

Swimming in the Hudson River Estuary

Feasibility Report on Potential Sites



Prepared for

The Hudson River Estuary Program
New York State Department of Environmental Conservation
Denise M. Sheehan, Acting Commissioner

New York State Office of Parks, Recreation and Historic Preservation
Bernadette Castro, Commissioner

George E. Pataki, Governor
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2005

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EXECUTIVE SUMMARY

BACKGROUND

In the 19th and early 20th Centuries, millions of people swam in the Hudson River every summer, from public beaches along the river's length or in floating pools located along Manhattan's shoreline. Worsening water quality conditions, increasingly stringent public health codes, liability issues and increased costs in operating beaches caused many of these facilities to close. Swimming in the Hudson River was largely abandoned, limited to a handful of public beaches.

Beginning in the 1960's the federal and state governments adopted and implemented significant environmental laws intended, in part, to restore the water quality of our rivers, streams, and lakes. This public investment – culminating in the passage of Governor Pataki's 1996 Clean Water/Clean Air Environmental Bond Act – has resulted in remarkable improvements in the cleanliness of Hudson River water. Today, water quality improvements in the Hudson River allow us to once again consider expanding opportunities for public swimming, addressing significant needs of the citizens of the Hudson Valley and the New York City metropolitan area and allowing the public to more fully enjoy the benefits of its investment in a cleaner Hudson River.

The purpose of this study was to identify feasible sites for public swimming along the Hudson River from the Troy Dam to the Battery in Manhattan. The status of existing beaches was also examined, and recommendations were made for improvements at these sites. In addition, the study identified places on the river where swimming could potentially take place in the future with continuing improvements in water quality. In locations where beaches are not physically possible, the study also examined opportunities to create alternative swimming facilities. The findings from this study should be considered as the results of a preliminary analysis rather than recommendations for site development.

This study was conducted pursuant to the 1998 Hudson River Estuary Action Plan released by Governor George E. Pataki and was undertaken as a partnership project of the New York State Department of Environmental Conservation (NYSDEC) and the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP). The Action Plan is a blueprint for the NYSDEC and partnering state agencies to implement specific management actions along the estuary, addressing three general themes: conservation of natural resources; remediation of pollution; and public use and enjoyment of the river.

Governor Pataki, in his 2004 State of the State Address, called for plans to improve the health of the Hudson River by 2009 – the 400th anniversary of Henry Hudson's exploration of the Hudson River on the Half Moon – so that the Hudson River will be swimmable from its source in the Adirondacks to New York City.

DESCRIPTION OF THE STUDY

An initial inventory of potential beach sites was developed through mail surveys, public meetings, and site visits. This effort resulted in a list of 60 sites. Sites with insurmountable obstacles were eliminated from further review, and field surveys of the remaining sites were conducted. Each site was given a numerical score based on selected criteria, including: beachfront conditions, accessibility, hydraulic conditions, water quality, and feasibility of construction and operation of a swimming facility. The screening resulted in the selection of 17 potential swimming sites to be subjected to a more comprehensive review, which focused on health, safety and environmental considerations, and site feasibility. In addition, five existing public beaches along the river were also studied in order to identify potential improvements and to develop cost estimates of such improvements.

Following this evaluation, these sites were classified into four groups:

- A. Potential Improvements to Existing Swimming Sites
- B. Feasible New Sites
- C. Potential New Sites Requiring Additional Action to Become Feasible
- D. Potential New Sites With Substantial Barriers to Development

Additionally, options for sites not suitable for development of a typical beach were studied (i.e., floating pools at Hudson River Park and Mills Norrie State Park).

SUMMARY OF FINDINGS

I. Site Specific Studies

A. Potential Improvements to Existing Swimming Sites

The study determined that four of the five existing Hudson River beaches would benefit from improvement. They are:

- Saugerties Village Park (Village of Saugerties, Ulster County)
- Ulster Landing County Park (Town of Ulster, Ulster County)
- Kingston Point City Park (City of Kingston, Ulster County)
- Croton Point County Park (Village of Croton-on-Hudson, Westchester County)

The total cost of capital improvements for these four beaches was estimated to range from \$1.3-2.1 million. Operating costs were not estimated for these sites, since it is not expected that the capital improvements would increase current operating costs. The fifth existing site, Port Ewen Municipal Park (Town of Esopus, Ulster County), has been

closed due to the presence of aquatic vegetation. Potential improvements to this site were not explored because no solution to the aquatic vegetation problem has been identified.

B. Feasible New Sites

Of the 17 potential sites studied, five were identified as feasible with no additional action necessary, other than the construction of a beach and related facilities and the approval of the property owner. All five of these sites are publicly owned. The cost of developing these five sites is estimated to be about \$5.5 million for capital improvements and \$200,000 per year for operating expenses.

The five sites are:

- Stuyvesant New York State Office of General Services (NYSOGS) property (Town of Stuyvesant, Columbia County)
- Kowawese NYSDEC Unique Area/Orange County Park (Town of New Windsor, Orange County)
- Riverfront Park (Town of Stony Point, Rockland County)
- Rockland County Park (Town of Haverstraw, Rockland County)
- Kingsland Point Westchester County Park (Village of Sleepy Hollow, Westchester County)

C. Potential New Sites Requiring Additional Action to Become Feasible

Eight sites were identified as potentially feasible but in need of significant additional action, such as land acquisition, water quality classification change or resolution of potential conflicts with other public policies. The total cost of developing beaches at these sites is estimated to be approximately \$3.5 million, not including the costs of land acquisition, water quality improvements, and other needed actions. Operating costs were not estimated for all sites in this category, but can be expected to fall in the range of \$25-\$40,000 a year per site. These eight sites are:

- Henry Hudson Town Park (Town of Bethlehem, Albany County)
- Schodack Island State Park (Town of Schodack, Rensselaer County)
- Four Mile Point (privately owned, Town of Coxsackie, Greene County)
- Mills Norrie State Park (Town of Hyde Park, Dutchess County)
- Little Stony Point State Park (Town of Philipstown, Putnam County)
- White Beach (privately owned by Con Edison, Verplanck, Town of Cortlandt, Westchester County)
- Nyack Beach State Park (Town on Clarkstown, Rockland County)
- Hudson River Park (Borough of Manhattan, New York County)

D. Potential New Sites with Substantial Barriers to Development

Four potential sites were found to have substantial barriers to development due to sediment, water quality, or other local conditions. No costs were estimated for these sites. They are:

- Bristol Beach State Park (Town of Saugerties, Ulster County)
- Bowline Point Town Park (Town of Haverstraw, Rockland County)
- Louis Engel, Jr. Waterfront Park (Town of Ossining, Westchester County)
- Dobbs Ferry Waterfront Park and Wickers Creek (Village of Dobbs Ferry, Westchester County)

Summaries of these findings are found in Table ES-1 following this section. Further information on these sites can be found in Section 6 of this report. It should be noted that these are preliminary findings based on physical characteristics. All potential new sites would require further site-specific analysis of water quality, sediment characteristics, environmental issues and other conditions to determine actual feasibility. Furthermore, sites proposed for development as public swimming facilities would require the support of the agency, municipal government or individual owning the property. Therefore, these findings should be considered as the results of a preliminary analysis rather than recommendations for site development.

II. Alternate Swimming Facility Options

Geotextile fabrics offer an option for swimming in waters with some bacterial pollution and are currently in use at beaches on Long Island Sound at Sea Cliff Beach in Sea Cliff, N.Y. They were used for several years in Mamaroneck, N.Y., as well. These custom-designed fabrics are hung from a boom surrounding the perimeter of a swimming area. The fabrics are highly porous and allow interchange with ambient water but also act as a filter to prevent pollution from entering the area surrounded by the fabric. Bacteria counts were reduced by 62% at Mamaroneck Harbor Beach through the use of this technology. On the Hudson, use of such fabrics may make it possible to reduce swimming impacts on surrounding aquatic life and to protect swimmers from floatable debris.

Floating or barge mounted pools, a concept that is common in Europe, may offer a solution for locations where water depths or sediment conditions are not otherwise suitable for swimming. Design of floating pools for such situations may warrant further study. Historically, such pools were widely used along the shore of Manhattan; however, historic pool designs are not suitable for today's standards.

CONCLUSION

The study determined that there are several sites along the Hudson River offering both short-term and long-term promise as potential public beaches. For sites where physical barriers preclude beach development, or where local water quality precludes swimming, other options exist which may merit further exploration.

Table ES-1
Summary of Findings
Analysis of Existing and Potential Sites

A. Potential Improvements to Existing Sites (Does not include operating costs which will not change)

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---------------------------------|----------------------------------|
| Saugerties Village Park – Ulster County (located on Esopus Creek) | 150 | \$125,000 | Bathroom rehabilitation |
| Ulster Landing County Park –Ulster County (Town of Ulster) | 400 | \$150,000- \$500,000 | Beach restoration and protection |
| Kingston Point City Park – Ulster County (City of Kingston) | 500 | \$500,000+ | Bathroom rehabilitation |
| Port Ewen Municipal Park – Ulster County (Town of Esopus) (not currently in operation) | 150 | Unknown | Water chestnut removal |
| Croton Point County Park – Westchester County (Village of Croton-on-Hudson) | 700+ | \$600,000- \$1,000,000 | Bathroom rehabilitation |

Table ES-1
Summary of Findings
Analysis of Existing and Potential Sites

B. Feasible New Sites

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|--|-----------------------------------|---|---|
| Stuyvesant NYS OGS Property – Columbia County (Town of Stuyvesant) | 300 | \$600,000/ \$30,000 | Parking, bathhouse, resolution of potential siting issues to complement other planned uses, site- specific analysis of water quality, sediment characteristics |
| Kowawese Unique Area at Plum Point, Orange County Park – Orange County (Town of New Windsor) | 350 | \$825,000/ \$40,000 | Parking, bathhouse/comfort station, grading improvements, potential water chestnut maintenance, improved bicycle and pedestrian access, site-specific analysis of water quality, sediment characteristics |
| Riverfront Park – Rockland County (Town of Stony Point) | 250 | \$500,000/ \$30,000 | Bathhouse, possible road relocation and parking, site-specific analysis of water quality, sediment characteristics |
| Rockland County Park – Rockland County (Town of Haverstraw) | 600 | \$1,000,000/ \$50,000 | Beach improvement, bathhouse, access, potential land acquisition, Investigate potential wetlands issues, conduct site-specific analysis of water quality, sediment characteristics |
| Kingsland Point Westchester County Park – Westchester County (Village of Sleepy Hollow) | 600 | \$2,500,000/ \$50,000 | Bathhouse restoration, beach replenishment, parking, site-specific analysis of water quality, sediment characteristics |

Table ES-1
Summary of Findings
Analysis of Existing and Potential Sites

C. Potential New Sites Requiring Additional Action to Be Established as a Beach

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---|--|
| Henry Hudson Park –Albany County (Town of Bethlehem) | 250 | \$500,000/ \$40,000 | State water quality classification change, land ownership determination, bathhouse, parking, site-specific analysis of water quality, sediment characteristics |
| Schodack Island State Park – Rensselaer County (Town of Schodack) | 300 | \$500,000/ \$30,000 | State water quality classification currently Class C would need to be upgraded to Class B. Additional investment needed includes bathhouse construction, parking, site-specific analysis of water quality, sediment characteristics. |
| Four Mile Point (private property) – Greene County (Town of Coxsackie) | 150 | \$125,000/ \$25,000 | Land acquisition, parking, bathhouse, site-specific analysis of water quality, sediment characteristics, including ways to make parking compatible with adjacent Vosburgh Swamp habitat |
| Mills-Norrie State Park – Dutchess County (Town of Hyde Park) | 300 | \$600,000/ \$30,000 | Further examine floating pool options at the “old town beach” in the Norrie section of the State park; further review park master plan and related policy issues for establishment of a beach within the historic core of the Mills section of the State Park; site-specific analysis of water quality, sediment characteristics |

Table ES-1
Summary of Findings
Analysis of Existing and Potential Sites

C. Potential New Sites Requiring Additional Action to Become Feasible (Cont'd)

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---|---|
| Little Stony Point State Park Property – Putnam County (Town of Philipstown) | 300 | \$600,000/ \$30,000 | Complete park master plan; address constraints of parking and vehicle and handicapped access, possible scenic considerations; conduct a site-specific analysis of water quality, sediment characteristics |
| White Beach (Verplanck) (private property) – Westchester County (Town of Cortlandt) | 300 | \$600,000/ \$30,000 | Land acquisition, bathhouse, parking, site-specific analysis of water quality, sediment characteristics |
| Nyack Beach State Park – Rockland County (Town of Clarkstown) | 300 | \$500,000/ unknown | Development will include removal of existing sea wall, restoration of groin, restoration at slope and observation to see if beach restores as a result. If so, address bathhouse and parking and conduct a site-specific analysis of water quality, sediment characteristics. Additional capital investment will be required for bathhouse and parking. |
| Hudson River Park – New York County (Borough of Manhattan) | unknown | unknown | Research geotextile fabric applicability for public beach; research floating pool potential; site specific analysis of water quality, sediment characteristics |

Table ES-1
Summary of Findings
Analysis of Existing and Potential Sites

D. Potential New Sites with Substantial Barriers to Development

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---|---|
| Bristol Beach State Park – Ulster County (Town of Saugerties) | unknown | unknown | Soil conditions, wetlands, sand retention |
| Bowline Point Town Park – Rockland County (Town of Haverstraw) | unknown | unknown | Close proximity to fuel off-loading pier |
| Ossining, Louis Engel Park – Westchester County (Town of Ossining) | unknown | unknown | Small size, water quality, no available parking, proximity of wastewater treatment plant |
| Dobbs Ferry Village Waterfront Park and Wickers Creek – Westchester County (Village of Dobbs Ferry) | unknown | unknown | Minimal upland area for support infrastructure, unsuitable subsurface conditions (strong currents at Wickers Creek); lack of access |

SECTION 1 INTRODUCTION

1.1 PURPOSE AND OBJECTIVES

The Hudson River Estuary Program was established in 1987 under the Hudson River Estuary Management Act of the New York State Environmental Conservation Law. The Act established the policy to preserve, protect, and where possible, restore and enhance the natural resources, species, habitat and commercial and recreational values of the Hudson River Estuary. Under the Act, the Hudson River Estuarine District is defined as "...the tidal waters of the Hudson River, including the tidal waters of its tributaries and wetlands from the Federal Lock and Dam at Troy to the Verrazano Narrows".

Governor George E. Pataki released New York State's first Hudson River Estuary Action Plan in May of 1996, which was updated in 1998. The Plan has served as a blueprint for the New York State Department of Environmental Conservation (NYSDEC) and partnering agencies to implement management actions along the estuary. The Hudson River Estuary Action Plan incorporates three general themes: conserving natural resources, promoting use and enjoyment of the river, and cleaning up pollution.

Under the leadership of Governor Pataki, NYSDEC serves as project manager for the estuary program. Other State partners in the program include the Office of Parks, Recreation and Historic Preservation; the State Departments of Agriculture and Markets, General Services, State, Transportation, and the Empire State Development Corporation, Metro-North Railroad, and the Hudson River Valley Greenway. Local governments along the estuary, the State of New Jersey, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the U.S. Department of Interior, the U.S. Department of Commerce, and the American Heritage Rivers Program also have a stake in the plan and actively participate. Moreover, the Hudson River Estuary Action Plan has been developed with extensive input from environmental management professionals, scientists, business leaders, and citizens, including a citizens advisory committee.

New York State selected Lawler, Matusky and Skelly Engineers LLP (LMS) and its subcontractor, The Hudson Group, to conduct this feasibility study related to the development of public swimming facilities along the shores of the Hudson River Estuary. The feasibility study has been conducted pursuant to Commitment 11c of the 1998 Estuary Action Plan, under Theme II, Promoting Use and Enjoyment of the River, which states that the Hudson River Estuary Program will "study issues, opportunities and feasibility for increased use of the Hudson River for swimming".

Governor Pataki, in his 2004 State of the State Address, called for plans to improve the health of the Hudson River by 2009 – the 400th anniversary of Henry Hudson's exploration of the Hudson River on the Half Moon – so that the Hudson River will be swimmable from its source in the Adirondacks to New York City.

This study simply identifies sites that may be feasible. It does not propose that the state will undertake or fund the development of a beach at these sites.

1.2 REPORT FORMAT

This report provides an overall view of the process used for determining the feasibility of developing public swimming facilities along the Hudson River Estuary. Sections 1 and 2 provide an introduction and a brief discussion of historical and current use of the Hudson River estuary for swimming.

Section 3 provides a description of the project area, from its most northern point at the Troy Dam, south to the Battery in Manhattan. Water quality classifications, river morphometry, the proximity of hazardous waste sites and the issue of recreational need are discussed in this section. Section 4 is an overview of the regulations and safety requirements required by both New York State and New York City for the creation and operation of public swimming facilities.

Section 5 describes the two-step approach that was used to determine the most feasible swimming sites for potential development. It discusses the development of the preliminary site list, as well as the objectives, criteria, and results of the site screening processes. Section 5 also summarizes the project's environmental review and includes a summary of state and federal agency correspondence, a brief discussion of threatened and endangered species reported in the vicinity of the sites with the greatest potential for development at this time, Hudson River Estuary significant habitats, permit needs, wetlands identification, and a general impact assessment.

Specific findings regarding potential swimming facility sites, site photos, conceptual designs and general costs for swimming facility development at the feasible sites are discussed in Section 6. Sites with future potential are also included in the discussion, as well as potential actions for existing facilities. Section 7 explores alternative facility options for areas where conditions are not ideal for the development of a typical beach swimming facility.

SECTION 2

SWIMMING IN THE HUDSON RIVER

2.1 HISTORY

The first written account of swimming in the Hudson River was Henry Hudson's log from his trip up the river in the "Half Moon", noting that on September 23, 1609, natives approached and retreated, "some in their canoes, some swimming" (Juet 1609). Swimming in the river is occasionally mentioned in historic accounts, but it is usually offered as an incidental comment, such as mention of children swimming off barges and piers, which is briefly noted when boat traffic and harbor uses are being discussed (Verplanck and Collyer 1908; Ringwald 1958). These incidental notes appear in many depictions of life and commerce along the River.

Pictures and other documents depicting the Hudson River from the post Civil War era to the early 20th Century show a more formal use of the river for swimming, often including fashionable recreation sites, along with other scenes from public life. "Escaping summer heat along the city docks", "New York City's public floating pools located along the Hudson", and "Newly established beaches along the NY Harbor", depicted river swimming as well as the recently established competing oceanfront resorts (Lowey 1890). Books, journals and reports developed during the late 19th and the early 20th centuries describing life, commerce and historic land uses often included public and commercial amusement parks, which were located on waterfronts at the terminus of trolley lines or at day liner piers. These strategically located properties were scenic, cool in the summer, and often offered a dock or beach that was used for swimming. In addition, commercial floating pools were located along Manhattan's shoreline in a 1817 guide, and two "free floating marine baths" were located on the west side of Manhattan near the Battery in 1870. Sports such as rowing and sailing are also depicted in reports and photographs.

Public swimming in the Hudson River was greatly curtailed during the mid 20th century. The Palisades Interstate Park Commission (PIPC) notes that this reduction in recreational swimming was initially the result of staff reductions and travel restrictions due to World War II. Water pollution and stringent sanitary and health requirements further reduced river swimming. Increasingly, new public and backyard pools and inland lakes and ponds provided swimming alternatives.

Beginning in the 1960s, national and state programs began to address water pollution issues. The Federal Water Pollution Control Act of 1965 presents as one of its main goals the attainment of "swimmable" waters. While the quality of water in the Hudson River has improved dramatically since that time, only one new public beach, Ulster Landing, has opened.

Locations where swimming is accommodated on the River were inventoried nearly thirty years ago for the Statewide Comprehensive Recreation Plan (SCORP). This Plan also noted the need to improve Hudson River water quality. Updated SCORP documents, published every five years, all supported meeting swimming needs in the Hudson Valley and improving recreational access along the Hudson.

In the 1980s, the value of shoreline resources and waterfront lands in New York State and the Nation were recognized in federal and state programs designed to protect them and plan for their beneficial use. New York State adopted its Coastal Management Program (CMP) in 1982 and established 44 coastal policies that included public access to waterfront recreation and other goals for the Hudson River Estuary and for the other designated areas in the state. The New York State Department of State's Coastal Program also provided grants to communities in the designated areas to develop Local Waterfront Revitalization Programs (LWRP). A review of current LWRPs for the Hudson River counties found little information about swimming in the river or plans to do so in the future.

In 1999, Governor Pataki signed into law the Hudson River Marine Sanitation Act, which provides NYSDEC with the authority to regulate the no discharge zone designation. This designation prohibits the discharge of sewage from vessels in the 64 miles of the estuary that are classified "A," source of drinking water. The "A" classification area extends from Newburgh to the southern tip of Schodack/Houghtaling Island. In October 2003, New York State and the USEPA announced the designation of a No Discharge Area for the entire 153 miles of the Hudson River Estuary from Battery Park in Manhattan to the City of Troy Dam.

2.2 CURRENT HUDSON RIVER SWIMMING

2.2.1 Swimming Facilities

There are five public swimming beaches along the Hudson River estuary, four of which are currently operating. The fifth, Port Ewen, recently closed. Three of the four operating beaches are located in Ulster County and one is located in Westchester County. All are public sites, open seasonally, with successful operations. Outdated bathhouses and support facilities in poor condition are a common constraint. Each of these sites was reviewed as part of this study for purposes of evaluation and comparison with potential sites. Since these sites have been successful on their own and do not require the amount of analysis and resources of a new facility, this study simply offers potential actions that would continue their success. In addition, there is a private beach located at the Philipsburg Manor Beach Club.

Croton Point Westchester County Park, located on the east shore at river mile 36, this beach operates along the northwest shore of Croton Point. Primary concerns for the continued operation of this site include the close proximity of boaters, floating debris, and deterioration of existing infrastructure, including pipes, showers, and other necessary plumbing.

Ulster Landing County Park, located on the west shore at river mile 97, is a modest-sized facility, with excellent upland design. The primary issue related to this scenic and well-used site is the retention of sand at the beach and along the adjoining shoreline picnic area to the south. Records indicate that 30 feet of the sand beach formed in the 1930's, as well as the trees and vegetation, has been lost during the ensuing years. This problem must be addressed in the near term.

Kingston Point Park is an existing city park with swimming facilities, located on the Hudson River's west shore at river mile 92. It includes an extensive and wide sand beach with approximately 300 feet of developed shoreline, with a width of over 150 feet. Swimming at this site dates to the 19th century with many support services such as a bathhouse dating to the early 20th century. These existing facilities are in need of improvements and upgrades.

Saugerties Village Beach is a small municipal beach located on Esopus Creek, a Hudson River tributary, at river mile 102.5. This beach is located west of a dam and is therefore not affected by Hudson River tides. The beach has approximately 150 feet of shorefront, with water depths increasing gradually to nine feet. The primary issues of maintaining this site are sand management, control of aquatic vegetation, and improvements to infrastructure including the bathhouse and parking facilities.

Port Ewen is a small municipal beach located in the Town of Esopus, not currently in operation. Port Ewen's primary issue is the control of aquatic vegetation, which has made the area unswimmable. Prior attempts at weed control did not prove to be successful. As part of this study, Port Ewen was evaluated; however, no solution to the aquatic vegetation problem was found.

For more detailed information on these existing swimming facilities and findings regarding improvements, see Section 6 of this report.

2.2.2 Informal Swimming

Though there are currently only four publicly-operated swimming beaches on the Hudson River, responses to the Spring 2000 NYSDEC swimming survey of residents indicated more than a hundred informal sites where people reported swimming, and many more where they would like to swim (See Section 5.1).

This study does not focus on such informal swimming sites or the potential issues of safety and legal liability which accompany them. However, it is believed that public beaches generally offer a safer experience, and would be chosen by most people, especially families.

SECTION 3 DESCRIPTION OF THE PROJECT AREA

3.1 GENERAL DESCRIPTION OF HUDSON RIVER

The Hudson-Mohawk river basin is located in the eastern part of New York State and covers an area of 13,366 square miles. Most of the watershed lies within the east-central part of the state; small portions however, extend into Vermont, Massachusetts, Connecticut, and New Jersey (Figure 3-1). The watershed is one of five major drainage basins within New York State.

The basin can be divided into three principal sub-basins: (1) the upper Hudson and (2) Mohawk River sub-basins, which drain into (3) the lower Hudson sub-basin. The upper Hudson River and Mohawk River sub-basins are the primary sources of the freshwater which flows into the lower Hudson.

The 315-mile-long Hudson River originates at Lake Tear-of-the-Clouds on the southwest slope of Mt. Marcy in the Adirondack Mountains. Near river mile 156 the Mohawk River joins the Hudson. Two miles farther downriver is the Federal Dam at Troy, which creates a physical barrier between the upper and lower Hudson River. The Federal Dam is the northernmost extent of the tide and marks the upper limit of the Hudson River Estuary.

The lower Hudson River commences at the Federal Dam at Troy and flows south to its discharge into Upper New York Bay at the Battery. The Lower Hudson River between the Federal Dam at Troy and the Battery at the southern tip of Manhattan is classified as a tidal estuary. The lower Hudson River basin drains an area of approximately 5,277 square miles and is essentially a flooded valley with very little gradient. Over its 154-mile course from the dam to its mouth, the river drops approximately 5 feet, an average of 0.04-inch per mile. It is this lower area of the Hudson River that is the area considered in this study.

3.2 HUDSON RIVER ESTUARY – STUDY AREA

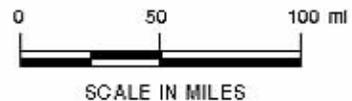
3.2.1 Channel Conditions - Tides and Currents

Channel morphometry (shape), seasonal freshwater flow patterns and tidal conditions (elevation and current velocity) are important parameters related to the development of swimming facilities along the shore of an estuary. Swimming facility development parameters affected by these three conditions are water depth changes at the site, speed and direction of water currents, sediment type and ability to maintain acceptable beach sediments at the site.

Waves and wakes are important considerations for any swimming beach. The Hudson River's relatively even tidal flows make dangerous high tide conditions improbable. Down-river currents also do not cause wave problems in the section of the Hudson River north of the Tappan Zee. The many turns, changes in riverbank height and uneven shoreline configuration limit the amount of windward open waters that might otherwise generate wind driven wave conditions. In



Source: Abood 1992



1804...graphics\figure1.dwg

the more developed and expansive southern sections, areas where hard bulkheads are present, wave and current conditions can be more dynamic.

With few exceptions, wind generated waves and tidal currents are not a problem along the lower Hudson. Though not really problematic, the north or south facing Hudson River beaches, and the beaches along the wider, southern reaches, are the most affected by wind driven waves. The east or west facing beaches are the most exposed to currents. In addition, the east and west facing beaches, which are located near shipping channels, are also exposed to boat generated waves. Beach managers that operate swimming areas near the Federally maintained navigation channel and its associated ship and barge traffic indicate that unlike the choppy, small waves of small motor boats, the large, long-period waves of large ships and barges build in height in the shallow waters near shore and can be a danger to small children. Also, the wake from large commercial ships tends to suck the water out of shallow areas, making it unsafe for swimmers or at least very turbulent with rock, bricks, debris being moved around and a resultant small “tidal” wave returning in to shore. This effect lasts quite a while and is applicable to Ulster County Park and Port Ewen sites. Lifeguards must be observant for this situation, and markers for “deep” swimming sections must be set with these waves in mind.

3.2.2 Water Quality

3.2.2.1 Water Quality Overview. The water quality of the Hudson River is influenced by temporal variations relating to tides and site location. Major components of water quality include salinity, temperature, dissolved oxygen, turbidity, pH, alkalinity, pollutants and nutrients (Cooper et al. 1988).

In the Albany or Upper reaches of the Hudson River estuary, biological sampling shows significant increases in water quality from the 1970s through the 1990s, moving from poor water quality indicative of sewage and industrial impacts to slightly impacted. In the most recent 10 year period, two of the four Albany area sites have slipped back to moderately impacted sites. Though the trend over 30 years is positive, this recent (and as yet not fully explained) slippage is of some concern. Water chemistry trends in this portion of the river from the 1970s through the 1990s also show significant improvement in dissolved oxygen and ammonia, reflecting treatment facility improvements.

In the Mid/Lower Hudson River reaches, water quality appears to be largely unchanged, based on biological and chemical sampling data over the past 30 years. This larger river area is controlled to a greater extent by hydrologic and tidal influences than the upstream portions of the river.

The water temperature range of the Hudson River estuary is from 0.6-2 °C (33.1-35.6 °F) in January to average annual highs of 22-29 °C (71.6-84.2 °F) in July and August. In shallow water areas, maximum summer temperatures may exceed 30 °C (86 °F). Water temperatures are primarily influenced by freshwater flow and ocean waters. High freshwater flows, which occur during periods of high rainfall, keep temperatures low in the downstream areas. At any one time during the year, water temperature differences between the upper and lower reaches of the river channel can reach 11 °C (51.8 °F) (Cooper et al. 1988). Water temperature becomes a factor in

beach site feasibility when considering projected use of the site. If water temperatures were to remain too cold through the summer, the site is likely to get very little use.

Turbidity in the Hudson River is caused primarily by silt transported by land runoff. Data on pH have shown no predictable patterns, but has been documented to vary between 6.4 and 8.2 (Cooper et al. 1988). Both turbidity and pH are important considerations for individual swimming beach locations. If the turbidity of the river is too high, lifeguards may not be able to locate distressed swimmers, causing safety hazards.

3.2.2.2 Water Quality Data and Analysis. Available water quality data for the Hudson River estuary were obtained from various agencies, compiled, and analyzed. Particular attention was paid to locate data for parameters pertinent to beach use (i.e. total/fecal coliform and turbidity data).

The New York State Department of Health (NYSDOH) sanitary code contains water quality standards for bathing beaches. The most relevant NYSDOH standards are those pertaining to bacteriological quality. NYSDOH sanitary codes are similar to NYSDEC water quality standards (Table 3-1).

The criteria for NYSDOH's bathing beach standard are as follows:

- (1) The total number of organisms of the coliform group shall not exceed a logarithmic mean of 2400/100 ml for a series of five or more samples in any 30-day period, nor shall 20 percent of total samples during the period exceed 5000/100 ml. When data does not meet/satisfy standards, the permit-issuing official shall cause an investigation to be made to determine and eliminate the source of pollution.
- (2) The fecal coliform density from a series of five or more samples in any 30-day period shall not exceed a logarithmic mean of 200/100 ml. When the fecal coliform density of any sample does not meet standards (1000/100 ml), consideration shall be given to closing the beach, and daily samples shall immediately be collected and analyzed for fecal coliform for at least two consecutive days.

NYSDOH's water quality standards for bathing beaches specify a numerical criterion for the clarity of the water as a safety precaution. The secchi depth, which marks the point where a 200-mm diameter disk can be seen, should be greater than or equal to 4 feet.

The availability of water quality, (particularly coliform and turbidity) data for the Hudson River estuary is very limited. More recently, NYSDEC, through the Hudson River Estuary Program funded a cooperative study with the NYS Office of Parks, Recreation and Historic Preservation to assess water quality and the suitability of the Hudson River in the Albany area (the "Albany Pool") for swimming. The results of this study confirmed some general assumptions: the highest coliform bacteria levels occur below Patroon Creek and below the Albany County and Rensselaer County wastewater treatment facilities discharges, during increased river flow (wet-

TABLE 3-1
Summary of Beach-Related Water Quality Criteria Compliance

| Data Source | Appendix III | Number of Sample Locations | Time Period | Compliance with water quality criteria | | |
|---------------------------------|--------------|----------------------------|-----------------------------|--|----------------|----------------|
| | | | | Secchi Disk | Total Coliform | Fecal Coliform |
| Albany County Sewer District | A | 4 | June 1987 - July 1996 | ND | YES | ND |
| Glenmont & Poughkeepsie | B | 2 | March 1984 - October 199 | ND | ND | ND |
| Ulster County | C | 2 | July 1991 - August 1999 | ND | ND | YES |
| Port Ewen Sewer District | D | 1 | April 1999 - February 2000 | ND | YES | ND |
| USGS | E | 5 | April 1992 - September 1999 | ND | ND | ND |
| Rockland County Dept. of Health | F | 4 | June 1990 - August 2000 | ND | VARIABLE | VARIABLE |
| Bear Mountain Laboratory | G | 5 | June 1983 - August 1985 | ND | YES | ND |
| Westchester County | H | 3 | June 1999 - July 1999 | ND | YES | YES |
| NYCDEP Harbor Survey | I | 7 | June 1990 - September 1999 | NO | YES | YES |

YES = Compliance is always attained

VARIABLE = Compliance is occasionally not attained

NO = Compliance is generally not attained

ND = No Data

NYSDOH water quality standard criteria

The total number of organisms of the total coliform group shall not exceed a logarithmic mean of 2400/100 ml for a series of five or more samples in any 30 day period

20% of total coliform samples during the period shall not exceed 5000/100 ml

The fecal coliform density from a series of five or more samples in any 30-day period shall not exceed a logarithmic mean of 200/100 ml

When fecal coliform density of any sample exceeds 1000/100 ml, consideration shall be given to closing the beach

The secchi depth, which marks the point where a 200-mm diameter disk can be seen, should be greater than or equal to 4-ft

NYSDEC water quality standard criteria

Class A,B,C,SB

The total coliform monthly median value shall not exceed 2400/100 ml from a minimum of five samples

20% of total coliform samples during the period shall not exceed 5000/100 ml.

The monthly geometric mean from a minimum of five fecal coliform samples shall not exceed 200/100 ml

Class I

The total coliform geometric mean value shall not exceed 10000/100 ml from a minimum of five samples

The monthly geometric mean from a minimum of five fecal coliform samples shall not exceed 2000/100 ml

weather). Typically, coliform levels meet water quality standards at Castleton and points south. In response to the Governor's commitment to a swimmable Hudson, NYSDEC is working with the Albany Pool communities to determine if seasonal disinfection is needed at the wastewater treatment plants in this area. In addition, the Albany Pool communities were recently successful in obtaining funding from the Hudson River Estuary Program/Environmental Protection Fund to develop a Long Term Control Plan to address CSO discharges in this area.

However, at locations where bacteriological data was collected, most samples fall within NYSDEC and NYSDOH standards for total and/or fecal coliform counts. Where coliform standards are exceeded, it is generally for short periods.

Water quality data collected by the Albany County Sewer District between 1987 and 1996 show that total and fecal coliform criteria for NYSDEC and NYSDOH standards are generally not exceeded. NYSDEC through the Office of Parks, Recreation and Historic Preservation funded a study to assess water quality and the suitability of the Hudson River in the Albany area for swimming and other water-based recreational activities. A total of 15 sampling events at each of ten locations between the Federal Dam in Troy to the southern end of Houghtaling Island were collected in 2003. The results of this study confirmed some general assumptions: the highest coliform levels occur below Patroon Creek and below the Albany County and Rennselaer County wastewater treatment facilities discharges, the highest levels occur during increased river flow (wet-weather) and typically coliform levels drop to near or below water quality standards at Castleton and points south. Though not unexpected, these findings – along with questions of the most appropriate best use of the waters of the Hudson River in the Albany Pool – will be addressed as NYSDEC continues to work toward a swimmable Hudson River.

Data collected at the Glenmont and Poughkeepsie STPs are of limited use since bacteriological data were not collected. Nevertheless, data on total suspended solids and turbidity indicate relatively low levels during the summer months, when water temperature is generally between 20 and 25 °C (68 and 77 °F).

Fecal coliform data collected by Ulster County at two existing public swimming facilities (Kingston Point Beach and Ulster Landing Beach) between 1991 and 1999 show the NYSDEC and NYSDOH standards for fecal coliform criteria are met at these locations.

Data collected by the Port Ewen Sewer District is limited but the total coliform samples collected did not exceed water quality standards. A bacteriological pathogen, *E. Coli*, was generally not found in these samples.

Total and fecal coliform data collected by the Rockland County Department of Health at four locations during June, July and August of the last several years showed that NYSDEC and NYSDOH bacteriological criteria are exceeded at times. Exceedances of NYSDOH criteria for total and fecal coliforms were found in at least one month at all four sampling stations. The results of this analysis are summarized in Table 3-1.

Westchester County collected data at Croton Point Park over a period of one month (June 1999). Analysis of this data shows that NYSDEC and NYSDOH criteria were not exceeded.

The New York City Department of Environmental Protection (NYCDEP) collected secchi disk depth, and total and fecal coliform data at six locations along the Hudson River. In addition to the NYSDEC and NYSDOH water quality standards, New York City Department of Health has a beach use criterion on total coliforms not exceeding 5,000 counts/100ml for a storm with a three-year return period. The NYCDEP data show a trend of decreasing fecal coliform concentrations through the 1990's. Total coliform concentration data, which were not collected after 1996, also exhibit a similar trend. The NYSDOH criteria are used for a comparative assessment because they apply to bathing beaches whereas the NYSDEC standards for Class I apply to non-contact recreation. Fecal coliform data collected in 1999 by NYCDEP show compliance with NYSDOH criteria. Total coliform concentration data for the last three years are not available for comparison with NYCDOH criteria.

Secchi disk depth at the seven New York City sampling stations is generally within the NYSDOH criterion of 4 feet for bathing beaches. The most upstream station (Mt. St. Vincent) and most downstream station (The Battery) have a higher percent of measurements in compliance with the state's criterion than the other stations between them. In summary, bacteriological quality along the New York City shoreline appears to be in compliance with NYSDOH criteria; however, the water clarity is not in compliance with the NYSDOH's secchi-disk depth criterion.

3.2.2.3 Proximity of Potential Beach sites to CSOs and STP Discharges. While discharges from wastewater treatment plants and combined sewer overflows are controlled by NYSDEC, it is generally recognized that locating bathing beaches close to these facilities is less desirable because of the structures themselves and the potential for operational upsets. A Geographic Information System (GIS) was used to determine the proximity of potential swimming sites to combined sewer overflows (CSO) and waste-water treatment plant (WTP) outfalls.

Charts of the Hudson River published by the National Oceanographic and Atmospheric Administration (NOAA) were used as a base map and the location of the potential swimming facilities were located and their coordinates were entered into the GIS database. Locations of CSO discharges and WTP outfalls were determined from two data sources: the EPA's Permit Compliance System (PCS) database and State Pollutant Discharge Elimination System (SPDES) permits for WTP along the Hudson River.

Each potential swimming site was given a score based on its proximity to a CSO discharge or a WTP outfall. Sites that were too close to a CSO or WTP outfall were disqualified. More information can be found in Section 5.

3.2.2.4 Possible Sources of Chemical Contaminants on Potential Beach Sites. Overall water quality in much of the Hudson River has steadily improved over the past 30 years. Wastewater treatment facilities and other water pollution control efforts have resulted in significant water quality improvement in the Capital District area. Industrial, agricultural and municipal discharges (i.e., combined sewer overflows) are also responsible for adding pollutants such as cadmium, nickel, polychlorinated biphenyls (PCBs), pesticides, and nutrients such as phosphorus, nitrogen, and ammonia to the river (Cooper et al. 1988).

The NYSDEC continues to track down sources of contaminants in the Hudson River and monitor responses to pollution reduction activities. In particular, a comprehensive, multi-million dollar project is underway to identify and quantify sources of contaminants of concern such as dioxin, PCBs, PAHs, metals, pesticides, and volatile organic compounds throughout the Hudson River and its tributaries.

Hazardous Waste Sites. Ninety-five hazardous waste sites were identified along the Hudson River, eleven of which are located within five miles of a potential swimming site (Table 3-2). Further evaluation of individual hazardous waste sites and individual swimming locations would be required to assess any potential impact related to water quality. Brownfield sites, past spills, voluntary clean-up sites, etc., are also potential sources of environmental contamination, and should also be evaluated on a case-by-case basis.

PCBs. Industries along the river used PCBs for many years until they were banned in the mid-1970s. The Hudson River from Hudson Falls to the Battery in New York City has been classified as a National Priority List site because of PCBs in the river. Although PCBs are still detected in sediments and river biota, the higher levels are mostly outside the estuary waters being considered for beaches. On the Hudson River Estuary, where PCBs are found deeper in sediments, PCB exposure is not considered a significant health risk for public swimming. The USEPA recently completed a baseline human health risk assessment for the Mid-Hudson River which evaluated both cancer and non-cancer health risks from exposure to PCBs. A major finding of the EPA risk assessment is, “Risks from being exposed to PCBs in the Mid-Hudson River through skin contact with contaminated sediments and river water, residential ingestion of river water for drinking water, incidental ingestion of sediments, and inhalation of PCBs in air are significantly below USEPA’s levels of concern for cancer and non-cancer health effects” (USEPA 1999). In addition, PCBs tend to concentrate in fine, silty organic sediments, and are less likely to be found in the sands and gravel that comprise good swimming beaches (Rand 1995, Hoffman et al. 1995, Connell and Miller 1984).

Conclusions: Hazardous waste sites, other sources of environmental contamination and PCBs in the Hudson River are unlikely to have a significant impact on any potential swimming facility, due to their distance from the potential swimming sites. However, site-specific water quality data related to recreational uses on the Hudson River are limited. A comprehensive survey for potential sources of chemical contamination, including the potential for runoff, is recommended for any site designated for development as a public swimming facility. This survey could be used to identify any specific water quality or sediment data that are needed to evaluate the feasibility of developing that site.

3.2.2.5 Water Quality Testing and Re-evaluation of Existing Hudson River Water Classifications. Should new sites be determined to be feasible beach sites, the waterbody classification for the River segment where the new site is located should be consistent with the best use of primary and secondary contact recreation – Class B. If the waterbody classification is not currently Class B or higher, then a reclassification should be made prior to the development of a beach. This process starts with a decision on the part of the Department or a petition to do so by another party.

Table 3-2
 CERCLIS Hazardous Waste Sites Found Within the Vicinity¹ of a Step II Potential
 Swimming Facility*

| |
|--|
| Columbia County |
| Allied Health Care Chemetron Medical Division – Stuyvesant, NY |
| L&B Products – Stockport, NY |
| |
| Greene County |
| American Valve – Coxsackie, NY |
| |
| Orange County |
| Dupont Stauffer Duramante – Newburgh, NY |
| Consolidated Iron & Metal – Newburgh, NY |
| Provan Transport Corp. – Newburgh, NY |
| |
| Westchester County |
| Croton Point Sanitary Landfill – Croton on Hudson, NY |
| Stauffer Chemical/Eastern Research Center – Ardsley, NY |
| |
| Rockland County |
| Kay-Fries Inc. – Stony Point, NY |
| Haverstraw Landfill – Haverstraw, NY |
| Haverstraw Landfill – West Haverstraw, NY |

*USEPA 2000.

¹Approximately 5 miles

The upper reach of the Hudson River estuary, from the Troy Dam to the south end of Houghtaling Island in northern Columbia County is Class C. This classification reflects the fact that no sanctioned swimming beaches had been permitted or proposed in recent generations in this area, which in turn is a response to localized dangerous conditions such as currents and shipping activity, as well as pollution in the “Albany Pool”, an area of the River that is still subject to periodic combined sewer overflow problems (Hudson River Foundation and NYSDEC 1998). The best use of Class C waters is defined as fishing. Typically wastewater discharges to Class C waters are not disinfected, although they can be if needed to protect public health for swimming. Making the waters of the Hudson generally swimmable in the Albany Pool area would necessitate disinfection of some or all municipal wastewater discharges, but would not require reclassification. However, should specific new sites be determined to be feasible as a beach, the waterbody classification for the surrounding area should be consistent with the best use of primary and secondary contact recreation, which is Class B. If the waterbody classification is not currently Class B or higher then a reclassification should be made prior to the establishment of a beach. This process starts with a decision on the part of the Department or a petition to do so by another party.

Recent investments by the NYSDEC Hudson River Estuary Program with Clean Water/Clean Air Bond Act funds will substantially reduce combined sewer overflow discharges in the “Albany Pool” with likely improvements in water quality in southern Albany and Rensselaer counties. In addition, seasonal disinfection of municipal discharges into the Albany Pool waters can be expected to produce swimmable water quality in these Class C waters.

Two potential swimming sites, one at the Town of Bethlehem’s Henry Hudson Town Park in Albany County, and another beach on Schodack Island State Park in Rensselaer County are in Class C waters, which would need to be reclassified to B in order for a beach to be established at these locations. This process would be initiated once a decision is made by NYSDEC or a third party to seek establishment of a beach there. A multi-year study is needed over the entire river segment, and additional information is needed on wastewater treatment facility discharges and CSOs to confirm that water quality standards are achieved.

3.3 ECONOMIC GROWTH, WATERFRONT DEVELOPMENT AND RECREATIONAL SWIMMING NEEDS

3.3.1 Economic Growth and Waterfront Development

Over the past few years, improvements in the River’s water quality and the healthy economy have led to new development and redevelopment projects and plans along many waterfronts. A substantial number of the proposed projects all related to tourism and water-related recreational demands. Local Waterfront Revitalization Program (LWRP) plans, sponsored by the State under its Coastal Management Program, and projects and programs identified in the State’s Estuary Action Plans, are guiding new projects to “bring the River back to the people”. Seventeen communities along the River have approved LWRP Plans, with New York City submitting major

revisions to its approved Plan. Many direct State sponsored water access projects are underway or planned with several already completed.

3.3.2 Recreational Swimming Needs

Over five million people live in the counties along the River, from Manhattan to the Troy Dam, and the demand for swimming is high. In almost all counties the needs are far greater than the available facilities. In the lower Hudson from New York City to Orange and Dutchess Counties, the State Park's Index of Need is very high, as noted in its statewide Outdoor Recreation Plan.

Lack of access to swimming facilities open to the general public is a particular problem for low and moderate-income people throughout the Hudson Valley. The siting of new public swimming facilities along the Hudson, and improving those few already operating, would create unique recreational opportunities for residents of the Greater Hudson Valley. The benefits of these recreational opportunities will also advance State and local objectives to improve the economic and social well being of the people and communities in the Valley.

SECTION 4 REGULATIONS AND SAFETY REQUIREMENTS

4.1 NEW YORK STATE SANITARY CODE

Sanitary codes related to bathing beaches are contained in Subpart 6-2 of the New York State Sanitary Code. The code defines a bathing beach as:

a bathing place, together with any buildings and appurtenances, and the water and land areas used in connection therewith, at a pond, lake, stream or other body of fresh or salt water which is used for bathing or swimming with the express or implied permission or consent of the owner or lessee of the premises or which is operated for a fee or any other consideration or which is openly advertised as a place for bathing or swimming.

The New York State code is extremely detailed in regard to all aspects of beach operations including permits and variances, injury and incident reporting, site development, site construction, maintenance, operations and supervision. Therefore, a sanitary survey and monitoring program would be necessary in any operating state run facility. The most notable regulations applicable to this Feasibility Study can be found in Table 4-1. It should be noted that certain counties may also have their own sanitary code requirements which would need to be reviewed as part of any monitoring program.

4.2 NEW YORK CITY SWIMMING BEACH REGULATIONS

New York City bathing beach regulations are covered under Article 167 of the New York City Health Code. The code defines a bathing beach as:

any waterfront area of the City not specifically restricted by the provisions of Section 167.03, where swimming is permitted regardless of whether it is recommended in accordance with the classifications given in Section 167.13. The term does not include a bathing beach used by a family on private property for non-commercial purposes.”

New York City is required to follow all New York State regulations regarding bathing beaches. The City does retain the option of enforcing a stricter version of the State requirements. The New York City Bathing Beach Code includes all aspects of bathing beach operation including, operating permits, plan approval, facilities, maintenance, lifeguards/equipment, water classification and drowning reports as well as sanitary surveys and monitoring once a beach is operational. The most notable regulations applicable to this Phase I Feasibility Study can be found in Table 4-1.

Table 4-1
 Summary of Bathing Beach Regulations for New York State and New York City Beach
 Facilities

| NYS Regulations | NYC Regulations* |
|---|---|
| Operating Permit Required | |
| Approval of bathing waters <ul style="list-style-type: none"> • Bathing area is free of sewage • Use of waters does not pollute water supply • NYS water quality standards are met • Bathing waters are equipped with float lines to designate shallow and deep areas | No bathing beaches can be located along the Hudson River from the Harlem River to the Battery |
| Adequate toilet and handwashing facilities are supplied (if showers are provided, tempered water must be available) | |
| Water Quality Standards <ul style="list-style-type: none"> • Total coliforms do not exceed a 30 day logarithmic average of 2400/100 ml • Fecal coliforms do not exceed a 30 day logarithmic average of 200/100ml • Algae and aquatic vegetation control | No outfalls within 500 feet of beach area |
| 25 square feet of water surface per bather, and 75 square feet per bather for water over 4 feet in depth | |
| Total water surface area equal to 1 acre** | |
| 35 square feet of land area per bather | |
| Slope not to exceed 1:10 for depths up to 4 ft | |
| Water current not to exceed 3 ft per second | |
| No outfalls within 750 feet of beach | |
| Water clarity should be at least 4 feet in depth | |

*In addition to all NYS regulations, NYC also requires these standards be met by all beaches.

**Total acreage standards are primarily intended for small, enclosed water bodies, and are of less concern in a flowing river.

4.3 ENVIRONMENTAL REGULATIONS-WATER USE CLASSIFICATIONS

The NYSDEC has classified all surface waters based on their most appropriate use. NYSDEC considered past, present and future uses of the surface waters in the classification process. If other selection criteria are met and no other conditions preclude use for primary and secondary contact recreation, portions classified C should be considered for reclassification to B prior to development of a beach.

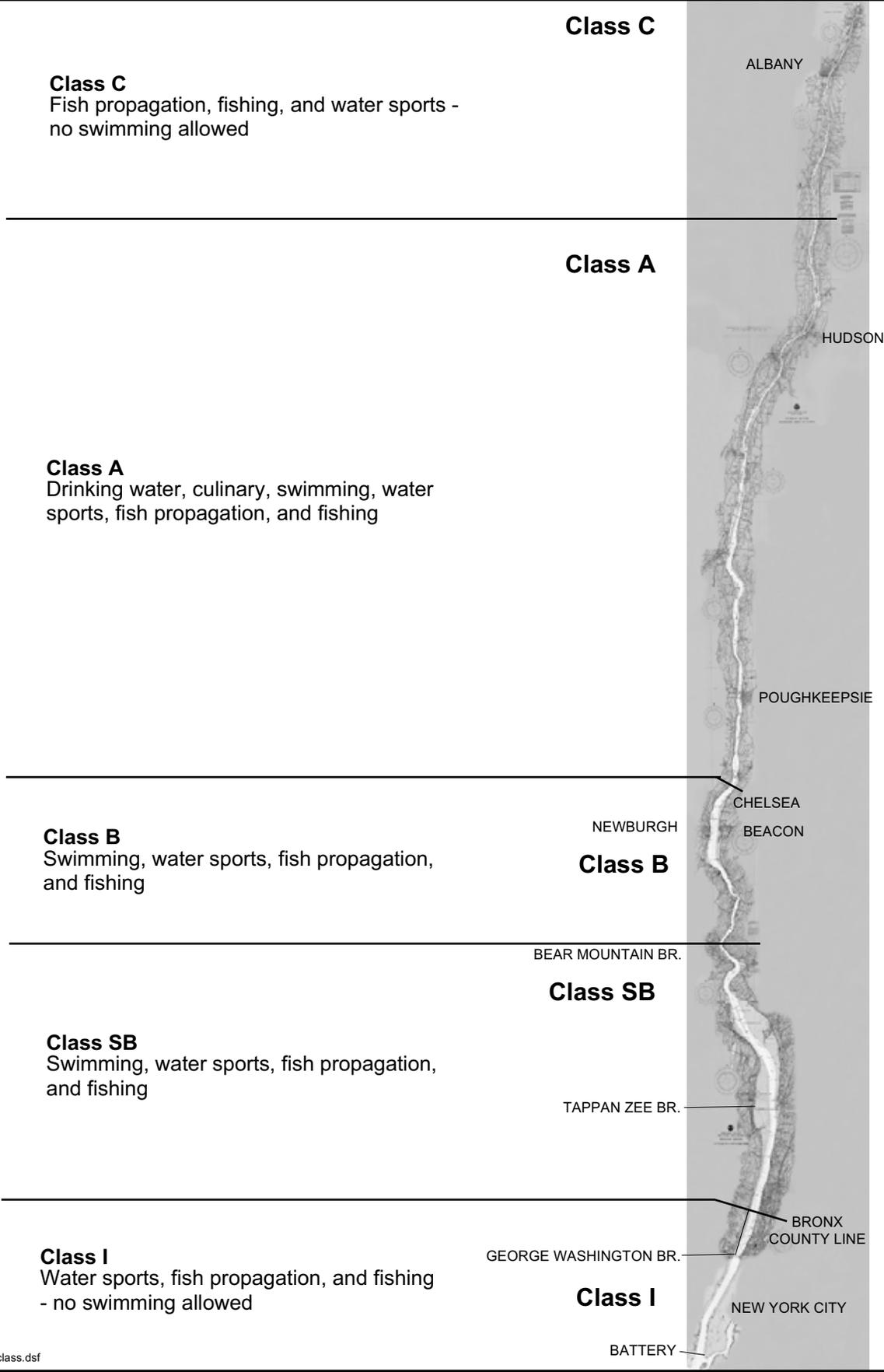
Table 4-2 lists the water quality classifications in the Hudson River, and what uses are protected (NYCRR 1996). A map showing each of these water segment classifications can be found in Figure 4-1.

Several of the sites are located in areas of the Hudson that are not presently used as public beaches. Seasonal disinfection of municipal wastewater is not always required in these areas. Capital investments may have to be made to seasonally disinfect municipal wastewater discharges. In addition, municipalities must work to further control discharges from CSOs, if other selection criteria support a beach site.

Table 4-2
Water Quality Classifications of the Hudson River

| Hudson River Region | Water Class | Best Use |
|---|--------------------|---|
| From the Battery to the New York-Bronx county line within boundaries of New York State | I | The best usages of Class I waters are secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival. (Swimming Not Included) |
| From New York-Bronx county line within boundaries of New York State to the boundary formed by Northerly Rockland County line on west shore and northerly Westchester County line on east shore (Bear Mountain Bridge) | SB | The best usages of Class SB waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival. (Swimming Included) |
| From boundary formed by Northerly Rockland County line on west shore and northerly Westchester County line on east shore (Bear Mountain Bridge) to boundary formed by Roseton on west shore and Low Point on east shore in general area of Chelsea. | B | The best usages of Class B waters are primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival. (Swimming Included) |
| From boundary formed by Roseton on west shore and Low point on east shore in general area of Chelsea to boundary formed by east-west line through Aid to Navigation (ATN) light No. 28 on southern end of Esopus Island. | A | The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish propagation and survival. (Swimming Included) |
| From boundary formed by east-west line through (ATN) light No.28 on southern end of Esopus Island to boundary formed by east-west line through light no 72 off south end of Houghtaling Island. | A | The best usages of Class A waters are: a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish propagation and survival. (Swimming Included) |
| From boundary formed by east-west line through light no. 72 off south end of Houghtaling Island to boundary formed by east-west line through most northern confluence of Mohawk and Hudson River. | C | The best usage of Class C waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. (Swimming Not Included) |

Data compiled from NYCRR 1996.



\\804...graphics\wq class.dsf

SECTION 5 SITE SCREENING/SELECTION PROCESS

5.1 PRELIMINARY SITE LIST DEVELOPMENT

5.1.1 NYSDEC Questionnaire

The New York State Department of Environmental Conservation (NYSDEC) distributed a questionnaire in the spring of 2000 to gauge the sentiment of the public toward swimming in the Hudson River. The survey sought information regarding general interest in swimming in the Hudson River, locations where people are swimming now, locations they would like to see developed into a formal swimming facility, and reasons for or against swimming in the river. Distributed to members of groups and representatives of agencies and municipalities already on NYSDEC and NYSOPRHP mailing lists, the survey was not intended to represent the overall population of the Hudson Valley.

The survey indicated significant numbers of people who were interested in and others who were opposed to swimming in the Hudson River. Viewpoints of the survey respondents included the following:

- 36% of survey respondents reported swimming in the river currently
- 52% of survey respondents reported swimming in the river in the past
- 52% of survey respondents said they would utilize a new swimming facility in the Hudson River
- 29% of respondents said they would not utilize a new swimming facility on the Hudson River
 - 41% of these people think the river is too polluted for swimming (12% of total respondents)
 - 23% of these people believe that swimming is prohibited in the Hudson River
 - 30% of these people cite age and abilities as reasons not to swim in the river

As part of the survey, respondents were asked to list specific swimming locations known to them. More than 100 locations were identified by the respondents, either as places they swim now, or places they would like to swim. The most popular swimming regions or areas suggested for the creation of a swimming site included Ulster, Dutchess, Rockland, and Westchester counties. Fewer sites were named in the Albany Capital District and New York City, where water quality has not improved as much and where navigation presents a greater hazard.

5.1.2 Public Information Sessions

Two public information meetings were held during the Step I phase of the feasibility study, on 20 and 25 July 2000, at Bear Mountain State Park and in Catskill. The objectives of these meetings were to inform the public that a study was being conducted, and to solicit feedback on the study approach and on sites to be evaluated under the feasibility study. The public was presented with a summary of the research conducted by the consultants as of that date, including a breakdown of the procedures that would be followed during the study. Handouts and maps depicting the potential sites were available to the public for review, and they were encouraged to make suggestions regarding sites that had been reviewed or to introduce new sites for review by the consultant team. A public comment period followed the meetings and comments were compiled and reviewed.

5.1.3 Consultation with Government Agencies, Public Action Groups and Interested Parties

There is a wealth of governmental, public and non-governmental organizations located in the Hudson River Valley. Many have jurisdiction over specific programs, geographic areas or properties that play a critical role in the study of existing and potential swimming facilities on the Hudson. Many meetings, telephone contacts, review of documents, and other forms of outreach provided basic information for the study, and an opportunity to interact with many of the key individuals who are knowledgeable about potential sites and the issues associated with them.

New York State and New York City organizations that administer, plan or review swimming programs in the Hudson Valley were consulted. Pertinent regulations, standards, and operating procedures were reviewed and incorporated into the Study. This often required contact with several units in each organization. Health and environmental agencies provided limited water quality data. Park and recreational entities provided data applicable for design and cost parameters. Resource agencies with coastal and other planning responsibilities provided relevant documents many of which focused on specific sites and communities. The initial Project Team providing advice to the Consultants included seventeen individuals with a great range of expertise and responsibilities. The information obtained and analyzed from these many sources is referenced in the report sections.

Many of the entities, public or private, that own or manage properties that were considered for swimming facility development were contacted for their input. Outreach through mailed surveys, public meetings, announcements, newsletters and notices, alerted other interested parties. Suggestions came from all parts of the State, with the greatest percentage from the counties in the Hudson Valley. A considerable effort was made to contact people and organizations in all areas of the estuary and to follow up all suggestions of sites and relevant issues. Those organizations with broader areas of jurisdiction, such as counties and River-wide organizations, were asked to broker information to and from smaller organizations in their areas of interest.

State agencies, many acting in an advisory capacity, provided data and constructive advice. NYSDEC provided information pertaining to specific properties and water quality, and

coordinated the input of a number of communities. NYSOPRHP provided data, forecasts, standards and operating procedures, contract management and continuing help. Regional State Parks Staff in the Taconic, New York City, Saratoga and Capital District regions, and the Palisades Interstate Park Commission provided information and help with field surveys. NYSDEC and NYSOPRHP shared the task of maintaining project oversight. NYS Department of Health provided data and standards, and reviewed project work elements during the study. The Department of State's Local Waterfront Revitalization Program provided plans and data, statewide standards and advice throughout the process.

Other State entities also provided important input including The Hudson River Valley Greenway Communities Council and Conservancy, and the Hudson River National Estuarine Research Reserve. The NYS Office of General Services provided information regarding State land in the Hudson River, NYS Department of Transportation provided cartographic and other information, and the New York City based Hudson River Park Trust provided plans and suggestions for the Study.

Meetings were held with county officials, usually involving staff from planning, parks, conservation, health, and/or public works agencies in Albany, Rensselaer, Greene, Columbia, Ulster, Dutchess, Orange and Westchester Counties. A number of municipal and New York City agencies and officials were contacted to review specific issues and sites including NYC Parks and Environmental Protection staffs, as well as the staff and officials from a number of smaller municipalities. These agencies provided reports, data, suggestions, operating manuals, and hosted an additional boating survey.

Several non-profit organizations provided pertinent reports, data, maps, and suggestions including Scenic Hudson, The Hudson River Water Trail Association, the Metropolitan Waterfront Alliance, the River Project, Floating the Apple, and the Parks Council (in NYC), and the NY Parks and Conservation Association. Staff from two utility companies, Consolidated Edison Company of New York, Inc. and Mirant New York, Inc. provided important input and St. Lawrence Cement Corp. staff reviewed properties that were considered.

Notwithstanding all of the outreach described, with more than sixty sites identified for the Step I evaluation, and nearly two-dozen sites undergoing additional Step II analysis, contact with all entities interested in each specific site was not possible. The extensive outreach provided a comprehensive inventory of sites to be reviewed, and standards to be considered, which served as the basis for the site evaluation.

The study to determine the feasibility of developing Hudson River public swimming facilities included the analysis of many primary data sources, collected specifically for the project, and the direct input of State and municipal government and not-for-profit agency staffs, as well as the contribution of many citizens. There were many secondary data sources and references that were important in helping to select sites that were evaluated, identify needs, plans and applicable standards. Relevant designs and costs were also collected from analogous swimming beach projects, and updated to represent the facilities that could be considered for selected sites.

5.1.4 Preliminary Site List

A preliminary site list for potential swimming facilities was developed as a result of swimming survey site suggestions, meetings with government officials, informal field surveys and suggestions made at the public meetings held in the summer of 2000 (Table 5-1, Figures 5-1a and 5-1b). At the conclusion of the site developmental phase, the potential swimming site list totaled 60 potential sites (including five existing sites). This list in its entirety was analyzed during the Step I screening process to determine the most feasible sites for development.

5.2 STEP I OF THE SCREENING PROCESS

5.2.1 Step I Screening Objectives

The basic objective of the Hudson River Public Swimming Facilities Feasibility Study is to find sites that can accommodate safe and attractive swimming programs on the River at this time, or in the near future. A two step process was used to select the most appropriate sites. The Step I review process considered many sites that were well known or suggested for review. Initial analysis, primarily based on an on-shore inspection and review of Hudson River and site specific information, indicated limitations and problems with many locations identified by the public and other sources. Only sites that appeared to be safe and adequate for a public swimming program were selected for a more comprehensive, Step II review.

5.2.2 Step I Screening Criteria

Field surveys of each site and a literature search enabled the categorical numerical scoring of each site based on selected criteria. Scoring differed for each criteria category, but for each category the higher the score, the more suited the site was for creation of a swimming beach. When scoring for each category was complete, the scores for each site were totaled to obtain an overall score. Sites determined to continue on to Step II review were selected based on this scoring analysis as well as the local knowledge provided by the project team.

The criteria used during the Step I phase of site analysis (detailed in the following sections) included beachfront conditions, accessibility, general Hudson River hydraulic conditions, water quality, and construction and operational feasibility. These criteria were selected because of their usefulness in identifying sites with characteristics that would eliminate them from future consideration. This Step I analysis took a broad view of all the potential sites with a goal of eliminating only those sites with insurmountable obstacles to facility creation.

5.2.2.1 Beachfront Conditions. Four factors required for a good swimming beach were used in the initial screening: 1) the quality of sand or beach materials, 2) the slope at the waterfront, 3) the length of beach available, and 4) the availability of an area backing the beach. Locations where more than two of these factors were rated as marginal will have little chance to establish a beach-based swimming program. Each site was rated independently and beaches were then ranked accordingly.

Table 5-1 (Page a of 2)

Initial List of Potential Swimming Facility Sites * (Step I)

| Proposed Site Name | County | Municipality | Step II Category | Notes From Site Inspections |
|--|--------------------|------------------------------|------------------|-----------------------------|
| Watervliet Park | Albany | Watervliet City | | 5,7,8 |
| Corning Preserve/Hudson Linear Park | Albany | City of Albany | | 7,8,16 |
| Rensselaer (North of High School) | Rensselaer | City of Rensselaer | | 7,8,3 |
| City of Albany-South End | Albany | City of Albany | | 7,8,3 |
| Henry Hudson Park-Town of Bethlehem | Albany | Town of Bethlehem | C | 8 |
| Papscanee/Campbell Islands (peninsula) | Rensselaer | Town of Schodack | | 8,6,10 |
| Schodack Island State Park (peninsula) | Rensselaer | Town of Schodack | C | 8,15 |
| Bronck Island | Greene | Town of New Baltimore | | 4,11,17 |
| Stuyvesant (Riverview Park) | Columbia | Town of Stuyvesant | B | 11 |
| Nutten Hook | Columbia | Town of New Baltimore | | 3,9,5 |
| Coxsackie Riverfront Park | Greene | Village of Coxsackie | | 1,10 |
| Gays Point/Stockport Middle Ground Island | Columbia | Town of Stockport | | 11,3,10 |
| Four Mile Point Road | Greene | Town of Coxsackie | C | 13 |
| Middle Ground Flats | Columbia | Town of Greenport | | 11,13 |
| St. Lawrence Cement Company | Columbia | Town of Greenport | | 3,16 |
| Rogers Island | Columbia | Town of Greenport | | 1,11 |
| Dutchman's Landing Park | Greene | Village of Catskill | | 4,10,17 |
| Greene Point | Greene | Town of Catskill | | 2,12,17 |
| Cheviot (Germantown) | Columbia | Germantown | | 3,6,16 |
| Bristol Beach State Park | Ulster | Town of Saugerties | D | 4,2,16 |
| Saugerties Village Beach (Esopus Creek) | Ulster | Village of Saugerties | A | 14 |
| Cruger Island | Dutchess | Town of Red Hook | | 11,6,3 |
| Barrytown | Dutchess | Town of Red Hook | | 3,5,16 |
| Ulster Landing County Park | Ulster | Town of Ulster | A | 15 |
| Charles Rider Park | Ulster | Town of Ulster | | 3,16,10 |
| Ulster Town Park | Ulster | Town of Ulster | | 10,16 |
| Kingston Point Park | Ulster | City of Kingston | A | 14 |
| Port Ewen | Ulster | Town of Esopus | A | 2,17 |
| Mills - Norrie State Park | Dutchess | Town of Hyde Park | C | 10 |
| Black Creek Forest Preserve | Ulster | Town of Lloyd | | 11,15 |
| Bard Rock | Dutchess | Town of Hyde Park | | 5,6,10, |
| Hudson Psychiatric Center (HPC) | Dutchess | Town of Poughkeepsie | | 3,10,16 |
| Marist College | Dutchess | Town of Poughkeepsie | | 3,10,16 |
| Poughkeepsie – Waryas Park | Dutchess | City of Poughkeepsie | | 10,6,16 |
| Poughkeepsie - Kaal Rock | Dutchess | City of Poughkeepsie | | 5,6,16 |
| Central Hudson/Traprock | Orange | Town of Newburgh | | 12,11,3 |
| Dennings Point State Park | Dutchess | City of Beacon | | 3,1,2 |
| Eastern Harbor Marine | Orange | Town of New Windsor | | 10,13,14 |
| Kowawese Unique Area at Plum Point | Orange | Town of New Windsor | B | |
| Little Stony Point (Sandy Beach) | Putnam | Town of Philipstown | C | |
| Constitution Island | Putnam | Town of Philipstown | | 11,6,5 |
| Iona Island | Rockland | Town of Stony Point | | 6,9,10 |
| Verplanck – Consolidated Edison of NY, Inc. | Westchester | Town of Cortlandt | C | 13 |
| Stony Point State Historic Park | Rockland | Town of Stony Point | | 11,10,3 |
| George's Island | Westchester | Town of Cortlandt | | 5,6 |
| Oscawana | Westchester | Town of Cortlandt | | 11,5,6 |
| Riverfront Park | Rockland | Town of Stony Point | B | 10 |
| Rockland County Park | Rockland | Town of Haverstraw | B | 15 |
| Bowline Point | Rockland | Town of Haverstraw | D | 10 |
| Croton on Hudson (Village Beach) | Westchester | Village of Croton-on-Hudson | | 1,16 |

Table 5-1 (Page b of 2)

Initial List of Potential Swimming Facility Sites * (Step I)

| Proposed Site Name | County | Municipality | Step II Category | Notes From Site Inspections |
|---|--------------------|------------------------------------|------------------|-----------------------------|
| Crawbuckie Park | Westchester | Village of Ossining | | 3,11 |
| Croton Point /Westchester County Park | Westchester | Village of Croton on Hudson | A | 14 |
| Ossining, Louis H. Engel, Jr. Park | Westchester | Town of Ossining | D | 3,7 |
| Nyack Beach State Park | Rockland | Town of Clarkstown | C | 15,3 |
| Nyack Memorial Park | Rockland | Village of Nyack | | 16,10,3 |
| Kingslands Point Westchester County Park | Westchester | Village of Sleepy Hollow | B | 14,15 |
| BA Beach Tarrytown | Westchester | Village of Tarrytown | | 3,11 |
| Piermont Pier | Rockland | Village of Piermont | | 3,6,10 |
| Dobbs Ferry | Westchester | Village of Dobbs Ferry | D | 1,3 |
| Hudson River Park (Gansevoort Peninsula) | Manhattan | City of New York | C | 7,8,16 |

*Sites in bold are those that were determined to be most feasible for further study following the Step I analysis.

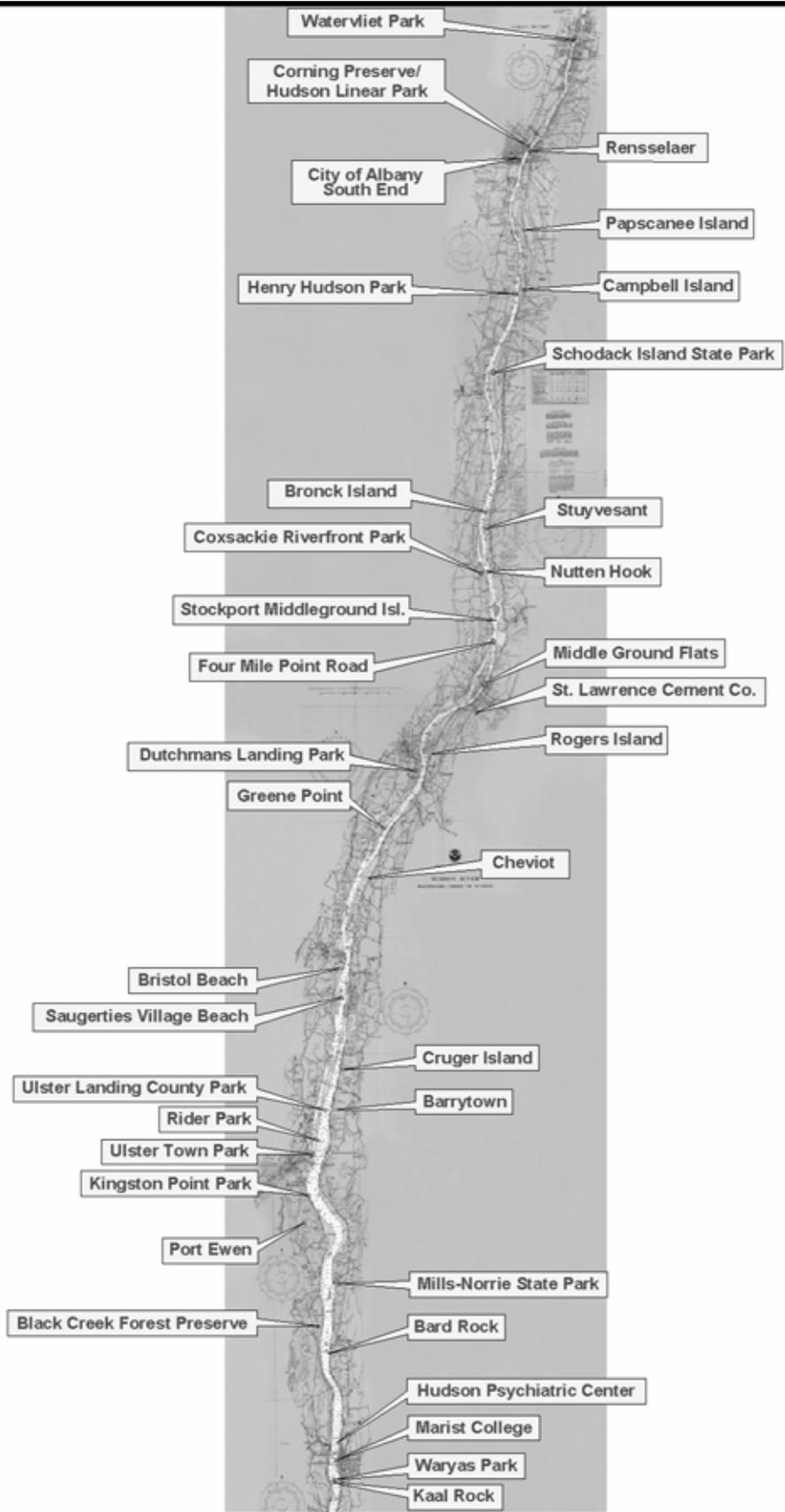
LEGEND

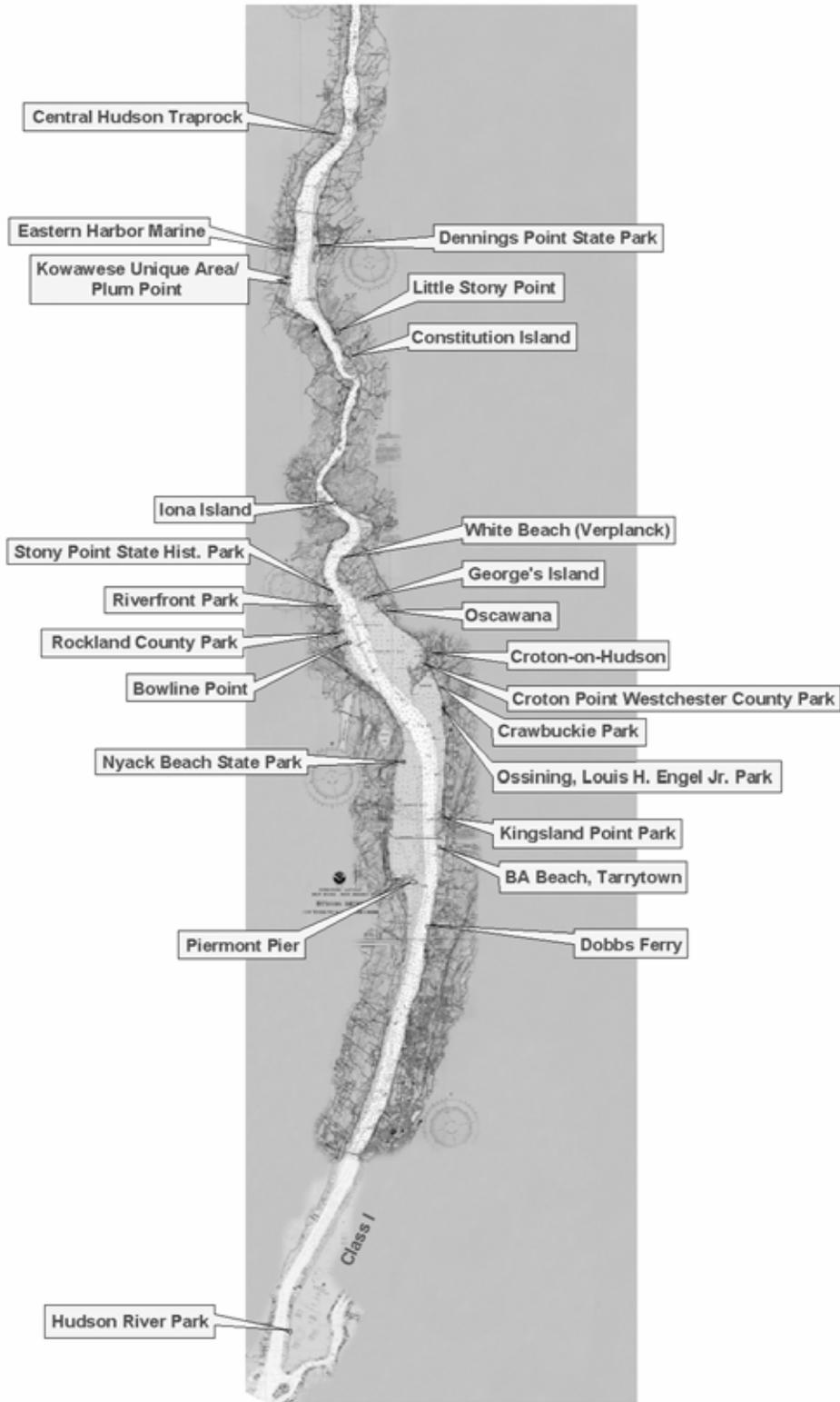
Step II Category

- A Potential improvements to existing swimming sites
- B Feasible new sites.
- C Potential new sites requiring additional action to become feasible
- D Potential new sites with substantial barriers to development

Notes From Site Inspections

- 1 Deep layer of silt and mud along shoreline
- 2 Considerable aquatic plants along shoreline
- 3 Insufficient upland space to accommodate public swimming
- 4 Upland beach is often underwater
- 5 Steep shoreline, cliffs upland
- 6 Drop-off under water, unsafe for guarded beach
- 7 Water quality problems, nearby discharge locations
- 8 Water quality classification – bathing not identified as best use
- 9 Dangerous water currents, wakes and other wave exposure
- 10 Conflicting uses, i.e. boat traffic, historic sites
- 11 Safe access is not possible, or very difficult to provide
- 12 Property is not available and cannot be acquired for public swimming
- 13 Property needs to be acquired if considered
- 14 Existing structure(s) need rehabilitation
- 15 Erosion control and /or limited beach restoration is needed
- 16 Complicated and extensive beach construction is required
- 17 Poor, flat slope





5.2.2.2 Accessibility. The swimming sites were inspected for good, safe accessibility now, or the potential for economical access development. Without safe access, or the potential for constructing or arranging for access, the best potential sites are not feasible. All modes of access were considered; however, the ability to drive to beaches or to use mass transit (New York City area) were the primary characteristics considered at this stage of study. Good pedestrian, bicycle and boat access as well as the potential for chartered bus accommodations were also noted where possible at this stage of study. Where no access currently exists but where access could reasonably be provided sites were considered feasible and the need to create access was noted.

5.2.2.3 Hydraulic Conditions. For Step I screening considerations, the channel current velocity range in feet per second and the channel tide height (spring tidal range in feet) were obtained and considered for each site. The results were then scored, the scores for each category were averaged and a final score was determined. Hydraulic conditions are important to consider in determining if a particular site will be safe to swim at with regard to tides and currents.

5.2.2.4 Water Quality. Potential Hudson River swimming sites were screened to determine their suitability for swimming in terms of water quality. Two screening criteria were used (distance from combined sewer overflows (CSO) and waste water treatment plant (WTP) outfalls and water classification) to determine a raw score.

A Geographic Information System (GIS) was used to determine the proximity of potential swimming sites to CSOs and WTP outfalls. NOAA charts of the Hudson River were used as a base map and the location of the potential swimming facilities were located and their coordinates were entered into the GIS database. Locations of CSO discharges and WTP outfalls were determined from two data sources - the USEPA's Permit Compliance System (PCS) database and State Pollutant Discharge Elimination System (SPDES) permits for WTP along the Hudson River.

Once all the potential facilities, CSO discharges and WTP outfalls were located and entered into the GIS database, each potential swimming site was given a score based on its' proximity to a CSO discharge or a WTP outfall. Water quality is discussed in further detail in Section 3.

5.2.2.5 Construction and Operational Feasibility. The feasibility of developing a public swimming facility is highly dependent upon how difficult it would be to construct the facility at a particular site. Construction concerns, such as soil type and cost of creating a suitable beach area are important factors. Wetlands and steep terrain would restrict the potential for site construction. Suitable parking or alternative methods of site access would increase the feasibility of developing a site.

The Step I screening takes a broad look at construction and operational constraints at the potential beach sites. Available parking and or transportation to the site, site soil type, as well as projected waterside construction costs were all considered. The screening criteria also included a category representing any special site features that would add to its appeal as a beach site. These categories were scored for each site, the total becoming the raw score. The raw score was then broken down to reflect the scoring range used for the other Step I parameters.

5.2.3 Step I Field Survey

The Step I field survey was ongoing throughout the Step I screening process. Sites were reviewed as they were suggested through returned surveys, interviews with local agencies, and suggestions received at the public meetings held in July 2000. As many sites as was possible were visited to obtain site information, with photo documentation and field notes of the sites used for the Step I analysis. The Step I field survey was done primarily from the shore, with observations made regarding upland conditions at each site, as well as some minimal waterside conditions including bottom type, estimated water velocity and estimations of high and low tide lines as determined by disturbance on the beaches. A few sites were also inspected underwater during Part I of the study, however these field inspections did not have the advantage of consistent survey locations and depth measurements, such as could be obtained from a boat survey.

5.2.4 Results of the Step I Screening

The Step I screening process resulted in narrowing the initial list of more than 60 potential sites to 22 sites that were most feasible for further analysis. Those sites are shown in bold type on Table 5-1.

5.3 THE STEP II SCREENING PROCESS

5.3.1 Step II Screening Objectives

The objective of the Step II analysis was to select sites that would be suitable for developing access and infrastructure required by a public swimming facility. While it is sometimes possible to construct facilities where natural and other conditions are substantially modified, an effort was made to identify projects where construction constitutes good public policy. Project costs and environmental constraints that may make selecting some of the Step II sites difficult, versus the ones that are less complicated for implementing a swimming program, were noted. Such site advantages and constraints were considered in light of the availability of nearby alternative sites, and the relative costs of developing similar upland facilities in that locality. Sketch plans and initial cost estimates were developed for the sites selected through this process, to help identify the scale of the project that may be considered for these locations. For a detailed discussion of plans and costs for individual sites, see Section 6.

5.3.2 The Step II Screening Process

The Step I process was designed to select sites with good upland characteristics that include adequate upland beach quality, area and slope, existing or potential access, and no apparent hazards posed by water currents, proximity to the ship channel or unacceptable underwater conditions, as shown on navigation charts. While constraints were noted at some locations, all of the sites advanced for Step II study showed promising conditions for swimming facilities.

The Step II screening focused on underwater conditions, local plans and other issues that relate to each site. After the twenty-two Step II locations were identified, a second inspection of these sites was undertaken from a research boat. Conditions that could only be determined from measurements of water clarity, water currents, underwater contours and a sample of sediments were observed for each Hudson River site. These findings and earlier observations were then reviewed for their impact on the feasibility of establishing swimming facilities. Five of the sites examined have existing swimming facilities, and were included in the Step II research. Four of those five sites, those located on the main stem of the Hudson River were subjected to site evaluation.

In addition to site-specific physical and technical review, the evaluation of recreational demand was part of the screening process. The purpose of the recreational assessment was to determine if these sites would fill a recreation gap or provide a worthy and perhaps unique recreational experience.

The recreational assessment methodology was consistently applied to all of the initial 60 sites and integrated three elements: (1) a county-level Index of Swimming Needs for the year 2010, developed for the State Comprehensive Outdoor Recreation Plan by State Parks staff; (2) determining the availability and capacity of public swimming facilities in the municipality where the site is located and in nearby localities; and (3) identifying if the sites would serve nearby populations with modest incomes, who generally have low mobility and higher need for public swimming facilities. A scoring system for each of the three recreational assessment elements was developed and a combined rating was completed that assigned each site into one of three categories of overall recreational need: high, moderate and low.

Of the 22 sites, 7 rated high, 10 rated moderate and 5 scored low in recreational need. Of the five low scoring sites, two were sites with current swimming facilities and two were locations with future potential, if constraints could be addressed.

As part of the Step II screening process, each site was reviewed to determine if it was located within, or near an area having a Local Waterfront Revitalization Program (LWRP). These LWRPs are funded and administered through the New York State Department of State's Coastal Management Program. The purpose of this review was to determine if swimming needs and projects were identified in approved, or well advanced plans, and to also determine if advancing these sites would be consistent with existing or proposed waterfront land and water uses and projects identified in the LWRP's.

Nine of the twenty-two Step II sites were within or near LWRPs. A review of these LWRP plans determined that development or improvement of Hudson River swimming beaches in these communities would be supportive of the recreational needs and opportunities identified in the LWRP, and also be consistent with other major dimensions of the plans. In no case was it evident that swimming at any of these nine sites would conflict with existing or proposed local waterfront programs.

Also conducted as part of the Step II screening process was an environmental assessment and review of the 22 sites which passed the Step I screening process. Individual site environmental issues are discussed with each site description in Section 6.2.

5.3.3 Environmental Review

A preliminary environmental review of potential new sites was conducted to determine potential impacts of developing swimming facilities at the sites. The following is a brief description of the environmental review conducted.

Requests for file searches to identify any endangered, threatened or special concern species were conducted for each of the sites. These requests were directed to the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the New York State Department of Environmental Conservation (NYSDEC). Responses to these requests have been received from the U.S. Fish and Wildlife Service, who also supplied information on NYSDEC listed species, and the NYSDEC Natural Heritage Program. For a listing of threatened and endangered species by site, as well as species and communities of special interest, see Table 5-2.

The New York State Department of State's (NYSDOS) Division of Coastal Resources and Waterfront Revitalization in conjunction with The Nature Conservancy (TNC) have identified 39 Hudson River areas located on the tidal section of the Hudson River between the Federal Dam at Troy, NY and New York City as having special environmental importance. Detailed information on the 39 areas is presented in the document *Hudson River Significant Tidal Habitats: A Guide to the Functions, Values and Protection of the River's Natural Resources* (NYSDOS and TNC 1990). Included in the 39 sites are 34 sites designated as Significant Coastal Fish and Wildlife Habitats under New York State's Coastal Management Program, and five sites recognized by the New York Natural Heritage Program as containing important plant and animal communities.

The potential public swimming facilities evaluated under the Step II screening were examined in relation to the designated Hudson River Significant Tidal Habitat areas. Of the 22 sites selected for evaluation under Step II, including the existing public swimming facilities, nine are located within designated significant habitat areas and nine are located on the boundary or within a mile of a designated area. The evaluated sites and their relationship to designated Hudson River Significant Tidal Habitat areas are presented in Table 5-3.

All sites that were found to be feasible as a result of the Step II screening analysis were also subjected to a review based on National Wetland Inventory (NWI) records. Wetlands mapped by NWI are Federally (USACE and USEPA) regulated and are identified by habitat type(s). Sites were reviewed first for wetlands occurring within a 1/4-mile radius, then for wetlands within a 1/8-mile radius of the site (Table 5-4). Federally regulated wetlands have no regulated adjacent buffer area. NYSDEC-regulated wetlands have a 100-foot buffer zone upland from the edge of a wetland. A review of the sites in areas that have been mapped by NWI, shows that no wetlands occur within 100 feet of a potential site. NYSDEC regulated wetlands were determined to be adjacent to two potential beach sites, Stuyvesant and Four Mile Point Road. State maps showed an area of submerged aquatic vegetation adjacent to the proposed Stuyvesant Beach site, and an area of shoals/mudflats along the beach of Four Mile Point Road. Before determining if a beach should be

Table 5-2 (Page 1 of 3).
Threatened, Endangered and Rare Species, Communities and Habitats As Reported by the NYS Natural Heritage Program. Reported by Site.

| | |
|---|---|
| <p>Stuyvesant</p> <p>Endangered Species (Year Observed) American Waterwort (1933) Quillwort (1936) Blunt Spikerush (1936) Estuary Beggar-Ticks <i>Bidens hyperborea</i> (1937)</p> <p>Threatened Species (Year Observed) Upland Sandpiper (1983) Heartleaf Plantain (1996, 1993, 1988) Spongy Arrowhead (1992, 1985) Davis' Sedge (1978)</p> | <p>Rare Species (Year Observed) Tawny Emperor – unprotected (1994)</p> <p>Communities/Habitats (Year Observed) Freshwater Intertidal Mudflats (1988) Freshwater Tidal Marsh (1988)</p> |
| <p>Four Mile Point Road</p> <p>Endangered Species (Year Observed) American Waterwort (1965, 1935) Blunt Spikerush (no date) Muensher's Naid (1965)</p> <p>Threatened Species (Year Observed) Bald Eagle (1999) Least Bittern (1986, 1987) Golden Club (1933) Swamp Lousewort (1935) Smooth Bur Marigold (1993, 1994) Heartleaf Plantain (1988, 1993) Spongy Arrowhead (1993)</p> | <p>Rare Species (Year Observed) Estuary beggar-ticks <i>Bidens bidentoides</i> (1992, 1994) Taxiphyllum – unprotected (1989)</p> <p>Communities/Habitats (Year Observed) Freshwater Tidal Swamp (1994) Freshwater Intertidal Mudflats (1988, 1994) Freshwater Intertidal Shore (1988, 1991) Freshwater Tidal Marsh (1988, 1994) Anadromous Fish Concentration Area Waterfowl Wintering Area</p> |
| <p>Mills-Norrie State Park</p> <p>Endangered Species (Year Observed) Shortnose Sturgeon (1986)</p> <p>Threatened Species (Year Observed) Pied-billed Grebe (1980)</p> | <p>Communities/Habitats (Year Observed) Waterfowl Concentration Area – Esopus Meadows (1986) Anadromous Fish Concentration Area – Esopus Meadows (1986)</p> |

Table 5-2. (Page 2 of 3)
Threatened, Endangered and Rare Species, Communities and Habitats As Reported by the NYS Natural Heritage Program. Reported by Site.

| | |
|--|---|
| <p>Kowawese Unique Area at Plum Point</p> <p>Endangered Species (Year Observed) Estuary Beggar-Ticks <i>Bidens hyperborea</i> (1936) American Waterwort (1937)</p> <p>Threatened Species (Year Observed) Bald Eagle (1996, 2000) Least Bittern (1991) Spongy Arrowhead (1990)</p> | <p>Communities/Habitats (Year Observed) Brackish Intertidal Mudflats (1988) Brackish Tidal Marsh (1988) Waterfowl Concentration Area (1984) Raptor Concentration Area (1984) Anadromous Fish Concentration Area (1987)</p> |
| <p>Little Stony Point</p> <p>Endangered Species (Year Observed) Shortnose Sturgeon (1986) Peregrine Falcon (1999) Few-Flowered Panic Grass (1867)</p> <p>Threatened Species (Year Observed) Bald Eagle (1998) Fence Lizard (1997)</p> | <p>Communities/Habitats (Year Observed) Anadromous Fish Concentration Area (1986)</p> |
| <p>Verplanck</p> <p>Threatened Species (Year Observed) Bald Eagle (1988, 1998) Least Bittern (1980)</p> | |
| <p>Riverfront Park/Rockland County Park*</p> <p>Threatened Species (Year Observed) Bald Eagle (1992, 1996, 1998) Pied-Billed Grebe (1981) Least Bittern (1980) Troublesome Sedge (1957) Heartleaf Plantain (1936) Spongy Arrowhead (1936)</p> | <p>Communities/Habitats (Year Observed) Waterfowl Concentration Area (1986)</p> |
| <p>Kingslands Point Westchester County Park</p> <p>Endangered Species (Year Observed) Peregrine Falcon (1998) Rattlebox (1896) Virginia False Gromwell (1896)</p> <p>Threatened Species (Year Observed) Shrubby St. John's Wort (1898)</p> | <p>Protected Species (Year Observed) Kentucky Warbler (1980)</p> |

*Due to the close proximity of these sites, they were evaluated together for species presence.

Table 5-2. (Page 3 of 3)
 Threatened, Endangered and Rare Species, Communities and Habitats As Reported by the NYS Natural Heritage Program. Reported by Site.

| | |
|--|--|
| <p>Saugerties Village Beach</p> <p>Endangered Species (Year Observed) Shortnose Sturgeon (1986) Muensher's Naid (1927) Estuary Beggar-ticks <i>Bidens hyperborea</i> (1937) Waterpigmy Weed (1936) Drummond's Rock Cress(1974)</p> <p>Threatened Species (Year Observed) King Rail (1987) Marsh Horsetail (1973) Heartleaf Plantain (1934, 1988) Woodland Agrimony (1916) Spongy Arrowhead (1988)</p> | <p>Communities/Habitats (Year Observed) Waterfowl Concentration Area (1993) Anadromous Fish Concentration Area (1986) Freshwater Tidal Swamp (1988) Freshwater Intertidal Mudflats (1988) Freshwater Tidal Marsh (1988)</p> |
| <p>Kingston Point</p> <p>Endangered Species (Year Observed) Shortnose Sturgeon (1986) American Waterwort (1936) Frank's Sedge (1993) Muensher's Naid (1936)</p> <p>Threatened Species (Year Observed) Pied-Billed Grebe (1980, 1984) Least Bittern (1984) Smooth-Bur Marigold (1985) Heartleaf Plantain (1985, 1988) Spongy Arrowhead (1993) Swamp Cottonwood (1993)</p> | <p>Rare Species (Year Observed) Estuary Beggar-Ticks (1993)</p> <p>Communities/Habitats (Year Observed) Rondout Creek Mouth Freshwater Tidal Community (1988) Freshwater Intertidal Shore (1988) Waterfowl Concentration Area (1987) Anadromous Fish Concentration Area (1987) Anadromous Fish Concentration Area at the Flats (1986) Freshwater Tidal Marsh (1988)</p> |
| <p>Ulster Landing County Park</p> <p>Threatened Species (Year Observed) King Rail (1987) Heartleaf Plantain (1936, 1992)</p> | <p>Communities/Habitats (Year Observed) Waterfowl Concentration Area (1986) Anadromous Fish Concentration Area (1986)</p> |
| <p>Croton Point Park</p> <p>Threatened Species (Year Observed) Bald Eagle (1998) Least Bittern (1981)</p> | <p>Communities/Habitats (Year Observed) Anadromous Fish Concentration Area (no date) Warm Water Fish Concentration Area (no date)</p> |

TABLE 5-3

EVALUATION OF HUDSON RIVER PUBLIC SWIMMING FACILITIES RELATED TO SIGNIFICANT TIDAL HABITAT AREAS
(NYSDOS 1990)

| SITE DESIGNATION | LOCATION RELATIVE TO SIGNIFICANT HABITAT AREA | | NYSDOS DESIGNATED SIGNIFICANT TIDAL HABITAT AREA | POTENTIAL FOR IMPACT |
|---|---|--------|--|----------------------|
| | NEAR | WITHIN | | |
| Henry Hudson Town Park | X | | Shad and Schermerhorn Islands | 2 |
| Schodack Island State Park | | X | Schodack and Houghtaling Islands and Schodack Creek | 1 |
| Stuyvesant | | X | Stuyvesant Marshes | 3 |
| Four Mile Point | | X | Vosburgh Swamp and Middle Ground Flats | 3 |
| Bristol Beach State Park | X | | Germantown-Clermont Flats | 2 |
| Saugerties Village Beach | X | | Esopus Estuary | 2 |
| Ulster Landing County Park | X | | The Flats | 2 |
| Kingston Point Park | X | | Rondout Creek | 2 |
| Port Ewen | X | | Rondout Creek / Kingston Deepwater | 2/4 |
| Mills-Norrie State Park | | X | Vanderburg Cove and Shallows / Kingston Deepwater | 3/4 |
| Kowawese Unique Area at Plum Point | X | | Moodna Creek | 2 |
| Little Stony Point | | X | River Miles 44-56 | 3 |
| Verplanck-Consolidated Edison Co. of NY | X | | Haverstraw Bay | 2 |
| Riverfront Park | | X | Haverstraw Bay | 3 |
| Rockland County Park | | X | Haverstraw Bay | 3 |
| Bowline Point | | X | Haverstraw Bay | 3 |
| Croton Point/Westchester County Park | | X | Haverstraw Bay | 3 |
| Ossining-Louis H. Engel, Jr. Park | X | | Croton River and Bay | 4 |
| Nyack Beach State Park | X | | Piermont Marsh | 2 |
| Kingsland Point Westchester County Park | X | | Piermont Marsh | 2 |
| Dobbs Ferry | X | | Piermont Marsh | 2 |
| Hudson River Park | | | No significant habitat area within the vicinity of this site | 4 |

1 Complies with intended use – significant area is located within site designation – no projected environmental impact

2 Although swimming does not comply with intended use, significant area is not located within site designation, and is not subject to direct impacts.

3 Significant area is located within site designation, there is potential for impact, further study is needed.

4 No identified intended use – significant area is not located within site designation – no project environmental impact

Table 5-4
National Wetlands Inventory Review for Step II Sites

| Site | Mapped Wetlands | Map Cited |
|-------------------------|---|---------------------------|
| Stuyvesant | SV located adjacent to proposed beach site | NYSDEC |
| Four Mile Point Road | SM located along the shoreline of the site | NYSDEC |
| Mills-Norrie State Park | (1) PFOIE located within ¼ mile radius, falling on the border of the 1/8 mile radius (1) PUBH _x within ¼ mile radius, but outside the 1/8 mile radius | NWI Map: Hyde Park, NY |
| Riverfront Park | (1) PEMIE – mapped within ¼ mile radius, but outside the 1/8 mile radius (2) PFOIE – mapped within ¼ mile radius, but outside the 1/8 mile radius | NWI Map: Haverstraw, NY |
| Little Stony Point | (1) PUBH _x within 1/8 mile radius of the site | NWI Map: West Point, NY |
| Kingsland Point Park | (1) RIUBV within ¼ mile radius of the site, none within 1/8 mile of the site | NWI Map: White Plains, NY |
| Rockland County Park | (2) EZEMIN6 within ¼ mile radius of site, but outside the 1/8 mile radius (1) PSSIR within ¼ mile radius of site, but outside the 1/8 mile radius | NWI Map: Haverstraw, NY |
| Verplanck | (1) LIUBH _x within ¼ mile radius, but outside the 1/8 mile radius | NWI Map: Peekskill, NY |
| Kowawese | (1) PEMIE, located on the ¼ mile radius (1) PFOIE located on the ¼ mile radius | NWI Map: Cornwall, NY |

SM: Shoals/vegetated mud flats

SV: Submerged attached vegetation

PFOIE: Palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated

PUBH_x: Paulstrine, unconsolidated bottom, permanently flooded, excavated

PEMIE: Palustrine, emergent, broad-leaved deciduous, seasonally flooded/saturated

RIUBV: Riverine, tidal, unconsolidated bottom, permanent tidal

EZIMIN6: estuarine intertidal, emergent, persistent, regularly flooded, oligohaline

PSSIR: Palustrine, scrub shrub, broad-leaved deciduous, seasonal tidal

LIUBH_x: Lacustrine, limnetic, unconsolidated bottom, permanently flooded, excavated

built at these sites, further investigation and determination of potential impacts to these significant habitat areas would be necessary. There were also locations where wetlands are indicated within close proximity of a Step II site (Table 5-4).

Although the NWI maps serve as a useful resource for beginning a wetlands survey, due to the age of the maps and lack of complete coverage of all sites, an on-site wetland survey is suggested for any site that is considered for development. In addition, many of the wetlands on NWI are "mapped" from aerial surveys and are not field-confirmed.

SECTION 6 FINDINGS

6.1 RESULTS OF SCREENING PROCESS

The Step II field survey, and the other relevant information reviewed, indicated that of the 17 new sites (the five existing sites were considered separately), five showed good potential for a swimming program at this time, and eight additional sites could be considered after some existing constraint was resolved (these sites are listed in Table 6-1 and discussed in detail in Section 6.3). The remaining four sites present substantial barriers to development. It was also clear that some locations would necessitate a proportionally greater effort and cost than other locations. Consequently, the 17 new sites and five existing public swimming facility sites were separated into four groups, as follows:

- A) Potential Improvements to Existing Swimming Sites. These five sites were included in Part II of this study for the purpose of determining improvements that could be made to enhance existing conditions.
- B) Feasible New Sites. Five sites were determined to be feasible as public swimming areas with no additional action (other than construction of a beach and related facilities, and the approval of the property owner). All five sites are publicly owned.
- C) Potential New Sites Requiring Additional Action to Become Feasible. Eight sites require additional research and evaluation before these sites could be advanced for development.
- D) Potential New Sites With Substantial Barriers to Development. These sites are unlikely to be advanced at this time because of: 1) constraints that require costly site development programs with unpredictable results, 2) proximity to sites that are considered preferable, or 3) site constraints that would preclude a swimming beach, unless considerable investment is made as a part of a comprehensive park plan.

6.2 ESTIMATED CONSTRUCTION AND OPERATION COSTS OF TYPICAL SWIMMING FACILITIES

Most of the swimming sites that are being considered along the Hudson River fit into a small or an intermediate sized swimming beach category. The natural beach limits are constraints at many of these sites and the needs in other areas suggest beaches in the 150 foot range, with a few locations with beaches of 300 feet or greater in length. Many of these beaches are limited in width as well. These beach size limits indicate the potential for small, or for those few areas where there are more extensive beaches as well as area needs, a medium sized facility.

To obtain a scale of magnitude and cost for these small and medium sized swimming facilities and operations, several model sites were reviewed for their construction and operation costs. A very small, private site was also reviewed for those few locally administered operations that may

Table 6-1a
Summary of Findings
Analysis of Existing and Potential Sites

A. Potential Improvements to Existing Sites (Does not include operating costs which will not change)

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---------------------------------|----------------------------------|
| Saugerties Village Park – Ulster County (located on Esopus Creek) | 150 | \$125,000 | Bathroom rehabilitation |
| Ulster Landing County Park –Ulster County (Town of Ulster) | 400 | \$150,000- \$500,000 | Beach restoration and protection |
| Kingston Point City Park – Ulster County (City of Kingston) | 500 | \$500,000+ | Bathroom rehabilitation |
| Port Ewen Municipal Park – Ulster County (Town of Esopus) (not currently in operation) | 150 | Unknown | Water chestnut removal |
| Croton Point County Park – Westchester County (Village of Croton-on-Hudson) | 700+ | \$600,000- \$1,000,000 | Bathroom rehabilitation |

Table 6-1b
Summary of Findings
Analysis of Existing and Potential Sites

B. Feasible New Sites

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|--|-----------------------------------|---|---|
| Stuyvesant NYS OGS Property – Columbia County (Town of Stuyvesant) | 300 | \$600,000/ \$30,000 | Parking, bathhouse, resolution of potential siting issues to complement other planned uses, site-specific analysis of water quality, sediment characteristics |
| Kowawese Unique Area at Plum Point, Orange County Park – Orange County (Town of New Windsor) | 350 | \$825,000/ \$40,000 | Parking, bathhouse/comfort station, grading improvements, potential water chestnut maintenance, improved bicycle and pedestrian access, site-specific analysis of water quality, sediment characteristics |
| Riverfront Park – Rockland County (Town of Stony Point) | 250 | \$500,000/ \$30,000 | Bathhouse, possible road relocation and parking, site-specific analysis of water quality, sediment characteristics |
| Rockland County Park – Rockland County (Town of Haverstraw) | 600 | \$1,000,000/ \$50,000 | Beach improvement, bathhouse, access, potential land acquisition, Investigate potential wetlands issues, conduct site-specific analysis of water quality, sediment characteristics |
| Kingsland Point Westchester County Park – Westchester County (Village of Sleepy Hollow) | 600 | \$2,500,000/ \$50,000 | Bathhouse restoration, beach replenishment, parking, site-specific analysis of water quality, sediment characteristics |

Table 6-1c
Summary of Findings
Analysis of Existing and Potential Sites

C. Potential New Sites Requiring Additional Action to Become Feasible

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---|--|
| Henry Hudson Park –Albany County (Town of Bethlehem) | 250 | \$500,000/ \$40,000 | State water quality classification change, land ownership determination, bathhouse, parking, site-specific analysis of water quality, sediment characteristics |
| Schodack Island State Park – Rensselaer County (Town of Schodack) | 300 | \$500,000/ \$30,000 | State water quality classification currently Class C would need to be upgraded to Class B. Additional investment needed includes bathhouse construction, parking, site-specific analysis of water quality, sediment characteristics |
| Four Mile Point (private property) – Greene County (Town of Coxsackie) | 150 | \$125,000/ \$25,000 | Land acquisition, parking, bathhouse, site-specific analysis of water quality, sediment characteristics, including ways to make parking compatible with adjacent Vosburgh Swamp habitat |
| Mills-Norrie State Park – Dutchess County (Town of Hyde Park) | 300 | \$600,000/ \$30,000 | Further examine floating pool options at the “old town beach” in the Norrie section of the State park; further review park master plan and related policy issues for establishment of a beach within the historic core of the Mills section of the State Park; site-specific analysis of water quality, sediment characteristics |

Table 6-1c (Cont'd)
Summary of Findings
Analysis of Existing and Potential Sites

C. Potential New Sites Requiring Additional Action to Become Feasible

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---|---|
| Little Stony Point State Park Property – Putnam County (Town of Philipstown) | 300 | \$600,000/ \$30,000 | Complete park master plan; address constraints of parking and vehicle and handicapped access, possible scenic considerations; conduct a site-specific analysis of water quality, sediment characteristics |
| White Beach (Verplanck) (private property) – Westchester County (Town of Cortlandt) | 300 | \$600,000/ \$30,000 | Land acquisition, bathhouse, parking, site-specific analysis of water quality, sediment characteristics |
| Nyack Beach State Park – Rockland County (Town of Clarkstown) | 300 | \$500,000/ unknown | Development will include removal of existing sea wall, restoration of groin, restoration at slope and observation to see if beach restores as a result. If so, address bathhouse and parking and conduct a site-specific analysis of water quality, sediment characteristics. Additional capital investment will be required for bathhouse and parking. |
| Hudson River Park – New York County (Borough of Manhattan) | unknown | unknown | Research geotextile fabric applicability for public beach; research floating pool potential; site specific analysis of water quality, sediment characteristics |

Table 6-1d
Summary of Findings
Analysis of Existing and Potential Sites

D. Potential New Sites with Substantial Barriers to Development

| SITE NAME/LOCATION (North to South) | CAPACITY (persons/day) | COSTS (Construction/ Annual Operation) | INVESTMENT/ACTION NEEDED |
|---|-----------------------------------|---|---|
| Bristol Beach State Park – Ulster County (Town of Saugerties) | unknown | unknown | Soil conditions, wetlands, sand retention |
| Bowline Point Town Park – Rockland County (Town of Haverstraw) | unknown | unknown | Close proximity to fuel off-loading pier |
| Ossining, Louis Engel Park – Westchester County (Town of Ossining) | unknown | unknown | Small size, water quality, no available parking, proximity of wastewater treatment plant |
| Dobbs Ferry Village Waterfront Park and Wickers Creek – Westchester County (Village of Dobbs Ferry) | unknown | unknown | Minimal upland area for support infrastructure, unsuitable subsurface conditions (strong currents at Wickers Creek); lack of access |

fit into the “mini-site” category. The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations. The costs associated with these sites summarized for scale of magnitude cost comparisons, are presented below:

Mini site

120 foot beach, private or special condition use operations.

| | |
|-----------------------------|-----------------|
| Instant beach population: | 50 |
| Design day population: | 150 |
| Facility construction cost: | \$125,000 |
| Operations costs: | \$25,000 / year |

Small Public Hudson Swimming Site

150 foot beach, full public use.

| | |
|-----------------------------|------------------|
| Instant beach population: | 100 |
| Design day population: | 300 |
| Facility construction cost: | \$600,000+ |
| Operations costs: | \$30,000+ / year |

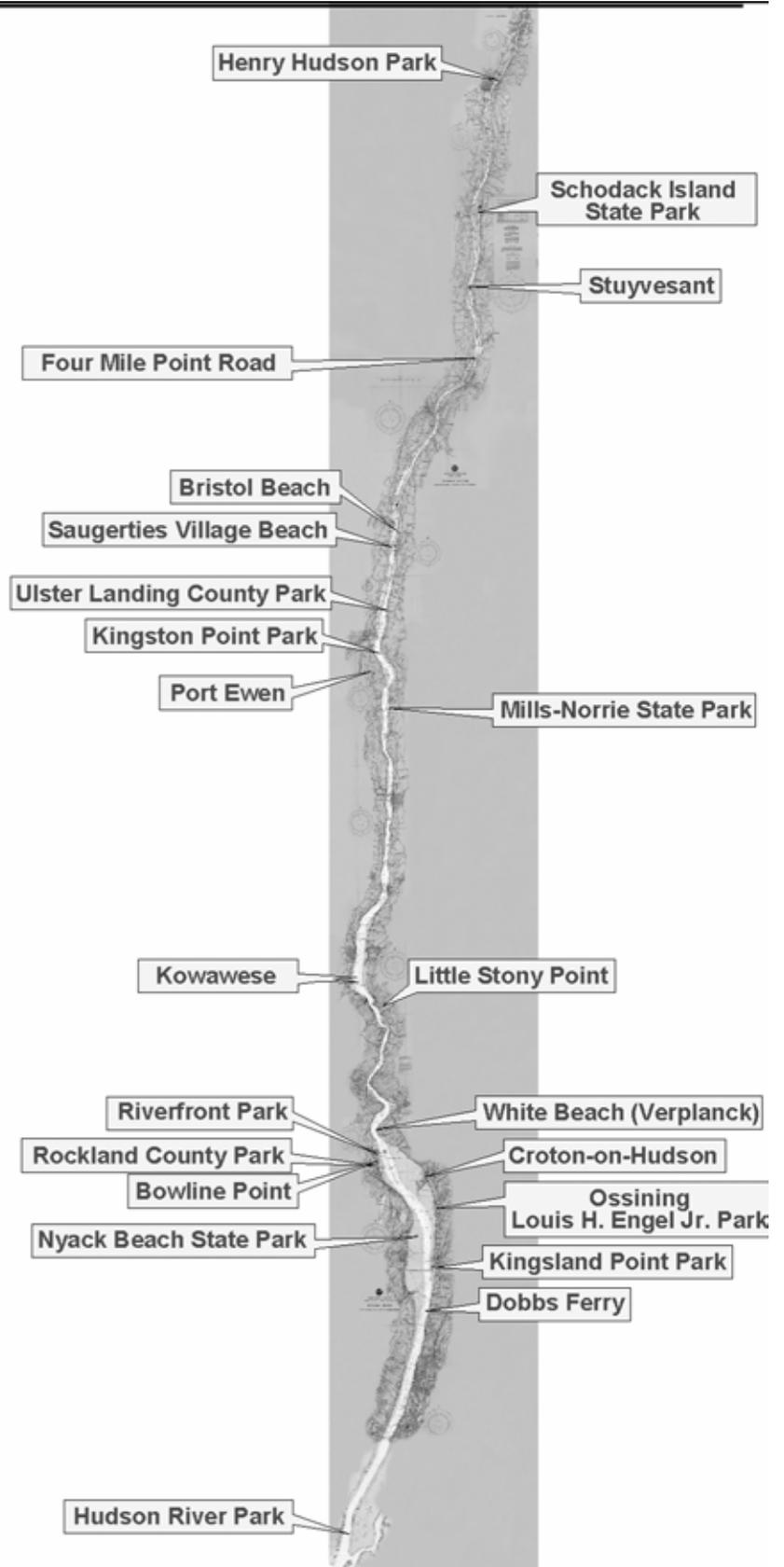
Medium Sized Hudson Swimming Site

Two adjoining beach areas, total length 300 feet

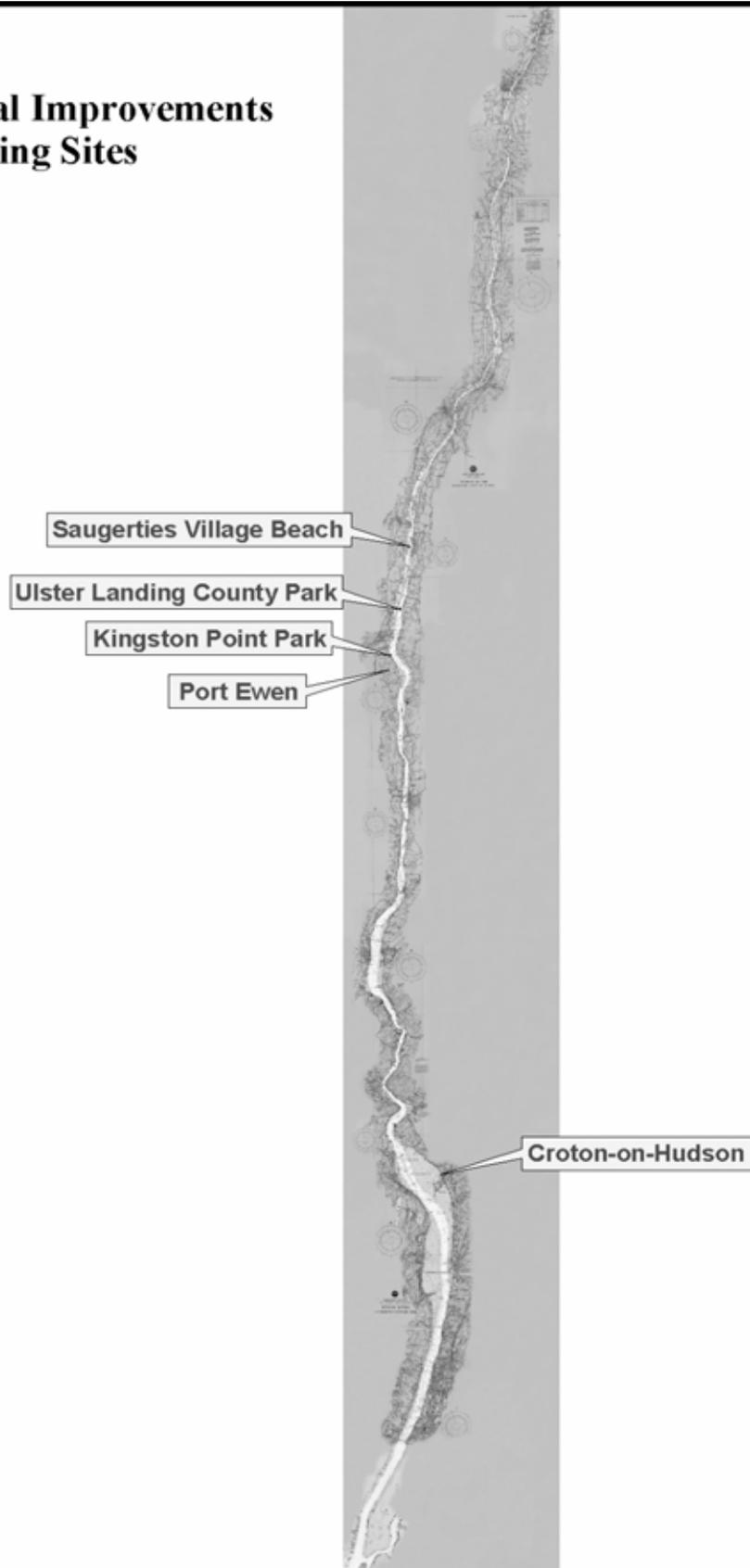
| | |
|-----------------------------|------------------|
| Instant beach population: | 200 |
| Design day population: | 600 |
| Facility construction cost: | \$1,000,000+ |
| Operations costs: | \$50,000+ / year |

6.3 SWIMMING SITES FEASIBLE FOR DEVELOPMENT

The Step II screening process resulted in four categories of sites, those that are most suited for development in the near future, those that are potential sites for future development depending on variables such as improved water quality, sites with substantial barriers to development, and those sites that are currently in operation. A listing of these sites can be found in Table 6-1 and on Figure 6-1. Table 6-1 presents a summary of the proposed or existing facility site modifications needed. A more detailed discussion of each site can be found starting in Section 6.3.1. The following discussion of each of these sites includes a brief summary of the site’s attributes, a figure depicting the site, a suggested site development plan, and site photos.



6.3.1. Category A: Potential Improvements to Existing Sites



6.3.1 Category A: Potential Improvements to Existing Swimming Sites

SAUGERTIES VILLAGE BEACH

Village of Saugerties

Ulster County

River Mile 102.5

Ownership: Village of Saugerties

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: The Village of Saugerties has a small and popular park and beach on a tributary to the Hudson, the Esopus Creek, only a few hundred feet West of the tidal river. The beach, located two blocks from the Village center, is a logical destination, especially for youth, who can walk or bicycle to the facility from home. It is a guarded beach, with a small, old bathhouse and a designated sand beach, with a roped swimming enclosure with floating docks. Access is from Route 9W and from local streets. While parking at the site can only accommodate approximately 30 cars, local street parking can provide for overflow. Family groups use the park on weekends and senior citizens frequent the Park, to enjoy the outdoors and to watch children at play. The facility is ideally located to provide an important community service.

A small impoundment is created by a dam on the Esopus Creek, which keeps the water level constant, though Creek currents maintain good water circulation. Sand, augmented by occasional replenishment provides a good beach surface. Slopes are moderate, marked as 9 feet to 12 feet depths, though no diving is permitted from floats anchored approximately 125 feet off shore. There is one lifeguard station at this “one-bay” beach. No entrance control is provided at this small Park. Those learning to use small, non-motorized boats also use the park in the off-season and to access the Creek by canoe and kayak.



Village representatives indicate that there is an occasional weed control problem, though this condition was not observed at the time of this study. What was apparent, however, is that the Park's bathhouse will require rehabilitation in the near future, to keep the facility operating. Additionally, the bathhouse and some of the other facilities could use cosmetic improvements and nearby landscaping to increase the overall attractiveness of the Park, which is located at the South entrance to downtown. Additionally, the impromptu parking off Route 9W could be redesigned so that the use of these few spaces will not contribute to traffic problems along this busy route. Angle parking that can only be entered in a southbound direction may be a solution for this road front section of the Park.

Facility Budget Estimate: The cost of refurbishing this site has not been evaluated, but would include upgrading the bathhouse, landscaping, and parking improvements. Construction costs were estimated to be \$125,000.

Tides, Currents, Waves and Wakes. This beach is on a small, controlled segment of the Esopus Creek tributary; consequently waves and currents are not of concern at this site.

ULSTER LANDING COUNTY PARK

Town of Ulster

Ulster County

River Mile 97

Ownership: Ulster County

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: The beach is located on clean sands from dredged material placement on this shore several decades ago. The Ship Channel, the Barrytown Navigation Reach, is located only approximately 500 feet off shore, so wakes have important effects on the beach. The lifeguards take special notice of ships and barges that can create unusual wave action, and may even ask small children to come nearer to shore on the infrequent occasion when this creates a temporary risk. Large, long period, waves caused by larger ships erode sections of the shore and can move debris on to the beach, which must be periodically cleaned. In contrast, the wave washed beach looks clean and inviting, free of silts and mud.

The beach is served by a well-designed, small bathhouse, comfort station and lifeguard office building. This structure is also well placed to support other activities in the Park. The swimming area has only one bay designated by lemon-lines, and protected from three lifeguard stations. The sand has a gradual slope providing a deeper swimming area, with ample, gradual shallow sections, as well as upland areas that can be used for sunning, volleyball, and other activities.

A row of very popular parking places along the shoreline road offers direct access to the picnic sites. These parking activities may have caused root compaction stressing the row of shoreline trees that provide shade for the picnic sites. This combined with erosion from the waves hitting the River shoreline may have contributed to shoreline retreat, beach loss and the loss of shade trees. Another potential problem exacerbating beach erosion may be a vertical wall constructed near shore to help retain the paved area and support facilities in front of the bathhouse. Engineering proposals have been solicited by the County to protect the



shoreline and row of shade trees. The consultants working with this study suggested further consideration of the recommendations received to date, to assure that the best measures are found to protect this important beach and shoreline. Staff from several agencies contacted during these initial efforts indicated an interest in providing help in solving this erosion problem.

The shoreline configuration, and near shore contours may offer more clues regarding the erosion problem and it's potential solutions. Significant shoals composed of fine-grained sand are located a few hundred feet to the north and to the south of the eroding beach and shoreline. This material may provide another clue regarding the erosion at the beach and may provide sand for replenishment if such action is indicated as needed, feasible and environmentally compatible.

Other Potential Site Uses: Located on Ulster Landing Road (County Route 37), a loop off of Route 9W, this large County Park offers exceptional views of the Hudson and a wide range of activities. The beach is one of the primary attractions of this Park, attracting residents and tourists to this section of the Hudson River. NYSDEC scenic Turkey Point property can be accessed directly from the trails heading north from the beach area. Picnickers are accommodated in a wooded section along the shore to the south of the beach, or at a group shelter to the north of the beach. Court games and other sports facilities are provided in the Park, as well as substantial parking facilities, located a few hundred feet inland from the beach. The park is also heavily used by boaters off-shore who enjoy swimming and by personal watercraft users (jet skiers) for launching.

Facility Budget Estimate: The cost of refurbishing this site has not been fully evaluated but would include erosion control and sand replenishment. Tentative costs for construction and rehabilitation are estimated to be \$150,000-500,000.

Tides, Currents, Waves and Wakes. The site is open to currents and wakes from the not very distant ship channel, adding to erosion potential and requiring added vigilance for lifeguards. Wind from the north or south, and less so from the east, can add to occasional wave conditions. On the other hand water circulation is excellent. The channel current at Ulster Landing is 2.4 fps, maximum tidal range is 4.2 feet.

KINGSTON POINT BEACH

City of Kingston

Ulster County

River Mile 92

Ownership: City of Kingston

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: A naturally occurring beach, located at the terminus of the original trolley system serving the City, this location was part of an amusement park that offered popular access to the Hudson River for residents and visitors. The spit of land serving as the north shore of the Rondout Creek and harbor, terminating in a lighthouse, traps sand brought downriver by littoral drift, to form this fine beach. Consequently the sand quality is excellent, and the beach is gradual, though a little shallow at low tide. Water chestnut seed pods and bricks are found in the sand. Grading and shifting of sand would help to avoid any hazards that might be created by their presence. The City of Kingston operates the public beach that has been traditionally used at this location since the nineteenth century.

A wide upland sand beach provides excellent areas for sunning and other beach activities, including the launching of sailboards in the off seasons. Two bays are provided for swimming, marked by lemon-lines, each protected by a lifeguard station. A short, heavy timber wall separates the end of the beach from a substantial, paved parking area west of the wall. A contact station, staffed in season, marks the end of Delaware Avenue, which also serves as the entrance road to the Park, and the abrupt beginning of the paved rectangular parking field serving the Park.

While Kingston Point Park features the beach as the centerpiece of Hudson Riverfront rejuvenation, the parking, bathhouse and its concession area, next to the beach indicate the need for update. The layout of the parking lot could be improved. The small building used as a contact station and parking lot entrance,



located at the western end of the parking lot, also needs improvement. The bathhouse interior shows signs of aging and heavy use. Improved services for the handicapped may also be advisable. These features may be updated at modest cost, but their improvements can change the marketable appearance of this major regional tourist destination.

Other Potential Site Uses: A considerable range of park facilities extends to the south of the beach and entrance road. In addition to swimming, the area is also heavily used for launching personal watercraft. Trails and a restored trolley service are linked to the other attractions of the Kingston Urban Cultural Park (a Statewide program for a few selected areas of great historic interest) is located a mile up the Rondout Creek, at the “Strand” section of the Harbor. Formal fields for field and court games are a popular part of this complex, but the Creek and Hudson shore sections of the Park are much more natural in appearance, lending a “greenway” section to the entrance to Kingston Harbor, a popular tour-boat attraction. Access to the historic Rondout lighthouse is also being improved within this scenic riverfront area. The potential of added “Hudson Greenway” shorefront or other scenic open space, located on adjoining lands to the north, may also further enhance these attractions in the future.

Facility Budget Estimate: The cost of refurbishing this site has not been fully evaluated, but would include refurbishing the bathhouse, parking and concession areas as well as improved handicapped accessibility at a cost of approximately \$500,000.

Tides, Currents, Waves and Wakes. The bay formed by the Rondout Creek entrance provides an ideal beach location for this northeast-facing beach. It provides both good shelter and sufficient exposure to ensure circulation. Choppy waves caused by winds from the northeast can be experienced due to the width of the River at this location. The channel current at Kingston Point is 2.2 fps, maximum tidal range is 4.2 feet.

PORT EWEN

Town of Esopus

Ulster County

River Mile 90.5

Ownership: Town of Esopus

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: The hamlet of Port Ewen, located south of Roudout Creek, has much of its Hudson River shoreline on a bay formed by the protective peninsula built at the mouth of the Creek and harbor. The bay is very shallow, with mud flats underlying only one foot of water one half mile from shore. Stable, fine-grained sand, black in color, forms a beach, with somewhat deeper offshore water near the end of Parsell Street.

Though a guarded swimming facility was open at this beach, water chestnut invaded the shallow bay, making operations difficult. Harvesting of the aquatic weed has been attempted, and is still being run by volunteers in an attempt to bring the bay back to its earlier condition. It is unclear if these harvesting operations will prove successful. The shallow, protected bay, nutrient rich sediments and the aggressive nature of water chestnut may be too difficult to surmount. Without control of the aquatic plant problems, it is unlikely that the swimming area can be opened again.

Other Potential Site Uses: A peninsula and protective works for a marina form the southern boundary of this beach. A small park was developed at this beach by the municipality, including a combination bathhouse comfort station, a concession building, fields and courts used for sports and games and a group picnic shelter. Shade trees, landscaping and the parking provided are simple, but suitable for the scale of operations at the Park.

Facility Budget Estimate: Costs for improving this site have not been evaluated due to the significant obstacles presented by the water chestnut.



Tides, Currents, Waves and Wakes. A wide, shallow bay formed by the Rondout Creek and its protective structures to the north and groins protecting a marina to the south, results in fewer waves, from all but the rare wind from the east. This enhanced sheltered position coupled with limited water circulation favors water chestnut growth. The channel current at Port Ewen is 2.2 fps, maximum tidal range is 4.2 feet.

CROTON POINT WESTCHESTER COUNTY PARK

Village of Croton-on-Hudson

Westchester County

River Mile 36

Ownership: Westchester County

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: The beach faces north, and receives ebb-tidal littoral drift, forming a fine half mile long natural beach that extends well upland as well as underwater. The slopes of the beach are excellent. Water quality and currents at the beach location have not posed any problem during the past decade. Lemon-lines and a second set of warning lines designate two guarded beach sections and buoys have been established to keep small boats out of the swimming area. Non-powered boats are allowed to use sections of the beach outside of the swimming area and in the off-season. Water currents bring in floating debris that is periodically raked and removed. The availability of trained lifeguards and operating budgets has been a problem at this popular beach and at similar parks.

Park operations at Croton Point included a public beach during the mid-20th Century. A very large bathhouse complex and an architecturally interesting concession building served the patrons in this section of the Park. The bathhouse is still in use, supporting existing beach operations, but sections of the bathhouse building and the entire concession structure have been virtually abandoned. The open sections show significant deterioration and possibly vandalism. The entire Park operates out of a construction trailer.



It is apparent that the supporting buildings for this important park and beach must be fully evaluated. Modern practices, brought about by the use of quick-drying swimming suits have made some of these large bathhouse operations obsolete at other beaches. It is uncertain if this cinderblock building is worth rehabilitation with a number of uses being added to its bathhouse function, or if a smaller modern structure would be a better solution for the beach and Park. Other buildings and infrastructure in this area of the Park may also have to be evaluated for future uses.

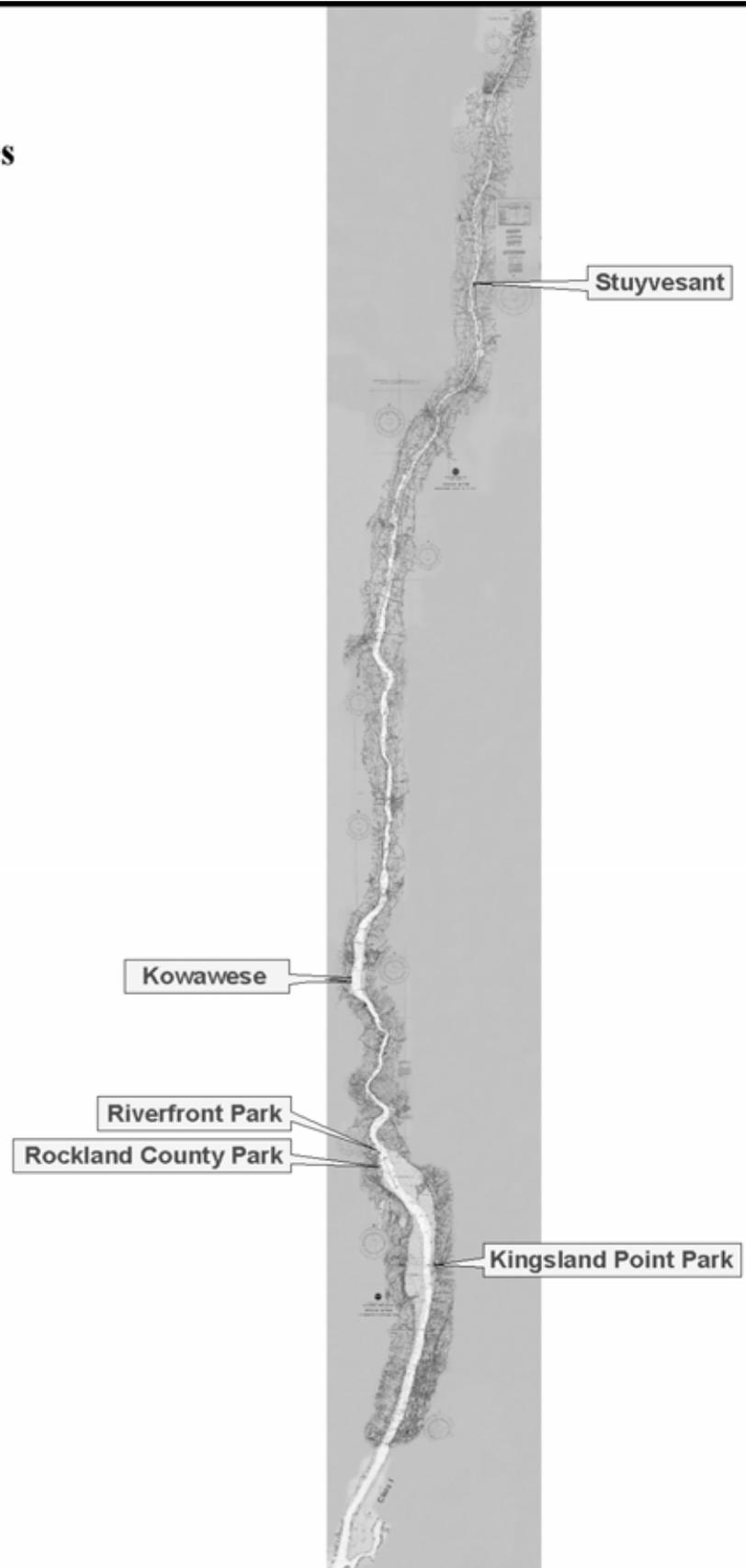
Croton Point is possibly the most important beach on the Hudson River. It has had great popularity in the past, and is again gaining use with increased awareness of the River by the public. The condition of the beach support facilities, and perhaps other elements of the Park may require strategically important decisions that small increases in maintenance efforts may not be able to fully, or efficiently address.

Other Potential Site Uses: Croton Point has undergone a substantial change during the past three decades. The Park is located on a peninsula with spectacular views of one of the most scenic sections of the Hudson. The area was also the location of a solid waste disposal project operated during the mid-20th Century. This reclaimed site has become one of the most popular County Parks in the State. Located within walking distance from the Metro-North Commuter Railroad Station, and adjoining the Croton-on-the-Hudson exit of an expressway section of Route 9, the Park offers camping, athletic fields, a nature center, trails, and a spectacular beach. Croton point is also the venue for very popular festivals that attract many thousands of people.

Facility Budget Estimate: The cost of improving this site is estimated at \$600,000 to \$1,000,000 and would include bathhouse improvements.

Tides, Currents, Waves and Wakes. The Croton Point peninsula offers good shelter for this northeast-facing beach from a wide section of the Hudson open to the northwest. A point of land at the northwest corner of Croton Point protects the site from the wake of large vessels, however small boat traffic and wind from the northwest can occasionally cause choppy wave conditions. The channel current at Croton Point is 1.4 fps, maximum tidal range is 3.4 feet.

6.3.2. Category B: Feasible New Sites



6.3.2 Category B: Feasible New Sites

STUYVESANT BEACH

Town of Stuyvesant

Columbia County

River Mile 127

Ownership: Currently NYS OGS, to be transferred to NYSDEC in 2002

***The following analysis is offered to guide potential development of a beach. No action will be taken by the State of New York to develop swimming at this site without further examination and review.**

Beach Conditions: Nearly a quarter mile of beaches are located at the Stuyvesant site on state land just south of Stuyvesant Landing. The beach sands along the entire north shore of this peninsula have high quality consistency and good slope conditions, with some rocks and debris found near the eastern end, next to a railroad right-of-way. The west shore of the peninsula, facing the channel, has a much flatter slope, with fine-grained sand that is less desirable for either beach development or other construction. The north-facing beach is paralleled by a deeper area with an all sand bottom, which becomes a shallow tidal flat to the north with considerable vegetation. A bay protects this beach from currents found on the open river.

While the beach site at Stuyvesant is attractive, the characteristics of the adjoining underwater area in the bay are also of great potential importance. If the areas directly next to the beach are bare sand, deepened and kept clear by water currents, as some of this study's field checks indicate, then they pose different habitat implications than the vegetated, shallow flats, located just a few hundred feet further north in the bay. It will be necessary to provide a more comprehensive review of this area before an informed policy recommendation can be made. It is unlikely that the Stuyvesant site can be selected for early action without this environmental survey work.



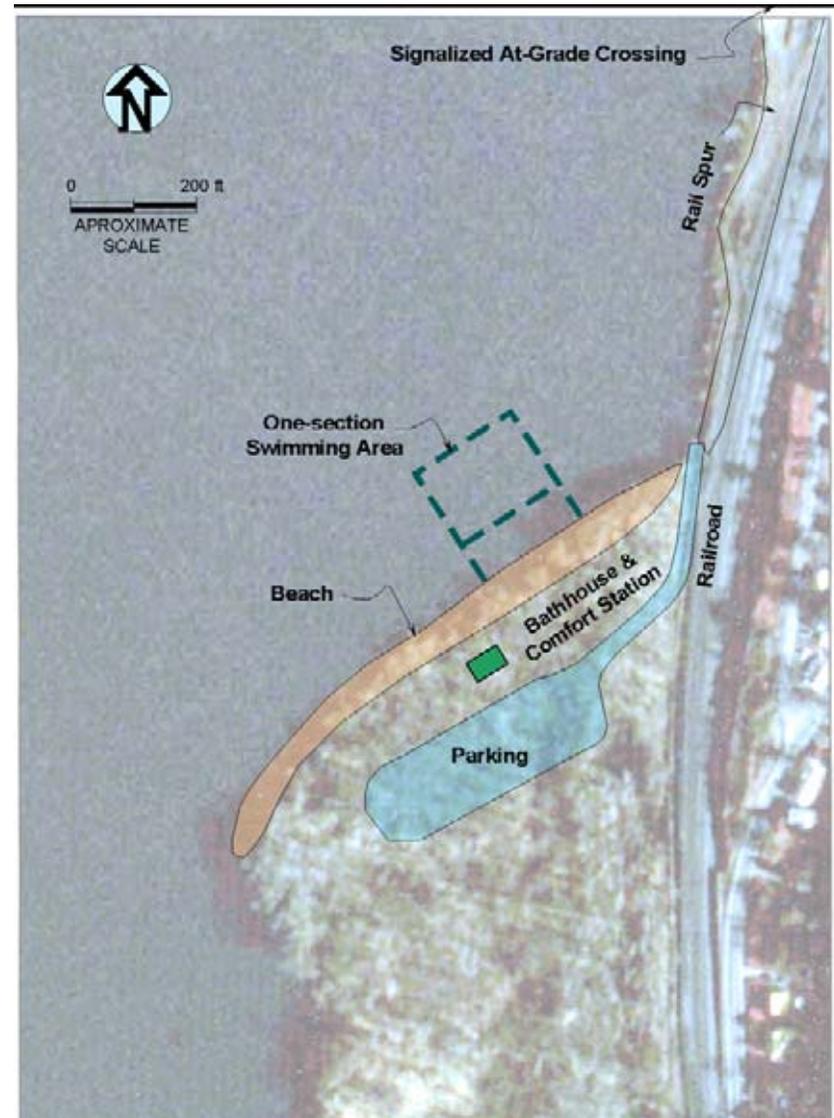
During the time that these environmental and engineering studies are undertaken, a dialog needs to be established with municipal and County officials as well as different State agencies to see what roles they would wish to undertake in advancing a recreational facility at this site. The proposed operations at this site, if any, should then be tailored to the needs envisioned in a Park Management Plan that responds to State, regional and local needs.

Size of Feasible Facility and Other Potential Site Uses: Governor George E. Pataki announced (25 February 2001) the availability of \$8.5 million for projects along the Hudson River in Columbia County. The proposed projects include a boat launch, improvements to railroad tracks and crossings, a cultural and environmental interpretive center, and a protected pedestrian crossing at Stuyvesant Landing, the proposed location of Stuyvesant Beach. The improved site access and site development work authorized at Stuyvesant Landing could greatly facilitate the development of a public swimming facility.

A “small” public swimming site can probably adequately serve local and regional demands at this potential beach site. The design day population at this site is estimated at 300 persons, with an instant population of 150. The building serving the beach could also be used as a comfort station supporting other activities that may be planned for the peninsula. This structure can easily be winterized to support off-season users if these activities are anticipated. Final site plans could combine the beach house with the cultural and environmental interpretive center.

Since the north facing shore has a better slope and sand for both a boat launch and swimming facility, the project would require at least a 200-foot separation along the beach between the two activities. The east-end of the beach has more debris and noise from the railroad, so it’s not desirable for the beach. A location approximately 200 feet from this boundary will probably be the best-suited location for a 150 foot guarded beach. This eastern location of the beach would put the boat ramp near the northwest curve of the peninsula, but at a location that is still protected from winds from the south and southwest.

The boat ramp on the beach would be built at-grade with the natural beach sand slope to maintain littoral drift along its surface. All docks and other supporting features of the launch site would be designed so they could be removed during the off-season to help protect the beach. Occasional sand clean up of the boat launch site would include shoveling sand that is deposited on the ramp to the lower side of the adjoining beach.



The small beach and the boat launch ramp could share parking. The few buses that periodically may bring in school groups and tours to the recreational site may also use some of the double-sized parking slots designed for boats and trailers.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: Facility costs for the beach and bathhouse and adjoining facilities will reflect the previously discussed construction and operations cost of "small" publicly run sites, approximately \$600,000, with annual operating costs of approximately \$30,000/year. A bridge over the railroad tracks is also needed to make this site accessible. This is currently in the design stage as part of a package of \$8.5 million in boating access and other improvements announced by Governor Pataki in 2001. Swimming beach development costs are not included in the current funding.

Environmental Conditions: The Stuyvesant site is located in the Stuyvesant marshes Natural Heritage Program area. This is a small site classified as having good quality habitat of moderate diversity that has experienced moderate disturbance and containing tidal communities of moderate significance. The site is located on the north side point of land just to the south of the Village of Stuyvesant. The point of land where the potential beach site is located forms the northern side of a peninsula that is located along the eastern shore of the River in Colombia County. Submerged, emergent and upland marshes are found in the area, as well as a stretch of rocky shore along the Hudson River in the vicinity of the proposed beach site. A significant area of deeper water with a sand bottom devoid of vegetation exists next to the beach area on the north side of the peninsula. The area contains several different community types identified by the NYS Natural Heritage Program. The rare species heartleaf plantain and kidney leaf mud-plantain are reported to be in the area, however significant habitat types and rare species are not located on the studied location.

The bald eagle, listed as threatened by the U.S. Fish and Wildlife Service and the NYSDEC, along with the upland sandpiper, the heartleaf plantain, and the spongy arrowhead are species of concern that have been identified within the vicinity of the potential Stuyvesant beach site. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would be conducted during Phase II should plans for construction be advanced at this site. Additional studies are recommended to address the occurrence of significant habitats on site.

Water Quality Considerations: The water quality observations nearest to this site are data collected by the Albany County Sewer District and the data collected at the Glenmont STP. These sampling locations are approximately 15 miles upstream of the site. Total and fecal coliform data collected by the Albany County Sewer District between 1987 and 1996 show that total and fecal coliform criteria for NYSDEC and NYSDOH standards are not exceeded. Data collected by the Glenmont STP is of limited use since bacteriological data were not collected. Additional water quality investigations should be performed at the site to determine its suitability since no data is available near the site.

Tides, Currents, Waves and Wakes. This northwest-facing beach is well protected from the south and southwest by its location on a peninsula. The selection of a site to the east of the open river will also reduce the impact of wakes from the shipping lanes and ebb tidal currents. Winds from the northwest can generate choppy waves at this beach. The channel current at Stuyvesant is 2.7 fps, maximum tidal range is 4.3 feet.

KOWAWESE UNIQUE AREA AT PLUM POINT

Town of New Windsor

Orange County

River Mile: 58

Ownership: NYSDEC, operated by Orange
County Parks Department

***This analysis is offered to guide potential development of a beach. No action will be taken by the State of New York to develop swimming at this site without the consent of the site manager.**



Beach Conditions: There are two potential beaches at Kowawese, one north and one south of the boat slip cut to accommodate barge landings. The southern beach has been determined to be best suited for further study, because it is longer, has better shale-sand and has an excellent subsurface gradient. The only flaw at this beach is a limited area for a dry, upland component of the beach area. The flat, sparsely vegetated, rocky area backing the beach may be improved by sand-fill, or by better grading and the establishment of grass. Water chestnut pods and beach glass is found on the beach and would need to be included in a maintenance program. This would greatly improve a still narrow back-beach.

Though swimming continues as an unauthorized activity at this property and in the nearby shallow waters, the management plan developed for Kowawese emphasizes the scenic character of the site and does not address if this activity should, or should not be provided. Fishing and car-top boat launching are allowed, but not served by specific facilities. A trail system offers hiking opportunities and scenic views. Development of a swimming facility at this location would require the approval of NYSDEC, which owns the property, and Orange County, which manages the property as parkland.

Traffic problems on Route 9W were mentioned as a possible constraint to attracting additional people to Kowawese. This is a legitimate concern since there are few existing provisions for accommodating the traffic headed to the Park. Good road design at the turn from 9W and a sign that can be seen by approaching

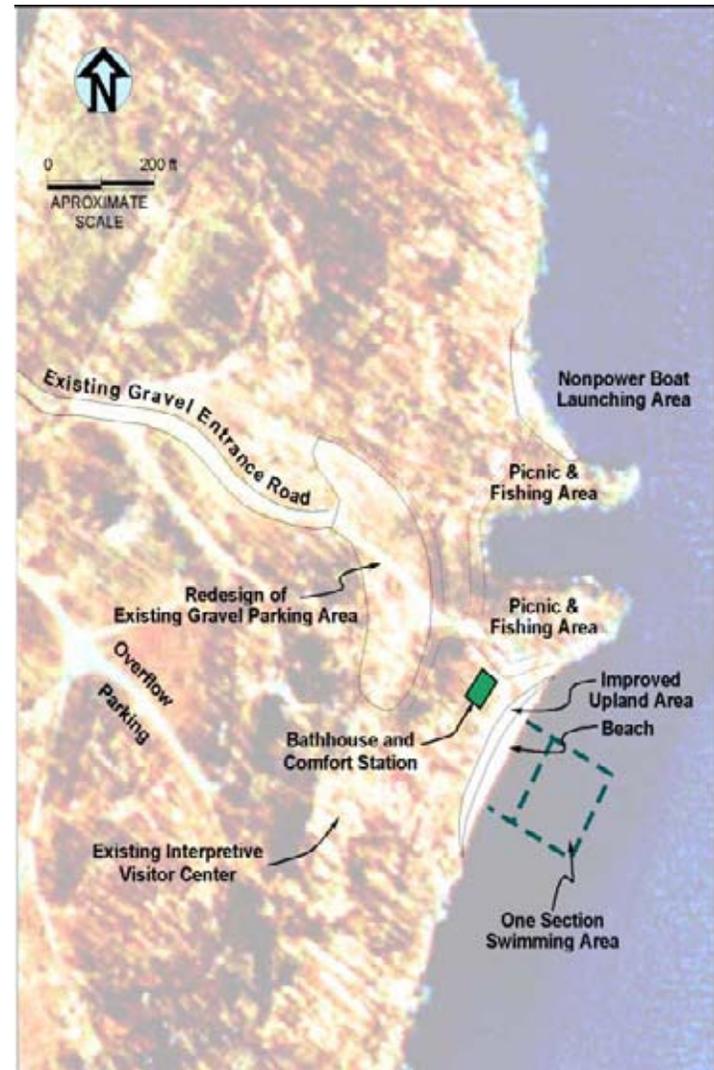
traffic can prevent erratic turns by drivers in search of the park. A more ambitious approach would consider a left turn lane on southbound 9W, and improved bicycle and pedestrian routes.

Size of Feasible Facility and Other Potential Site Uses: While needs could dictate the establishment of a larger swimming area, site constraints only allow a relatively modest sized guarded beach, 200 feet in length, accommodating an instant* beach population of 125 people, and a design day population of 350 people. The bathhouse serving this beach would also have to be designed as the comfort station serving the rest of the park. The placement of the bathhouse/comfort station on the slight rise located to the north of the beach would allow this facility to serve other park activities as well as the beach. Care would have to be taken in siting a bathhouse that would not block scenic views.

Facilities serving the general public on this heavily used property are minimal and include portable toilets, a few picnic tables and a gravel parking area. A building accommodating meetings overlooks the River. The northern third of the peninsula is owned by the Town of New Windsor and has been developed for field games and a playground.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th. highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: A swimming beach project at Kowawese would fall between the cost of a small and a medium sized facility, perhaps \$800,000 for construction and \$40,000 annually for operations. These costs include some improvements to the gravel parking lot and walks, making that facility more efficient and addressing some of the most problematic drainage problems. Paving the lot and Park road would require substantial drainage improvements and added costs. The costs at the 9W intersection can be limited to \$25,000 for improved turning radius for inbound and outbound traffic and better signs. This would include the re-striping of a turning lane for southbound, arriving traffic. Precise measurements would have to be done for, or by NYSDOT to design these improved pavement markings.



Environmental Conditions: The park is located just north of the Moodna Creek Significant Coastal Fish and Wildlife Habitat area, which is characterized as an area of moderate habitat diversity of good quality that has experienced moderate disturbance.

The bald eagle, listed as threatened by the U.S. Fish and Wildlife Service and by the NYSDEC, along with the least bittern and the spongy arrowhead, also listed as threatened by the NYSDEC are species that have been identified within the vicinity of the potential Kowawese Unique Area beach site. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would be conducted during Phase II should plans for construction be advanced at this site.

Water Quality Considerations: The closest water quality stations to this location are data collected by the Poughkeepsie Sewage Treatment Plant (STP) and data collected by the Rockland Department of Health at Riverfront Park. These stations are located about 18 miles upstream and 20 miles downstream of the site, respectively. Data from the Poughkeepsie sampling location is of limited use since no bacteriological data was collected. Data collected at Riverfront Park show that NYSDOH bacteriological criteria are exceeded at times. Since this sampling station is located far away from the beach site additional data collection should be performed.

Tides, Currents, Waves and Wakes. The best beach at this site is protected from the south by headlands and from the north by former barge docking bay and associated structures. The potential beach site located on a wide section of the Hudson diminishes shipping wakes but increases choppy waves associated with easterly winds during rare winds from the east. The channel current at Kowawese is 1.5 fps, maximum tidal range is 3.2 feet.

RIVERFRONT PARK

Town of Stony Point

Rockland County

River Mile: 39

Ownership: Town of Stony Point

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: The beach located in the Town Park has good characteristics for use as a swimming facility. There is at least 150 feet of north facing beach shoreline, and ample upland beach space.

The slope underwater is a little steep, but acceptable. Sub surface conditions indicate an acceptable mix of gravel sized stones mixed with sand. The east facing beaches formed by the groins have fine grain sand and a good near shore slope. Measurements and bottom samples were not collected at these beaches. Though more open to wave action from the Hudson, the beaches formed by the groins may be a good alternative at this location. Development of a swimming facility at this location would require the approval of the Town of Stony Point, which owns the property.

A street paralleling the northern shoreline of Riverfront Park is located behind the Town Park. This street then turns south, running along the eastern shoreline of the Point. Several groins and a seawall have been built to protect this road and the nearby properties. The three groins closest to the Town beach have built up good beaches, which are used by people who park along the street and climb over the seawall. Swimmers were observed to use these beaches and boats also land on these narrow strips of sand located between groins and the seawall. A property across the street from both the seawall and the Town Park has an open stand of trees and areas showing the signs of frequent use for parking.



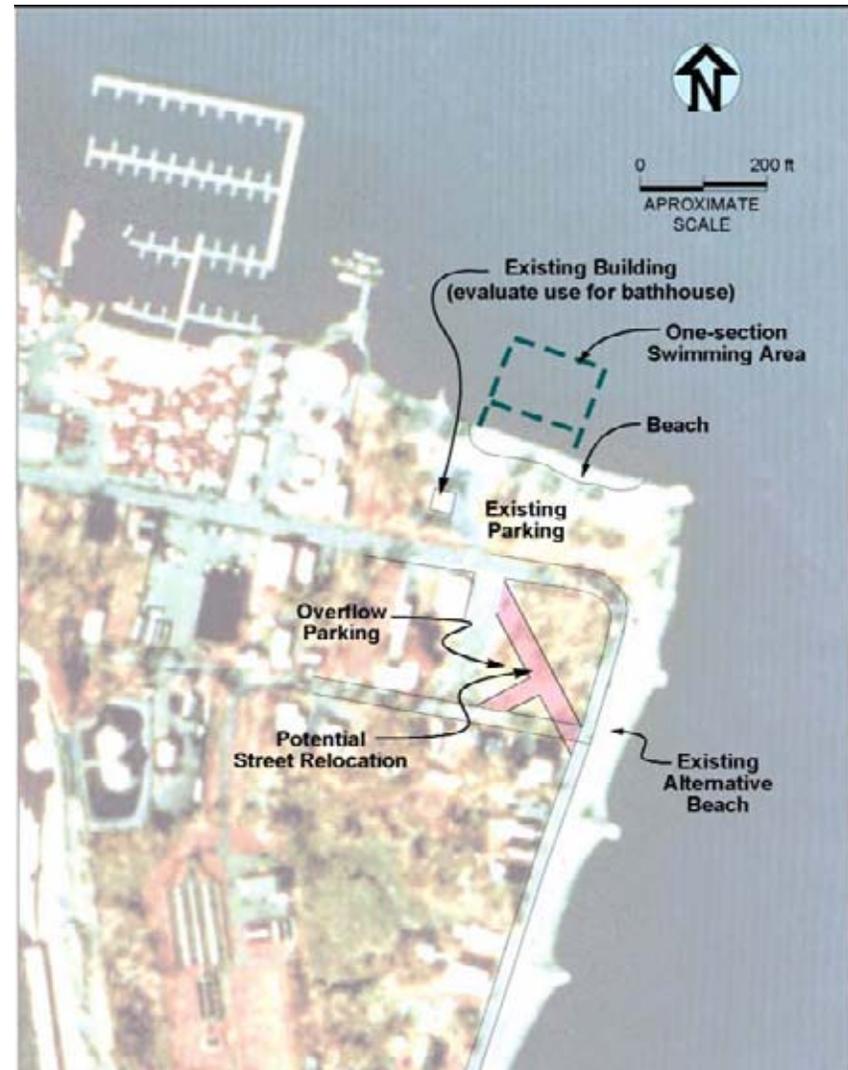
One possibility for using the groin-field beaches in conjunction with the Town Park, would be to re-locate the shoreline street behind the open stand of trees, forming a larger park, which would include either a north facing or a east facing swimming beach. If this option is not possible, then the east facing, groin-field beaches could not support a swimming program because of lack of upland spaces.

Size of Feasible Facility and Other Potential Site Uses: It is clear that if a swimming beach were to be established at this location, it would have to be a “small” beach accommodating an instant* population of about 80, and a design day population of about 250. This facility has a fishing pier, picnicking and a playground. An existing building supports these services (not inspected because a guard restricted access). Some parking is located in the park, and additional parking is available across the street.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th. highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: The operating cost of the beach, in addition to existing park operational costs would be approximately \$25,000 to \$30,000 per year. Construction costs for a beach at this location would depend on which location is selected (if any) and the capacity of the existing park building to accommodate bathhouse activities. Road relocation costs and utilities may also be minimal, or a significant cost associated with the project. Given the broad range of options, \$200,000 to \$500,000 may represent a range of costs associated with the development of a swimming beach at Riverfront Park. The lesser cost would be required if the existing structure and park could be readily converted to support the swimming program.

Environmental Conditions: This site is located within the Haverstraw Bay Significant Coastal Fish and Wildlife Habitat area. The area is described as including vast shallow and deep-water areas covering a six-



mile river reach with low diversity habitat of good quality that has experienced extensive disturbance. Extensive shallows are found in the eastern part of the bay with deeper water areas along the western shore. The Federal navigation channel, which is located along the western side of the Bay, is maintained through periodic dredging at a depth of 35 feet below mean low water (MLW). Haverstraw Bay is characterized as an extensive nursery for anadromous and estuarine migrant fish species, a nursery and feeding area for many marine species, spawning and wintering ground for the Atlantic sturgeon, and a wintering area for the Federal and state listed shortnose sturgeon. Incompatible activities within the designated significant habitat area include dredging of the shallows, construction or filling especially in the eastern part of the Bay, and clearing buffer vegetation.

Any swimming facility development would occur in the western portion of the bay, where impacts would be expected to be minimal. Onshore activities will involve some clearing of vegetation; however, the amount of loss will be small.

Three species listed as threatened by the NYSDEC, the bald eagle, the pied-billed grebe and the least bittern have been known to occur within the vicinity of Riverfront Park. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would be conducted during Phase II should plans for construction be advanced at this site.

Water Quality Considerations: The water quality stations closest to this site are those sampled by the Rockland County Department of Health. Four sites (Riverfront Park, Bowline Point, Hook Mt., and Piermont Pier) were sampled between June 1990 and August 2000. Data collected at Riverfront Park show that NYSDOH bacteriological criteria are exceeded at times. This trend is also noted at the other three sites. Additional water quality investigation should be performed to provide data that are more current.

Tides, Currents, Waves and Wakes. Short peninsulas on the Hudson's West shore protect the north-facing beach at Riverfront Park from all but occasional winds from the east or northeast. Short groins protect shallow waters next to east facing beaches also located at this site. The wide river can increase the fetch of wind-generated waves from the northeast or south to this eastern beach. The channel current at Riverfront Park is 1.4 fps, maximum tidal range is 3.4 feet.

ROCKLAND COUNTY PARK

Town of West Haverstraw

Rockland County

River Mile 37.5

Ownership: Rockland County and private ownership

***This analysis is offered to guide potential development of a beach if the site owners wish to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owners.**

Beach Conditions: Rockland County recently acquired a large property in West Haverstraw for park development. The County Park plan currently does not envision swimming at this site, however the site is suitable for development of a swimming beach. The property is north of the Bowline Point power plant. The parcel of land includes a complex of natural areas, and properties that were developed at one time, but subsequently demolished. Sections of roads, railroad spurs, paving, fences and other abandoned facilities are on this site. The property also includes extensive wetlands, over 1000 feet of shoreline along the Hudson, and small streams. Some structures remain on site, as well as on the adjacent vacant power plant property owned by Mirant New York Inc. including a meteorological tower. Because of the high value this location has for a future swimming site, it should be secured, with appropriate buffers, to protect the possibility of offering this popular activity at the Park. Rockland County officials and staff should consider if swimming facilities are to be a part of their plans, and when these programs can be undertaken. If a swimming facility is considered as a possibility, then, acquisition, and beach improvement elements of the program (groins and clean up) should be undertaken as the initial steps needed to develop these facilities.

The Hudson shoreline in the Park is an impressive resource associated with the property. A rocky shoreline starts south of the Haverstraw Marina and continues up to abandoned steel bulkheads that were a part of barge loading docks, which once served a quarry near this site. The County plans a boat launch at this

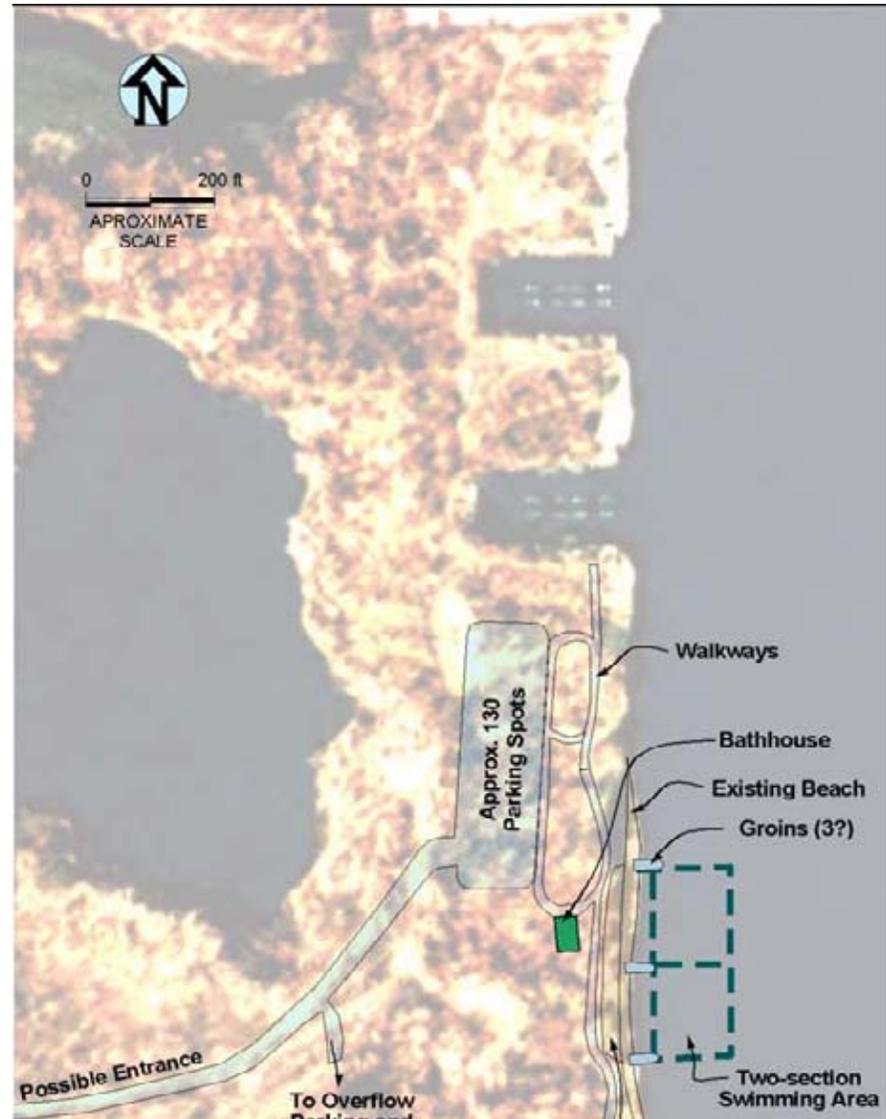


location. A low shore beach composed of brick particles, occasional quarry rock and some sand stretches for a considerable distance south, up to the Utility owned shorelines at Bowline Point. There is dense tree and brush cover and some wetlands near the shoreline and further inland.

Though public swimming sites are available in Rockland County, substantial nearby population as well as visitors from New York City and New Jersey frequently use these facilities to their capacities. Additionally, though swimming in the Hudson was a very popular activity in this area in the past, the closest facility offering this today is across the Hudson River at Croton Point County Park. People have been observed using the shorelines, occasionally for sunning and swimming.

The shoreline nearest to the meteorological tower was analyzed for its potential as a swimming beach, though it appeared that any location within a few hundred feet from this point would offer similar characteristics. A gradual slope that can easily serve a beach was observed. The upland beach was narrow, but relatively flat slopes with brush and tree cover will permit modification to well designed sand or grass surfaces behind the beach. The sand, rounded brick remnants and stones on the beach and underwater may require improvement to upgrade swimming conditions. Raking the larger fragments to a side of the potential beach may suffice. This mound of raked pebbles and stones may also work in the future as mini-groins, and help retain sand on the beach.

Size of Feasible Facility and Other Potential Site Uses: The extensive length of beach in Rockland County Park, and the significant demand for these facilities, suggests a “medium” sized beach, probably two sections of 150 feet to 200 feet each, 300 feet to 400 feet total. A single beach section could pilot the program, then be expanded as required. The total beach facility would serve an instant* population of 200 people, and a design day population of 600 people.



The design of the entire County Park, or at least the large section including the beach, would need to be completed to identify the best options for access, other park activity and designated preservation areas, and to orchestrate construction, funding and operation programs in an efficient and effective manner. A survey of property lines should determine where the County owned shoreline ends. Coordination with the Power Plant management could include negotiations for additional needed lands, or for understandings regarding access or buffers between these two properties. These discussions should precede any design work. The swimming beach would be the prime attraction for this new park. The prominent location of the beach facility may also allow other activities to make efficient use of the toilets and spaces in the bathhouse on a year-round basis.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th. highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: The bathhouse, utility and access costs that would serve the beach area would require \$1,000,000 or more in construction costs. Operations cost would be in excess of \$50,000 per year.

Environmental Conditions: This site is located within the Haverstraw Bay Significant Coastal Fish and Wildlife Habitat area. The area is described as including vast shallow and deep-water areas covering a six-mile reach of River, with low diversity habitat of good quality that has experienced extensive disturbance. Extensive shallows are found in the eastern part of the bay with deeper water areas along the western shore. The Federal navigation channel, which is located along the western side of the Bay, is maintained through periodic dredging at a depth of 35-ft below mean low water (MLW). Haverstraw Bay is characterized as an extensive nursery for anadromous and estuarine migrant fish species, a nursery and feeding area for many marine species, spawning and wintering ground for the Atlantic sturgeon, and a wintering area for the Federal and state listed shortnose sturgeon. Incompatible activities within the designated significant habitat area include dredging of the shallows, construction or filling especially in the eastern part of the Bay, and clearing buffer vegetation. Onshore activities especially at the Rockland County Park site will involve some clearing of vegetation; however, the amount of loss will be minimal.

Three species listed as threatened by the NYSDEC, the bald eagle, the pied-billed grebe and the least bittern have been known to occur within the vicinity of Rockland County Park. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would be conducted during Phase II should plans for construction be advanced at this site.

Water Quality Considerations: The water quality stations closest to this site are those sampled by the Rockland County Department of Health. Four sites (Riverfront Park, Bowline Point, Hook Mt., and Piermont Pier) were sampled between June 1990 and August 2000. The closest station, Riverfront Park is located just a few miles from the site. Data collected at Riverfront Park show that NYSDOH bacteriological criteria are exceeded at times. This trend is also noted at the other three sites. Additional water quality investigation should be performed to provide data that are more current.

Tides, Currents, Waves and Wakes. A project to enhance the east-facing beach at this site should include groins, similar in scale to those successfully deployed at Riverfront Park. In addition to enhancing and protecting sand conditions, this project should also protect the shallow waters from wind-generated waves from the north and south. The wide river can increase the fetch of wind-generated waves from the east and from the north or south in open water facing this site. The channel current at Bowline Point is 1.4 fps, maximum tidal range is 3.4 feet.

**KINGSLAND POINT
WESTCHESTER COUNTY PARK**

Village of Sleepy Hollow

Westchester County

River Mile 28

Ownership: Westchester County

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**



Beach Conditions: The beach at Kingsland Point is a beautiful 900 foot crescent shaped beach facing the northwest. The beach is protected and retained by a groin located on its western end. The sand quality is excellent, however the near shore slope is a little steep. A fence and high hedge keeps the public from viewing the beach. Even the exceptional scenery offered by High Tor Mountain, across the Hudson, is screened from public view for half the park. A few occasionally climb the fence to gain access to the beach. A locked underpass and passageway leads from the beach to the Kingsland bathhouse.

The bathhouse and pavilion building have a major space on the floor closest to grade, that formerly housed an extensive bathhouse area. The east and north side of this space now houses park maintenance. The southwest lower floor area is used to store boats and another section is vacant or full of wet debris. Only a small section of the massive, but beautiful bathhouse and pavilion building is used for storage and offices. Decades without appreciable maintenance limit the remaining life and beneficial use of the structure. Though not on a register, the building may be eligible for consideration by the National Register of Historic Buildings by the State's Historic Preservation Officer. The operational space required for the entire Park may have to be redesigned. Half of the ground floor may prove adequate to support both maintenance and swimming programs. Development of a beach and restoration of the bathhouse present an exceptional opportunity, which can enhance the other planned uses of the Sleepy Hollow Waterfront.

A complete study of the beach would help to determine the best location and configuration for use and the most cost effective procedure for beach nourishment, including possible off shore sources of sand, if swimming is considered.

During its decades of use (ending in 1974), the Kingsland beach was replenished with sand every few years. These maintenance activities were suspended for the past 26 years, causing the near shore of the beach to steepen. While the beach is beautiful most of the time, at high tide one-hour of each park operation-day, little or no beach is left dry. If the beach is not maintained, then the stone seawall behind the beach may soon be undermined by waves and have to be protected. Beyond the near shore area of erosion, a flat offshore sand profile may indicate the location of some of the eroded sand. If a swimming program is advanced, then the restoration of a 400 foot section (half) of the beach would be undertaken, together with periodic maintenance of the beach profile. Restoration of the beach could be buttressed on one side by either the land to the east or the groin to the west.

Southeast of Kingsland Park along the River, also in Sleepy Hollow, a large reclaimed area of about 50 acres remains from the demolished former GM Automobile Assembly Plant. A number of redevelopment concepts have been advanced to date, including a mix of residential, commercial and open space areas for the site, which is still owned by GM. Many of these proposals support strategic connections to Kingsland Park. New park access from the GM Site by pedestrians and vehicles, coupled with the Park's upgrading, would strengthen the economic values and recreation benefits of people living and/or working in and those coming to the redeveloped GM site.

Size of Feasible Facility and Other Potential Site Uses: Based on the size of the site and local need, a medium sized swimming program would be best for this site. This would include 300 linear feet of guarded beach, serving an instant* population of 400 people, and a design day population of 600 people.



The Villages of Sleepy Hollow and Tarrytown, the NYS Department of State, Scenic Hudson, and Westchester County Parks are currently working in partnership to improve the Park and to link these initiatives to adjacent public and private projects. The Village of Sleepy Hollow is working on initiatives to enhance DeVries Park, that is separated from Kingsland on the West by the Metro-North line, and to restore and reopen the pedestrian bridge across the tracks. GM is poised to propose redevelopment of its former site. Scenic Hudson has been engaged by the Village of Sleepy Hollow to develop a concept plan for the GM Site, which provides public waterfront access, other open space and mixed commercial and residential development.

A restored Kingsland Park would be a major critical link in the Village's approved Local Waterfront Revitalization Plan that proposes a waterfront promenade from its southern end, at the Tappan Zee Bridge, around the GM site, and anchored on the northern end by the Park. It would provide an outstanding recreation facility to serve immediate surrounding communities with pockets of modest income residents, as well as more well-to-do local and regional users.

In addition to a continuous shoreline walkway, parking needs could also be coordinated during the improvement of the two adjoining properties. One-way traffic entering the Park from the GM site and exiting at the current two-way entrance would mitigate some of the traffic impacts that a swimming beach would have on local streets. In return, the restored beach and pavilion, as well as coordinated parking policy could enhance the value of the new development at the GM site. The inbound lane remaining from the existing entrance road could be used for the continuation of a shoreline trail up to the railroad station.

Swimming facility plans need to be coordinated with the plans for the development of the GM site, which include vehicular, bicycle and pedestrian access, parking, and access to Metro-North trains and perhaps tour boats and ferries.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th. highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: The uses that are contemplated, and the historic rehabilitation standards that are to be met can result in wide ranges of costs for the bathhouse and pavilion building at Kingsland. A new bathhouse would cost \$1 million. Adaptive reuse of the existing historic bathhouse to accommodate both swimming and other park uses would cost \$2-3 million. If the bathhouse is restored for modern uses, about one third of the ground floor of this building would be sufficient to adequately support a medium sized swimming program. Operating costs for the facility would be approximately \$50,000 per year.

Meeting these Park needs leaves more than half of the bathhouse and the pavilion open for compatible adaptive uses. Concessionaires may be willing to fund rehabilitation in return for a long-term lease, opening up the potential for exciting concepts for the re-use of the building, such as a restaurant and catering service.

Environmental Conditions: Kingsland Point is not located in a Significant Habitat Area, therefore destruction of essential habitat is not an issue for this site. However, correspondence with the New York State Natural Heritage Program has identified the peregrine falcon as a species that occurs in the vicinity of the potential Kingsland Point Westchester County Park site. The peregrine falcon is listed as endangered by the NYSDEC. Although impacts to the peregrine falcon are not anticipated as a result of beach construction, further individual site analysis would be conducted during Phase II should plans for construction be advanced at this site.

Water Quality Considerations: The water quality stations closest to this site are those sampled by the Rockland County Department of Health. Four sites (Riverfront Park, Bowline Point, Hook Mt., and Piermont Pier) were sampled between June 1990 and August 2000. The closest stations, Hook Mt. and Piermont Pier are located approximately three miles away from the site. Data collected at these sites show that NYSDOH bacteriological criteria are exceeded at times. This trend is also noted at the other two sites. Additional water quality investigation should be performed to provide data that are more current.

Tides, Currents, Waves and Wakes. The Kingsland peninsula offers good shelter for this northeast-facing beach. A wide section of the Hudson, open to the northwest, protects the site from the wake of large vessels; however small boat traffic and wind from the northwest can occasionally cause choppy wave conditions. The selection of a feasible guarded site closer to the bathhouse underpass should help reduce conflicts with small boat traffic and waves. The channel current at Kingsland Point is 1.9 fps, maximum tidal range is 3.7 feet.

**6.3.3. Category C:
Potential New Sites Requiring
Additional Action to be
Established as a Beach**



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6.3.3 Category C: Potential New Sites Requiring Additional Action to Become Feasible

HENRY HUDSON TOWN PARK

Town of Bethlehem

Albany County

River Mile 138.5

Ownership: Private

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: Several hundred feet of beach exist at this site were reviewed for suitability for a swimming program when water quality classification allows. This beach has a good slope and a narrow upland beach composed of small shale fragments. At a three-foot depth a few inches of mud and clay cover a rock-fragment beach surface. The upland beach material continues up to thirty feet in a wooded area.

Size of Feasible Facility and Other Potential Site Uses: A narrow beach is located on a bay, adjacent to the north end of Henry Hudson Town Park, seven miles south of the City of Albany. The Town of Bethlehem Park has developed facilities at its south end, providing a boat launch site, picnicking, fishing and other activities. Though the Park access road is located adjacent to the beach, no improvements have occurred in this section since the proposed beach development area located north of the NYSDEC boat launch ramp is private property. The size of a potential beach was not evaluated at this stage, since water quality classification currently precludes swimming at this site.



Water Quality Considerations: The New York State water quality classification of the Hudson River at Henry Hudson Park does not permit swimming at this time. Some observations indicate, however, that the water quality in this area has improved and may be suitable for reclassification, opening a greater span of the Hudson River in Southern Albany and Rensselaer Counties (currently Class C) for swimming and other activities. The analysis and review of the proper classification of this reach of the Hudson River may be useful as a part of the next phase of the Hudson River Swimming Feasibility Study.

The review of water quality constraints in this section of the River is a necessary first step in determining the suitability of this site for swimming. The current class C rating may be upgraded to Class B or A on the basis of existing water quality if sampling shows no constraints. An additional issue that requires evaluation is the discharge from a wastewater treatment plant that is located to the south of the Park, approximately one third of a mile from the potential beach. Even if the reclassification of this reach of the Hudson is deferred, securing the beach for future use would be a wise action if the owner is willing.

Tides, Currents, Waves and Wakes. A shallow bay location helps protect this site from north or south winds and currents. Wake from shipping along this narrow river reach will require similar lifeguard procedures as are exercised at Ulster Landing Park. Winds from the southeast and northeast will carry occasional choppy waves to the beach. The channel current at Henry Hudson Park is 2.2 fps, maximum tidal range is 4.5 feet.

SCHODACK ISLAND STATE PARK

Town of Schodack

Rensselaer County

River Mile 135

Ownership: New York State Office of Parks,
Recreation and Historic Preservation

***The following analysis is offered to guide potential development of a beach. No action will be taken by the State of New York to develop swimming at this site without further examination and review.**

Beach Conditions: The beach slope is good and the water clarity was excellent at the proposed beach site. A well compacted, fine-grained sand was found on the shore, placed there through the deposit of clean dredged material. The near-shore subsurface had a few inches of clay and mud over a firm sand and pebble base. Regular swimming use of the beach may quickly improve this subsurface condition. The upland beach is narrow, limited to the erosion line of wave action which is slowly eroding a two to three foot bluff composed of dredged material sands. Heavy scrub brush growth helps to retain this bluff.

The other beaches on Schodack Island located approximately one mile and four miles further south on the island, looked similar to the characteristics of the “planned” beach site. These two sites had a wider upland beaches, indicating that somewhat less work may be required to establish a swimming beach at these alternative sites than at the site shown in plans.

The beaches along Schodack Island were examined to determine if they constitute a good prospect for establishing beach swimming on the island, if water quality is found to be suitable for reclassification upgrades. The site determined to be most suitable for a beach by NY State Parks was checked from on-land and



boat-based inspections. The other beaches, located further south of the planned beach on the island were only observed from the River. All three sites face the open river to the west, with the same constraints associated with ship wakes, and the same advantage of afternoon sun. Access and utility improvements only are suggested to extend to the beach site shown in the NYS Office of Parks, Recreation and Historic Preservation's 1998 Master Plans for the Island (NYSOPRHP 1998). This supports the modification of the beach site shown in the Plan, so that it would also have choice upland beach characteristics.

Size of Feasible Facility and Other Potential Site Uses: Estimation of the size of a potential swimming facility has not been evaluated at this stage. Further evaluation of this site as a potential beach location would be required. A new State Park has been constructed at Schodack Island, located on the east side of the Hudson, just ten miles south of the Capital District's cities of Albany and Rensselaer. A bridge was constructed across the east shore railroad right-of-way to permit site access. Other park amenities include camping areas, a boat launch and picnic areas with benches. While a potential "beach" is indicated on the Park plans, a project for that site has not yet been designed or scheduled for development.

Facility Budget Estimate: Not evaluated at this stage, since water quality classification currently precludes swimming at this site.

Water Quality Considerations: As with Henry Hudson Park, the State water quality classification of the Hudson River adjoining all of Schodack Island does not permit swimming at this time (currently Class C). Some observations indicate however that the water quality in this area has improved and may be suitable for reclassification. A review of the classification of this reach of the Hudson River has been suggested, as noted above, for the next phase of the Hudson River Swimming Feasibility Study.

It would be prudent to determine if water quality constraints can be lifted for the beaches on Schodack Island, before major investments are made at the potential beach. A relatively inexpensive project may also be considered to be advanced at the same time as the water quality analysis, to re-shape the upland component of the potential beach. This would allow natural wave action to stabilize the site after the project, and confirm that this location is suitable to provide a swimming facility.

Tides, Currents, Waves and Wakes. The beach site shown in the Park Master Plan is somewhat protected from the north and south by a very slight shoreline indentation offering near shore protection from tidal currents and winds from the southwest and northwest. Wake from shipping along this narrow river reach at this location will require similar lifeguard procedures as are exercised at Ulster Landing Park. Winds from the southwest and northwest will carry occasional choppy waves to the beach. The channel current at Schodack Island State Park is 2.4 fps, maximum tidal range is 4.7 feet.

FOUR MILE POINT ROAD

Town of Coxsackie

Greene County

River Mile: 121.5

Ownership: Private

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: A small bay protects a short stretch of fine-grained sand beach approximately mid-way along the section of Four Mile Point Road that parallels the Hudson. The privately owned site is at a point where the road is closest to the River, providing only a narrow strip of upland property next to the beach. Parking for the site is at roadside. A little more wooded land exists at either end of this narrow property, which appears to be used on an impromptu basis for picnicking. The configuration of any public proposal would require research of the availability of these lands from a willing seller. Development of this site because of its size would probably be local and would require the approval of the town or the county. State support would probably be needed to make this happen.

The usable beach length at the Four Mile Point Road site is approximately 125 feet and the upland beach is only 30 feet, with another 30 feet to the road shoulder. The underwater slopes were excellent and the sand conditions are good for a small swimming beach. If this site is used for a swimming program, the narrow upland beach can be improved, and must be protected from parking vehicles and any new structures.

Roughly triangular properties at either side of the beach have fine stands of trees and brush that could be used to buffer most of the site from the road. These side properties could be effectively used for site support facilities. The views from the shoreline are excellent.



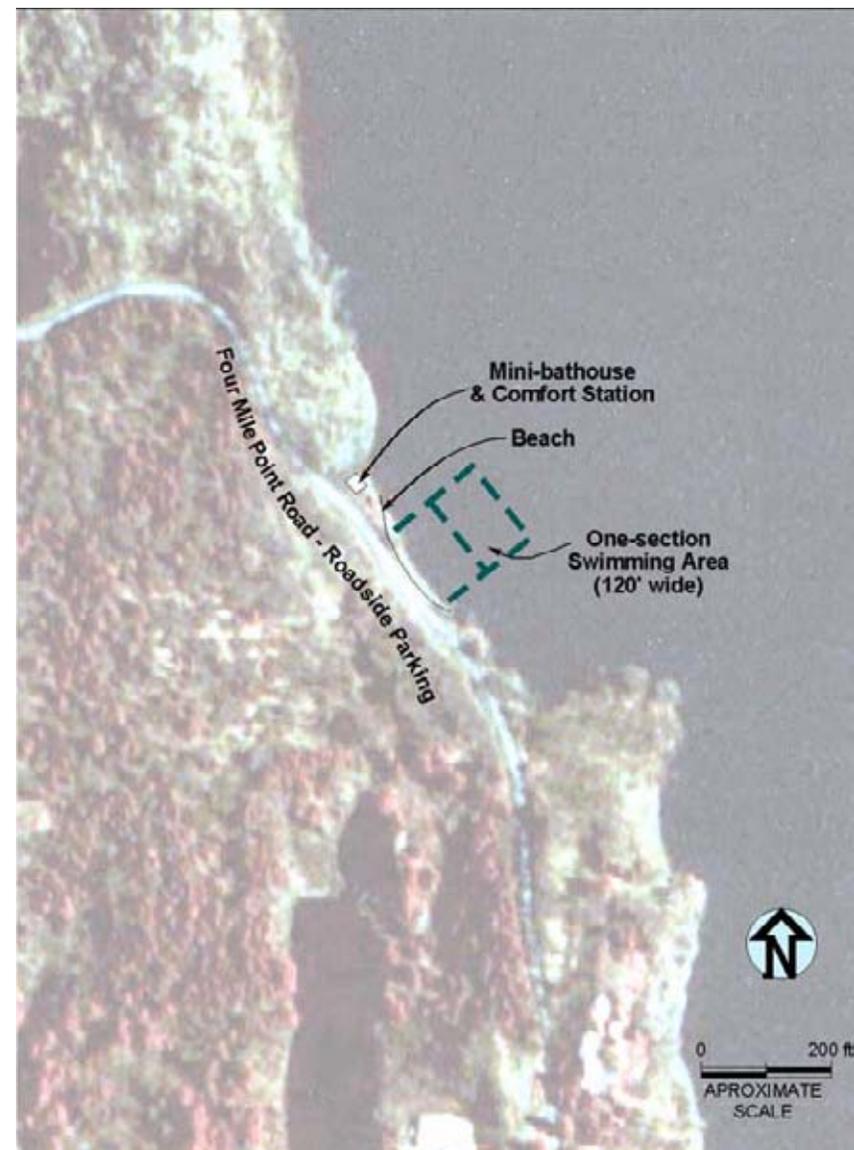
Parking will be a constraint at this site. Four Mile Point Road does not carry through traffic, or any appreciable volume of vehicles. Roadside parallel parking may be a solution for limited use, which is in keeping with the small beach. Other options may involve angle parking or other nearby properties if neighboring property owners are willing sellers. Improvements facilitating safe pedestrian flow are an important part of any parking design.

The need for a public swimming facility along Greene County's Hudson River shore has been documented. Public swimming facilities in the Catskills and in nearby counties are quite distant for the population that resides near the River. There are significant proportions of low-income families, with poor mobility in Greene County, who are unable to get to these distant facilities. One result of these limits is that local people do swim in the Hudson, often in unsafe areas. Consequently, finding the swimming beach "potential" along Four Mile Road, simply involved looking for the spot where people are already consistently using the beach. Four Mile Point Road is an understandable destination, since it is only a fifteen-minute bicycle ride from the nearby Villages of Athens and Coxsackie.

Size of Feasible Facility and Other Potential Site Uses: Considering the limited scale of the Four Mile Point Road property and its limited parking potential, a "minimum" scale facility would be the appropriate project for the site. The entire facility would serve roughly an instant* population of only 50, and a design day population of 150.

In addition to swimming the completed facility may provide for picnicking, fishing and the launching of car-top boats in the off-season. Fires that are made by picnickers would be kept to one or two prepared fire-rings or fireplaces. Access for ice fishing may also be explored, partly depending on the conditions that will be generated by the near shore tidal action.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th. highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."



Facility Budget Estimate: The approximate cost for a bathhouse and utilities would be \$125,000, and operations would cost about \$25,000 per year. Improvements along the road to support this new activity may add to these costs. Land acquisition would add to the cost and unknown at this time.

Environmental Conditions: Four Mile Point is located within the Vosburgh Swamp and Middle Ground Flats Significant Coastal Fish and Wildlife Habitat area. Several potential swimming sites are located along Four Mile Point Road from the vicinity of Barker Mountain on the north to Four Mile Point, with the best potential site located on the north side of Four Mile Point and within the northern boundary of the significant habitat area. The primary habitat feature of the area is Vosburgh Swamp, which is an extensive intertidal wetlands area located on the south west side of Four Mile Point. The significant habitat area is characterized as having a highly diverse habitat of excellent quality that has experienced moderate disturbance. Recommended use of the area calls for the continued protection of the extensive shallows and flats in the immediate vicinity of Four Mile Point.

The bald eagle, listed as threatened by the U.S. Fish and Wildlife Service and the NYSDEC, along with the least bittern, smoother bur marigold, heartleaf plantain, and spongy arrowhead, also listed as threatened by the NYSDEC, are species that have been identified within the vicinity of the potential Four Mile Point Road beach site. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would need to be conducted should plans for construction be advanced at this site.

Water Quality Considerations: The water quality observations nearest to this site are data collected by the Albany County Sewer District and the Glenmont STP. These sampling locations are approximately 21 miles upstream of the site. Total and fecal coliform data collected by the Albany County Sewer District between 1987 and 1996 show that total and fecal coliform criteria for NYSDEC and NYSDOH standards are not exceeded. Data collected by the Glenmont STP is of limited use since bacteriological data were not collected. Additional water quality investigations should be performed at the site to determine its suitability since no data is available near the site.

Tides, Currents, Waves and Wakes. This site is well protected by the configuration of the shoreline from all but the east. A little way out in deeper water, winds from the north or south can fetch choppy waves. Wakes from the ship channel can require similar caution by lifeguards, as is successfully exercised at Ulster Landing Park. The channel current at Four Mile Point Road is 2.7 fps, maximum tidal range is 4.3 feet.

MILLS-NORRIE STATE PARK

Town of Hyde Park

Dutchess County

River Mile 87

Ownership: New York State Office of
Parks, Recreation and Historic
Preservation

***The following analysis is offered to guide potential development of a beach. No action will be taken by the State of New York to develop swimming at this site without further examination and review.**



Beach Conditions: The survey of potential Hudson River swimming sites located several good options for developing a small facility at Mills-Norrie State Park to meet park related as well as local needs. The survey included two beach sites on the north side of the Park and a potential site for a small floating pool at the south end of the park. The best of these options for a beach and a location for a floating pool are discussed below.

A narrow, north-facing beach is located at the base of the Mills Mansion hill. A small intermittent stream empties approximately mid-beach, and helps to maintain the good quality sand that is found at this location. At the same time; however, the proximity of the stream to the beach warrants a close examination of the potential for non-point source pollution impacts especially during heavy runoff. With over 300 ft of beach, and a suitable gradient, especially for family groups, a small swimming area can readily be located at this beach. A bay protects this beach from currents found on the open river. A location on the beach near the stream outlet offers the best slope and sub-surface sand for a swimming beach. The water in the bay is not deep enough to permit a diving raft.

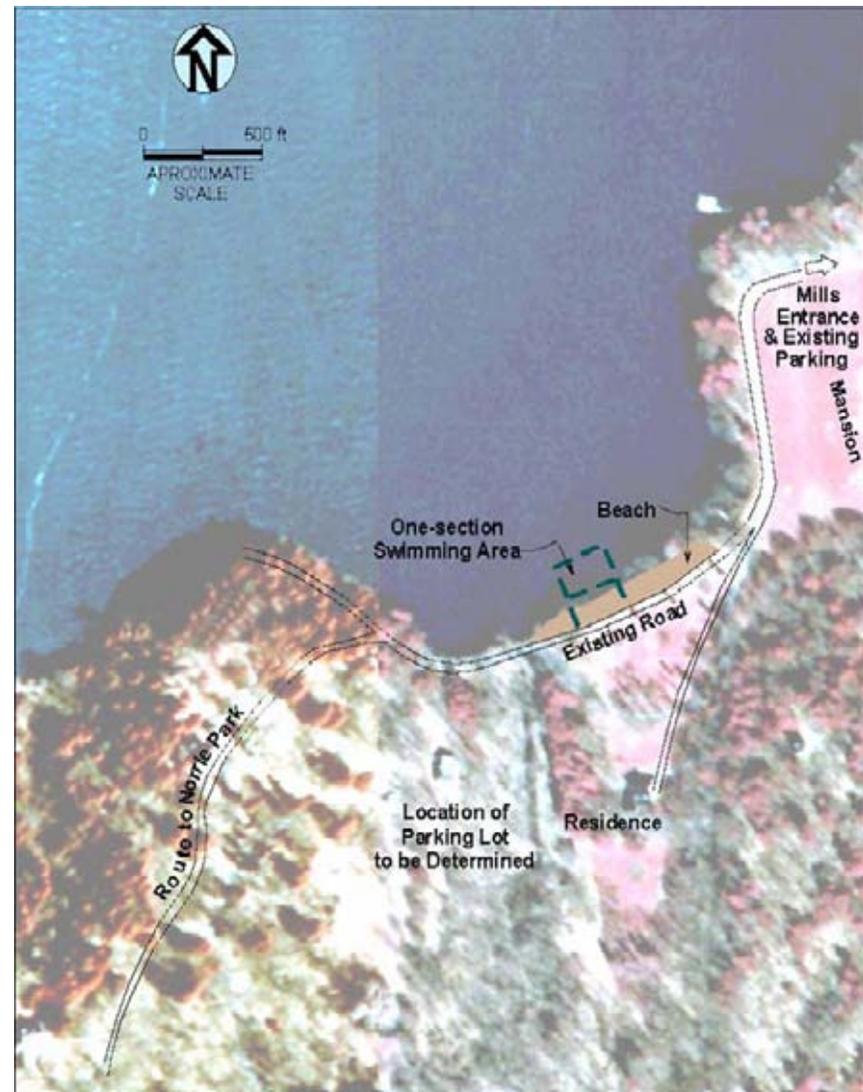
A careful selection for location of parking and a small bathhouse may reduce impacts to the Mills Mansion view-shed. This location could also serve as trailhead parking and bathroom facilities that are independent of activities associated with the Mansion. The extension of the utilities that serve a nearby Park residence may be adequate to serve the bathhouse.

Access options to this site are good. A gravel road, which branches off of the historic entrance to Mills Mansion and serves the former groundskeeper's house, parallels the shoreline behind (south of) the potential beach. Improving this road and locating a parking area to the south of the beach is the best short-term solution for providing access to this beach.

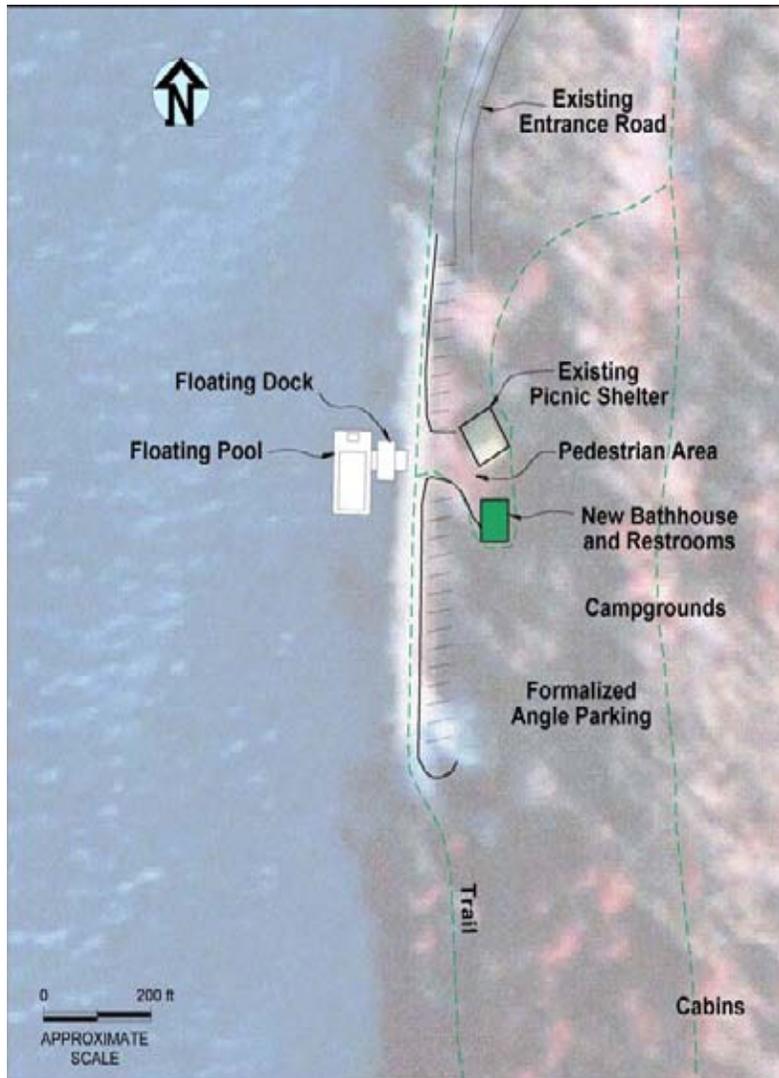
Another option for beach access (found to be most feasible) requires a more comprehensive approach that involves a large segment of the Park. The gravel road behind the beach heads uphill, then to the south to the unoccupied Hoyt Mansion. Several sections of old carriage roads interconnect to form a walking path (blue trail) that leads to the picnic area, campground and cabins. Improvement of these old roads could open up sections of the park that are now little used, and allow visitors access to the beach without negotiating the Mills Mansion entrance. The costs, impacts and opportunities associated with this access route should be considered, but are well beyond the scope of this study.

Size of Feasible Facility and Other Potential Site Uses: A small scale facility with a design-day population of approximately 300, including an instant* population of 100 swimmers, would adequately serve recreational needs at this site.

The most feasible beach is near the Mills section of the State Park. There are four bays with beaches, two in the Park and two north of the Park. The southern most bay and its north-facing beach were found to be most feasible for swimming. Ebbing currents and a small stream cleanse this beach. The next cove, with a west-facing beach had undesirable silt sediment not far off shore. Based on the survey of the area similar sedimentary conditions probably prevail at the two beaches north of the Park. The two feasible beaches in the Mills section of the State Park are



NOTE: The scale for this figure is 1 in. = 500 ft. Beach size is comparable to other figures.



within the historic core area of the Mills and Hoyt mansions and are in areas designated for passive recreation. Possible conflicts with historic preservation policies and other recreational uses would need to be evaluated.

Deep water along the picnic site at the Norrie section of the State Park will permit the mooring of vessels, given shoreline improvements. These improvements would have to be seasonal because of damaging ice scour. The location could readily accommodate a seasonal floating pool discussed in Section 6.

No suitable swimming beaches were located in the southern section (Norrie Section) of the Park; however, deep water in the vicinity of the existing picnic area (River Mile 85.5) would permit the mooring of a floating pool. The floating pool would be a seasonal deployment requiring winter removal due to potentially damaging ice conditions along the exposed shoreline. The use of the site for a floating pool would require the development of additional parking, up-grading the picnic pavilion and construction of a bathhouse. The existing shorefront trail would need to be protected and improved.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th. highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: A small swimming area and bathhouse at this site would require approximately \$600,000 in construction costs and \$30,000 per year in operations costs. Floating pool costs are discussed in Section 6.

Environmental Conditions: The site extends several miles along the eastern shore of the Hudson River. The Park is located in the Vanderburgh Cove and Shallows Significant Coastal Fish and Wildlife Habitat area. The habitat area is characterized as a moderately disturbed area of moderately diverse good quality habitat. The principle feature of the significant habitat area is Vanderburgh Cove an extensive marsh area formed at the mouths of the Landsman Kill and Fallsburg Creek. The potential beach site is located approximately 6000 ft south of the Vanderburgh Cove area at the southern end of the significant habitat area. The

development of the site would not interfere with the designated use of the Park and since the site is not in the immediate vicinity of Vanderburgh Cove potential environmental impacts associated with increased boat traffic should not be a factor.

Two species listed by the NYSDEC; the shortnose sturgeon (endangered) and the pied-billed grebe (threatened) have been identified within the vicinity of the potential Mills-Norrie State Park beach site. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would be conducted during Phase II should plans for construction be advanced at this site.

Water Quality Considerations: Two water quality sampling locations are located within 5 miles of this site. Monthly data collected by Ulster County at Kingston Point Beach show that the fecal coliform criteria for NYSDEC and NYSDOH standards were not exceeded. Data collected by the Port Ewen sewer district show total coliform samples collected did not exceed water quality standards and a bacteriologic pathogen, *E. coli* was not found in the samples. Additional water quality investigations should also be performed at the site to determine its suitability, due to the lack of data necessary to determine if geometric mean criteria are exceeded.

Tides, Currents, Waves and Wakes. The feasible beach location is well protected from the south and northeast by shoreline headlands. A wide river will however, allow choppy waves from the north and west. The picnic area site is open from the north or south to winds, and the deep channel and signs of shoreline erosion indicate scour by currents and winter ice flows. The channel current at Mills Norrie is 2.0 fps, maximum tidal range is 3.6 feet.

LITTLE STONY POINT

Town of Philipstown.

Putnam County

River Mile 55

Ownership: New York State Office of
Parks, Recreation and Historic
Preservation

***The following analysis is offered to guide potential development of a beach. No action will be taken by the State of New York to develop swimming at this site without further examination and review.**

Beach Conditions: The site includes scenic rock outcrops that were mined for traprock in the past. A relatively flat section of the peninsula faces north, and the shore on this side of the property accumulated a deposit of fine quality beach sand.

The beach at Little Stony Point shows excellent potential. Nearly a thousand feet of northwest facing beach provides a wide choice of sites for the selection of an ideal small 150-foot area for a swimming beach. The eastern half of this beach appears to have better slopes and more protection from wakes created by ships in the River channel. This site also avoids a sunken wreck that is located off shore, further to the west. The western end of the beach could continue to serve boaters, so it would be less likely that boat landings would conflict with swimmers if the designated beach space was located nearer to the open river.

There are several constraints that any programmed use of Little Stony Point must overcome. The raised elevation of the new bridge required ramps that are currently too steep for some vehicles or use by the handicapped. With tight spaces, the bridge ramp constraints should be addressed with imaginative solutions. Limited space both on the peninsula and next to Route 9D is probably a greater constraint. The scenic rock outcrops, a small section of wetlands and wooded areas on the small peninsula are too valuable natural features to be used for all but the most necessary of facilities needed to support a programmed use. A cooperative effort with NYSDOT may help solve potential parking problems. The selection of only a “small” swimming program should not exceed the capacity



of the peninsula and associated parking limits, though 40-50 more parking spaces would be needed to support a swimming facility. An important feature of substantial concern to patron safety is the railroad lines that run between Route 9D and the beach. Patrons parked at a distance from the overpass may choose to cross these high-speed rail lines by foot. This situation would need to be addressed immediately.

Size of Feasible Facility and Other Potential Site Uses: The construction and operations costs representing “small” beach facilities may be appropriate for this site, even after adjustments to allow for a few mutually offsetting program components. This beach would accommodate an instant* beach population of 150 people, and a design day population of 300 people.

A combination walkway and service entrance road would lead to a bathhouse located behind the potential swimming beach, and perhaps to a picnic area located at the northeastern end of the peninsula. If the bathhouse is placed sufficiently far back from the beach it will allow for a natural visual buffer, preserving views from the river and to protect the structure from severe weather. The bathhouse would also serve as bathrooms for other activities planned for Little Stony Point.

It is unlikely that a sheltered pavilion will be part of the beach area design, given the tight spaces available at this location on Little Sony Point. Flood proofing of the building may be warranted in lieu of a pavilion. Additional costs may also be required to improve the bridge “ramps” and to bring utilities to the peninsula. Also adding parking in constrained locations may require added costs. These initial costs will however, open up the waterfront component of Hudson Highlands State Park for a number of activities, including swimming.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th. highest weekend day. This number is called the "instant population" accommodated by the site. Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: The estimated basic costs are \$600,000 for construction and \$30,000 for annual beach operations. The beach operations may be supervised



from the swimming operation at nearby Canopus Lake.

Environmental Conditions: The Highlands section of the Hudson River between mile points 44 and 56 has been designated the Hudson River Miles 44-56 Significant Coastal Fish and Wildlife Habitat Area. The significant habitat area also includes the New York Natural Heritage Program's Hudson River Miles 44-56 area. Little Stony Point is located on the eastside of the Hudson River just south of Breakneck Ridge. The proposed beach site runs along the north side of the Point. The Hudson River Miles 44-56 Significant Coastal Fish and Wildlife Habitat area is a relatively narrow 12-mile long deepwater section of the Hudson River with the habitat characterized as uniform that of excellent quality that has experienced limited disturbance. One limiting feature for shore zone development in the area is the railroad tracks that run along both sides of the River.

Two species listed as endangered by the NYSDEC, the shortnose sturgeon and the peregrine falcon are known to occur within the vicinity of Little Stony Point. In addition, two NYSDEC threatened species, the bald eagle and the fence lizard have also been observed in the vicinity. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would be conducted should plans for construction be advanced at this site.

Water Quality Considerations: The closest water quality stations to this location are data collected by the Poughkeepsie STP and data collected by the Rockland County Department of Health at Riverfront Park. These stations are located about 21 miles upstream and 16 miles downstream of the site respectively. Data from the Poughkeepsie sampling location is of limited use since no bacteriological data was collected. Data collected at Riverfront Park show that NYSDOH bacteriological criteria are exceeded at times. Since this sampling station is located far away from the beach site, additional data collection should be performed.

Tides, Currents, Waves and Wakes. The short, rocky peninsula protecting this northwest-facing beach also protects the site from the south and southwest. Located on a narrow reach of the Hudson, wakes from the ship channel to the west travel the length of the beach, and ebb tidal currents increase near the open river. Locating the guarded beach toward the middle or east side of the peninsula will limit these potential concerns. Wind generated waves from the northwest will cause occasional choppy conditions. The channel current at Little Stony Point is 1.7 fps, maximum tidal range is 3.1 feet.

WHITE BEACH (VERPLANCK)

Town of Cortlandt

Westchester County

River Mile 41

Ownership: Consolidated Edison Company of
New York, Inc.

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: The shoreline at White Beach (Verplanck) is composed of sand that is of good quality. The beach slope could support an excellent swimming beach. Natural deposition on the inside of this “meander” in the River will likely continue adding sand to this beach. A site just south of the former Consolidated Edison Company of New York, Inc. (Con Ed) fish hatchery appears to have the best slope for a beach. River currents may also favor this beach section for the development of swimming facilities.

Currently access to the ConEd site in White Beach (Verplanck) is via a quiet residential street. The total property does have the potential for a direct connection to Broadway, an arterial road street serving this community. Additionally, this same wide street has a roadside buffer that can be used to continue a landscaped walkway that would connect to “Hudson Greenway” trails proposed to connect from the south to Steamboat Landing Park, located at the south end of Broadway in Verplanck. A park on the Hudson would be a logical terminus to this section of the Hudson Greenway.

The former quarry operations on the White Beach (Verplanck) property present both a constraint and an opportunity. The sizable, deep, clear lake with steep sides is attractive, but can also be regarded as a hazard, if not treated effectively. A Hudson River beach adjoining this “lake” area would channel swimmers to a “beach”, an attraction that will readily compete with the quarry-lake for most people.

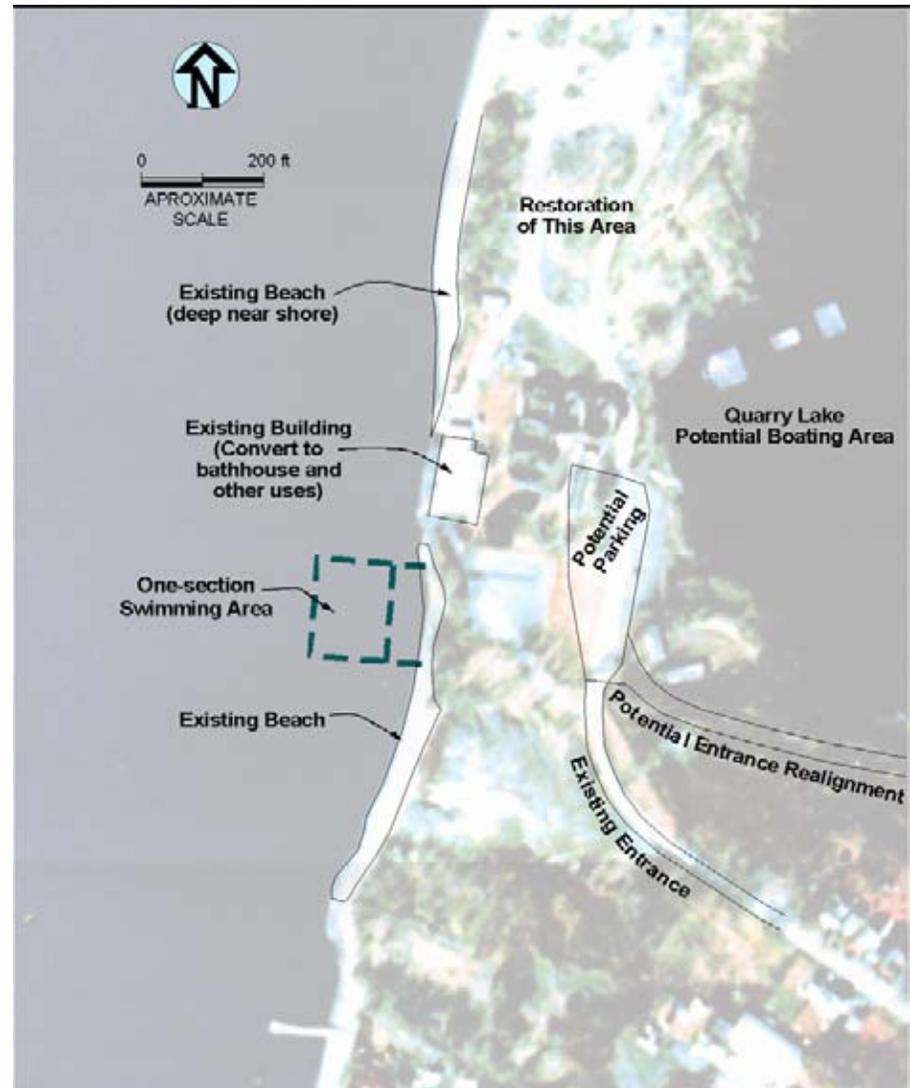


The concrete silos can be considered for adaptive uses such as prepared and supervised climbing walls, or art projects, which can also run by concession and/or by permit. If these silos are not used, there are demolition costs associated with these structures that must be considered. The towers of a power transmission line crossing the site would also need to be secured from public access. Adjoining land uses may need to be separated from the potential facility by fence or screen. This includes a gypsum plant to the north and an oil transfer site to the south of the site.

Size of Feasible Facility and Other Potential Site Uses: Though the White Beach (Verplanck) site offers a generous length of potential beach, the upland constraints of this site suggest a “small” scale beach swimming program, with an instant* population of 150 persons and a design day population of 300 persons. The designated swimming beach would be approximately 150 feet long and could be placed in a location that has the best slope and current conditions. The beach area would also be in close proximity to sufficient land and facilities to serve the beach. Also this level of use would not pose any traffic constraints on local roads, which are primarily residential. Though this project would have statewide significance in preserving an important Hudson River beach and access site, the park may function as a facility that primarily serves local and tourist needs.

The former fish hatchery building has ample space to support adaptive reuse as a bathhouse and comfort station and also serve as a park maintenance building and office, concession space, or for a small community meeting space. These and other adaptive uses require careful review to determine what activities are the best combinations of uses for the building. The suitability of this structure for adaptive reuse would need to be evaluated.

***Note:** "The design of recreational facilities is guided by how many people can be accommodated. Beaches and pools can be represented by the number of people found at a site on the afternoon of the design day, often the 10th highest weekend day. This number is called the "instant population" accommodated by the site.



Other times of the day or less popular days are then easily accommodated, while a few really crowded afternoons may exceed this number and necessitate turning away people or pre-scheduling the use to accommodate the pool or beach limitations."

Facility Budget Estimate: Adaptive use of a portion of this existing structure would not be less expensive than the construction of a simple new bathhouse. The existing on-site gravel road system may offer some benefits for future uses, but parking and perhaps most of the internal road system will probably be redesigned as part of any park project. In contrast, utilities on site may be readily adapted to park uses. The "small site" costs, discussed above, may be applicable for the proportional cost of a swimming program at this site, indicating \$600,000 for construction and \$30,000 / year for operation of the swimming facility.

The design of the park utilizing the remainder of the site will require careful planning to make the best use of the existing property and its resources and to minimize visual and security concerns. It is likely that construction and operation costs for the rest of the potential park at White Beach (Verplanck) may equal or exceed the costs associated with the Hudson beach elements. Acquisition of the site would add to these site development costs.

Environmental Conditions: The property along the eastern shore of the Hudson River was previously used as an environmental laboratory and fish hatchery. It is located south of the Indian Point Nuclear Generating Station and just north of the extensive Haverstraw Bay Significant Coastal Fish and Wildlife Habitat area. The Haverstraw Bay area is described as a vast shallow bay containing extensive shallows, especially along the eastern shore and a shipping channel maintained by periodic dredging to a depth of 35 feet below mean low water. The site is north of the significant habitat area and is currently used by boaters and area residents as a swimming site.

The bald eagle, listed as threatened by both the U.S. Fish and Wildlife Service and the NYSDEC, and the least bittern, also listed as threatened by the NYSDEC are the only protected species that have been found to occur within the vicinity of the potential White Beach (Verplanck) beach site. Although impacts to these species are not anticipated as a result of beach construction, further individual site analysis would be conducted during Phase II should plans for construction be advanced at this site.

Water Quality Considerations: The water quality stations closest to this site are those sampled by the Rockland County Department of Health. Four sites (Riverfront Park, Bowline Point, Hook Mountain, and Piermont Pier) were sampled between June 1990 and August 2000. The closest station, Riverfront Park is located about 3 miles upstream of the site. Data collected at Riverfront Park show that NYSDOH bacteriological criteria are exceeded at times. Additional water quality investigation should be performed to provide data that are more current.

Tides, Currents, Waves and Wakes. The beach site found most suitable because of its gradual slope at this location is also somewhat protected from the north and south by a very slight shoreline indentation, which also offers near shore protection from tidal currents and winds from the south, east and northeast. Wake from shipping along this narrow river reach at this location will require similar lifeguard procedures as are exercised at Ulster Landing Park. Winds from the southwest and northwest will carry occasional choppy waves to the beach. The channel current at White Beach (Verplanck) is 1.4 fps, maximum tidal range is 3.4 feet.

NYACK BEACH STATE PARK

Town of Clarkstown

Rockland County

River Mile 30.5

Ownership: New York State Palisades Interstate
Parks Commission

***The following analysis is offered to guide potential development of a beach. No action will be taken by the State of New York to develop swimming at this site without further examination and review.**

Beach Conditions: Though “small”, the beach has the slope and sand consistency for swimming, hinting at what this site may have looked like during its prime period of use. A small area, about 125 linear feet of this beach could accommodate a swimming program. This beach section is located at the far, southern end of the existing Park, distant from potential support facilities, making it less than optimal for a swimming program. Also the Park currently attracts substantial use, and serves as a point of access to a popular shoreline bike trail. This use fills the site’s limited parking.

The vertical stone wall along the Nyack Beach shoreline requires significant maintenance in the near future. The southern 150 feet of this wall is protecting an open blacktop area which offers little activity. This area is closer to the existing support facilities in the Park. A redesign of this section of the Park to eliminate part of the seawall, restore a groin, and restore the beach slope upland may bring a larger “beach” back to Nyack Beach in an area more suitable to the public. If this project is considered, then a period of evaluation of the reconstructed beach would follow, and precede any swimming program. This would include an analysis of access including adequate parking. It is recommended that removal of a portion of the sea wall be evaluated as part of any planned sea wall maintenance.

Nyack beach was used for swimming during the first half of the past century and may have necessitated on-shore developments during the 1930s at this popular park. A vertical stone wall located along the shoreline was a part of this project. Wave action deflected from this wall may have, however, contributed to the



erosion of the beach in front of the wall. A short stretch of natural beach remains south of the walled shoreline, and this section of beach was considered for a swimming program.

Size of Feasible Facility and Other Potential Site Uses: This site currently operates as a state park and is heavily used. Parking is currently a significant constraint and this problem would worsen if swimming were provided. With 125 feet of potential beach, if restored, this site would be a “small” site with instant population of 100, design day of 300.

Facility Budget Estimate: Not evaluated.

Water Quality Considerations: Not evaluated.

Tides, Currents, Waves and Wakes. A project to enhance the east-facing beach at this site should include groins, similar in scale to those successfully deployed at Riverfront Park and demonstrated by the pile of rubble on the neighboring shoreline, to the south. In addition to enhancing and protecting sand conditions, this project should also protect the shallow waters from wind-generated waves from the north and south and help restore sand beaches. The wide river can increase the fetch of wind generating winds from the east and from the north or south in open water facing this site. The channel current at Nyack Beach is 1.9 fps, maximum tidal range is 3.7 feet.

HUDSON RIVER PARK

Borough of Manhattan

New York County

River Mile 3.5

Ownership: New York State Department of Parks, Recreation and
Historic Preservation

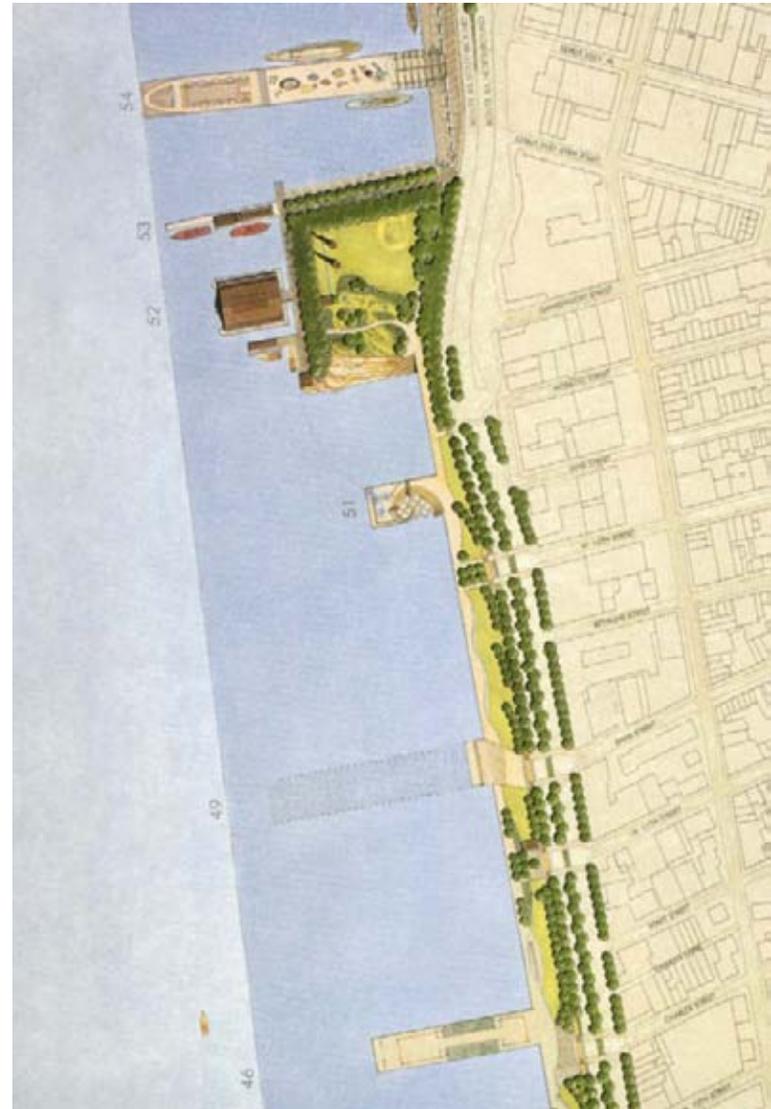
Operator: Hudson River Park Trust

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: A new park with great promise to serve millions of New York City residents, regional visitors and tourists is now being developed along the Hudson River shoreline of Manhattan. The opportunities along the west side of Manhattan for additional recreational activities are now being planned. Swimming, an historic use of the City's shorelines, including the Hudson, is one of the activities that are included in plans and were considered in this study.

Plans for the Hudson River Park in Manhattan indicate opportunities for a constructed beach at Piers 52-53, a peninsula with sufficient land to support a beach program, and offshore slopes that look promising for this consideration. Additionally several piers designated for active recreational uses, could accommodate a floating pool.

The possibility of providing a floating geotextile fabric filter that would allow the development of a beach in Hudson River waters off Manhattan, or as part of a natural water filtration and protection system for a floating pool using these same waters, is



discussed in Section 7. This study recommends tests of these filtering materials, to see if the water quality issues, in particular combined sewer overflows, can be solved in this area with filtering fabric enclosures. Additionally, a floating pool that has an on-board water treatment system, also discussed in Section 7, would meet Sanitary Codes, but perhaps would encounter environmental constraints.

The Hudson River Park Trust, along with State and City agencies' staff, are considering the possibilities discussed in this report, and perhaps other options as well, to address the need for additional swimming facilities along the Hudson in Manhattan. A number of organizations and many individuals responded enthusiastically to the concept of once again offering swimming along the Hudson in New York City, so these interests and needs will receive careful consideration.

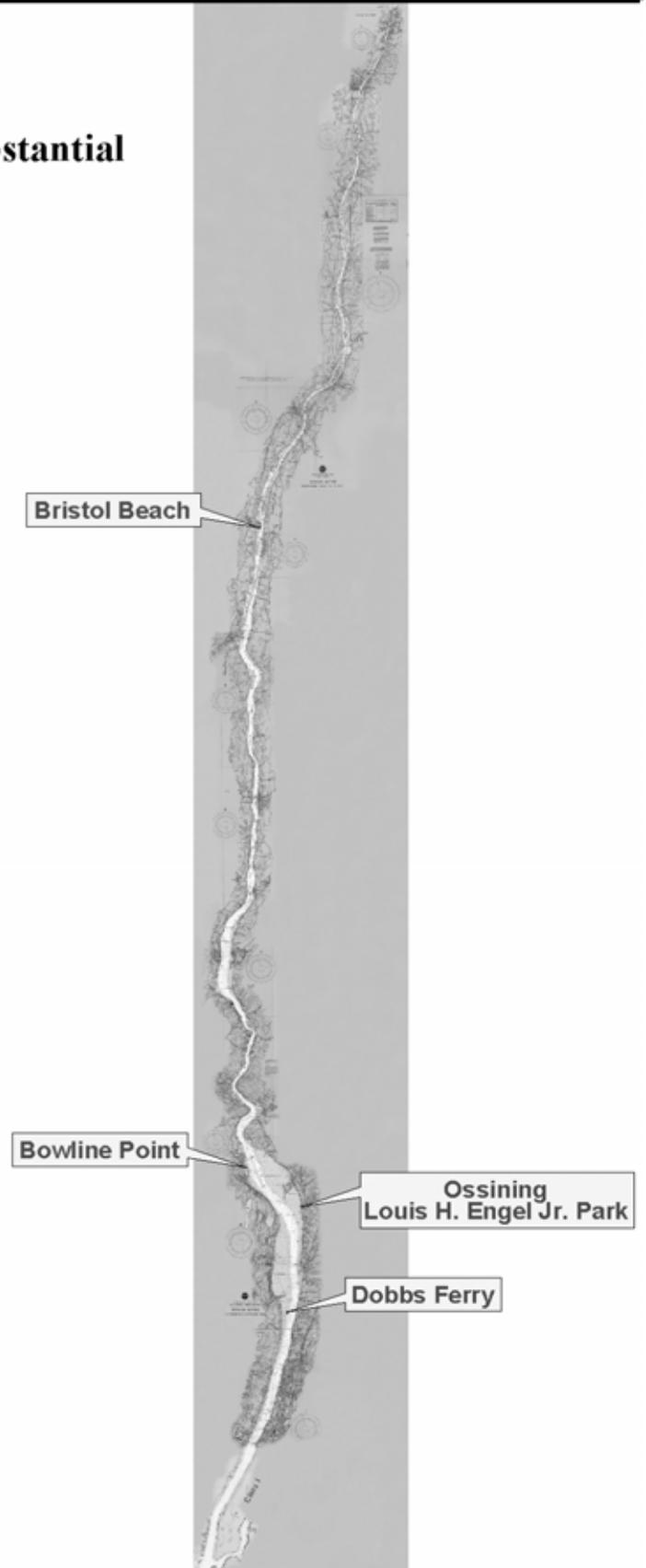
Size of Feasible Facility: Requires further evaluation.

Facility Budget Estimate: Requires further evaluation.

Water Quality Considerations: Unofficial swimming activities already occur at sites along Hudson River Park, noted and discussed in the survey. Some of the long and interesting history of floating pools along the Hudson is discussed in section 2.1 of this report. State water quality classification and NYC Swimming Regulations, section 4.2 of this report, make the implementation of a swimming beach or pool program within the Hudson's waters in New York City improbable at this time unless innovative concepts are not a part of the beach or pool design.

Tides, Currents, Waves and Wakes. Either a north or a south-facing beach on this peninsula can be considered at piers 52 / 53. A north-facing beach would be more consistent with other successful peninsula beaches upriver. Also a little sand deposition is already found along the north facing, pier 53 side. Such a location would offer good shelter for a north-facing beach. Long piers, only open to the west, protect the site from the wake of large vessels, small boat traffic and some of the wind from the northwest. A south facing beach, as is shown on conceptual plans, would be more exposed to wave systems from the open harbor. The channel current at piers 52/53 is 2.4 fps, maximum tidal range is 5.5 feet.

**6.3.4. Category D:
Potential New Sites with Substantial
Barriers to Development**



6.3.4 Category D: Potential New Sites With Substantial Barriers to Development

BRISTOL BEACH STATE PARK

Town of Saugerties

Ulster County

River Mile 105

Ownership: New York State Office of Parks,
Recreation and Historic Preservation

***The following analysis is offered to guide potential development of a beach. No action will be taken by the State of New York to develop swimming at this site without further examination and review.**

Beach Conditions: Bristol Beach State Park is essentially undeveloped property located north of the Town of Saugerties, in Ulster County. The northern end of the Park, Eve's Point, is maintained as a pastoral park, as initially intended by Scenic Hudson and other organizations that helped to secure this part of the Park. Eve's Point offers fine views of the Hudson, woods and open fields, a gazebo and portable toilets. At the south end of the Park and on properties that are soon to be added to the Park, long abandoned brickyard and clay mining operations have left a few dirt roads and industrial artifacts within dense woods and scrub and along the shoreline. The northern, Eve's Point and the southern "brickyard" shorelines are either steep with rock, brick or abandoned barges protecting the shore, or solid clay, both conditions are unsuitable for swimming beaches. The shoreline between the sections described above includes dense woods, scrub and wetlands, and a section that is regarded as the "beach".

This central section of Bristol Beach shore is currently difficult to access and is best approached by boat. A scenic bay has narrow, but promising looking beaches along its south shore. Unfortunately the water depth on the entire beach side of the bay is only one to two feet in depth and has considerable mud deposits. Approximately 200 feet south of the bay, depths improve for swimming and there is a longer section of sand, still overlain by mud.



The highest point of the “beach” is under a few inches of water at low tide. Wave-caused ripple marks continue from the beach into the nearby woods. There is no dry beach. The sand is a compact, clean, fine-grained dredged material. Over decades, these sediment deposits have been flattened to the base of wave troughs, so it is more of a sand bar than a beach. It may be fun to wade out to this site, then swim, but it is difficult to conceive of offering public swimming at Bristol Beach without providing any nearby dry beach. This in turn could require a significant beach building project or the careful consideration of adding clean sand from future dredging projects to create a beach design.

Size of Feasible Facility: Not evaluated due to obstacles presented at this site.

Facility Budget Estimate: Not evaluated due to obstacles presented at this site.

Environmental Conditions: The presence of aquatic plants in this area would likely make this site unsuitable from the standpoint of environmental impact. Wetland and habitat conditions in this part of the Park, as well as the engineering required to retain sand at this location make it a challenge for beach development. If swimming is ever to be contemplated at Bristol Beach, a master plan for the entire Bristol Beach State Park property and a full feasibility study evaluating a beach section for reconstruction and protection would be required. This study may not support development of swimming facilities.

Tides, Currents, Waves and Wakes. This site is open to ship wakes and wind-generated waves from the north, east and south. The wide river can increase the fetch of these wind-generated waves. In effect, the beach is facing open water in a 270-degree arc. The channel current at Bristol Beach is 2.4 fps, maximum tidal range is 4.2 feet.

BOWLINE POINT

Town of Haverstraw

Rockland County

River Mile 37

Ownership: Town of Haverstraw

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: Groins have been developed along the northwest Hudson shore of Bowline Park to prevent erosion. These groins have collected enough sand to form small beaches that have not been emphasized in the Park's design. These beaches are composed, in part, from red sand and pebbles left from bricks discarded in the 19th century (this same material is also characteristic of the Rockland County Park beach, one mile to the north). The beach slopes are a little steep, but acceptable. The Town of Haverstraw staff should review opportunities associated with the Bowline Point Park, as well as the actions that are taken at Rockland County Park to determine if a swimming program is warranted at the Town Park now or in the future.

The close proximity of a fuel off-loading pier, and the designed orientation of Bowline Point Park away from the Hudson beaches, removes this site from consideration for a swimming site. Additionally, the close proximity of Rockland County Park has to be noted if this location is considered. If a swimming program is successfully advanced at the nearby County Park, then Bowline Point Park beach could be reserved for future consideration, assuming demands warrant additional swimming in this area. If the county decides not to provide swimming at their site, this site would warrant further investigation and may be suitable for a small size facility, designed around existing structures.

Size of Feasible Facility: Not evaluated due to obstacles presented at this site.



Other Potential Site Uses: The Town of Haverstraw Park located on Bowline Point offers a number of notable attractions including a sizable outdoor stage, playgrounds and grassed playing fields, walkways, and fishing access. Power generating facilities and an oil delivery pier share this southeast end of the Bowline Peninsula with the Park, so scenic areas in the Park concentrate on a bay to the west and on the part of the Hudson to the southeast.

Facility Budget Estimate: Not evaluated due to obstacles presented at this site.

Tides, Currents, Waves and Wakes. Short groins protect shallow sections of east facing beaches at this site. The wide river in this reach can increase the fetch of wind-generated winds from the north, east or south in open water facing this site. Ships destined to unload at the adjoining pier can cause turbulence perhaps including wakes that would have to be evaluated if this site is considered. The channel current at Bowline Point is 1.4 fps, maximum tidal range is 3.4 feet.

OSSINING, LOUIS H. ENGEL Jr. PARK

Town of Ossining

Westchester County

River Mile 32

Ownership: Town of Ossining

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: Louis H. Engel Jr. Park, in Ossining, includes a small crescent shaped beach at the south end of the property. A narrow grassed strip is located behind the beach, separated from an adjoining road by a fence. This strip of land is used by visitors to access an old prison guard tower, which could serve as an interpretative site for visitors to the Ossining Urban Cultural Park. Other Park facilities are located several hundred feet to the north. A small restroom is closest, but probably too far removed and too small to be directly used as a bathhouse. Parking used by the Park as well as for the Metro-North railroad station, is further north from this area, but appears to be already in full use.



Though the upland section of the Park beach is considerably limited by the space available, a Step II survey was conducted for this beach due to interest expressed locally. The underwater slope and the sand quality of this beach were found to be good, and under other circumstances would have been feasible for a swimming facility.

A wastewater treatment plant is located approximately 500 feet to the south of Louis H. Engel Jr. Park beach. It is not clear where the treated effluent from this plant is discharged or if this effluent would remove this beach from consideration because of the provisions of the State Sanitary Code. There are, however, noticeable airborne sewage odors near the treatment plant. Though these odors are probably not associated with the discharge to the River, this condition may discourage acceptance of the site by some swimmers.

If the treated discharge location is found not to be a problem, if airborne odor control becomes more effective, and if the limited upland space can be resolved, Louis H. Engel Jr. Park would be a good swimming site. Pending these many conditions, it may be prudent to protect this beach for future consideration, but not to advance a swimming program at this site at this time.

Size of Feasible Facility: Not evaluated due to obstacles presented at this site.

Facility Budget Estimate: Not evaluated due to obstacles presented at this site.

Tides, Currents, Waves and Wakes. The southern bay in Louis H. Engel Jr. Park is well protected from waves and currents from the south by the peninsula housing the prison facilities. The channel current at the Park is 1.5 fps, maximum tide range is 3.6 feet. The bay is far enough from mid channel to negate wake problems. Winds from the west and northwest can generate choppy waves.

DOBBS FERRY

Village of Dobbs Ferry

Westchester County

River Mile 23

Ownership: Village of Dobbs Ferry

***This analysis is offered to guide potential development of a beach if the site owner wishes to pursue it. No action will be taken by the State of New York to develop swimming at this site without the consent and support of the site owner.**

Beach Conditions: Popular waterfront parkland with good access at Dobbs Ferry and community interests suggested that a small swimming program might be possible at a waterfront park located adjacent to the railroad station. A small crescent shaped beach located in this park offers good shelter from river currents. While this site would require additional upland area, this space could be gained only through the sacrifice of parking spaces.



A review of underwater conditions was advanced as the next stage of investigation of this site. Unfortunately, the survey boat could not get close to shore at low tide. Dense mud was within a foot of the water surface 210 feet from shore. Hand driven probes of this deposit indicated a heavier clay-like material up to 2 feet in depth. Once inserted, the probe could only be removed with some difficulty, and it is possible that this unacceptable material is even deeper. This sub-surface condition is unsuitable for a swimming beach. It is unlikely that this mud and clay deposit can be dredged and removed easily. Furthermore, there is a good chance that new mud would be deposited in the bay within a short time.

A second site was reviewed in Dobbs Ferry, located at the mouth of Wickers Creek. The sand deposited by the Creek was of good quality, both upland and underwater. The small delta formed by the Creek extended close to the open river, however, and water currents close to this location were strong and inconsistent. Therefore, this condition probably makes this site unacceptable for a swimming beach.

Size of Feasible Facility: Not evaluated due to obstacles presented at this site.

Facility Budget Estimate: Not evaluated due to obstacles presented at this site.

Tides, Currents, Waves and Wakes. This narrow beach is well protected by waves and currents from the south by a peninsula with park facilities and from the north by a larger landmass. The beach area is far enough from mid channel to negate wake problems. It is possible that the small scale of the bay and its protected location contribute to the deposition of silt. Winds from the west can generate choppy waves because of the width of the River at this location. The channel current at Dobbs Ferry is 2.2 fps, maximum tide range is 4.0 feet.

6.4 PERMIT NEEDS

This section describes the probable state, federal and local approvals associated with the development of public swimming facilities on the Hudson River.

The Hudson River is a State regulated water body pursuant to Article 15 of the Environmental Conservation Law (ECL). The NYSDEC is responsible for implementing this regulatory program through a permit system prescribed in 6NYCRR Part 608 – Use and Protection of Waters (Article 15). Accordingly, a Protection of Waters permit will be needed from NYSDEC for any proposed activities resulting in excavation or fill below mean high water and for structures or activities disturbing the river shoreline. Permitting for areas within New York City would be handled by Region 2 (Long Island City); areas between the southern Westchester and Rockland County lines north to the Greene/Columbia and Ulster/Dutchess County lines would be handled by Region 3 (New Paltz); beaches to the north would be handled by Region 4 (Schenectady). An expedited permitting and approval process will be available for smaller projects defined as “minor” under New York State DEC’s Uniform Procedures permit process. At some sites wetlands may be present. Wetlands which fall under U.S. Army Corps of Engineers (USACE) jurisdiction would require permits for any filling activity and could also trigger permits for some types of excavation.

Hudson River wetlands in many cases are mapped and regulated under Article 24 ECL in which case permits are required for activities that could impair any of the functions or benefits of wetlands. For new facilities or expansions of existing facilities located south of the Tappan Zee Bridge, Article 25 tidal wetlands permits may also be required (6 NYCRR Part 661). However, some activities are exempt from Article 25, such as the maintenance of existing facilities, including beaches. Each project would need to be reviewed on a case-by-case basis to determine if Article 25 applies. All State agency decisions, including decisions on the issuance of permits, the provision of financial assistance, or activities directly proposed or undertaken by a State agency, are required by Article 42 of the New York State Executive Law to be consistent with the New York State coastal policies found in 19 NYCRR Part 600.5, or as expressed in a Local Waterfront Revitalization Program (LWRP) approved by the Secretary of State.

Since some of the anticipated structures (both temporary and permanent) associated with the beaches might be considered “fill” under Section 404 of the Clean Water Act, approval from the U.S. Army Corps of Engineers (USACE) will also be required. As the work is expected to be modest at each of the proposed sites, the work will likely be covered by one or more Nationwide Permits (NWP) currently authorized by USACE. NWPs potentially applicable to the proposed creation of bathing beaches are #3 (Maintenance), #18 (Minor Discharges) and #19 (Minor Dredging). The NWPs #18 and #19 are applicable to discharges and dredge activities of not more than 25 cubic yards, respectively. Individual water quality certifications pursuant to Section 401 of the Federal Water Pollution Control Act may be required from NYSDEC. All federally permitted activities must be consistent with the applicable policies of the New York State Coastal Management Program and will be reviewed by the Department of State as required by 15 CFR Part 930 and the federal Coastal Zone Management Act of 1972, as amended.

Mooring buoys, swim floats, and other structures are also regulated by a Floating Objects Permit under New York State Navigation Law. Aids-to-Navigation permits may also be required from the U.S. Coast Guard. The NYSOPRHP regulates floating objects in state navigable waters. The NYSOPRHP should also be consulted regarding the potential for historic/archaeological resources at the proposed bathing beach sites. The New York State Office of General Services (NYSOGS) administers permits for the use of underwater lands owned by the state. Prior grants and easements for each bathing beach site will have to be reviewed to determine if approval is needed from NYSOGS. Areas within Hudson River Park in New York City are subject to the jurisdiction of the Hudson River Park Trust. Other permits and approvals that may be required on a location-by-location basis include but are not limited to County Health Department approvals, Town or County highway departments (road opening or road closures), New York State Department Transportation (railroad crossings), and local building departments.

SECTION 7

ALTERNATIVE SWIMMING FACILITY OPTIONS

7.1 BEACH PROTECTION SYSTEMS

Potential Hudson River estuary swimming areas, primarily those sites located in the northern Class C section and southern estuary sites around Manhattan, may be affected by particulate matter and associated contaminants and pathogenic organisms, which could impair the health and safety of swimmers particularly after it rains, when sewers in some places can overflow. One technique currently used to maintain safe-swimming conditions at swimming facilities is a beach protection boom such as the Beach Protection System (BPS™) manufactured by Gunderboom, Inc., a custom-designed fabric boom, which is deployed around the perimeter of the swimming area to protect water quality and mitigate safety hazards from floating matter such as drift wood. The Gunderboom BPS™ is currently deployed at beaches in several tidally influenced locations including Sea Cliff Village Beach, Sea Cliff, New York.

In March 1994, an article in the Journal of Environmental Health (Guido et al. 1994) reported on the Westchester County Health Department's evaluation of a Gunderboom Beach Protection System™ (BPS™) at the Village of Mamaroneck in Westchester County. The boom installed at Mamaroneck Harbor Beach on Long Island Sound in 1992, reduced total and fecal coliform bacteria counts by 62%. Lawler, Matusky and Skelly Engineers LLP (LMS) evaluated the use of a Gunderboom Marine Life Exclusion System™ (MLES™) at the Lovett Generating Station on the Hudson River (LMS 2001) as a means of lowering ichthyoplankton entrainment in the cooling water intake. The report concluded that use of the Gunderboom MLES™ resulted in a significant reduction of entrainable organisms. The Lovett evaluation program has been instrumental in the development of a boom anchoring system capable of maintaining the boom in the tidal portion of the Hudson River and in confirming the effectiveness of an air burst cleaning system.

While beach protection systems such as the Gunderboom BPS™ would still require testing for use at selected Hudson River swimming sites, it does offer a technology which could maintain swimming waters at considerably higher quality than the surrounding river water, and also significantly reduce the potential impact on swimmers from boat wakes and tidal currents.

7.2 FLOATING POOLS

Floating pools were investigated as a possible solution for locations where natural beaches are unavailable or unacceptable for public swimming. Historic records from the 19th Century and early 20th Century were examined, which revealed that floating pools were once extensively used for public swimming in the Hudson River around Manhattan Island, drawing millions of swimmers annually (Figure 7-1).

Although it is unlikely that the 19th Century design would be acceptable today, it is possible that a smaller floating pool can be designed for use in the Hudson River on New York City's

waterfront, and possibly for other Hudson River locations that do not have favorable prospects for beaches. One concept would involve cribwork supported by flotation, open to the flow of river water. The pool would be totally dependent on river quality conditions. Swimming “cribs” suspended on piles are currently used for the group camps located on Harriman State Park lakes and are an example of this design concept, though they are smaller than what might be needed on the Hudson. A Hudson River floating “pool” (crib) would need to be designed to maintain correct water depth within all tidal ranges. A docking site with sufficient depth to accommodate all tide levels and wave conditions would be needed for this floating vessel. Winter storage would also be required. Support facilities could be located on the shore, a pier or on the floating structure. Utility connections to shore could be relatively simple.

The advantage of this design is that the public would actually swim in the river, though inside of a protected structure. Given good river water conditions and good circulation, water treatment would not be required. The disadvantage of this design is that contamination in the river would shut the facility down, and turbidity could impair operations or the aesthetic condition of the water in the pool.

Another version of this floating pool/crib could include a geotextile fabric (Gunderboom – like fabric) envelope surrounding the crib. The highly porous material would generally have sufficient interchange with the ambient water to maintain satisfactory water quality conditions and geotextile fabric would help filter the water, thus achieving a more aesthetically pleasing swimming experience. A pump could be incorporated in the design to aid water circulation if required. This system would also maintain good circulation even at slack tide. This option would reduce some of the uncertainty pertaining to water conditions.

A floating pool would face substantial regulatory hurdles due to potential impact on aquatic habitat (see section 6.4 Permit Needs). The viability of this concept merits further discussion and analysis with state and federal regulators.

7.3 HUDSON RIVER PARK PLAN REVIEW

The General Project Plan for development of Hudson River Park in Manhattan and the parks’ existing conditions were reviewed as part of this study. Hudson River Park development plans include two possible beach areas, one south of Pier 76 and one on the south side of the Gansevoort Peninsula. In addition to the beach sites, Hudson River Park also has several sites that could be developed to accommodate floating pools.

Coordination with the Hudson River Park Trust, the entity with jurisdiction over park properties, as well as modification of the park General Project Plan and approvals from the NYSDEC and USACE would be required before plans for floating pools within Hudson River Park could proceed. In addition, New York City regulations currently preclude the siting of bathing beaches along the Hudson River from the Harlem River to the Battery.

Other solutions will be required if swimming projects in the Hudson are to be advanced in this high demand area. The possibility of protecting a swimming site from pollutants from periodic

combined sewer overflow may be accomplished through the use of a geotextile fabric filter, such as the “Gunderboom”. The use of these innovative techniques to protect swimming sites during their operating season needs to be researched at this location, and the New York City Health Department would need to be contacted to determine if such alternative approaches could meet City regulations and standards. Possibly one initial component of this analysis would be to protect one or more small test areas on an experimental basis to see if suitable water quality can be maintained with the help of this type of seasonal protective barrier.

SECTION 8 ADDITIONAL STUDIES NEEDED

This Feasibility Study has determined that the development of public swimming facilities is a viable option at various locations along the Hudson River. The study also identified several specific sites where development of a beach is likely feasible, either in the near term or after specific issues are addressed. In some cases, further research of study is needed. The following is a listing of actions that may help to advance the development of swimming facilities along the Hudson River.

- Though erosion and sand deposition play important roles at all existing and potential Hudson River beaches, some swimming sites require special attention to this issue at this time. Among the existing beaches, Ulster Landing County Park has experienced this problem to the point that it must be addressed in the near term. Since beach erosion management requires analysis and remediation techniques that are uniquely focused on this resource, it may be practical to address the needs associated with this popular Hudson River swimming site as a part of any assessment of this issue at some of the new Hudson swimming sites proposed in this study. At Ulster Landing County Park as well as any other site, care needs to be taken to ensure preservation of the natural beauty and scenic character of the site.
- Due to the limited availability of site-specific water quality data, a comprehensive water quality survey is recommended for any site designated for development as a public swimming facility to determine the feasibility of developing that site from a water quality perspective.
- Two potential swimming sites, the Town of Bethlehem's Henry Hudson Town Park in Albany County and Schodack Island State Park in Rensselaer County, are in Class C waters, which would need to be reclassified to B in order for a beach to be established at these locations. This process would be initiated once a decision is made by NYSDEC or a third party to seek establishment of a beach there. A study of water quality would be undertaken to represent conditions during an entire summer swimming season, or year round. In addition, this water quality analysis should include an assessment of the additional capital requirements which would be needed at local treatment plants and CSO discharges and a review of opportunities to fund needed improvements as part of an overall public swimming initiative. Permit conditions for nearby sewage treatment plants will need to be analyzed.
- The vertical stone wall along the Nyack Beach shoreline requires significant maintenance in the near future. The southern 150 feet of this wall is protecting an open blacktop area, which offers little activity. A redesign of this section of the Park to eliminate part of the seawall, restore a groin, and restore the beach slope upland may bring a larger "beach" back to Nyack Beach in an area more suitable to the public. It is recommended that removal of a portion of the sea wall be evaluated as part of any planned maintenance of the sea wall.
- Hudson River Park. Tests of geotextile filtering materials will be needed to determine if

water quality issues, in particular combined sewer overflows, can be solved in this area with filtering fabric enclosures until such time as planned State investments in water quality improvements are completed. Additionally, a floating pool concept could be explored, but perhaps would encounter environmental constraints, which need to be investigated.

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