

LAWRENCE HYDROELECTRIC PROJECT

LIHI APPLICATION

ATTACHMENT E

THREATENED AND ENDANGERED SPECIES

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN MASSACHUSETTS**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Barnstable	Piping Plover	Threatened	Coastal Beaches	All Towns
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Chatham
	Sandplain gerardia	Endangered	Open areas with sandy soils.	Sandwich and Falmouth.
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Bourne (north of the Cape Cod Canal)
Berkshire	Bog Turtle	Threatened	Wetlands	Egremont and Sheffield
Bristol	Piping Plover	Threatened	Coastal Beaches	Fairhaven, Dartmouth, Westport
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Fairhaven, New Bedford, Dartmouth, Westport
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Taunton
Dukes	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Piping Plover	Threatened	Coastal Beaches	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Aquinnah and Chilmark
	Sandplain gerardia	Endangered	Open areas with sandy soils.	West Tisbury
Essex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Gloucester, Essex and Manchester
	Piping Plover	Threatened	Coastal Beaches	Gloucester, Essex, Ipswich, Rowley, Revere, Newbury, Newburyport and Salisbury
Franklin	Northeastern bulrush	Endangered	Wetlands	Montague, Warwick
	Dwarf wedgemussel	Endangered	Mill River	Whately
Hampshire	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Hadley
	Puritan tiger beetle	Threatened	Sandy beaches along the Connecticut River	Northampton and Hadley
	Dwarf wedgemussel	Endangered	Rivers and Streams.	Hatfield, Amherst and Northampton
Hampden	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Southwick
Middlesex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Groton
Nantucket	Piping Plover	Threatened	Coastal Beaches	Nantucket
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Nantucket
	American burying beetle	Endangered	Upland grassy meadows	Nantucket
Plymouth	Piping Plover	Threatened	Coastal Beaches	Scituate, Marshfield, Duxbury, Plymouth, Wareham and Mattapoisett
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Kingston, Middleborough, Carver, Plymouth, Bourne, Wareham, Halifax, and Pembroke
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Plymouth, Marion, Wareham, and Mattapoisett.
Suffolk	Piping Plover	Threatened	Coastal Beaches	Winthrop
Worcester	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Leominster

- Eastern cougar and gray wolf are considered extirpated in Massachusetts.
- Endangered gray wolves are not known to be present in Massachusetts, but dispersing individuals from source populations in Canada may occur statewide.
- Critical habitat for the Northern Red-bellied Cooter is present in Plymouth County.



BioMa2

CONSERVING THE BIODIVERSITY OF
MASSACHUSETTS IN A CHANGING WORLD

Lawrence

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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Massachusetts Division of Fisheries & Wildlife

The Nature
Conservancy 
Protecting nature. Preserving life.™



Town Overview

Lawrence lies within the Southern New England Coastal Plains and Hills Ecoregion, an area comprised of plains with a few low hills. Forests are mainly central hardwoods with some transition hardwoods and some elm-ash-red maple and red and white pine. Many major rivers drain this area.



Lawrence at a Glance

Total Area: 4,754 acres (7.4 square miles)

Human Population in 2010: 76,377

Open space protected in perpetuity: 122 acres, or 2.6% percent of total area*

BioMap2 Core Habitat: 438 acres

BioMap2 Core Habitat Protected: 32 acres or 7.3%

BioMap2 Critical Natural Landscape: 482 acres

BioMap2 Critical Natural Landscape Protected: 44 acres or 9.0%.

BioMap2 Components

Core Habitat

2 Aquatic Cores

1 Species of Conservation Concern Core**

o 1 bird, 1 insect

Critical Natural Landscape

2 Aquatic Core Buffers

* Calculated u

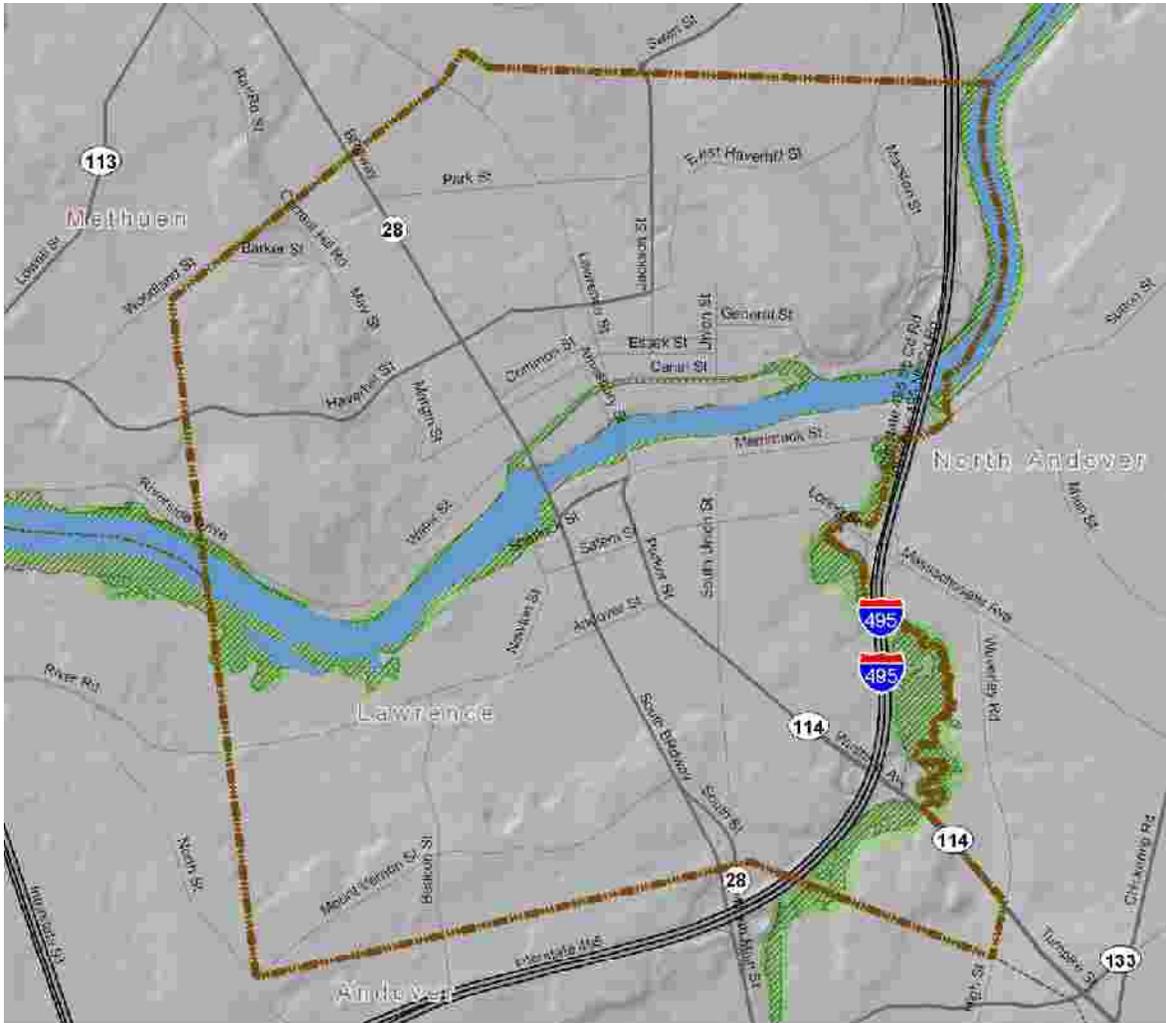
and Recreational Open Space March, .

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





BioMap2 Core Habitat and Critical Natural Landscape in Lawrence



-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape

1 Mile



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 & Endangered
 Species Program**

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 100 Hartwell Street, Suite 230, West Boylston, MA 01583
 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.nhesp.org.



BioMap2

Conserving the Biodiversity of Massachusetts in a Changing World

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

Insects

Dragonflies

[Umber Shadowdragon](#), (*Neurocordulia obsolata*), SC

Birds

[Bald Eagle](#), (*Haliaeetus leucocephalus*), T

Other BioMap2 Components

[Aquatic Core](#)

[Aquatic Core Buffer](#)

E = Endangered

T = Threatened

SC = Special Concern

S1 = Critically Imperiled communities, typically 5 or fewer documented sites or very few remaining acres in the state.

S2 = Imperiled communities, typically 6-20 sites or few remaining acres in the state.

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



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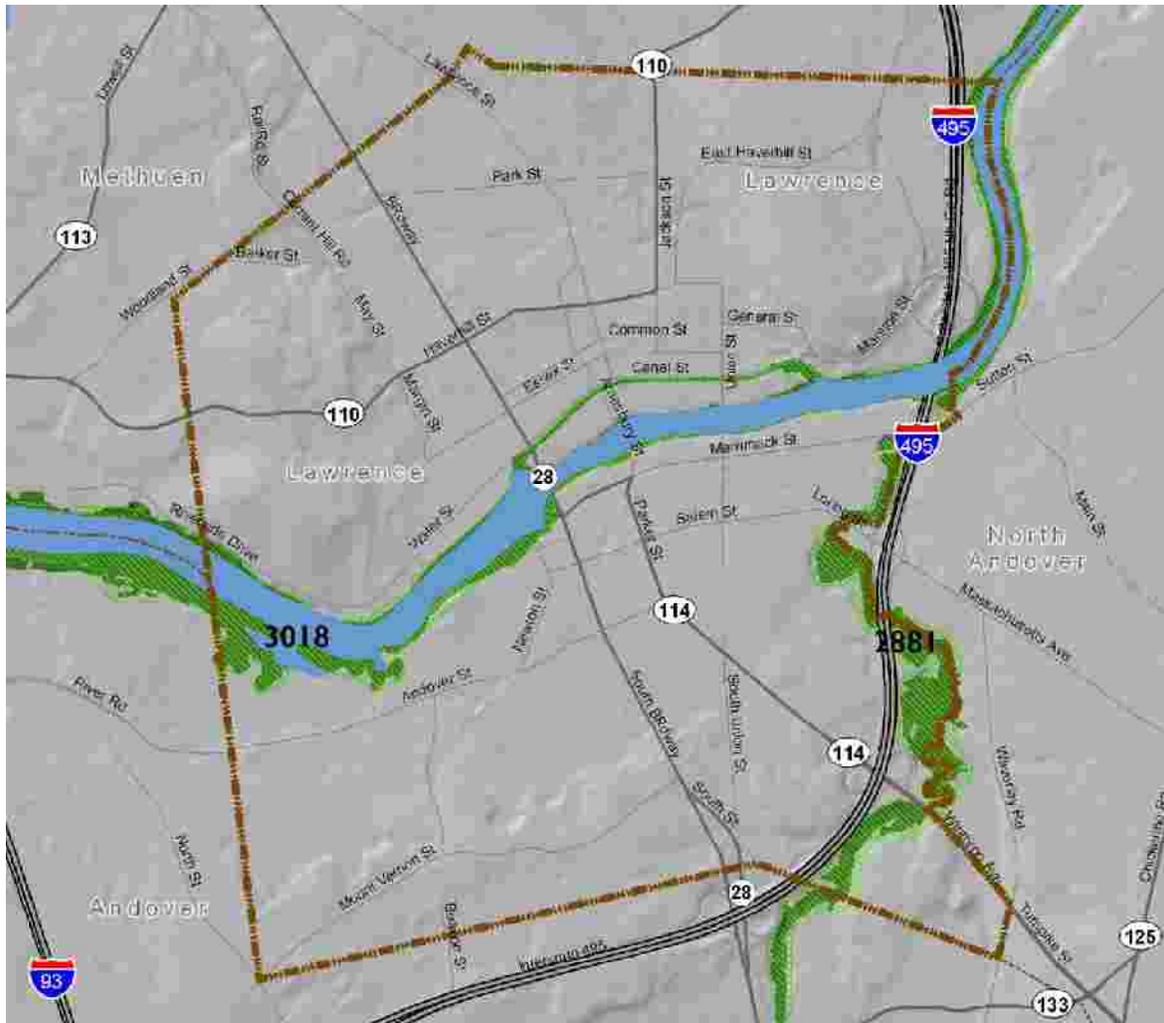
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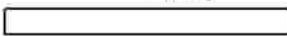
BioMap2 Core Habitat in Lawrence

Core IDs correspond with the following element lists and summaries.



-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape

1 Mile



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Elements of BioMap2 Cores

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

Core 2881

Aquatic Core

Core 3018A

Aquatic Core

Wetland Core

Priority & Exemplary Natural Communities

Estuarine intertidal: freshwater tidal marsh S1

Estuarine intertidal: salt marsh S3

Small-river floodplain forest S2

Species of Conservation Concern

American Waterwort *Elatine americana* E

Eaton's Beggar-ticks *Bidens eatonii* E

Engelmann's Umbrella-sedge *Cyperus engelmannii* T

Estuary Arrowhead *Sagittaria montevidensis ssp. spongiosa* E

Parker's Pipewort *Eriocaulon parkeri* E

Seabeach Dock *Rumex pallidus* T

Vasey's Pondweed *Potamogeton vaseyi* E

New England Siltsnail *Floridobia winkleyi* SC

Arrow Clubtail *Stylurus spiniceps* Non-listed SWAP

Cobra Clubtail *Gomphus vastus* SC

Coppery Emerald *Somatochlora georgiana* E

Riverine Clubtail *Stylurus annicola* E

Umber Shadowdragon *Neurocordulia obsoleta* SC

Atlantic Sturgeon *Acipenser oxyrinchus* E

Shortnose Sturgeon *Acipenser brevirostrum* E

Bald Eagle *Haliaeetus leucocephalus* T





Core Habitat Summaries

Core 2881

A 131-acre Core Habitat featuring Aquatic Core.

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.

Core 3018A

A 6,298-acre section of a larger 35,194-acre Core Habitat featuring Wetland Core, Aquatic Core, Priority Natural Communities, and Species of Conservation Concern.

The mainstem of the Merrimack River, as it winds its way from the New Hampshire border in Tyngsborough to the tidal waters of its mouth, supports 19 rare and uncommon species. Bald Eagles have recently returned to nest along the river, while the federally Endangered Atlantic and Shortnose Sturgeons cruise the river's waters in small numbers. In West Newbury, a Freshwater Tidal Marsh - a very uncommon type of natural community - hosts six Endangered and Threatened plants, including the globally rare Eaton's Beggar-ticks and Parker's Pipewort.

The Freshwater Tidal Marsh community occurs along coastal rivers, upstream of brackish tidal marsh. Here the marshes are flooded by tidal action twice a day, but with fresh water. These structurally diverse marshes are globally rare. This example of Freshwater Tidal Marsh is relatively large and in good condition. It is the largest community of this type north of Boston.

The Salt Marsh community type is a graminoid-dominated, tidally flooded coastal community with several vegetative zones. Salt Marshes form in areas subject to oceanic tides, but sheltered from wave energy. At over 16,000 acres this example of Salt Marsh is the largest in New England. It is generally in good condition and largely under conservation ownership.

Small-River Floodplain Forests are silver maple/green ash forests occurring on alluvial soils of small rivers and streams. They occur on small tributaries of the Connecticut and Nashua Rivers and along some small rivers of eastern Massachusetts. This example of Small-River Floodplain Forest, though quite small, is an unusual variant of the community dominated by Green Ash. It is in relatively good condition and is well buffered by the surrounding landscape.

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 Lawrence

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



-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape

1 Mile



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BioMap2

Conserving the Biodiversity of Massachusetts in a Changing World

Elements of BioMap2 Critical Natural Landscapes

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

CNL 1301

Aquatic Core Buffer

CNL 1362

Aquatic Core Buffer

Coastal Adaptation Area

Landscape Block

Tern Foraging Area



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Critical Natural Landscape Summaries

CNL 1301

A 188-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 1362

A 50,627-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.

This 8,989-acre Landscape Block is the fourth largest of 62 Blocks in the ecoregion. 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, barrier beach, and estuary habitats.





BioMap2

Conserving the Biodiversity of Massachusetts in a Changing World

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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