E

Purple Needlegrass

*Aristida purpurascens*

T

Pygmyweed

*Crassula aquatica*

T

Saltpond Pennywort

*Hydrocotyle verticillata*

T

Sandplain Blue-eyed Grass

*Sisyrinchium fuscatum*

SC

Sandplain Flax

*Linum intercursum*

SC

Sea-beach Knotweed

*Polygonum glaucum*

SC

Smooth Branched Sponge

*Spongilla aspinosa*

SC

Barrens Buckmoth

*Hemileuca maia*

SC

Barrens Daggermoth

*Acronicta albarufa*

T

Barrens Metarranthis Moth

*Metarranthis apiciaria*

E

Chain Dot Geometer

*Cingilia catenaria*

SC

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Species Program****Massachusetts Division of Fisheries and Wildlife**

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Coastal Heathland Cutworm	<i>Abagrotis nefascia</i>	SC
Coastal Swamp Metarranthis Moth	<i>Metarranthis pilosaria</i>	SC
Dune Noctuid Moth	<i>Sympistis riparia</i>	SC
Faded Gray Geometer	<i>Stenoporpia polygrammaria</i>	T
Gerhard's Underwing Moth	<i>Catocala herodias gerhardi</i>	SC
Imperial Moth	<i>Eacles imperialis</i>	T
Melsheimer's Sack Bearer	<i>Cicinnus melsheimeri</i>	T
Pine Barrens Lycia	<i>Lycia ypsilon</i>	T
Pine Barrens Speranza	<i>Speranza exonerata</i>	SC
Pine Barrens Zale	<i>Zale lunifera</i>	SC
Pink Sallow	<i>Psectraglaea carnosa</i>	SC
Sandplain Euchlaena	<i>Euchlaena madusaria</i>	SC
Sandplain Heterocampa	<i>Heterocampa varia</i>	T
Slender Clearwing Sphinx Moth	<i>Hemaris gracilis</i>	SC
Southern Ptichodis	<i>Ptichodis bistrigata</i>	T
Spartina Borer Moth	<i>Photodes inops</i>	SC
The Pink Streak	<i>Dargida rubripennis</i>	T
Three-lined Angle Moth	<i>Digrammia eremiata</i>	T
Unexpected Cynia	<i>Cynia inopinatus</i>	T
Water-willow Stem Borer	<i>Papaipema sulphurata</i>	T
Oak Hairstreak	<i>Satyrium favonius</i>	SC
Purple Tiger Beetle	<i>Cicindela purpurea</i>	SC
Comet Darner	<i>Anax longipes</i>	SC
Eastern Spadefoot	<i>Scaphiopus holbrookii</i>	T
Four-toed Salamander	<i>Hemidactylium scutatum</i>	Non-listed SWAP
Eastern Box Turtle	<i>Terrapene carolina</i>	SC
Eastern Ribbon Snake	<i>Thamnophis sauritus</i>	Non-listed SWAP
Smooth Green Snake	<i>Opheodrys vernalis</i>	Non-listed SWAP
Spotted Turtle	<i>Clemmys guttata</i>	Non-listed SWAP
American Brook Lamprey	<i>Lampetra appendix</i>	T
Barn Owl	<i>Tyto alba</i>	SC
Common Tern	<i>Sterna hirundo</i>	SC
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	SC
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	T
Least Tern	<i>Sternula antillarum</i>	SC
Northern Harrier	<i>Circus cyaneus</i>	T
Piping Plover	<i>Charadrius melodus</i>	T
Roseate Tern	<i>Sterna dougallii</i>	E





## Core Habitat Summaries

### **Core 70**

A 6-acre Core Habitat featuring Species of Conservation Concern.

Barn Owls require grassy habitats for foraging, such as fresh and salt water marshes and agricultural fields. They rarely occur apart from populations of meadow voles, a primary food source, and avoid areas of deep snow and prolonged cold, which can preclude successful foraging. The Barn Owl is resourceful in making use of such nesting sites as hollow trees, cavities in cliffs or riverbanks, and artificial structures such as nest boxes, old barns, and bridges.

The Common Tern is a small seabird that nests in colonies on sandy or gravelly islands and barrier beaches, but also occurs on rocky or cobbly beaches and salt marshes. It feeds on small fish, crustaceans, and flying insects in the open ocean, bays, tidal inlets, and between islands.

The elegant Roseate Tern, with its long, white tail-streamers and rapid flight, alights on Massachusetts beaches in the spring. It tunnels under vegetation to nest within colonies of its more rough-and-tumble relative, the Common Tern, from which it derives protection from intruders. The Roseate Tern is a plunge-diver that feeds mainly on the sand lance, and availability of this fish may influence the timing of breeding.

### **Core 72**

A 9-acre Core Habitat featuring Species of Conservation Concern.

Coastal Heathland Cutworms are noctuid moths. In Massachusetts, this species is associated with sandplain/dunegrass grasslands, coastal heathlands and other maritime shrublands, and occasionally open pitch pine/scrub oak barrens.

The Dune Noctuid Moth inhabits coastal strand habitats on sandy soil, especially dunegrass grasslands. The larval host plant(s) are unknown.

### **Core 76**

A 4-acre Core Habitat featuring Species of Conservation Concern.

Coastal Heathland Cutworms are noctuid moths. In Massachusetts, this species is associated with sandplain/dunegrass grasslands, coastal heathlands and other maritime shrublands, and occasionally open pitch pine/scrub oak barrens.

The Dune Noctuid Moth inhabits coastal strand habitats on sandy soil, especially dunegrass grasslands. The larval host plant(s) are unknown.







### Core 78

A 7-acre Core Habitat featuring Species of Conservation Concern.

On Martha's Vineyard, the Faded Gray Geometer inhabits scrub oak barrens and open oak woodland. Larval hosts are undocumented in Massachusetts, but are probably oaks (*Quercus* spp.).

Gerhard's Underwing, a noctuid moth, inhabits xeric and open pitch pine/scrub oak barrens, especially scrub oak thickets on sandplains or rocky summits and ridges. The larvae feed on the catkins and new leaves of scrub oak (*Quercus ilicifolia*), and must complete feeding in the spring before the catkins drop off and the new leaves harden.

The Pine Barrens Zale is found in sandplain pitch pine/scrub oak barrens, especially in scrub oak thickets. Larvae feed on scrub oak (*Quercus ilicifolia*).

In Massachusetts, the Oak Hairstreak inhabits xeric and open oak woodland and barrens on rocky uplands and sandplains. Adults are often found nectaring in dry, open, weedy or scrub areas, such as old fields, clearings, powerline or pipeline cuts, abandoned gravel pits, etc. New Jersey tea (*Ceanothus americanus*), dogbanes (*Apocynum* spp.), milkweeds (*Asclepias* spp.), and blueberries (*Vaccinium* spp.) are favored nectar sources, although others are used. Larvae feed on various oaks (*Quercus* spp.) across the species' range; particular oak species have not been documented in Massachusetts.

### Core 90

A 242-acre Core Habitat featuring Species of Conservation Concern.

Barn Owls require grassy habitats for foraging, such as fresh and salt water marshes and agricultural fields. They rarely occur apart from populations of meadow voles, a primary food source, and avoid areas of deep snow and prolonged cold, which can preclude successful foraging. The Barn Owl is resourceful in making use of such nesting sites as hollow trees, cavities in cliffs or riverbanks, and artificial structures such as nest boxes, old barns, and bridges.

The Common Tern is a small seabird that nests in colonies on sandy or gravelly islands and barrier beaches, but also occurs on rocky or cobbly beaches and salt marshes. It feeds on small fish, crustaceans, and flying insects in the open ocean, bays, tidal inlets, and between islands.

Diminutive yet feisty, the Least Tern is a spring and summer colonial nester on Massachusetts' sandy beaches. For nesting, it favors for sites with little or no vegetation. In Massachusetts, the Least Tern nests on sandy or gravelly beaches periodically scoured by storm tides, resulting in sparse or no vegetation; it also takes advantage of dredge spoils. Along the coast, the Least Tern forages in shallow-water habitats, including bays, lagoons, estuaries, river and creek mouths, tidal marshes, and ponds.

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 93**

A 139-acre Core Habitat featuring Species of Conservation Concern.

Purple Needlegrass is a densely tufted perennial belonging to a distinctive genus of mostly drought-adapted grasses which are easily recognized by their long-awned "bottlebrush" flower spikes. This species prefers frequent disturbance and is not tolerant of shade or competition from encroaching woody plants.

Despite its name, Sandplain Blue-eyed Grass isn't a grass, but rather a handsome perennial wildflower of the iris family. It inhabits sandy soils of early succession coastal sandplain grasslands.

In Massachusetts, the Imperial Moth occurs in pitch pine/scrub oak barrens and open pine/oak forests, and larvae feed almost exclusively on pitch pine (*Pinus rigida*).

Although the Purple Tiger Beetle may be found on sandy loam soils along farm roads, grass-strip runways, or on earthen dams, in Massachusetts it primarily inhabits sandplain grasslands and heathlands, and grass or heath openings in pitch pine-scrub oak barrens.

### **Core 97**

A 2-acre Core Habitat featuring a Species of Conservation Concern.

Despite its name, Sandplain Blue-eyed Grass isn't a grass, but rather a handsome perennial wildflower of the iris family. It inhabits sandy soils of early succession coastal sandplain grasslands.

### **Core 100**

A 104-acre Core Habitat featuring a Species of Conservation Concern.

In Massachusetts, the Imperial Moth occurs in pitch pine/scrub oak barrens and open pine/oak forests, and larvae feed almost exclusively on pitch pine (*Pinus rigida*).

### **Core 101**

A 13-acre Core Habitat featuring Species of Conservation Concern.

Diminutive yet feisty, the Least Tern is a spring and summer colonial nester on Massachusetts' sandy beaches. For nesting, it favors for sites with little or no vegetation. In Massachusetts, the Least Tern nests on sandy or gravelly beaches periodically scoured by storm tides, resulting in sparse or no vegetation; it also takes advantage of dredge spoils. Along the coast, the Least Tern forages in shallow-water habitats, including bays, lagoons, estuaries, river and creek mouths, tidal marshes, and ponds.





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 102**

A 35,587-acre Core Habitat featuring Forest Core, Wetland Core, Aquatic Core, Priority Natural Communities, and Species of Conservation Concern.

Much of Martha's Vineyard is a large and complex Core Habitat, home to 65 rare and uncommon species, with 24 of those globally rare. In fact, the highest concentration of rare species in the state is near the center of the island in Corellus State Forest. Many of these rare species are moths, tiger beetles, and plants which inhabit only the kinds of sandplains that cover much of the island. As well, the Vineyard supports some of the best populations in the state of breeding Northern Harriers and Whip-poor-wills. The sandplains and barrens of this island have remained in states of early succession over the centuries because of fire and major storms; nowadays, active management techniques, such as prescribed fire and mowing, help keep these singular habitats alive.

Coastal Salt Pond communities consist of vegetation surrounding, and in, coastal brackish ponds. These ponds are usually separated from the ocean by a sandspit. Their salinity varies and is influenced by opening and closing of the spit. Five examples of Coastal Salt Pond, mostly large, in excellent condition, and well buffered in naturally vegetated settings.

Sandplain Grasslands are open, essentially treeless, grass-dominated communities that generally occur on sand or other dry, poor soils. Occurrences are maintained by fire, salt spray, and, now, mowing. This Core has two examples of Sandplain Grassland including one that is considered to be the largest and best in the state, and possibly in New England. This very rare natural community harbors many state-listed plant and animal species.

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.

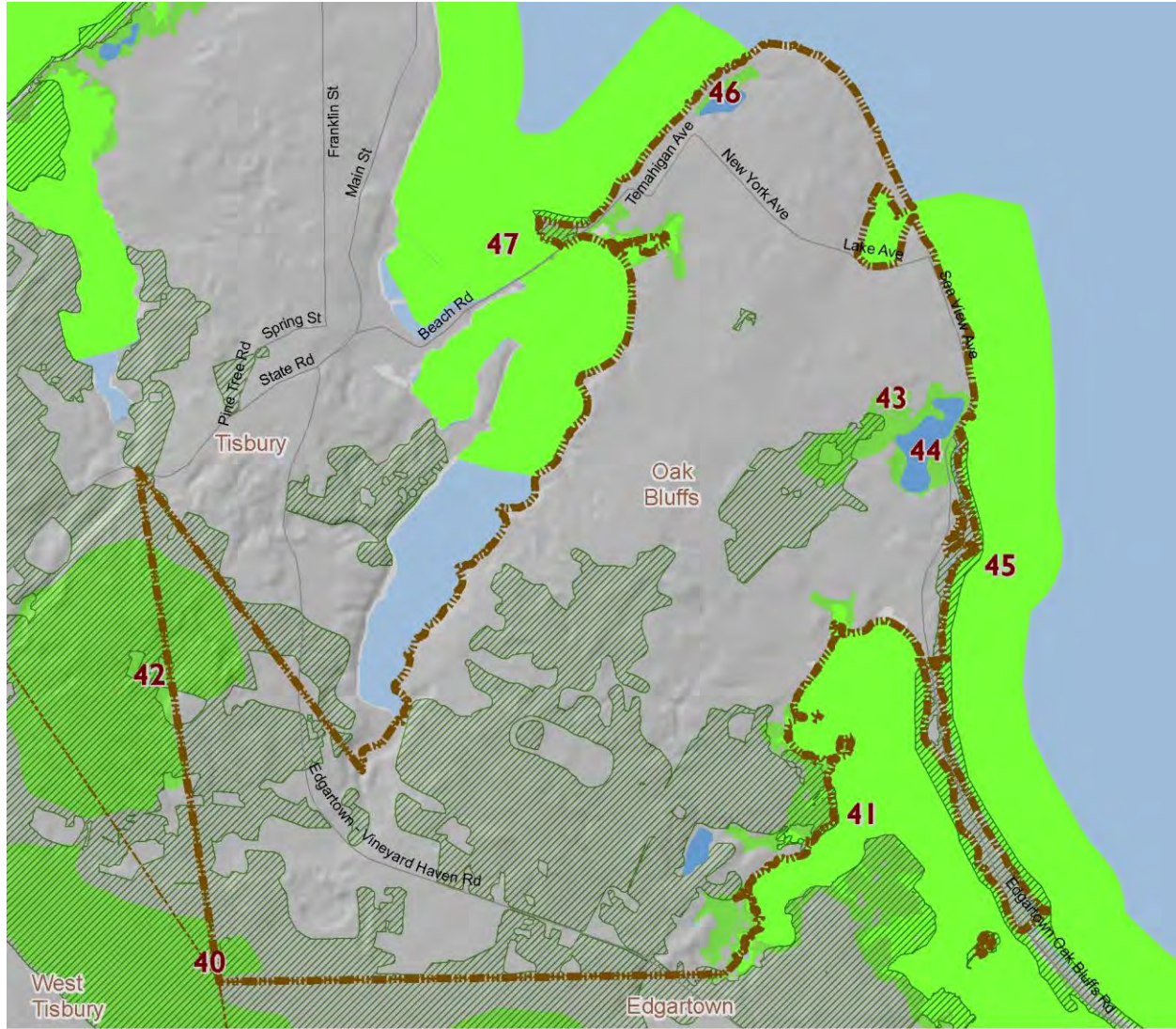
Aquatic Cores are intact river corridors within which important physical and ecological processes of the river or stream occur. They delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern.





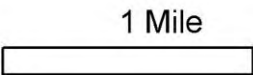


### BioMap2 Critical Natural Landscape in Oak Bluffs

Critical Natural Landscape IDs correspond with the following element lists and summaries.



-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape





### Elements of BioMap2 Critical Natural Landscapes

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

**CNL 40**

Landscape Block

**CNL 41**

Aquatic Core Buffer  
Coastal Adaptation Area  
Tern Foraging Area

**CNL 42**

Landscape Block

**CNL 43**

Coastal Adaptation Area

**CNL 44**

Coastal Adaptation Area  
Tern Foraging Area

**CNL 45**

Aquatic Core Buffer  
Coastal Adaptation Area  
Landscape Block  
Tern Foraging Area

**CNL 46**

Tern Foraging Area

**CNL 47**

Coastal Adaptation Area  
Tern Foraging Area





## Critical Natural Landscape Summaries

### **CNL 40**

A 2,926-acre Critical Natural Landscape featuring Landscape Block.

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 41**

A 1,119-acre Critical Natural Landscape featuring Aquatic Core Buffer, 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.

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

Terns range widely from their breeding colonies to forage. While the breeding and staging areas for Roseate, Arctic, Common, and Least Terns were included in the Species of Conservation Concern Core Habitat for *BioMap2*, tern foraging areas were included in *BioMap2* as part of Critical Natural Landscape. The extent of foraging habitat for Arctic, Common, and Roseate Terns depends on the size of the breeding





colony. For Least Tern, all shallow marine and estuarine waters within 2 miles of recent colony sites and up to 1 mile offshore were mapped as foraging habitat.

#### **CNL 42**

A 534-acre Critical Natural Landscape featuring Landscape Block.

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 43**

An 8-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 44**

A 109-acre Critical Natural Landscape featuring Coastal Adaptation Area and Tern Foraging 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.

Terns range widely from their breeding colonies to forage. While the breeding and staging areas for Roseate, Arctic, Common, and Least Terns were included in the Species of Conservation Concern Core





Habitat for *BioMap2*, tern foraging areas were included in *BioMap2* as part of Critical Natural Landscape. The extent of foraging habitat for Arctic, Common, and Roseate Terns depends on the size of the breeding colony. For Least Tern, all shallow marine and estuarine waters within 2 miles of recent colony sites and up to 1 mile offshore were mapped as foraging habitat.

#### CNL 45

A 42,510-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 10,411 acres, this Landscape Block is the fourth largest in the ecoregion, supports critical habitat, and is especially important in the developed landscapes of the Massachusetts Islands.

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

Terns range widely from their breeding colonies to forage. While the breeding and staging areas for Roseate, Arctic, Common, and Least Terns were included in the Species of Conservation Concern Core Habitat for *BioMap2*, tern foraging areas were included in *BioMap2* as part of Critical Natural Landscape.







The extent of foraging habitat for Arctic, Common, and Roseate Terns depends on the size of the breeding colony. For Least Tern, all shallow marine and estuarine waters within 2 miles of recent colony sites and up to 1 mile offshore were mapped as foraging habitat.

#### **CNL 46**

A 13-acre Critical Natural Landscape featuring Tern Foraging Area.

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

#### **CNL 47**

A 2,320-acre Critical Natural Landscape featuring Coastal Adaptation Area and Tern Foraging 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.

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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