

Hudson River Estuary Area of Biological Concern

Site Description:

The Hudson River Estuary Area of Biological Concern is a region of high biological and geological diversity, and has a long and rich human history. A dynamic geologic past has contributed to a great diversity of landscapes, habitats, natural communities, and species. This stunning history includes the workings of continental glaciers, dunes formed when wind carried sand from drained glacial lakes, the movements of great rivers that have eroded mountains, cliffs that have resisted erosion for eons while softer materials crumbled, and the formation of a mountain chain the size of the Himalayas 450 million years ago in what is now eastern New York.

The unique geologic setting of the Hudson River Valley is one the reasons the region is so biologically diverse. Although only 13.5% of New York's land area, the counties bordering the estuary from New York City to the Troy dam are home to approximately 86% of the different varieties of terrestrial vertebrate animals that occur in New York State (Smith et al. 2001). The Hudson River Estuary corridor is nationally and globally important for the occurrence of turtles and dragonflies in particular. Residents of the Hudson River Estuary corridor have benefited greatly from the rich biological abundance and clean water this region produces. Many local economies are dependent upon biodiversity, from pollination of important food crops and the production of timber, to recreational opportunities such as boating, fishing and hiking. Increasingly, biodiversity is recognized as a critical component of human and environmental health.



Sunset over the Hudson River. Photo courtesy of NYSDEC.

The 150-mile stretch of the Hudson River from the federal lock and dam in Troy to the ocean is tidal and thus defined as an estuary. The estuary includes the entire portion of the Hudson that shows daily influence of ocean tides, and the associated wetlands along the river's edge. There are approximately 60 tributaries to the Hudson River Estuary that transport nutrients, pollutants, organisms, dissolved minerals, and organic and inorganic suspended matter into the Hudson River's main channel. Because tributaries drain the uplands of the Hudson River, the environmental health of the estuary is closely linked to the condition of tributary watersheds. Some of the Hudson River Estuary's fisheries are negatively impacted by such factors as urban/suburban development, clearing of riparian forests for agricultural and other uses, barriers to fish passage, and contamination by industrial chemicals and pathogens that occur within tributary watersheds. Yet other tributaries in the Hudson River Estuary provide world-class coldwater fisheries and high-quality drinking water. Many wildlife species depend upon tributaries and associated riparian areas for all or a part of their life cycles.

Land ownership in the Hudson River Estuary Area of Biological Concern is classified as mostly private (approximately 89%) while most of the remaining lands are managed by the State (approximately 10%) (Smith et al. 2001). The Hudson River Estuary Area of Biological Concern can be described as predominately forest/woodland (approximately 77%), with important components of crop and pasture lands, urban and suburban areas, and water. Vegetation along the estuary's undeveloped shores is deciduous forest, which includes oak, maple, beech, birch, hemlock, white pine and other trees. Dry rocky slopes, such as the Palisades Ridge and Highlands, support red oak and chestnut oak. Areas with deeper soils, generally located in the mid to upper reaches of the estuary, as well as moist ravines downriver, support oak, sugar maple, tulip tree, black birch, beech, hemlock and flowering dogwood. Major changes in the species composition of hardwood forests have occurred and continue to occur. American chestnut and American elm were lost to fungal diseases of European origin, while other species expanded, including red maple and invasive woody species such as black locust and Norway maple. More recently, beech bark disease ("beech blight") caused by another introduced fungus has dramatically affected American beech in the Catskills, and an introduced insect, the hemlock woolly adelgid, is attacking hemlock, especially in the southern region of the Hudson River Valley.

The Hudson River Estuary Area of Biological Concern is one of the most densely populated areas of the country and is one of the state's primary industrial centers. Thus, open spaces are rapidly declining and large unbroken expanses of forest and wetland are becoming fragmented. The heavily populated corridor between Albany and New York City bordering the Hudson River Estuary includes more than 50% of New York's population within a land area only 13.5% of the total state. There is no significant area of the Hudson River Valley that has not been affected in some way by human activities, though the scale and intensity of those activities have varied over time and space. In 1880, nearly 80% of the state land area was in farms. In the wake of clearing for agriculture, grassland species moved into the state and may still be more common today than they were in pre-settlement times. During the 20th century, the common pattern of landscape change in New York State and in most of the Northeast was one of increasing forested acreage and urbanization following a decline in agricultural activities.

Much of the information above can be found in reports for the Hudson River Valley Gap Analysis Project (Smith et al. 2001), New York Natural Heritage Program inventory results (Howard et al. 2002), and the Hudson River Estuary Action Agenda 2005-2009.

Site Location:

The following information on distribution of land stewardship was taken from New York State databases and includes estimates current as of 2005:

Towns: 169 towns
Counties: Albany, Rensselaer, Greene, Columbia, Ulster, Dutchess, Orange, Putnam, Rockland, Westchester, Bronx, New York, Richmond, Kings, Queens

Approximate Size: 6,560 mi²

<u>Land Stewardship:</u>	<u>Name or Classification</u>	<u>Manager</u>	<u>Area</u>
	State Forest Lands	NYSDEC	419 mi ²
	State Wildlife Management Areas	NYSDEC	23 mi ²
	Public Conservation Easements	NYSDEC	5 mi ²
	State Parks	NYSOPRHP	216 mi ²
	New York City	NYCDEP	59 mi ²
	Municipal/County Parks		62 mi ²
	U.S. Military Land	USDOD	29 mi ²
	National Park Service	USDOI	23 mi ²
	National Wildlife Refuge	USFWS	0.2 mi ²
	Other State/Federal Lands		33 mi ²
	Private Conservation Land*		107 mi ²

Total Conservation Lands: 976 mi²

Other Private/Local Government 5,584 mi²

*Includes most non-governmental conservation lands.

Ecological Significance:

The biodiversity of the Hudson River Estuary Area of Biological Concern is greater than can be expected by chance alone for a land area of similar size within the State of New York. This diversity can be attributed to many factors, including the range in elevation from lowlands to high peaks, a diversity of soils and bedrock geology, and gradients of fresh to salt water.

Among terrestrial vertebrates, 85% (28 species) of New York's total amphibian species, 73% (27 species) of New York's total reptile species, 87% (199 species) of New York's total breeding bird species, and 92% (54 species) of New York's total mammal species can be found in the Hudson River Estuary Area of Biological Concern (Smith et al. 2001). The Hudson River Estuary corridor offers opportunities found nowhere else in the state for conservation of amphibian and reptile biodiversity. In the case of turtles, a 200 million year old group of reptiles, the Hudson River and its tributaries is one of the most important river systems in the world. The number of turtle species found in the Hudson River Valley is matched only by the Suwannee River (Florida), the Mekong River (south-east Asia), and the Irrawaddy River (Myanmar).

Among vegetative communities, the Hudson River Estuary corridor has proportionally more Sugar Maple-Mesic Forest, Oak Forest, and Appalachian Oak-Pine Forest than found elsewhere in New York State, embedded predominately in an urban/suburban matrix.

Grassland habitats of the Hudson River Estuary corridor support several rare or declining bird species, including Henslow's sparrow, vesper and savannah sparrows, sedge wren, northern harrier, meadowlark, and bobolink. Wetlands and coastal areas greatly contribute to the diversity of birds found in the region. Tidal wetlands along the estuary support egrets, least bittern, American bittern, black rail, osprey and many species of waterfowl. Wooded swamps support breeding red-shouldered hawks and concentrations of migrating warblers. Other notable bird habitats in the Hudson River Estuary Area of Biological Concern include the westernmost section of Long Island Sound (the Narrows) and the north shore bays of this area, marshes associated with bays, sand beaches, and the Arthur Kill area of the lower estuary.

Large wetlands scattered across Dutchess, Putnam, Ulster, and Orange counties support the highest diversity of turtles in New York State. These counties contain concentrations of important turtle habitats such as floodplain forest, dwarf shrub bogs, shrub swamps and calcareous fens. Six turtle species found in the Hudson River Estuary corridor (other than sea turtles) are state-listed as endangered, threatened and special concern species including the bog turtle, Blanding's turtle, eastern mud turtle, spotted turtle, wood turtle, and eastern box turtle. Numerous areas throughout the Hudson River Estuary Area of Biological Concern have been documented as containing crucial habitat for salamanders and frogs, including the northern cricket frog, blue spotted salamander, marbled salamander, four-toed salamander, spotted salamander, Jefferson salamander, and longtail salamander.

Hudson River tributaries and their area of confluence with the main stem provide important habitat for migratory fishes, including striped bass, American shad, rainbow smelt, alewife, and blueback herring, as well as resident species, such as white sucker, yellow perch, spottail shiner, white perch, and smallmouth bass. Tributaries with largely intact natural processes have food webs that support diverse plant and animal life. These systems convert watershed carbon and nutrients into biodiversity rather than excessive algae or nutrient exports, which in turn protects the estuary. In addition, streams with intact floodplains soak up and store flood waters, while replenishing ground water, filtering nutrients and chemicals, depositing sediments onto floodplains, and limiting erosion.

Conservation Issues and Recommendations:

While tens of thousand of acres, and numerous species and natural communities are protected by state, local and private landowners, the full range of diversity in the Hudson River Estuary corridor has no legal or management protection. As a result, the voluntary management of private lands for biodiversity, and improved management of public lands, will largely determine the success of biodiversity conservation. Key conservation issues facing private and public land managers within the region include:

- Loss and fragmentation of habitats, particularly those with high ecological significance;
- Loss of old ecosystems such as mature forests or wetlands with deep organic soil;
- Maintaining the natural cycles and processes that support biodiversity (such as predator-prey relationships, hydrologic regimes, land-forming processes, climate regimes, fire regimes, and many kinds of natural disturbance);
- Maintenance of habitat connectivity across the landscape;
- Maintenance of the composition and structure of habitats within natural ranges (replacement of native species by non-native invasive species is a particular concern); and
- Pollution and disruption of habitats that threaten wildlife and human health.

Many of the measures necessary for biodiversity conservation can be addressed by individual landowners, either on their own property or through representation by local governments. Biodiversity protection can be fostered in many small ways, but to stem the ultimate loss of species and habitats in the Hudson River Valley, biodiversity concerns need to be considered during land use planning and land stewardship activities. The following planning and stewardship measures are recommended for consideration and application where appropriate (Kiviat and Stevens 2001):

- Protect large, contiguous, unaltered tracts wherever possible;
- Preserve links between natural habitats on adjacent properties;
- Preserve natural disturbance processes such as fires, floods, tidal flushing, seasonal drawdowns, and wind exposure, wherever possible;
- Restore and maintain broad buffer zones of natural vegetation along streams, along the shores of other water bodies and wetlands, and at the perimeter of other sensitive habitats;
- In general, encourage development of altered land instead of unaltered land wherever possible;
- Promote redevelopment of brownfields, other post-industrial sites, and other previously altered sites, instead of breaking new ground in unaltered areas;
- Encourage pedestrian-centered developments that enhance existing neighborhoods, instead of isolated developments requiring new roads or expanded vehicle use;
- Concentrate development along existing roads and discourage construction of new roads in undeveloped areas. Promote clustered development wherever appropriate, to maximize extent of unaltered land;
- Direct human uses toward the least sensitive areas, and minimize alteration of natural features, including vegetation, soils, bedrock, and waterways;
- Preserve farmland potential wherever possible;
- Minimize area of impervious surfaces (roads, parking lots, sidewalks, driveways, roof surface) and maximize onsite runoff retention and infiltration to help protect groundwater recharge, and surface water quality and flows; and
- Restore degraded habitats wherever possible, but avoid destruction of existing intact habitats.