



BioMap2

CONSERVING THE BIODIVERSITY OF
MASSACHUSETTS IN A CHANGING WORLD

Aquinnah

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.

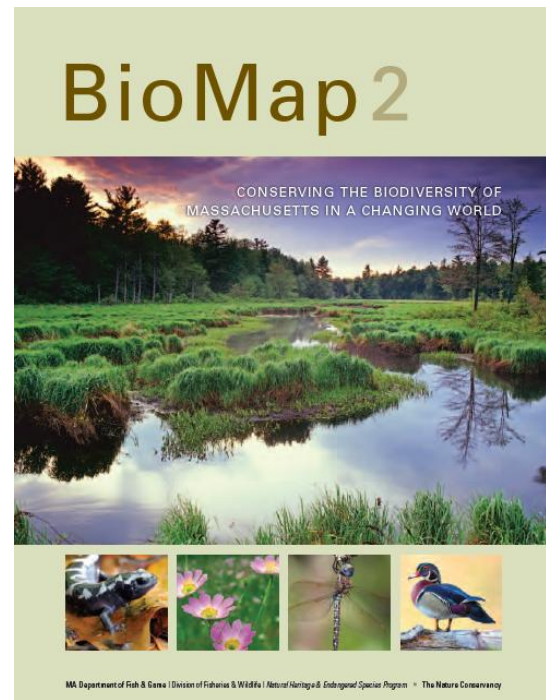
BioMap2 combines NHESP's 30 years of rigorously documented rare species and natural community data with spatial data identifying wildlife species and habitats that were the focus of the Division of Fisheries and Wildlife's 2005 State Wildlife Action Plan (SWAP). *BioMap2* also integrates The Nature Conservancy's 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 or contact Natural Heritage at 508-389-6360 or 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





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 Habitat 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
Total	413	62

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.

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. 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.



**Natural Heritage
& Endangered
Species Program**

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



Town Overview

Aquinnah 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.



Aquinnah Total Area: 3,697 acres (5.8 square miles)

- Human Population in 2010: 311
- Open space protected in perpetuity: 196 acres, or 5.3% percent of total area*
- BioMap2 Core Habitat: 2,802 acres
- BioMap2 Core Habitat Protected: 149 acres or 5.3%
- BioMap2 Critical Natural Landscape: 3,054 acres
- BioMap2 Critical Natural Landscape Protected: 152 acres or 5.0%.

BioMap2 Components

Core Habitat

- 3 Exemplary or Priority Natural Community Cores
- 2 Wetland Cores
- 2 Aquatic Cores
- 7 Species of Conservation Concern Cores**
 - 5 birds, 1 reptile, 1 amphibian, 8 insects, 6 plants

Critical Natural Landscape

- 1 Landscape Block
- 2 Wetland Core Buffers
- 1 Aquatic Core Buffer
- 3 Coastal Adaptation Areas
- 3 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.



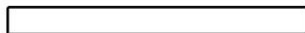


BioMap2 Core Habitat and Critical Natural Landscape in Aquinnah



-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape

1 Mile



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

Insects

Moths

- [Coastal Heathland Cutworm](#), (*Abagrotis nefascia*), SC
- [Gerhard's Underwing](#), (*Catocala herodias gerhardi*), SC
- [Chain Dot Geometer](#), (*Cingilia catenaria*), SC
- [Water-willow Stem Borer](#), (*Papaipema sulphurata*), T
- [Drunk Apamea Moth](#), (*Apamea inebriata*), SC
- [Dune Noctuid Moth](#), (*Sympistis riparia*), SC
- [Sandplain Euchlaena](#), (*Euchlaena madusaria*), SC
- [The Pink Streak](#), (*Dargida rubripennis*), T

Amphibians

- [Four-toed Salamander](#), (*Hemidactylium scutatum*), Non-listed SWAP

Reptiles

- Smooth Green Snake, (*Opheodrys vernalis*), Non-listed SWAP

Birds

- [Piping Plover](#), (*Charadrius melodus*), T
- [Northern Harrier](#), (*Circus cyaneus*), T
- [Common Tern](#), (*Sterna hirundo*), SC
- [Roseate Tern](#), (*Sterna dougallii*), E
- [Least Tern](#), (*Sternula antillarum*), SC

Plants

- [Sandplain Blue-eyed Grass](#), (*Sisyrinchium fuscatum*), SC
- [Cranefly Orchid](#), (*Tipularia discolor*), E
- [Broad Tinker's-weed](#), (*Triosteum perfoliatum*), E
- Broom Crowberry, (*Corema conradii*), recently de-listed
- [Nantucket Shadbush](#), (*Amelanchier nantucketensis*), recently de-listed
- [Sea-beach Knotweed](#), (*Polygonum glaucum*), SC

Priority Natural Communities

- Maritime Beach Strand Community, S3
- Maritime Dune Community, S2
- [Estuarine Subtidal: Coastal Salt Pond](#), S2





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.

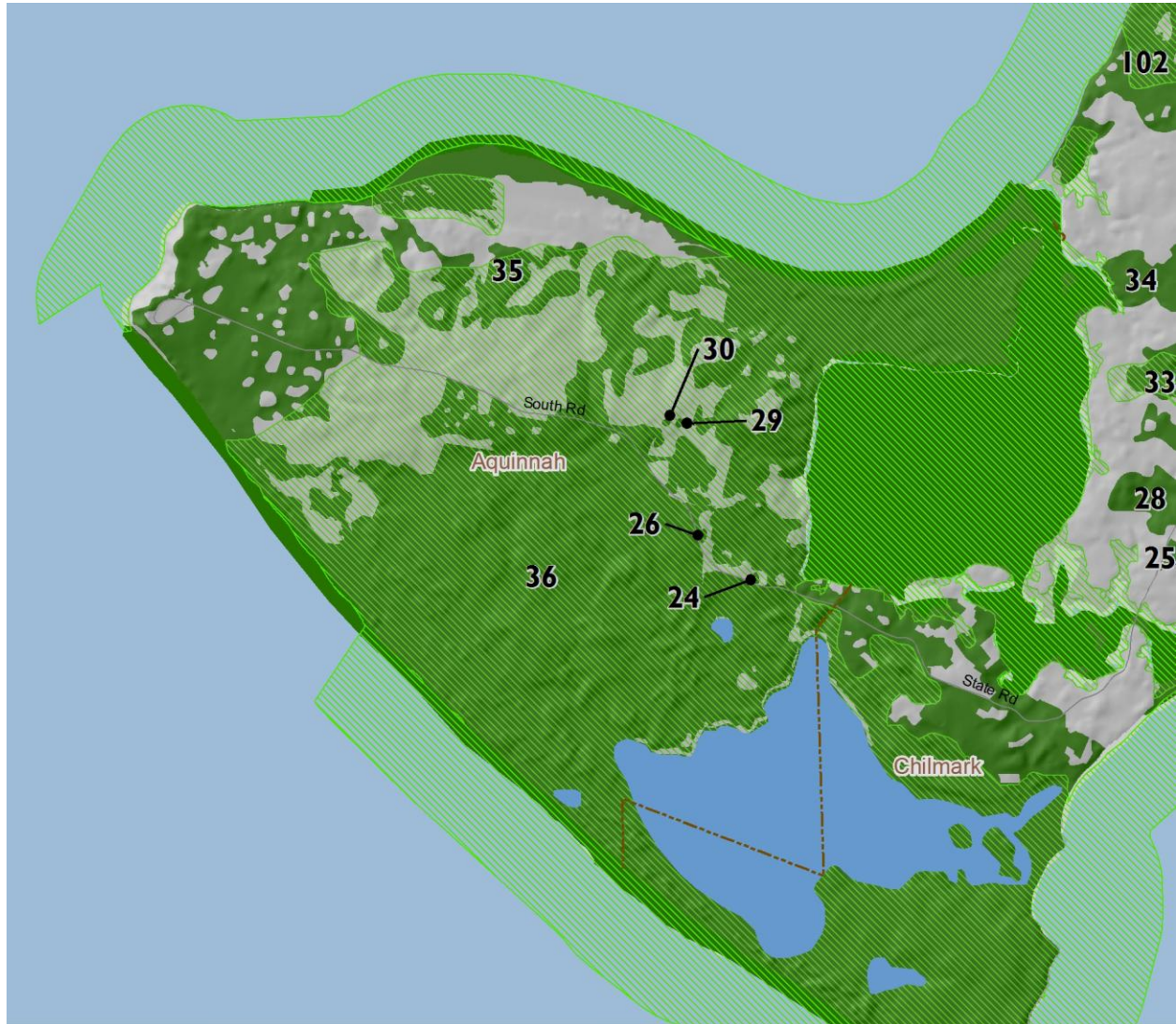
S3 = Vulnerable communities, typically have 21-100 sites or limited acreage across the state.








Aquinnah

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

Core 24

Species of Conservation Concern		
Water-willow Stem Borer	<i>Papaipema sulphurata</i>	T

Core 26

Species of Conservation Concern		
Water-willow Stem Borer	<i>Papaipema sulphurata</i>	T

Core 29

Species of Conservation Concern		
Water-willow Stem Borer	<i>Papaipema sulphurata</i>	T

Core 30

Species of Conservation Concern		
Water-willow Stem Borer	<i>Papaipema sulphurata</i>	T

Core 35

Species of Conservation Concern		
Gerhard's Underwing Moth	<i>Catocala herodias gerhardi</i>	SC

Core 36

Wetland Core		
Aquatic Core		
Estuarine Subtidal: Coastal Salt Pond		S2
Maritime Beach Strand Community		S3
Maritime Dune Community		S2
Species of Conservation Concern		
Broad Tinker's-weed	<i>Triosteum perfoliatum</i>	E
Crane-fly Orchid	<i>Tipularia discolor</i>	E
Saltpond Pennywort	<i>Hydrocotyle verticillata</i>	T
Sandplain Blue-eyed Grass	<i>Sisyrinchium fuscatum</i>	SC
Sandplain Flax	<i>Linum intercursum</i>	SC
Sea-beach Knotweed	<i>Polygonum glaucum</i>	SC
Chain Dot Geometer	<i>Cingilia catenaria</i>	SC
Coastal Heathland Cutworm	<i>Abagrotis nefascia</i>	SC
Drunk Apamea Moth	<i>Apamea inebriata</i>	SC





Dune Noctuid Moth	<i>Sympistis riparia</i>	SC
Gerhard's Underwing Moth	<i>Catocala herodias gerhardi</i>	SC
Sandplain Euchlaena	<i>Euchlaena madusaria</i>	SC
The Pink Streak	<i>Dargida rubripennis</i>	T
Water-willow Stem Borer	<i>Papaipema sulphurata</i>	T
Four-toed Salamander	<i>Hemidactylium scutatum</i>	Non-listed SWAP
Smooth Green Snake	<i>Opheodrys vernalis</i>	Non-listed SWAP
Common Tern	<i>Sterna hirundo</i>	SC
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 24

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 26

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 29

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 30

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 35

A 54-acre Core Habitat featuring a Species of Conservation Concern.

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.





Core 36

A 5,036-acre Core Habitat featuring Wetland Core, Aquatic Core, Priority Natural Communities, and Species of Conservation Concern.

This Core Habitat encompasses a variety of high-quality Estuarine and Maritime communities in Aquinnah and Chilmark on Martha's Vineyard. These diverse habitats support many rare plant species, several rare moth species, and a rare tiger beetle. The beaches and dunes provide important nesting habitat for Piping Plovers and Least Terns, and other areas are used by Northern Harriers and a variety of migrating bird species. There are two Coastal Salt Ponds in this Core Habitat; this type of natural community is very uncommon in Massachusetts and vulnerable to disappearing from our landscape. These ponds are usually separated from the ocean by a sandspit. Their salinity varies and is influenced by opening and closing of the spit. This Core Habitat also contains a Maritime Beach Strand considered to be one of the best examples of this type of strand community, given its particular plant association. Maritime Beach Strand communities are sparsely vegetated, narrow, wrack-strewn areas between the line of high tide and the foredunes. They are usually part of barrier beach systems and are found seaward of any dunes, but above daily high tides. Open, grassy, barren areas within this Core Habitat support one of the state's two largest and healthiest populations of Sandplain Blue-Eyed Grass. In other portions of the Core Habitat, the Endangered Crane-fly Orchid is growing. Along the shifting sands along the dunes, the globally rare Sea-beach Knotweed thrives. This Core Habitat includes habitat for at least nine rare invertebrate species, including eight species of moths and one species of tiger beetle. Heathlands and other maritime shrublands are habitat for moths such as the Coastal Heathland Cutworm, the Chain Dot Geometer, and the Sandplain Euchlaena. Marshes and other shallow freshwater wetlands provide habitat for the Water-willow Stem Borer moth, which is a Threatened species that is found nowhere in the world outside of Massachusetts. Shrublands, grasslands, and wetlands along Menemsha Pond and behind coastal beaches provide nesting and foraging habitat for Northern Harriers and migration habitat near the coast for a variety of landbirds.

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. This Core has two examples of Coastal Salt Pond including one that is quite large and supports a diverse community of plants and animals. It is also well buffered from development by a large, naturally vegetated landscape.

Maritime Beach Strand communities are sparsely vegetated, narrow, wrack-strewn areas between the line of high tide and the foredunes. They are usually part of barrier beach systems and are found seaward of any dunes, but above daily high tides. This large, minimally impacted example of Maritime Beach Strand is considered to be one of the best examples of this community, and has an unusual association of plant species.

The Maritime Dune Community consists of patches of herbaceous plants interspersed with areas of bare sand and shrubs. It occurs on windswept dunes within the salt spray zone, and often grades into





shrubland or woodlands on more sheltered back dunes. This relatively small example of Maritime Dune Community is in good condition. Access is limited despite the presence of several trails and a road.

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.

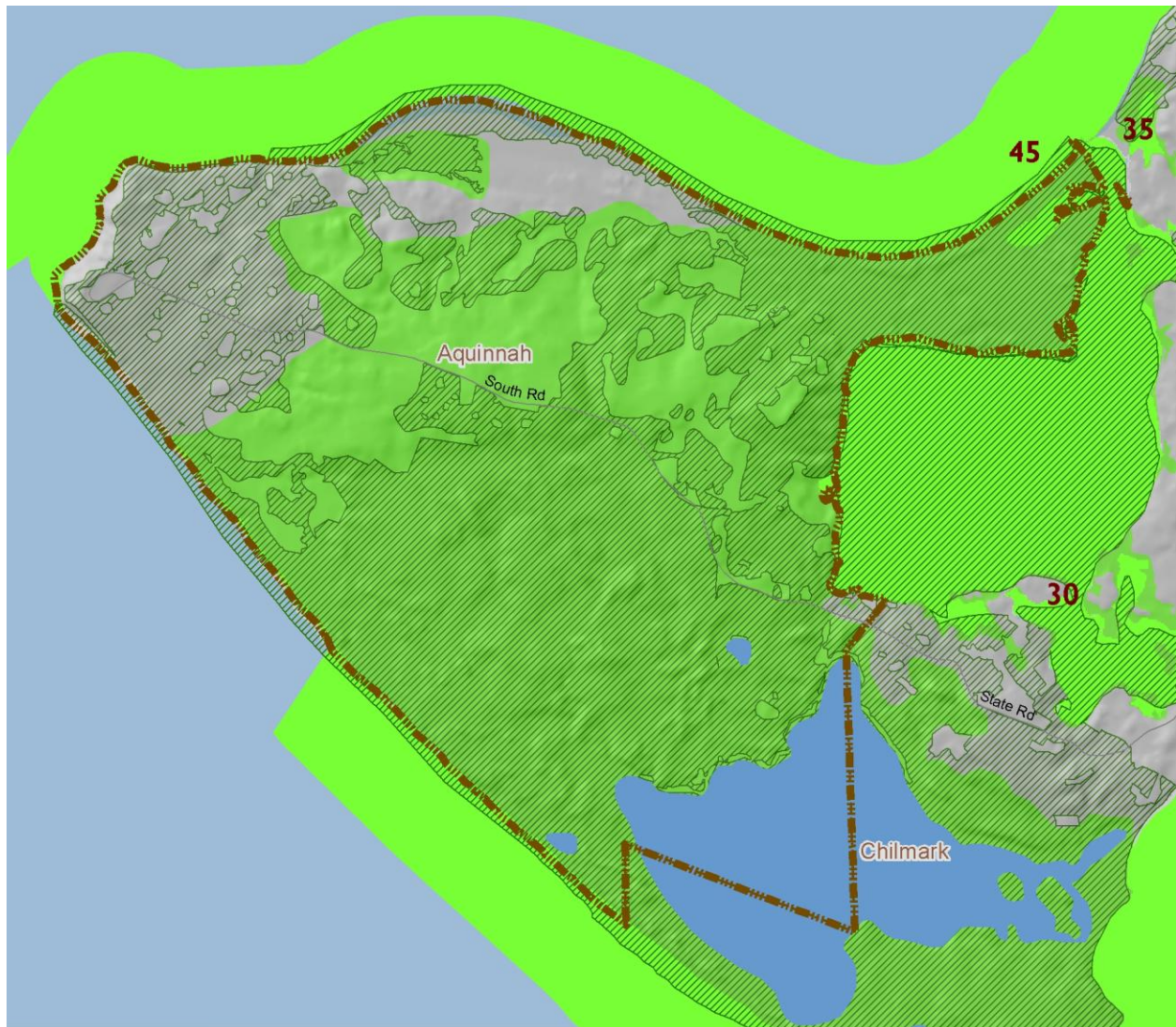
Aquatic Cores are intact river corridors within which important physical and ecological processes of the river or stream occur. They delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern.





BioMap2 Critical Natural Landscape in Aquinnah

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



BioMap2 Core Habitat



BioMap2 Critical Natural Landscape

1 Mile



Natural Heritage
& Endangered
Species Program

Massachusetts Division of Fisheries and Wildlife

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



Elements of BioMap2 Critical Natural Landscapes

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

CNL 45

- Aquatic Core Buffer
- Coastal Adaptation Area
- Landscape Block
- Tern Foraging Area





Critical Natural Landscape Summaries

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





BioMap2

Conserving the Biodiversity of Massachusetts in a Changing World

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.



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

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.