APPENDIX V

HUDSON RIVER PUBLIC SWIMMING FACILITIES FEASIBILITY STUDY

Site Selection Criteria for Step I Screening

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) in coordination with the New York State Department of State (NYSDOS) and the New York State Department of Health (NYSDOH) are conducting a study to determine the feasibility of developing public swimming facilities in the Hudson River Estuary. The study is being conducted in two phases. The first phase includes circulation and analysis of a swimming survey prepared by the NYSDEC, public input into site review in the form of public meetings, and a two step evaluation of the sites to determine which are most feasible for creation of new public swimming facilities or improvements to existing facilities. The second phase of the study will focus on more detailed planning for those sites and facilities that were selected from this Phase I effort.

The first part of phase one involved compiling a list of potential swimming facility sites along the Hudson River between the Federal Dam at Troy, NY and the Battery at the southern end of Manhattan. This incorporated the results of the Hudson River swimming survey, which requested locations where people currently swim as well as where they swam in the past, and locations suggested during public comment from a series of public meetings. The second part of phase I, currently underway, will analyze the potential site list to determine which have the best potential to be developed or improved.

This report outlines the procedure for the first step of analysis in determining feasible sites for swimming beaches. The goal of this step is to identify any constraints to the development and operation of a beach, which either alone, or in combination with other factors, may result in elimination of a site from consideration. To accomplish this, site inspections were made and available data were reviewed. Several specific criteria were identified and each potential beach site was evaluated using these criteria. The criteria include beach conditions, accessibility, hydraulic conditions, water quality, construction and operational considerations.

Final ratings for the Step I evaluations were based upon this information and the expert judgement of the consultant team. Given the tolerances of this Step I screening, however, one or two points in rating differences between the better rated sites and those slightly lower should not preclude further evaluation, based upon program requirements and opportunities. The Step II evaluation will be a more in-depth analysis for those sites that are recommended for further consideration. A detailed description of the rating criteria and process for each criterion in the Step I review follows.

Beach 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 several of these factors were rated as marginal will have little chance to establish a beach - based swimming program. Each of the four factors was rated, and beaches were then ranked accordingly.

The quality of sand or acceptable beach materials

Optimum sand beaches are a scarce and valuable resource along the Hudson River estuary. Shores constrained by rip - rap protecting fill or other structures limit the potential of some sites. Steep, rocky shores and wetlands preclude other river shorelines from being recommended. The best beaches are formed by sand that is deposited and sorted through the natural action of the river currents and waves. Ironically, many of these beach deposits are clean dredged materials; sand dredged or pumped from the shipping channel during the past 80 years, which has stabilized in a new near shore location. Natural or man made, good beaches are both stable and constantly changing at the same time. The river, tributaries or augmentation replenish sand that is lost through regular or occasional scouring. A surface of sorted, uniform sand granules are constantly being reworked by the river, keeping the beach clean, comfortable underfoot, and at an optimal angle for swimming and other uses. Sand is moved through a natural littoral process with each wave, tide cycle or annual changes in the river and its sediment regime. Natural and properly placed man-made structures enhance this dynamic process and help form these beaches, trapping and retaining sand, while poorly designed structures can result in accelerated erosion.

The ratings used for existing beach materials in the Step I screening process are based on an initial appraisal of beach material at the proposed sites. The following is a description of the scoring used for the Step I beach conditions category.

Score:

8 Good quality sand that is sorted and stabilized through natural processes is the primary ingredient for the best beach sites. The sand granules are well sorted, rounded by erosion, but large enough to be seen without magnification. Waves coming on shore percolate through the beach leaving no puddles, which may indicate a high component of silts and mud.

4 Small stones or pebbles can also make an acceptable beach. These stones should not be sharp underfoot, and should allow water to percolate through. Substrate granule size up to 0.5-in is acceptable. Stable, silty sand is also an acceptable beach surface, though slow water peculation, or wind blown silt can pose problems.

2 Smooth stone surfaces can produce an acceptable entry, though if infrequently used, algae can make these surfaces slippery. Cracks and uneven surfaces can also become problematic. Entrance from stairs or a pier can facilitate an easier entry at these sites.

1 Solid clay or glacially deposited till can also form an acceptable surface for occasional swimming access, though large numbers of users will produce a slippery bottom and/or sediment plumes .

0 Large rocks, rip-rap, piling or other remnants of man made structures (that can not be economically cleaned-up) or mud, wetlands and bog are unacceptable surfaces for swimming entry. These sites are both uncomfortable and unsafe.

Waterfront Slope

A good beach provides easy access to the water, but this obvious observation requires further definition. A long flat entry can be frustrating for swimmers and difficult for lifeguards. When combined with considerable tidal ranges the placement of swimming area lifelines and upland facilities are also more successful where beach slopes are apparent, but not steep. Very steep sand slopes on the other hand present dangers for small children, and may be an indication of erosion that will be accelerated by use and water currents. Optimum beach slopes are indicated in the rating scale below:

Score:

8 Slopes of approximately 6 to 8% with a gradual drop-off are an optimum slope for a swimming beach. The State's requirements (State Sanitary Codes) recommend that this gradual slope extend to 4-ft. depth, however for predicable management and the consideration of diving from rafts, this gradual drop-off should continue, preferably up to 14-in depth at low tide.

4 Beach slopes from 3 to 5% or 9 to 20% can also be acceptable, but understandably the closer to the optimum, the better. The extremes in these rages of beach slopes may require special consideration of beach design and management for safety and comfort.

1 Marginal slopes, too flat or too steep for easy use require unusual design and management solutions, and may never become optimal areas for the entire range of beach activities including, safety for toddlers and desirable deep water areas for swimmers. A stable beach surface is imperative for a steep or excessively flat beach.

0 Dangerous slopes, with sharp drop-offs, holes, or ledges pose problems and should be avoided in public beach selection.

Shoreline available for a public beach

Oceanfront barrier beaches provide unlimited options for beach location and operations; the best point of access determines where operations will be set up. The potential Hudson River beach sites do not offer this luxury. Beach availability is a limiting factor that determines the location, and sometimes the scale of operations. Existing public beaches on the Hudson and in similar areas indicate that a 200 ft. beachfront will accommodate successful beach operations serving a peak instant population of 300 to 400 people. Though many measurements of "capacity" are based on square feet of beach or water surface, linear guarded beachfront is often a better predictor of comfortable use levels. Longer beach segments allow the establishment of more than one guarded beach section that can be opened to accommodate peak use crowds. Short beaches are limiting if

more than a few people need to be accommodated. The following beach length ranges have been used to represent these selection criteria:

Score:

8 200 ft. or more of beach is an optimum beach site on the Hudson. At least one marked and guarded area will fit into this length of beach. Additional beach next to the designated guarded area is always helpful to accommodate more people on blankets and to provide a buffer from boating activities. Beach users can find adequate space in these longer areas for water access and shallow water play areas. Swimmers can use the length of deep water along a long marked beach with comfort.

4 100 to 200 ft. of beachfront will accommodate a modest public swimming program and provide for recreational need at many locations within the project area. In a few areas, a small site will pose operational constraints that will require limiting access to match site limits.

2 Small community beaches of 50 to 100 ft. may provide adequate facilities for a small local population or the campers at an existing park. These very limited scale beaches will accommodate 40 to 80 people.

0 Limited or no beach shorelines may look desirable for occasional use or for access from a private residence, but cannot be considered for a public beach.

Available dry (upland) beach or grassed area

Though people come to a beach to swim and play in the water, they spend most of their time on land, near the beach shore. Many bring equipment ranging from a simple blanket to chairs, umbrellas, a cooler, and play equipment. This requires approximately 8 to 10 square feet of space for each person that is "at the beach". The instant population on the beaches during the peak, warm weekend days usually show flexible use patterns. If the "beach" looks crowded, the family or group will set up their equipment for the day at a nearby lawn, deck or picnic site. Favorite spots on the beach, a little above high water and at sites with good views or shade will fill up first. Details such as the locations of garbage cans, lifeguard stations, and rest rooms can dictate where people settle first and last.

For the Step I screening, beaches were not measured precisely, with linear beach measurements determined through measured pace length estimates. Beach depth was usually measured in one average spot, and then adjusted for the approximate tide phase during the inspection. Since a few inches of water depth results in feet of linear upland impacts, this measurement was at best an approximation. In some locations high tide levels were indicated by debris lines or other visible features of the beach, which were used when available. In order to categorize beach width criteria, the following dry beach width ranges were considered:

Score:

8 30 ft. or more width of dry beach at approximately average high tide levels. Grassy or decked areas can serve this same requirement. This dry, flat (but well drained) area should be generally behind the swimming beach shoreline.

4 10 to 30 ft. width of dry area can accommodate immediate beachfront activities, but will require that other upland facilities accommodate most families or groups who come to use the Hudson for recreation.

2 5 to 10 ft. of dry beach at most times within the tide cycle will accommodate lifeguard operations, and the beach users who want to get into the water or need to watch children. Upland areas will serve a proportionally small instant population found at the waterfront.

0 Little or no back-beach will limit the use and the operation of the area. Special operational issues will have to be resolved to permit the establishment of a public program.

Total Beach Conditions Rating

The four rating factors discussed above were totaled then divided by ten to result in one score of similar value to the other site selection criteria. The three higher rating scales are then rounded to the nearest number, as follows:

Raw Score	Step I Score
Total rounded scores of 30 or more	3
Total rounded scores of 20	2
Total scores of 10 to 14	1
Scores 9 or less	0

Accessibility

Many comments noted on the Hudson River Swimming surveys as well as conversations with, and observations of swimmers in the River indicated that people use some remote and sometimes unsafe places for swimming, fishing and other activities. Perhaps the only action that could preclude these waterfront activities is stringent enforcement of restrictions. The ability to evade enforcement was as important as site quality or safety in predicting which locations are being used for swimming. Exacerbating the use of unsafe swimming sites were the access routes used to get to these locations. High-speed rail lines are crossed at many unsanctioned locations and the rail rights of way are used to get to the best spot for river access. Trespass, sometimes facilitated by holes in fences, is not uncommon. People scramble down steep, eroding slopes and slog across wet areas at low tide. Children cross roads at unexpected spots, and cars are parked in many questionable locations. Many come by water, but the landing sites and the boats that are used are often of concern. The lack of experience with tidal cycles poses a hazard to many using these sites and a nuisance to rescue personnel. These situations may have to be addressed when the all

encompassing issue of access to the Hudson is considered, but these observations offer little guidance for developing access to the new public swimming beaches that are being considered.

The swimming sites that are selected for beaches should either have good, safe accessibility now, or should permit the development of access within an available, cost effective program. Without safe access, or the potential for constructing or arranging for access, the best of potential sites cannot be recommended. All modes of access were considered, however the ability to drive to upstate beaches and to use mass transit in the New York City area were the primary characteristic considered at this stage of study. Good pedestrian, bicycle and boat access as well as the potential for charted bus accommodations were also noted where possible at this stage of study.

The following swimming facility access categories were developed for the Step I screening:

Score:

3 Good access (either highways readily serve the site and added traffic can be accommodated), or public transit access is linked to the site or within easy walking distance. Existing routes provide safe bike / pedestrian access. If automobile or bus predominates, existing or easily developed parking is available.

2 Access is acceptable and safe, with limited improvements. Transit may be arranged such as chartered bus service, or existing lines can be extended to the site. Well-designed road shoulders provide for/or can be improved for pedestrian and bicycle access. Traffic impacts can be mitigated.

1 Significant improvements to access are required, but can be accommodated on the site and its environs. A new bridge over the railroad or the requirement to add a new bus or ferry service would be in this rating category.

0 Access solution is unlikely. Landlocked parcel with a requirement to traverse difficult terrain or unavailable parcels are examples. The use of the property would pose significant dangers associated with access or limits to the type of population that can be accommodated (i.e. ADA requirements may not be met).

Hydraulic Conditions

The hydraulic conditions of the river are an important aspect of site consideration. Water velocity as well as tidal range has an effect on the feasibility of developing a site as well as site safety. Channel current velocity measures the speed at which the river water passes a particular point. As channel current increases, the skill level of the swimmer must increase and at some point the current becomes too dangerous even for accomplished swimmers. Tidal range is the change in the height of the river between low and high tide. At low tide, it may appear that a good beach area exists at some locations, when in fact, during high tide, the beach may disappear due to the rise in water level.

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. The following is a description of the scoring process for Step I hydraulic conditions.

Channel Current Velocity

Score:

3 Current velocity ranges from 0.0 to 1.8 feet per second.

2 Current velocity ranges from 1.9 to 2.6 feet per second.

1 Current velocity ranges from 2.6 to 2.9 feet per second.

0 Current velocity is greater than or equal to 3.0 feet per second.

Channel Tide Height

Score:

3 Spring tidal range fell between 0.0 and 3.7 feet.

2 Spring tidal range fell between 3.8 and 4.3 feet.

1 Spring tidal range fell between 4.4 and 4.9 feet.

0 Spring tidal range was greater than 5.0 feet.

Total Hydraulic Conditions Rating

Raw Score	Step I Score
5-6	3
4	2
2-3	1
0-1	0

Water Quality

New York State waters are classified in accordance with the type of use for which they are most suited. Waters along the Hudson River are classified as A, B, SB, C, or I. The majority of the river is classified as swimmable. This classification system helps to determine the most feasible sites for swimming beaches. There are also locations along the river that fall into swimmable classifications, but due to either combined sewer overflows (CSOs) or discharges from wastewater treatment plants (WTP), the area water quality may not be acceptable for swimming at all times.

The New York State Sanitary Code requires any beach to be a minimum of 750 feet from any waste-water treatment plants or CSOs (NYS Sanitary Code, Chapter 1, subpart 6-2.19, section 4.10)

The Step I screening uses water classification as well as the location of CSO and WTP's to develop an overall score for water quality at each site. The individual scores for water classification and distance of CSO/WTP's were totaled to obtain a raw score. This raw score was then broken down to reflect the 0-3 scoring range used for the other Step I parameters. The following is a description of the scoring process for Step I water quality conditions.

NYSDEC Water Classifications

Score:

8 Swimming permitted. This score indicates that the site is more than 12 river miles from the point where the river classification changes from non-swimmable to swimmable waters.

6 Swimming permitted. This score indicates that the site is between 7 and 12 river miles of the point where the river classification changes from non-swimmable to swimmable waters.

4 Swimming permitted. This score indicates that the site is between 0 and 6 river miles from the point where the river classification changes from non-swimmable to swimmable waters.

2 No swimming permitted – good potential. This score indicates that although the site falls within waters that are classified non-swimmable, these areas have the potential to be reclassified as swimmable if water quality continues to improve.

0 No swimming permitted

Proximity of CSO/WTP Outfalls

Score:

8 Outfall distance > 2 miles from the potential beach site

6 Outfall distance >1 but < 2 miles from the potential beach site

4 Outfall within 1 mile of the potential beach site

2 Outfall within 750 ft of beach of the potential beach site

0 Outfall adjacent to potential beach site

Total Water Quality Rating

Raw Score	Step I Score
13-16	3
9-12	2
5-8	1
0-4	0

Construction and Operational Considerations

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 0-3 scoring range used for the other Step I parameters. The following is a description of the scoring process for Step I construction and operational considerations.

Parking Area Available/Transportation

Score:

3 Parking is available on site or adjacent to the property (may or may not include mass transit)

2 Off-site parking with mass transit to potential beach area

1 Parking area is extremely limited

0 There is no parking or transportation facilities available for the potential site

Landside Construction Considerations/Soil Type

Score:

3 Good Soil Conditions found on site

2 Poor Soil conditions found on site

1 Rocky, steep terrain found on site

0 Wetlands/tidal marshes predominate at the site

Waterside Construction Considerations

Score:

3 Minimal or no construction costs associated with constructing a public swimming facility

2 Low construction costs associated with constructing a public swimming facility

1 Moderate construction costs associated with constructing a public swimming facility

0 High construction costs associated with constructing a public swimming facility

Site Extras

Score:

3 Three or more aspects
2 2 aspects
1 1 aspect
0 0 aspects

Total Construction and Operational Considerations Rating

Raw Score	Step I Score
10-12	3
7-9	2
4-6	1
0-3	0

Results

The Step I screening process resulted in narrowing the initial list of 60 potential sites to 22 sites that are most feasible for further analysis. The following table lists the names of sites considered most feasible in each county.

County	Site Name
Albany County	Henry Hudson Park
Rensselaer County Columbia County	Schodack Island State Park (peninsula) Stuyvesant (Riverview Park)
Greene County	Four Mile Point Road
Ulster County	Bristol Beach State Park Saugerties Village Beach (Esopus Creek) Ulster Landing County Park Kingston Point Park Port Ewen
Dutchess County	Mills – Norrie State Park
Orange County	Kowawese Unique Area at Plum Point
Putnam County	Little Stony Point (Sandy Beach)
Rockland County	Riverfront Park Rockland County Park Bowline Point Nyack Beach State Park
Westchester County	Verplanck – Consolidated Edison Co. of NY, Inc. Croton Point/Westchester County Park Ossining, Louis H. Engel, Jr. Park Kingsland Point County Park Dobbs Ferry
Manhattan County	Hudson River Park

The results of the Step I screening can be found in Attachment I. The scoring system consisted of 6 categories with a maximum score of 3 in each category. The 5 categories were totaled for possible 15 points to be scored for each site. Sites that attained a score of 12 or higher, and those with lower scores but significant public interest, were proposed for further evaluation under the Step II screening process.

Appendix V

Step I Screening
Hudson River Swimming Facilities

29-Aug-00

Proposed Site Name	County	River Mile	River Shore	Beach History	Ownership	Tier I Screening Criteria: Water Quality	Hydraulic Conditions	Accessibility	Beachfront Conditions	Construction and Operational Feasibility	Total Score
The Federal Dam at Troy, New York		154									
Watervliet Park	Albany	152	W		M	0	2	3	2	1	8
Corning Preserve/Hudson Linear Park	Albany	146.5	W		M	0	2	2	0	1	5
Rensselaer (North of High School)	Rensselaer	146.5	E		X	0	2	1	2	1	6
City of Albany-South End	Albany	145	W		M/P	0	1	2	0	0	3
Henry Hudson Park-Town of Bethlehem	Albany	138.5	W		M	1	2	3	3	2	11
Papscanee/Campbell Islands (peninsula)	Rensselaer	138.5	E		N	1	2	1	0	0	4
Schodack Island State Park (peninsula)	Rensselaer	135	E	I	S	1	2	2	2	1	8
Bronck Island	Greene	127.5	W	I	N	2	1	1	1	0	5
Stuyvesant (Riverview Park)	Columbia	127	E	I	S	2	1	2	3	2	10
Nutten Hook	Columbia	125	E		S	1	1	2	1	0	5
Coxsackie Riverfront Park	Greene	125	W	I	M	1	2	3	1	1	8
Gays Point and Stockport Middle Ground Island	Columbia	122.5	E	I	S	3	1	1	2	0	7
Four Mile Point Road	Greene	121.5	W		N	3	1	2	2	1	9
Middle Ground Flats	Columbia	119.5		I	P	2	1	1	2	0	6
St. Lawrence Cement Company	Columbia	118	E		P	2	1	2	0	0	5
Rogers Island	Columbia	115	E		S	2	1	0	0	0	3
Dutchman's Landing Park	Greene	113.5	W		M	2	1	3	1	1	8
Greene Point	Greene	110	W		X	3	1	1	1	1	7
Cheviot (Germantown)	Columbia	106.5	E		M	2	1	2	0	0	5
Bristol Beach State Park	Ulster	105	W	I	S	2	1	2	2	0	7
Saugerties Village Beach (Esopus Creek)	Ulster	102.5	E	I	M	2	3	2	2	2	11
Cruger Island	Dutchess	99.5	E	I	S	3	1	1	1	0	6
Barrytown	Dutchess	97.5	E		M	3	1	1	0	0	5
Ulster Landing County Park	Ulster	97	W	C	M	3	1	3	3	3	13
Charles Rider Park	Ulster	95.5	W		M	2	1	2	0	0	5
Ulster Town Park	Ulster	94.5	W		M	3	1	3	1	3	11
Kingston Point Park	Ulster	92	W	C	M	2	1	3	3	3	12
Port Ewen	Ulster	90.5	W	P	M	2	2	2	1	3	10
Mills -- Norrie State Park	Dutchess	87	E	I	S	3	3	2	2	2	12
Black Creek Forest Preserve	Ulster	84	W	I	N	3	3	0	1	0	7
Bard Rock	Dutchess	83	E	I	Fed	3	3	1	0	0	7
Hudson Psychiatric Center (HPC)	Dutchess	78	E		S	3	3	2	0	1	9
Marist College	Dutchess	77	E		P	2	3	1	0	0	6
Poughkeepsie - Waryas Park	Dutchess	76	E	I	M	2	2	2	0	3	9
Poughkeepsie - Kaal Rock	Dutchess	75	E		M	2	2	2	0	1	7
Central Hudson/Traprock	Orange	65 - 68	W		X	3	3	1	1	0	8
Dennings Point State Park	Dutchess	60	E	I	S	2	3	2	1	1	9
Eastern Harbor Marine	Orange	64	W		X	3	3	2	1	0	9
Kowawese Unique Area at Plum Point	Orange	58	W	I	S/M	3	3	2	2	2	12
Little Stony Point (Sandy Beach)	Putnam	55	E	I	S	2	3	2	3	2	12
Constitution Island	Putnam	53.5	E		S	2	3	1	1	0	7
Iona Island	Rockland	45	W	I	S	3	2	1	1	1	8
Verplanck - Consolidated Edison of NY, Inc.	Westchester	41	E	I	P	3	3	2	3	2	13
Stony Point State Historic Park	Rockland		W	I	S	3	3	0	1	0	7
George's Island	Westchester	39.5	E		M	3	3	2	1	2	11
Oscawana	Westchester	39	E		M	3	3	1	0	0	7
Riverfront Park	Rockland	39	W			3	3	3	1	3	13
Rockland County Park	Rockland	37.5	W	C		2	3	3	2	3	13
Bowline Point	Rockland	37	W	I	M	3	3	2	1	2	11
Croton on Hudson (Village Beach)	Westchester	37	E		M	3	3	1	1	1	9
Crawbuckie Park	Westchester	36.5	E		M	3	3	1	1	0	8
Croton Point/Westchester County Park	Westchester	36	E	C	M	3	3	3	3	3	15
Ossining, Louis H. Engle, Jr. Park	Westchester	32	E			3	3	3	2	2	13
Nyack Beach State Park	Rockland	30.5	W	P	S	3	3	2	2	3	13
Nyack Memorial Park	Rockland	28.5	W		M	3	3	2	0	2	10
Kingsland Point County Park	Westchester	28	E	P	M	2	3	3	3	2	13
"BA" Beach Tarrytown	Westchester	26	E			2	3	0	1	0	6
Piermont Pier	Rockland	25	W	I	M	2	3	1	0	0	6
Dobbs Ferry	Westchester	23	E			2	2	3	1	2	10
Hudson River Park (Piers 52/53)	Manhattan	3.5	E	I	S/M	0	0	2	1	2	5
The Battery	Manhattan	0									

Selection for Tier II
11 to 15
6 to 10
0 to 5

Beach History
C=Currently or recently an operating beach
P= Operated as a beach in the past
I= Well-used inofrmal site

Ownership
S= State ownership
M= Municipal ownership
N= Not for profit ownership
P= Private, possibly available/ willing seller
X= Private, unlikely to be available

Accesiblility Rating
3 = Good access
2 = Acceptable access
1 = Significant improvements needed
0 = Solution to access problem is unlikely

Beachfront Conditions - Step I Screening
Hudson River Swimming Facilities

29-Aug-00

Proposed Site Name	County	River Mile	River Shore	Screening Criteria: Available Beach Material	Beach Slope	Available Beach Shoreline	Area Available Above High Water Line	Raw Score	Total Score
The Federal Dam at Troy, New York		154							
Watervliet Park	Albany	152	W	8	8	2	0	18	2
Corning Preserve/Hudson Linear Park	Albany	146.5	W	0	0	4	2	6	0
Rensselaer (North of High School)	Rensselaer	146.5	E	8	4	8	2	22	2
City of Albany-South End	Albany	145	W	0	0	2	0	2	0
Henry Hudson Park-Town of Bethlehem	Albany	138.5	W	4	8	8	8	28	3
Papscanee/Campbell Islands (peninsula)	Rensselaer	138.5	E	4	0	0	0	4	0
Schodack Island State Park (peninsula)	Rensselaer	135	E	8	6	0	8	22	2
Bronck Island	Greene	127.5	W	4	4	4	4	16	1
Stuyvesant	Columbia	127	E	8	8	8	4	28	3
Nutten Hook	Columbia	125	E	4	4	2	0	10	1
Coxsackie Riverfront Park	Greene	125	W	0	4	2	4	10	1
Gays Point and Stockport Middle Ground Island	Columbia	122.5	E	8	4	2	4	18	2
Four Mile Point Road	Greene	121.5	W	4	8	4	2	18	2
Middle Ground Flats	Columbia	119.5		8	4	4	2	18	2
St. Lawrence Cement Company	Columbia	118	E	0	4	2	2	8	0
Rogers Island	Columbia	115	E	0	1	2	0	3	0
Dutchman's Landing Park	Greene	113.5	W	8	0	2	0	10	1
Greene Point	Greene	110	W	8	4	0	0	12	1
Cheviot (Germantown)	Columbia	106.5	E	0	1	2	0	3	0
Bristol Beach State Park	Ulster	105	W	8	8	2	0	18	2
Saugerties Village Beach (Esopus Creek)	Ulster	102.5	E	8	8	4	4	24	2
Cruger Island	Dutchess	99.5	E	2	4	2	2	10	1
Barrytown	Dutchess	97.5	E	0	0	2	2	4	0
Ulster Landing County Park	Ulster	97	W	8	8	8	4	28	3
Charles Rider Park	Ulster	95.5	W	0	4	2	0	6	0
Ulster Town Park	Ulster	94.5	W	0	4	4	4	12	1
Kingston Point Park	ULster	92	W	8	8	8	8	32	3
Port Ewen	Ulster	90.5	W	4	0	8	4	16	1
Mills -- Norrie State Park	Dutchess	87	E	8	8	4	0	20	2
Black Creek Forest Preserve	Ulster	84	W	4	4	2	2	12	1
Bard Rock	Dutchess	83	E	1	0	2	0	3	0
Hudson Psychiatric Center (HPC)	Dutchess	78	E	0	4	2	0	6	0
Marist College	Dutchess	77	E	0	0	1	2	3	0
Poughkeepsie - Waryas Park	Dutchess	76	E	0	0	1	2	3	0
Poughkeepsie - Kaal Rock	Dutchess	75	E	0	0	1	2	3	0
Central Hudson/Traprock	Orange	65 - 68	W	4	4	2	0	10	1
Dennings Point State Park	Dutchess	60	E	4	4	2	2	12	1
Eastern Harbor Marine	Orange	64	W	4	4	2	0	10	1
Kowawese Unique Area at Plum Point	Orange	58	W	4	8	8	2	22	2
Little Stony Point (Sandy Beach)	Putnam	55	E	8	8	8	4	28	3
Constitution Island	Putnam	53.5	E	4	2	2	2	10	1

Quality of Available Beach Material	
0	Large rocks, rip-rap, piles, or other man made structures
1	Solid clay or till
2	Stone slab/smooth surface/wading level with solid surface
4	Small stone/pebbles, not sharp, consolidated/stable silt/sand
8	Good quality sand

Waterfront/Beach Slope	
0	Sharp drop off, dangers, ledges, holes
1	Marginal slope/flat or steep for easy use, protection and maintenance
4	3 to 5% or 11 to 20% slope
8	6 to 10% slope, even drop off to deep water

Shoreline Area Available for a Public Beach	
0	limited or no beach shore available
2	Between 50 ft and 100 ft of linear beach available
4	Between 100 ft and 200 ft of linear beach available
8	200 ft or more of linear beach available

Area Available for Beach, Grassy Area (Now/Future) or Dry Deck Area	
0	Little or no back-beach area above high water
2	5 to 10 ft back of swimming shoreline, occasional narrowing
4	10 to 20 ft consistently back of swimming shoreline
8	30 or more ft consistently back of swimming shoreline

Scoring Criteria	
0	less than or equal to 8
1	Scores between 9 and 16
2	Scores between 17 and 24
3	Scores between 25 and 32

Beachfront Conditions - Step I Screening 29-Aug-00
Hudson River Swimming Facilities

Proposed Site Name	County	River Mile	River Shore	Screening Criteria: Available Beach Material	Beach Slope	Available Beach Shoreline	Area Available Above High Water Line	Raw Score	Total Score
Iona Island	Rockland	45	W	4	0	2	4	10	1
Verplanck - Consolidated Edison of NY, Inc.	Westchester	41	E	8	4	8	8	28	3
Stony Point State Historic Park	Rockland	40	W	4	4	2	0	10	1
George's Island	Westchester	39.5	E	4	4	2	0	10	1
Oscawana	Westchester	39	E	1	4	2	0	7	0
Riverfront Park	Rockland	39	W	4	4	8	0	16	1
Rockland County Park	Rockland	37.5	W	4	4	8	8	24	2
Bowline Point	Rockland	37	W	4	4	0	8	16	1
Croton on Hudson (Village Beach)	Westchester	37	E	2	4	4	2	12	1
Crawbuckie Park	Westchester	36.5	E	4	4	2	2	12	1
Croton Point/Westchester County Park	Westchester	36	E	8	8	8	8	32	3
Ossining, Louis H. Engle, Jr. Park	Westchester	32	E	8	4	4	2	18	2
Nyack Beach State Park	Rockland	30.5	W	8	8	4	4	24	2
Nyack Memorial Park	Rockland	28.5	W	0	4	4	0	8	0
Kingsland Point County Park	Westchester	28	E	8	8	8	4	28	3
"BA" Beach Tarrytown	Westchester	26	E	8	4	0	0	12	1
Piermont Pier	Rockland	25	W	0	0	0	4	4	0
Dobbs Ferry	Westchester	23	E	8	4	2	0	14	1
Hudson River Park (Piers 52/53)	Manhattan	3.5	E	0	4	8	2	14	1
The Battery	Manhattan	0	E						

Hydraulic Conditions - Step I Screening
Hudson River Swimming Facilities

29-Aug-00

Proposed Site Name	County	River Mile	River Shore	Current Velocity	Tidal Range	Score (Average)
The Federal Dam at Troy, New York		154				
Watervliet Park	Albany	152	W	3	0	2
Corning Preserve/Hudson Linear Park	Albany	146.5	W	3	0	2
Rensselaer (North of High School)	Rensselaer	146.5	E	3	0	2
City of Albany-South End	Albany	145	W	2	0	1
Henry Hudson Park-Town of Bethlehem	Albany	138.5	W	2	1	2
Papscanee/Campbell Islands (peninsula)	Rensselaer	138.5	E	2	1	2
Schodack Island State Park (peninsula)	Rensselaer	135	E	2	1	2
Bronck Island	Greene	127.5	W	1	1	1
Stuyvesant, Office of General Services Land	Columbia	127	E	1	1	1
Nutten Hook	Columbia	125	E	1	1	1
Coxsackie Riverfront Park	Greene	125	W	1	2	2
Gays Point and Stockport Middle Ground Island	Columbia	122.5	E	0	2	1
Four Mile Point Road	Greene	121.5	W	0	1	1
Middle Ground Flats	Columbia	119.5		0	1	1
St. Lawrence Cement Company	Columbia/Greene	118	E & W	0	1	1
Rogers Island	Columbia	115	E	0	1	1
Dutchman's Landing Park	Greene	113.5	W	0	1	1
Greene Point	Greene	110	W	0	1	1
Cheviot (Germantown)	Columbia	106.5	E	0	1	1
Bristol Beach State Park	Ulster	105	W	0	1	1
Saugerties Village Beach	Ulster	102.5	E	1	1	1
Cruger Island	Dutchess	99.5	E	1	1	1
Barrytown	Dutchess	97.5	E	1	1	1
Ulster Landing County Park	Ulster	97	W	1	1	1
Charles Rider Park	Ulster	95.5	W	1	1	1
Ulster Town Park	Ulster	94.5	W	1	1	1
Kingston Point Park	ULster	92	W	1	1	1
Port Ewen	Ulster	90.5	W	2	2	2
Mills -- Norrie State Park	Dutchess	87	E	2	3	3
Black Creek Forest Preserve	Ulster	84	W	2	3	3
Bard Rock	Dutchess	83	E	2	3	3
Hudson Psychiatric Center (HPC)	Dutchess	78	E	2	3	3
Marist College	Dutchess	77	E	2	3	3
Poughkeepsie - Waryas Park	Dutchess	76	E	2	3	3
Poughkeepsie - Kaal Rock	Dutchess	75	E	2	3	3
Central Hudson / Traprock	Orange	66 - 67	W	2	3	3
Dennings Point State Park	Dutchess	60	E	2	3	3
Eastern Harbor Marine	Orange	64	W	2	3	3
Kowawese Unique Area at Plum Point	Orange	58	W	2	3	3
Little Stony Point (Sandy Beach)	Putnam	55	E	2	3	3
Constitution Island	Putnam	53.5	E	2	3	3
Iona Island	Rockland	45	W	2	3	3
Verplanck - Consolidated Edison of NY, Inc.	Westchester	41	E	2	3	3
Stony Point State Historic Park	Rockland	40	W	2	3	3
George's Island	Westchester	39.5	E	2	3	3
Oscawana	Westchester	39	E	2	3	3
Riverfront Park	Rockland	39	W	2	3	3
Rockland County Park	Rockland	37.5	W	2	3	3
Bowline Point	Rockland	37	W	2	3	3
Croton on Hudson	Westchester	37	E	2	3	3
Crawbuckie Park	Westchester	36.5	E	2	3	3
Croton Point/Westchester County Park	Westchester	36	E	2	3	3
Ossining, Louis H. Engle, Jr. Park	Westchester	33.5	E	2	3	3
Nyack Beach State Park	Rockland	30.5	W	2	3	3
Nyack Memorial Park	Rockland	28.5	W	2	3	3
Kingsland Point County Park	Westchester	28	E	2	3	3
"BA" Beach Tarrytown	Westchester	26	E	2	3	3
Piermont Pier	Rockland	25	W	2	3	3
Dobbs Ferry	Westchester	23	E	1	2	2
Hudson River Park	Manhattan	3.5	E	0	0	0
The Battery	Manhattan	0	E			

Channel Current Velocity	
Velocity Range (fps)	Score
0.0 - 1.8	3
1.9 - 2.5	2
2.6 - 2.9	1
3.0 +	0

Channel Tide Height	
Spring Tidal Range (ft)	Score
0.0 - 3.7	3
3.8 - 4.3	2
4.4 - 4.9	1
5.0 +	0

Water Quality - Step I Screening
Hudson River Swimming Facilities

29-Aug-00

Proposed Site Name	County	River Mile	River Shore	Screening Criteria: CSO/WTP Outfall Distance	Screening Criteria: Classification Permits Swimming	Screening Criteria: Raw Score	Score
The Federal Dam at Troy, New York		154					
Watervliet Park	Albany	152	W	2	0	2	0
Corning Preserve/Hudson Linear Park	Albany	146.5	W	4	0	4	0
Rensselaer (North of High School)	Rensselaer	146.5	E	4	0	4	0
City of Albany-South End	Albany	145	W	4	0	4	0
Henry Hudson Park-Town of Bethlehem	Albany	138.5	W	6	2	8	1
Papscanee/Campbell Islands (peninsula)	Rensselaer	138.5	E	6	2	8	1
Schodack Island State Park (peninsula)	Rensselaer	135	E	6	2	8	1
Bronck Island	Greene	127.5	W	8	4	12	2
Stuyvesant	Columbia	127	E	6	4	10	2
Nutten Hook	Columbia	125	E	4	4	8	1
Coxsackie Riverfront Park	Greene	125	W	2	4	6	1
Gays Point and Stockport Middle Ground Island	Columbia	122.5	E	8	6	14	3
Four Mile Point Road	Greene	121.5	W	8	6	14	3
Middle Ground Flats	Columbia	119.5		4	6	10	2
St. Lawrence Cement Company	Columbia	118	E	4	6	10	2
Rogers Island	Columbia	115	E	4	8	12	2
Dutchman's Landing Park	Greene	113.5	W	2	8	10	2
Greene Point	Greene	110	W	8	8	16	3
Cheviot (Germantown)	Columbia	106.5	E	4	8	12	2
Bristol Beach State Park	Ulster	105	W	4	8	12	2
Saugerties Village Beach (Esopus Creek)	Ulster	102.5	E	4	8	12	2
Cruger Island	Dutchess	99.5	E	6	8	14	3
Barrytown	Dutchess	97.5	E	6	8	14	3
Ulster Landing County Park	Ulster	97	W	6	8	14	3
Charles Rider Park	Ulster	95.5	W	4	8	12	2
Ulster Town Park	Ulster	94.5	W	6	8	14	3
Kingston Point Park	ULster	92	W	4	8	12	2
Port Ewen	Ulster	90.5	W	4	8	12	2
Mills -- Norrie State Park	Dutchess	87	E	6	8	14	3
Black Creek Forest Preserve	Ulster	84	W	8	8	16	3
Bard Rock	Dutchess	83	E	8	8	16	3
Hudson Psychiatric Center (HPC)	Dutchess	78	E	6	8	14	3
Marist College	Dutchess	77	E	4	8	12	2
Poughkeepsie - Waryas Park	Dutchess	76	E	4	8	12	2
Poughkeepsie - Kaal Rock	Dutchess	75	E	2	8	10	2
Central Hudson/Traprock	Orange	65 - 68	W	8	8	16	3
Dennings Point State Park	Dutchess	60	E	4	8	12	2

Proximity of CSO/WTP Outfall	
0	Outfall adjacent to beach
2	Outfall within 750 ft of beach
4	Outfall within one mile
6	Outfall distance > 1 but < 2 mile
8	Outfall distance > 2 mile

Hudson River Classification (modified)	
0	No swimming permitted
2	No swimming permitted-good potential
4	Swimming permitted (0-6 miles from nonswimmable waters)
6	Swimming permitted (7-12 miles from nonswimmable waters)
8	Swimming permitted (>12 miles from nonswimmable waters)

Tier I Screening Score	
0	0-4
1	5-8
2	9-12
3	13-16

Water Quality - Step I Screening
Hudson River Swimming Facilities

29-Aug-00

Proposed Site Name	County	River Mile	River Shore	Screening Criteria			Score
				CSO/WTP Outfall Distance	Classification Permits Swimming	Raw Score	
Eastern Harbor Marine	Orange	64	W	6	8	14	3
Kowawese Unique Area at Plum Point	Orange	58	W	6	8	14	3
Little Stony Point (Sandy Beach)	Putnam	55	E	4	8	12	2
Constitution Island	Putnam	53.5	E	4	8	12	2
Iona Island	Rockland	45	W	6	8	14	3
Verplanck - Consolidated Edison of NY, Inc.	Westchester	41	E	6	8	14	3
Stony Point State Historic Park	Rockland	40	W	6	8	14	3
George's Island	Westchester	39.5	E	6	8	14	3
Oscawana	Westchester	39	E	8	8	16	3
Riverfront Park	Rockland	39	W	8	8	16	3
Rockland County Park	Rockland	37.5	W	4	8	12	2
Bowline Point	Rockland	37	W	6	8	14	3
Croton on Hudson (Village Beach)	Westchester	37	E	8	8	16	3
Crawbuckie Park	Westchester	36.5	E	8	8	16	3
Croton Point/Westchester County Park	Westchester	36	E	8	8	16	3
Ossining, Louis H. Engle, Jr. Park	Westchester	32	E	6	8	14	3
Nyack Beach State Park	Rockland	30.5	W	8	8	16	3
Nyack Memorial Park	Rockland	28.5	W	8	8	16	3
Kingsland Point County Park	Westchester	28	E	4	6	10	2
"BA" Beach Tarrytown	Westchester	26	E	4	6	10	2
Piermont Pier	Rockland	25	W	4	6	10	2
Dobbs Ferry	Westchester	23	E	4	6	10	2
Hudson River Park (Piers 52/53)	Manhattan	3.5	E	0	0	0	0
The Battery	Manhattan	0	E				

Construction and Operational Considerations - Step I Screening
Hudson River Swimming Facilities

29-Aug-00

Proposed Site Name	County	River Mile	River Shore	Screening Criteria: Parking Availability	Landside Construction Considerations	Waterside Construction Considerations	Site Extras	Raw Score	Score
The Federal Dam at Troy, New York		154							
Watervliet Park	Albany	152	W	3	2	0	1	6	1
Corning Preserve/Hudson Linear Park	Albany	146.5	W	1	3	1	0	5	1
Rensselaer (North of High School)	Rensselaer	146.5	E	0	1	1	2	4	1
City of Albany-South End	Albany	145	W	1	0	0	2	3	0
Henry Hudson Park-Town of Bethlehem	Albany	138.5	W	2	2	3	1	8	2
Papscanee/Campbell Islands (peninsula)	Rensselaer	138.5	E	0	0	0	0	0	0
Schodack Island State Park (peninsula)	Rensselaer	135	E	2	1	1	1	5	1
Bronck Island	Greene	127.5	W	0	0	2	0	2	0
Stuyvesant	Columbia	127	E	1	3	3	0	7	2
Nutten Hook	Columbia	125	E	1	0	1	0	2	0
Coxsackie Riverfront Park	Greene	125	W	3	2	0	1	6	1
Gays Point and Stockport Middle Ground Island	Columbia	122.5	E	0	0	2	1	3	0
Four Mile Point Road	Greene	121.5	W	1	1	3	0	5	1
Middle Ground Flats	Columbia	119.5		0	0	3	0	3	0
St. Lawrence Cement Company	Columbia	118	E	1	0	1.5	0	2.5	0
Rogers Island	Columbia	115	E	0	0	0	0	0	0
Dutchman's Landing Park	Greene	113.5	W	3	2	0	1	6	1
Greene Point	Greene	110	W	0	3	2.5	0	5.5	1
Cheviot (Germantown)	Columbia	106.5	E	1	0	0	1	2	0
Bristol Beach State Park	Ulster	105	W	0	1.5	1.5	0	3	0
Saugerties Village Beach (Esopus Creek)	Ulster	102.5	E	3	3	2	1	9	2
Cruger Island	Dutchess	99.5	E	0	1	0	0	1	0
Barrytown	Dutchess	97.5	E	1	0	0	1	2	0
Ulster Landing County Park	Ulster	97	W	3	3	3	2	11	3
Charles Rider Park	Ulster	95.5	W	1	0	0	1	2	0
Ulster Town Park	Ulster	94.5	W	3	3	2	2	10	3
Kingston Point Park	ULster	92	W	3	3	3	2	11	3
Port Ewen	Ulster	90.5	W	3	3	2	2	10	3
Mills -- Norrie State Park	Dutchess	87	E	1	3	1	2	7	2
Black Creek Forest Preserve	Ulster	84	W	0	0	2	0	2	0
Bard Rock	Dutchess	83	E	0	0	0	1	1	0
Hudson Psychiatric Center (HPC)	Dutchess	78	E	1	2	0	1	4	1
Marist College	Dutchess	77	E	1	0	0	1	2	0
Poughkeepsie - Waryas Park	Dutchess	76	E	3	3	1.5	2	9.5	3
Poughkeepsie - Kaal Rock	Dutchess	75	E	2	0	0	2	4	1
Central Hudson/Traprock	Orange	65 - 68	W	0	0	2	0	2	0
Dennings Point State Park	Dutchess	60	E	1	1	2	0	4	1
Eastern Harbor Marine	Orange	64	W	1	0	1	1	3	0
Kowawese Unique Area at Plum Point	Orange	58	W	2	2	3	1	8	2
Little Stony Point (Sandy Beach)	Putnam	55	E	1	3	3	0	7	2
Constitution Island	Putnam	53.5	E	0	1	1	0	2	0

Parking Area Availability/Transportation	
0	None
1	Extremely Limited
2	Off Site with Mass Transit
3	On Site or Adjacent

Landside Construction Considerations-Soil Type	
0	Wetlands Predominate
1	Rocky, Steep Terrain
2	Poor Soil Conditions
3	Good Soil Conditions

Waterside Construction Considerations	
0	High Construction Costs
1	Moderate Construction Costs
2	Low Construction Costs
3	Minimal or No Construction Costs

Site Extras	
0	None
1	One
2	Two
3	Three or More

Tier One Screening Score	
0	0 to 3
1	4 to 6
2	7 to 9
3	10 to 12

Construction and Operational Considerations - Step I Screening
Hudson River Swimming Facilities

29-Aug-00

Proposed Site Name	County	River Mile	River Shore	Screening Criteria: Parking Availability	Landside Construction Considerations	Waterside Construction Considerations	Site Extras	Raw Score	Score
Iona Island	Rockland	45	W	2	1	0	1	4	1
Verplanck - Consolidated Edison of NY, Inc.	Westchester	41	E	1	3	3	1	8	2
Stony Point State Historic Park	Rockland	40	W	0	0	2	0	2	0
George's Island	Westchester	39.5	E	3	1	1.5	1	6.5	2
Oscawana	Westchester	39	E	0	1	1	0	2	0
Riverfront Park	Rockland	39	W	2.5	2	2.5	3	10	3
Rockland County Park	Rockland	37.5	W	3	3	3	2	11	3
Bowline Point	Rockland	37	W	3	3	2	1	9	2
Croton on Hudson (Village Beach)	Westchester	37	E	2	3	0	1	6	1
Crawbuckie Park	Westchester	36.5	E	1	1	1	0	3	0
Croton Point/Westchester County Park	Westchester	36	E	3	3	3	2	11	3
Ossining, Louis H. Engle, Jr. Park	Westchester	32	E	2.5	3	3	0	8.5	2
Nyack Beach State Park	Rockland	30.5	W	3	3	2	2	10	3
Nyack Memorial Park	Rockland	28.5	W	3	3	0	1	7	2
Kingsland Point County Park	Westchester	28	E	3	2	3	1	9	2
"BA" Beach Tarrytown	Westchester	26	E	0	0	0	0	0	0
Piermont Pier	Rockland	25	W	1	0	0	2	3	0
Dobbs Ferry	Westchester	23	E	3	1	2	1	7	2
Hudson River Park (Piers 52/53)	Manhattan	3.5	E	3	2	1	2	8	2
The Battery	Manhattan	0	E						

APPENDIX V
REFERENCES

Herzog, Carl. 2000. Reed's Nautical Almanac East Coast 2000.

NYSDOH. 1998. Chapter I State Sanitary Code. Subpart 6-2, Bathing Beaches. Bureau of Community Sanitation and Food Protection.

New York State Department of Parks, 2000. Personal communications.