Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries & Wildlife
Route 135, Westborough, MA 01581

WETLAND CORE and UPLAND BUFFER

BioMap2 Components

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

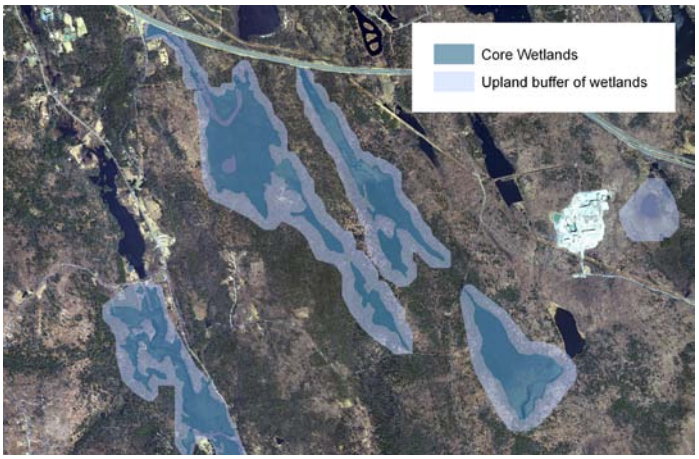

Figure 1: *BioMap2* Wetland Cores and Upland Buffers

FRESHWATER WETLANDS: CONCENTRATIONS OF RARITIES, ESSENTIAL HABITAT

Freshwater wetlands are productive ecosystems that support high biodiversity, including unique plant communities and many animal species that are dependent on wetlands for various life cycle needs. Wetlands also serve critical ecosystem functions: they capture heavy rains and help prevent flooding downstream, absorb greenhouse gases from the atmosphere, and store and purify groundwater. Wetlands are extremely important components of the Massachusetts landscape; however, they are limited in extent, covering only about 450,000 acres (less than 10%) of the state. Despite protection by state and federal regulations, historical wetland destruction, encroaching development, habitat fragmentation, unsustainable water withdrawals, pollution, invasive species, and climate change all threaten the ability of wetlands to support biodiversity and to continue to function effectively.

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.

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.

WETLAND CORES: *BioMap2* includes a statewide assessment of the most intact wetlands in Massachusetts. This analysis identified the least disturbed wetlands within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are mostly 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. High-quality wetlands were identified using an assessment of Ecological Integrity. This analysis combined individual wetland types (e.g., shrub swamps, forested wetlands, marshes, bogs) into contiguous wetland

complexes, selecting only those greater than 10 acres in order to prioritize long-term ecological function. Wetlands larger than 10 acres account for about 303,000 acres in Massachusetts.

To enhance the biodiversity value of wetlands selected as Core Habitat, it is important to represent the varied ecological settings found in Massachusetts. In particular, different plant and animal assemblages occur in unique physical settings determined by geology and elevation. For instance, 108,000 acres of wetlands occur on the sandy soils of southeastern Massachusetts in an elevation range between 20 and 800 feet. By contrast, fewer than 8,000 acres of wetlands are found on marble or calcareous bedrock in western Massachusetts between 800 and 1,700 feet. By mapping the most intact wetlands in each ecological setting, *BioMap2* will help prioritize conservation of wetland diversity in the context of climate change. These intact wetlands in diverse settings may be thought of as representing the ecological stage, and are most likely to support a diversity of wetland types over time, even as different plant and animal species (the actors on the ecological stage) shift in response to climate change.

UPLAND BUFFERS OF WETLAND 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

Figure 2: Spoonleaf Sundew is one of the many unique plants found in bog communities

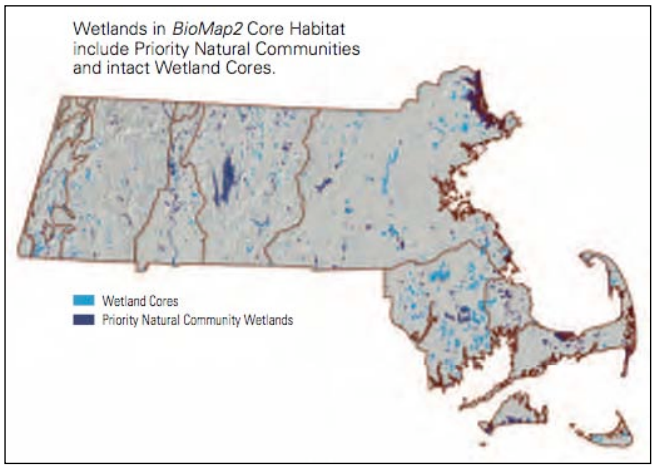

Figure 3: *BioMap2* Wetland Cores and Upland Buffers across Massachusetts

Wetland Core. 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.

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

Wetland Core Habitats in *BioMap2* represent the areas in which land protection and stewardship will contribute most significantly to the conservation of specific elements of biodiversity.

Upland Buffers of Wetland Cores, if protected, will help minimize impacts from development on natural wetland systems, allow connectivity among habitats, and provide area for natural processes 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* Wetland Cores and their Upland Buffers. For example, invasive species control may be necessary to maintain the integrity of the biodiversity of the Wetland Core, while land protection may be necessary to prevent land clearing and runoff from the adjacent Upland Buffers into the Wetland Cores.