

COASTAL FISH AND WILDLIFE RATING FORM

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Name of area: **North and South Tivoli Bays**  
 Designated: **November 15, 1987**  
 Revised: **August 15, 2012**  
 County: **Dutchess**  
 Town(s): **Red Hook, NY**  
 7.5' Quadrangles: **Saugerties, NY**

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<u>Assessment Criteria</u>	<u>Score</u>
<b>Ecosystem Rarity (ER) -- the uniqueness of the plant and animal community in the area and the physical, structural and chemical features supporting this community.</b>	
<b>ER Assessment</b> – The largest undeveloped tidal freshwater wetland complex on the Hudson River, rare in New York State.	<b>64</b>
<b>Species Vulnerability (SV) – the degree of vulnerability throughout its range in New York State of a species residing in the ecosystem or utilizing the ecosystem for its survival.</b>	
<b>SV Assessment</b> – bald eagle (T), northern harrier (T), least bittern (T), osprey (SC). Additive mean: $25 + 25/2 + 25/4 + 16/8 = 45.75$	<b>45.75</b>
<b>Human Use (HU) -- the conduct of significant, demonstrable commercial, recreational, or educational wildlife-related human use, either consumptive or non-consumptive, in the area or directly dependent upon the area.</b>	
<b>HU Assessment</b> -- Part of the Hudson River National Estuarine Research Reserve; statewide significance for research, and regional significance for recreational and educational uses; New York State Natural Heritage Area.	<b>36</b>
<b>Population Level (PL) – the concentration of a species in the area during its normal, recurring period of occurrence, regardless of the length of that period of occurrence.</b>	
<b>PL Assessment</b> -- Concentration of various wildlife species in this area are unusual in the Hudson Valley.	<b>9</b>
<b>Replaceability (R) – ability to replace the area, either on or off site, with an equivalent replacement for the same fish and wildlife and uses of those same fish and wildlife, for the same users of those fish and wildlife.</b>	
<b>R Assessment</b> – Irreplaceable	<b>1.2</b>
<b>Habitat Index(ER+SV+HU+PL)= 154.75</b>	<b>Significance (HI x R)= 185.7</b>

## LOCATION AND DESCRIPTION OF HABITAT

North and South Tivoli Bays encompass approximately 1,850 acres on the eastern shore of the Hudson River, one half mile south of the Village of Tivoli in the Town of Red Hook, Dutchess County (7.5' Quadrangle: Saugerties, N.Y.). The habitat area includes submerged aquatic vegetation beds, mainly water celery (*Vallisneria americana*), tidal freshwater marsh, fresh-tidal swamp, bays, shallows, two streams (Saw Kill and Stony Creek), and adjacent uplands dominated by hardwood forest, mixed forest and fallow fields.

The fish and wildlife habitat also includes Cruger and Magdalen Islands. Most of the upland area is a Wildlife Management Area owned by the New York State Department of Environmental Conservation. The wetland and riverine areas are under the jurisdiction of the New York State Department of Environmental Conservation.

Several rare plant species occur in the Tivoli Bays wetland complex. These include the heartleaf plantain (*Plantago cordata*) (T), golden club (*Oroonium aquaticum*) (T), blunt spikerush (*Eleocharis obtusa*) (E), smooth bur-marigold (*Bidens laevis*) (T), Southern estuary beggar-ticks (*Bidens bidentoides*) (R), swamp lousewort (*Pedicularis lanceolata*) (T), winged monkey flower (*Mimulus alatus*) (R), *Fissidens* moss (R), and *Taxiphyllum* moss (R). The invasive plant species common reed (*Phragmites australis*), purple loosestrife (*Lythrum salicaria*) and water chestnut (*Trapa natans*) also occur in this habitat.

## FISH AND WILDLIFE VALUES

The North and South Tivoli Bays habitat is ecologically unique as the largest freshwater tidal influenced bay and wetland complex surrounded by undeveloped land on the Hudson River. A tremendous variety of fish and wildlife are found in the area, including a large number of relatively uncommon species. Tivoli Bays has been designated as one of four sites comprising the Hudson River National Estuarine Research Reserve.

Tivoli Bays are an important feeding, spawning and nursery area for a variety of fish species in the Hudson River. Thousands of American eels (*Anguilla rostrata*) use the bays and associated creeks. Several important coastal migratory fish species such as blueback herring (*Alosa aestivalis*), striped bass (*Morone saxatilis*), and alewife (*Alosa pseudoharengus*) use the bays and the mouths of Stony Creek and the Saw Kill for spawning and feeding. Common freshwater species using the bays include largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), white sucker (*Catostomus commersoni*), white perch (*Morone americana*), and various minnows. Species that appear to be regionally rare that have been found in the bays include American brook lamprey (*Lampetra appendix*), central mudminnow (*Umbra limi*), Northern hogsucker (*Hypentelium nigricans*) and bridle shiner (*Notropis bifrenatus*). Juvenile and adult shortnose sturgeon (*Acipenser brevirostrum*) (E) may feed in the tidal channels and river shallows. The submerged aquatic vegetation provides food for fish, invertebrates and waterfowl as well as refuge for fish and invertebrates.

The shores of Tivoli Bays are habitat for the map turtle (*Graptemys geographica*). This area also contains habitat for painted turtle (*Clemmys insculpta*), spotted turtle (*Clemmys guttata*)(SC), wood turtle (*Clemmys insculpta*) (SC), water snake (*Nerodia s. sipedon*), garter snake (*Thamnophis sirtalis*), black racer (*Coluber constrictor*), milk snake (*Lampropeltis triangulum*), spotted salamander (*Ambystoma maculatum*), blue-spotted salamander (*Ambystoma maculatum*) (SC), red-spotted newt (*Notophthalmus v. viridescens*), redback salamander (*Plethodon cinereus*), Northern dusky salamander (*Desmognathus fuscus*), mudpuppy (*Necturus maculosus*), American toad (*Bufo americanas*), gray treefrog (*Hyla versicolor*), spring peeper (*Pseudacris crucifer*), bullfrog (*Rana catesbeiana*), green frog (*Rana*

*clamitans*), wood frog (*Rana sylvatica*), pickerel frog (*Rana palustris*) and Northern leopard frog (*Rana pipiens*). An extremely large population of common snapping turtles (*Chelydra serpentina*) exists in North Tivoli Bay.

Tivoli Bay supports breeding populations of least bittern (*Ixobrychus exilis*) (T), American bittern (*Botaurus lentiginosus*) (SC), Virginia rail (*Rallus limicola*), marsh wren (*Cistothorus palustris*), and in some years, sora rail (*Porzana carolina*), common moorhen (*Gallinago gallinago*) and occasionally king rail (*Rallus elegans*) (T). Many species of waterfowl use the area during the spring and fall migration periods for resting and feeding, including both dabbling ducks in the marshes, and diving ducks in the river shallows. This area has supported a large number of black ducks (*Anas rubripes*), during fall migration periods. Osprey (*Pandion haliaetus*) (SC) are regularly seen here during migration. Bald eagle (*Haliaeetus leucocephalus*) (T) nests have been reported (2005) and northern harriers (*Circus cyaneus*) (T) forage here during migration. Concentrations of post breeding swallows also use this area. Muskrat, beaver and bats are present in both North and South Tivoli Bays.

Waterfowl hunting and muskrat trapping have been traditional outdoor recreational activities at Tivoli Bays for years. Anglers and birdwatchers from throughout the Hudson Valley region visit this area.

In addition, scientific research conducted on estuarine ecology at Tivoli Bays is of statewide significance. Ongoing ecological research at Tivoli Bays has attracted scientists and students from throughout the country and its designation as part of the Hudson River National Estuarine Research Reserve will focus additional research and education activities in the Hudson Valley on this area.

## **IMPACT ASSESSMENT**

It is essential that any potential impacts on North and South Tivoli Bays be evaluated with respect to its use for environmental research and education, and the need to maintain natural or controlled experimental conditions.

Any activities that would degrade water quality, increase turbidity, increase sedimentation, or alter flows, temperature, or water depths in the Tivoli Bays would adversely affect the biological productivity of this area. All species may be affected by water pollution, such as chemical contamination (including food chain effects resulting from bioaccumulation), oil spills, excessive turbidity or sediment loading, nonpoint source runoff, and waste disposal.

Any physical alteration of the habitat, through dredging, filling, or bulkheading, would result in a direct loss of valuable habitat area. Any activity that impacts tidal flows in the bay and wetlands could significantly alter habitats for the fish and wildlife. Habitat disturbances would be most detrimental during bird nesting, and fish spawning and nursery periods, which generally extend from April 1 through August 31 for most warm water species.

Activities that would subdivide this largely undeveloped area into smaller fragments should not be allowed. Elimination or disturbance of adjacent wetland or shallow areas would result in a direct loss of valuable habitat. Land disturbances within the reserve may significantly affect the populations of many fish and wildlife that are studied in the area. Extensive cutting of the forest vegetation surrounding the bays could adversely affect use of the area by many fish and wildlife species. Vegetated upland buffer zones (e.g., wetlands and forested areas) should be protected, and where possible restored to provide bank cover, stabilize soil, maintain or improve water quality and provide buffer areas from development.

The presence of invasive species and the expansion of their range within the habitat may result in changes in native plant, vertebrate and invertebrate species composition and abundance. In particular, expansion of common reed (*Phragmites australis*) has been correlated with reductions in populations of several marsh-breeding birds and declines in avian biodiversity. Effective control of invasive plant species, through a variety of means, may improve fish and wildlife species use of the area. Control methods, including biological controls and regulated use of herbicides must only be implemented, if other methods of control have been explored, and then only under permit with strict adherence to all precautionary measures to avoid impacts to non-target species. The primary goals of such efforts must be recovery and maintenance of habitat for native fish and wildlife species.

The expansion of water chestnut (*Trapa natans*) and replacement of submerged aquatic vegetation may also result in changes in fish and invertebrate species composition in the areas occupied by this invasive plant. Activities that may result in expansion of water chestnut should be avoided.

## **HABITAT IMPAIRMENT TEST**

A **habitat impairment test** must be met for any activity that is subject to consistency review under Federal and State laws, or under applicable local laws contained in an approved local waterfront revitalization program. If the proposed action is subject to consistency review, then the habitat protection policy applies, whether the proposed action is to occur within or outside the designated area.

The specific **habitat impairment test** that must be met is as follows.

In order to protect and preserve a significant habitat, land and water uses or development shall not be undertaken if such actions would:

1. destroy the habitat; or,
2. significantly impair the viability of a habitat.

*Habitat destruction* is defined as the loss of fish or wildlife use through direct physical alteration, disturbance, or pollution of a designated area or through the indirect effects of these actions on a designated area. Habitat destruction may be indicated by changes in vegetation, substrate, or hydrology, or increases in runoff, erosion, sedimentation, or pollutants.

*Significant impairment* is defined as reduction in vital resources (e.g., food, shelter, living space) or change in environmental conditions (e.g., temperature, substrate, and salinity) beyond the tolerance range of an organism. Indicators of a significantly impaired habitat focus on ecological alterations and may include but are not limited to reduced carrying capacity, changes in community structure (food chain relationships, species diversity), reduced productivity and/or increased incidence of disease and mortality.

The *tolerance range* of an organism is not defined as the physiological range of conditions beyond which a species will not survive at all, but as the ecological range of conditions that supports the species population or has the potential to support a restored population, where practical. Either the loss of individuals through an increase in emigration or an increase in death rate indicates that the tolerance range of an organism has been exceeded. An abrupt increase in death rate may occur as an environmental factor falls beyond a tolerance limit (a range has both upper and lower limits). Many environmental factors, however, do not have a sharply defined tolerance limit, but produce increasing

emigration or death rates with increasing departure from conditions that are optimal for the species. The range of parameters which should be considered in applying the habitat impairment test includes but is not limited to the following:

1. physical parameters such as living space, circulation, flushing rates, tidal amplitude, turbidity, water temperature, depth (including loss of littoral zone), morphology, substrate type, vegetation, structure, erosion and sedimentation rates;
2. biological parameters such as community structure, food chain relationships, species diversity, predator/prey relationships, population size, mortality rates, reproductive rates, meristic features, behavioral patterns and migratory patterns; and,
3. chemical parameters such as dissolved oxygen, carbon dioxide, acidity, dissolved solids, nutrients, organics, salinity, and pollutants (heavy metals, toxics and hazardous materials).

### **KNOWLEDGABLE CONTACTS**

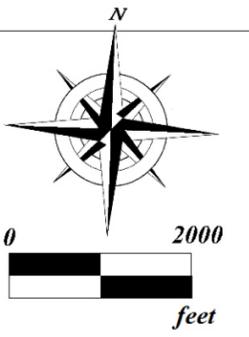
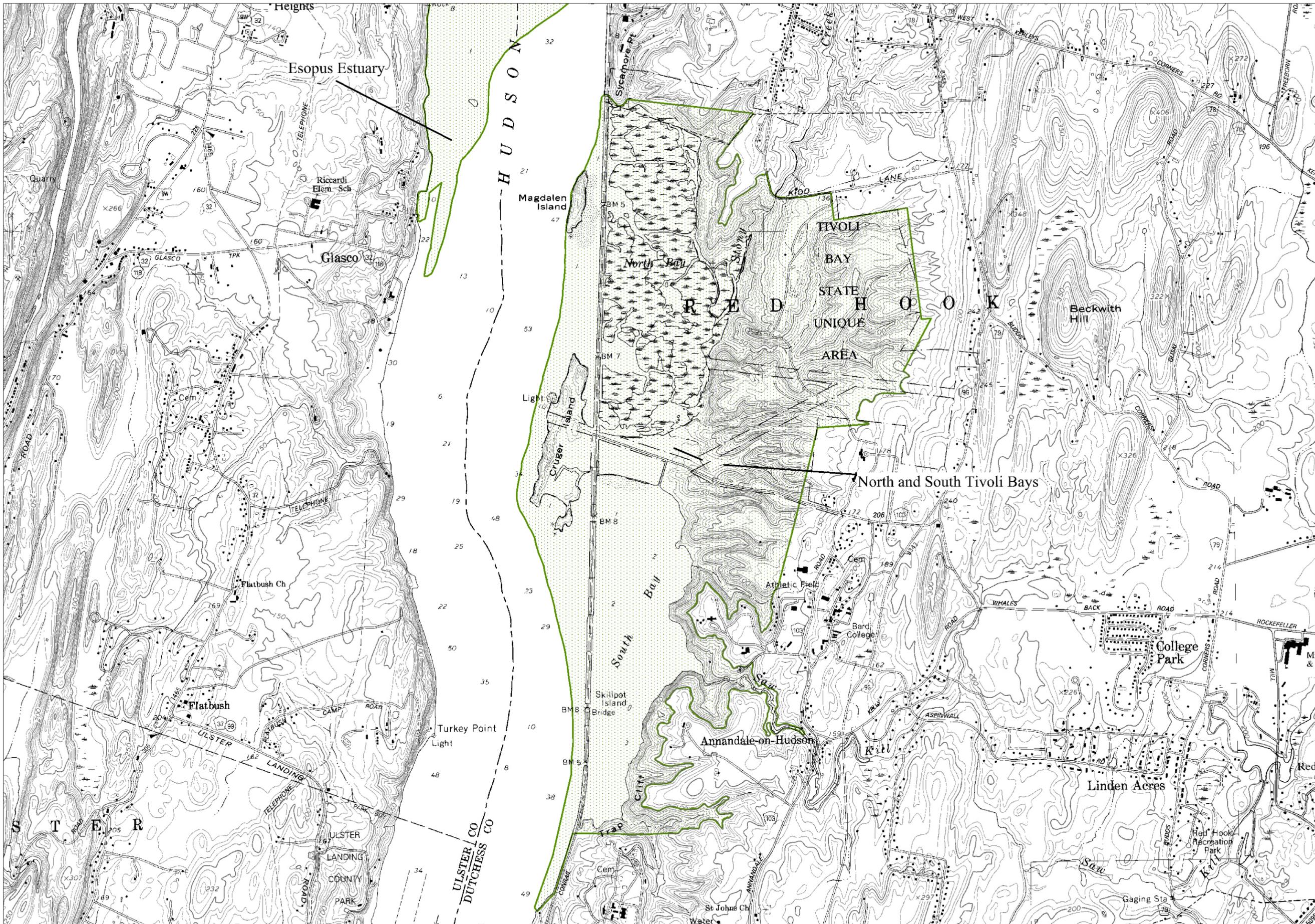
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**Significant Coastal Fish and Wildlife Habitats**

- North and South Tivoli Bays
- Esopus Estuary (In Part)

