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AQUATIC CORE and UPLAND BUFFER

BioMap2 Components

Core Habitat: **Aquatic Core**
Critical Natural Landscape: **Upland Buffer**

AQUATIC HABITATS: PROTECTING FRESHWATER BIODIVERSITY

Massachusetts is home to a wide variety of lakes, ponds, rivers, and streams. From small streams that cascade down the steep hills in western Massachusetts, to the powerful Connecticut and Merrimack Rivers, to the low-gradient meanders of the Taunton River in southeastern Massachusetts, the streams and rivers of the Commonwealth provide habitat for numerous species. Similarly, lakes and ponds vary from the mineral-laden hard-water ponds in the Berkshires to the sandy shores of globally significant Coastal Plain Ponds along the coast. Massachusetts waterways have been the lifeblood of Massachusetts' ecology and economy for centuries, supplying power, food, drinking water, and recreational opportunities. Yet pollution, water withdrawal, and habitat fragmentation have long threatened the integrity of aquatic habitats.

Together, these aquatic systems support a great diversity of species, including numerous fish, aquatic plants, freshwater mussels, crayfish, snails, aquatic insects, and more. Some of these species are quite rare, such as the Endangered Dwarf Wedgemussel and the Threatened Lake Chub, while others such as the Eastern Brook Trout are important for the high quality habitat types they occupy and the recreational opportunities they provide. Coastal rivers support fish that migrate between salt and freshwater. And rivers and streams are integrally linked to the floodplain wetlands along their borders, defining dynamic ecosystems and irreplaceable habitat.

The Massachusetts Natural Heritage & Endangered Species Program and The Nature Conservancy's Massachusetts Program developed *BioMap2* in 2010 as a conservation plan to protect the state's biodiversity. *BioMap2* is designed to guide strategic biodiversity conservation in Massachusetts over the next decade by focusing land protection and stewardship on the areas that are most critical for ensuring the long-term persistence of rare and other native species and their habitats, exemplary natural communities, and a diversity of ecosystems.

Figure 1: *BioMap2* Aquatic Cores and Upland Buffers

COMPONENTS OF *BIOMAP2*: *BioMap2* **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. *BioMap2* **Critical Natural Landscape** was created to identify and prioritize 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. *BioMap2* uses specific data and sophisticated mapping and analysis tools to spatially define each of these components, calling on the latest research and understanding of species biology, conservation biology, and landscape ecology.

AQUATIC CORES: To delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern, *BioMap2* identified intact river corridors within which important physical and ecological processes of the river or stream occur. To identify those areas integrally connected to each river and stream, each river segment was buffered 30 meters. All wetlands wholly or partially contained within this buffer were then included, and the combination of the river channel, the adjacent buffer, and the connected wetlands make up this riverine Core Habitat. The resulting Aquatic Cores are designed to protect 10 MESA-listed fish, 17 non-listed fish, as well as 145 MESA-listed species with all or a portion of their life cycle in aquatic habitats.

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In total, *BioMap2* Core Habitat identifies 220,000 acres of Aquatic Core Habitat, and includes 2,700 miles of rivers and streams specifically selected to protect aquatic species and ecosystems.

UPLAND BUFFERS OF AQUATIC CORES: 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 Aquatic Core. In this way, the conservation of aquatic buffers will support the habitats and functionality of each Aquatic Core, and also include adjacent uplands that are important for many species that move between habitat types.

ACHIEVING STRATEGIC CONSERVATION WITH *BioMap2*: In *BioMap2,* the Core Habitat and Critical Natural Landscape are complementary and

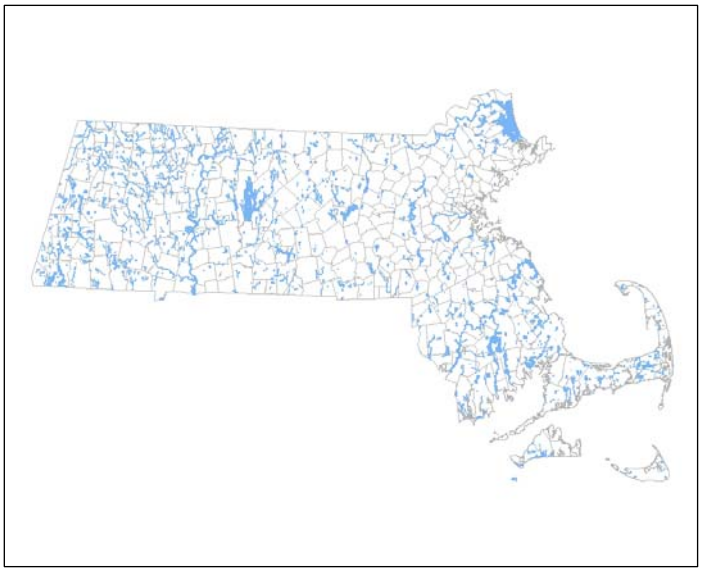

Figure 2: *BioMap2* Aquatic Cores across Massachusetts

overlapping, and were delineated based on separate criteria. Each represents a different scale of biodiversity in Massachusetts, yet the protection of both is important to conserve the full suite of biodiversity in the state.

Aquatic Core Habitats in *BioMap2* are based on rare species habitat mapped from actual observations, habitat for wildlife of conservation concern, exemplary natural communities, and other aquatic conservation targets. These delineations are based on both substantial high-quality field data and an understanding of species habitat requirements, and interpretation of land cover and land use data representing the distribution of ecosystems and patterns of development that affect them. They therefore represent the areas in which land protection and stewardship will contribute most significantly to the conservation of specific elements of biodiversity.

Upland Buffers of Aquatic Cores, if protected, will help minimize impacts from development on natural aquatic systems, allow connectivity among habitats, and provide area for natural processes—such as stream meanders within a floodplain—which result in a wider diversity of habitats and species.

Both land protection and stewardship may be necessary to protect the biodiversity represented by the *BioMap2* Aquatic Cores and their Upland Buffers. For example, invasive species control may be necessary to maintain the integrity of the biodiversity of the Aquatic Core, while land protection may be necessary to prevent land clearing and runoff from the adjacent Upland Buffers into the Aquatic Cores.

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