COASTAL FISH & WILDLIFE HABITAT RATING FORM

Name of Area: **Lower Hudson Reach**

Designated: **September 15, 1992**

County(ies): **New York; Bronx; Westchester**

Town(s): **New York City (Manhattan, Bronx); Yonkers**

7½' Quadrangle(s): **Jersey City, NY-NJ; Central Park, NY-NJ; Yonkers, NY**

Score	Criterion
72	Ecosystem Rarity (ER) One of only a few large tidal river mouth systems in the northeastern United States, providing a unique range of salinity and other estuarine features. Geometric mean: $(64 \times 81)^{1/2} = 72$.
0	Species Vulnerability (SV) No endangered, threatened or special concern species are known to reside in the area.
11	Human Use (HU) Recreational (and local subsistence) fishing of importance for a major region of New York State, particularly for metropolitan residents. Educational uses throughout the area (such as the River Project at pier 26 and Inwood Hill Park programs on Spuyten Duyvil) of county level importance. Additive division: 9 + 4/2
25	Population Level (PL) Concentrations of wintering striped bass and winter flounder are of regional significance (hot continental region of the U.S.).
1.2	Replaceability (R) Irreplaceable.

SIGNIFICANCE VALUE = [(ER + SV + HU + PL) X R]

= **130**

DESIGNATED HABITAT: LOWER HUDSON REACH

HABITAT DESCRIPTION:

The Lower Hudson Reach is the portion of the Hudson River starting from Battery Park at the tip of Manhattan and extending north to Yonkers in the vicinity of Glenwood. The eastern habitat boundary is the developed shoreline along Manhattan, Bronx, and Yonkers. The northern Manhattan portion of the eastern habitat boundary extends into the Spuyten Duyvil Creek to include some of the only remaining intertidal marsh and flats in Manhattan. The western habitat boundary runs along the NY-NJ state line in the middle of the River; the western boundary is political and does not address similar habitat values which exist in New Jersey waters. The Lower Hudson Reach includes the waters off the boroughs of Manhattan and the Bronx in New York City (New York and Bronx Counties) and the City of Yonkers (Westchester County) (7.5' Quadrangles: Jersey City, NY-NJ; Central Park, NY-NJ; Yonkers, NY). This area runs for 19 River miles and includes deepwater, shallows, piers and interpier basins.

Most of the shoreline along the habitat has been extensively disturbed through filling, bulkheading, and development including residential, commercial, industrial, and public uses. Natural shoreline and wetland vegetation is limited throughout the area with a notable exception on the Spuyten Duyvil at Inwood Hill Park. The shoreline and associated uplands are under a patchwork of public and private ownership, with the City of New York owning significant portions of Manhattan's west side. Underwater lands are also under both private and public ownership, with NYC holding grants to most underwater lands to the pierhead limit while lands beyond this limit are generally under State ownership.

Water depths in this stretch of the River range from 6 to 70 feet and tides range from 4 to 5 feet. This area of the River continues to receive pollutants from stormwater runoff, sewage effluents, and industrial or commercial point sources. The entire area is characterized as a brackish environment with salinity ranging from 3.8 parts per thousand (ppt) to 18.7 ppt. Salinity depends on the location of the saltfront which varies with the seasons. The location of the saltfront is influenced by a number of physical forces, the most important of which is the volume of freshwater flowing from the Hudson River. From late fall through spring, the volume of freshwater flowing downriver is large and the salt front is pushed south in the vicinity of New York City. During the summer months, the volume of freshwater decreases and the saltfront moves many miles upriver. The specific location of the saltfront varies considerably from year to year based on its dependance on precipitation occurring throughout the 13,000 square-mile Hudson River watershed. Water velocity in the area ranges from approximately 0.2 to 0.7 feet/sec and average dissolved oxygen content varies with seasons ranging from 3.5 parts per million (ppm) in August to 13.0 ppm in February.

FISH AND WILDLIFE VALUES:

Despite extensive disturbance from filling and development, and impaired water quality, this habitat sustains a diverse community of benthic, planktonic, and pelagic species. The River provides important wintering habitat for large numbers of young-of-the-year, yearling, and older striped bass between mid-November and mid-April.

The entire lower portion of the Hudson River estuary may provide an important habitat in the life history of striped bass by providing a sheltered environment with abundant food sources that are associated with the winter position of the River's salt front. Striped bass spawn above the River's salt front between West Point and Kingston from April to mid-June (see significant coastal fish and wildlife habitat narrative: Hudson River Miles 44 to 56). Eggs are semibouyant and are found in greatest concentration from mid-May to early June. Larvae generally transform to juvenile fish between late June and late July, concentrating in areas of

abundant zooplankton near the salt front (see significant coastal fish and wildlife habitat narrative: Haverstraw Bay). Juveniles remain near shore until November and December when they move to deeper water. Although juveniles may be widely distributed throughout the Hudson River estuary and nearby coastal waters (particularly for strong year classes when juveniles are abundant), a significant concentration of juveniles remain in the proximity of the salt front as it recedes downriver to its winter position in the Lower Hudson Reach. Yearling striped bass (those spawned in the previous year) generally remain within 25 to 50 miles of the mouth of the Hudson River with an unknown proportion staying in the estuary and the remainder moving out into higher salinity coastal waters. Those yearlings remaining in the River generally follow the salt front through their second year and overwinter in the Lower Hudson Reach. These fish may take advantage of undetermined physiological or ecological benefits associated with the transition area between estuarine brackish and higher salinity coastal environments. Large numbers of two year old fish move out of the estuary into coastal waters, returning to overwinter in or near the lower Hudson River. After age two, many of these fish may continue to use the lower Hudson River as an overwintering area, but the majority of their lives as adult fish is spent in coastal waters, only returning to the Hudson River to spawn beyond age 4.

In addition to striped bass, several other finfish species use the area. Significant numbers of yearling winter flounder also occupy this stretch of River in winter months (generally from December to April). Surveys have also found summer flounder, white perch, Atlantic tomcod, Atlantic silversides, bay anchovy, hogchokers and American eel in significant numbers. This area of the River may also be important for bluefish and weakfish young of year and both Atlantic sturgeon and shortnose (adult only) sturgeon (E). American shad and blue crabs also contribute to the fishery. Animals of lower trophic levels are also present in substantial numbers providing an important food source. These include planktonic forms such as copepods, rotifers, mysid shrimp; and, benthic forms such as nematodes, oligochaetes, polychaetes, and amphipods.

The Lower Hudson Reach also provides habitat for several species of wintering waterfowl. Mid-winter aerial surveys between 1986 and 1990 show an average of 1,619 canvasback, 281 scaup, and lesser numbers of mergansers, mallards, and Canada geese.

IMPACT ASSESSMENT:

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:
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> - destroy the habitat; or,
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> - 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, 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 include but are 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).

Although not comprehensive, examples of generic activities and impacts which could destroy or significantly impair the habitat are listed below to assist in applying the habitat impairment test to a proposed activity.

Any activity that would further degrade water quality in the Lower Hudson Reach would adversely affect habitat values for fish and wildlife using the area. Many species of fish and wildlife would be adversely affected by water pollution through chemical or toxic contamination (including food chain effects), oil spills, excessive turbidity or sedimentation, and waste disposal. Transient habitat disturbances, such as those resulting from dredging or in-River construction activities, could result in significant impairment of the habitat value for striped bass, particularly as an overwintering area between mid- November and mid-April. Dredging can only be conducted during the identified overwintering period under the following circumstances. Documentation must be provided which demonstrates that the dredging can only be scheduled during the overwintering period (passenger shipping is an example of a seasonal use which may require off-season maintenance activities over the winter months). This documentation should include an analysis of alternatives that could allow dredging to be occur during less sensitive periods (such as the use of alternative facilities, or staggering use and dredging schedules). In cases where alternatives to dredging during the overwintering period are not available, both spatial and temporal methods aimed at reducing potential impacts shall be used. Spatial methods may include use of dredging equipment that minimizes turbidity and sediment over-spill, use of turbidity curtains, and limiting the dredging project size. Temporal

methods include compressed job completion schedules and avoidance of high current velocity associated with spring tides and flood conditions. The scale of potential transitory impacts throughout the designated habitat that could result from dredging projects that meet the above conditions should be further minimized by evaluating cumulative impacts that may result from concurrent dredging activities in the designated habitat. An analysis of cumulative impacts should ensure that suitable adjacent habitat would be available for fish and wildlife species while a portion of the habitat is subject to transitory disturbance. Impaired water quality or transient disturbances may result in barriers to migration that would have significant impact on populations of anadromous fishes that migrate to the Hudson River for spawning, generally throughout the year depending on particular species.

Large scale non-consumptive use of water may disrupt salinity gradients both by removing significant quantities of freshwater from the Hudson or its watershed and, following use of the water, discharging it in a higher salinity environment. Maintaining natural salinity gradients and fluctuations is probably of major importance for preservation of the habitat function. Adverse impacts on the River's resources from large scale non-consumptive uses would be greatest during summer drought conditions. Installation and operation of water intakes could also have significant impacts on fish populations in the area through impingement of juveniles and adults, or entrainment of egg and larval stages. Efforts to improve water quality in the Lower Hudson Reach should continue and include upgrading and control of sewage discharges, other point sources, and nonpoint source pollution.

Major structural alteration to the habitat through dredging, filling, or platforming on dense piles could cause significant impairment of the habitat. Recent research suggests that little difference exists in habitat value or use between underpier areas and interpier basins. No information exists, however, that adequately demonstrates the relationship among the River's physical environment, existing shoreline and inwater structures, seasonal salinity regimes, and the resultant habitat values. Absent an adequate understanding of the function of this habitat, significant impairment of the habitat could result if major structural alterations occur. Current habitat values may be best protected by maintaining the current types and amount of structural diversity in the area. This is not to be interpreted as a prohibition on any activity in the area such as pier renovation, reconfiguration, or removal, but should be used as a guideline in coordinating otherwise unrelated activities through comprehensive planning. The final West Side Waterfront Panel Plan dated November 1, 1990, provides an example of comprehensive planning which appropriately recognizes the habitat values associated with the Lower Hudson Reach habitat. Site specific actions should not be undertaken that have not demonstrated an awareness and analysis of the context of that action within the habitat and its structural elements. With respect to cumulative impacts, the history of extensive filling and development of this shoreline from colonial to present times, coupled with interests in platforming proposals, suggests that the entire area continues to be vulnerable to development pressures that could lead to direct loss of significant amounts of habitat.

Similar habitat values appear to exist in the corresponding area of the Hudson River that is within New Jersey. Proposed developments which are likely to have impacts similar to those identified above which would result in destruction or significant impairment of the habitat, would also have a direct effect on New York's coastal resources.