

# INTERSTATE SANITATION COMMISSION

*A TRI-STATE ENVIRONMENTAL AGENCY*



1990 COLIFORM SAMPLING IN THE HUDSON RIVER  
TO DETERMINE THE FEASIBILITY OF SWIMMING

SUMMARY REPORT

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1990 Coliform Sampling in the Hudson River  
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Introduction

In 1986, the Interstate Sanitation Commission (ISC) and the environmental departments of the States of New York and New Jersey upgraded the portion of the Hudson River from its confluence with the Harlem River north to the New York/New Jersey border to "swimmable/fishable" -- ISC Classification "A". Several of the beach sites in and north of the upgraded portion of the Hudson River have been closed for swimming for many years due to high coliform bacteria densities and aesthetic blight. During the summer of 1987, the Commission conducted a limited coliform survey at 10 sites in the upgraded portion of the Hudson River and found the results encouraging.

During the summer of 1988, the ISC conducted a coliform survey at 16 stations in the Hudson River from just south of the upgraded portion to Iona Island near Bear Mountain. Prior to conducting the survey, the agencies responsible for opening swimming areas were contacted for the necessary sampling protocols and for suggested sampling locations. Those agencies were the state environmental and health departments in New York and New Jersey, the health departments in Westchester County and in New York City, and the Palisades Interstate Park Commission. The 16 sampling stations were located along the west and east shores of the Hudson River. A map and listing of the station locations are shown in Figure A-1 and Table A-1, respectively. The samples were taken at the shoreline from marinas, waterfront parks and beaches. The results of the 1988 survey indicated that some portions of the Hudson River could possibly be reopened for swimming.

During the summer of 1990, the Commission conducted another coliform sampling survey at the same stations sampled in 1988. Fecal and total coliform data were collected for comparison to the swimming criteria of the States of New York and New Jersey.

### Sampling Procedures

Samples for fecal and total coliforms were taken at all stations 10 times during a 30-day period. The 30-day period is derived from both the New Jersey and New York coliform criteria for bathing beaches (see Table A-2). Fecal and total coliform analyses were run using the 5-tube, 3-dilution MPN test using dilutions to yield resulting MPNs in the range of  $\leq 20$  to  $\geq 24,000$  per 100 ml. The samples were taken at the shoreline from marinas, waterfront parks and beaches at the the station locations shown in Figure A-1 and Table A-1. All samples were preserved by cooling to 4<sup>o</sup> C and brought to the ISC laboratory where all analyses were started within six hours of the time of sampling.

### Sampling Results and Conclusions

A summary of the results of the 1990 coliform sampling is shown in Table A-3. Only two stations met the swimming criteria for fecal coliforms -- Station 5 at Hook Mountain State Park and Station 11 at Croton Point Park. Many of the other stations were not far above the fecal coliform criteria of  $\leq 200/100$  ml for the geometric mean. However, the three stations in New Jersey also failed to meet that state's requirement that no more than 10 percent of the samples taken in a 30-day period can exceed a value of 400/100 ml for fecal coliforms.

The requirement for total coliforms applies only to New York waters. Seven stations in New York met both criteria for total coliforms -- that is, the geometric mean was  $\leq 2,400/100$  ml and



less than 20 percent of the samples exceeded 5,000/100 ml. Two of the other stations met the criteria for the geometric mean but exceeded the criteria for the percent of samples exceeding a value of 5,000/100 ml.

A comparison of the 1988 and 1990 coliform sampling results is shown in Table A-4. Although the values are in the same general range, the sampling results for 1990 are somewhat higher than those obtained in 1988 -- especially when compared to the fecal coliform requirement for swimming.

A comparison was made of the rainfall prior to the sampling dates in 1988 and in 1990. In the 24 hours prior to the sampling dates in 1990, the rainfall totaled 4.49 inches; for the comparable period in 1988, the rainfall totaled only 1.69 inches. Similarly higher rainfalls were recorded in 1990 compared to 1988 for the 48-hour (8.04 inches in 1990 versus 4.35 inches in 1988) and 72-hour (9.22 inches in 1990 versus 4.60 inches in 1988) periods prior to sampling.

The higher rainfalls recorded in 1990 versus those recorded in 1988 lead to greater spillage of raw sewage (with no disinfection) from combined sewer outfalls (CSOs) and nonpoint source runoff. This most likely accounts for the somewhat higher coliform values in 1990 versus 1988 and points out the need for controlling CSOs during wet weather. Although some areas in the Hudson River can possibly be opened for swimming, it is not likely that all or most of the areas can be opened for swimming until CSOs are controlled to the extent that they will not cause water quality standards to be contravened.

**APPENDIX**

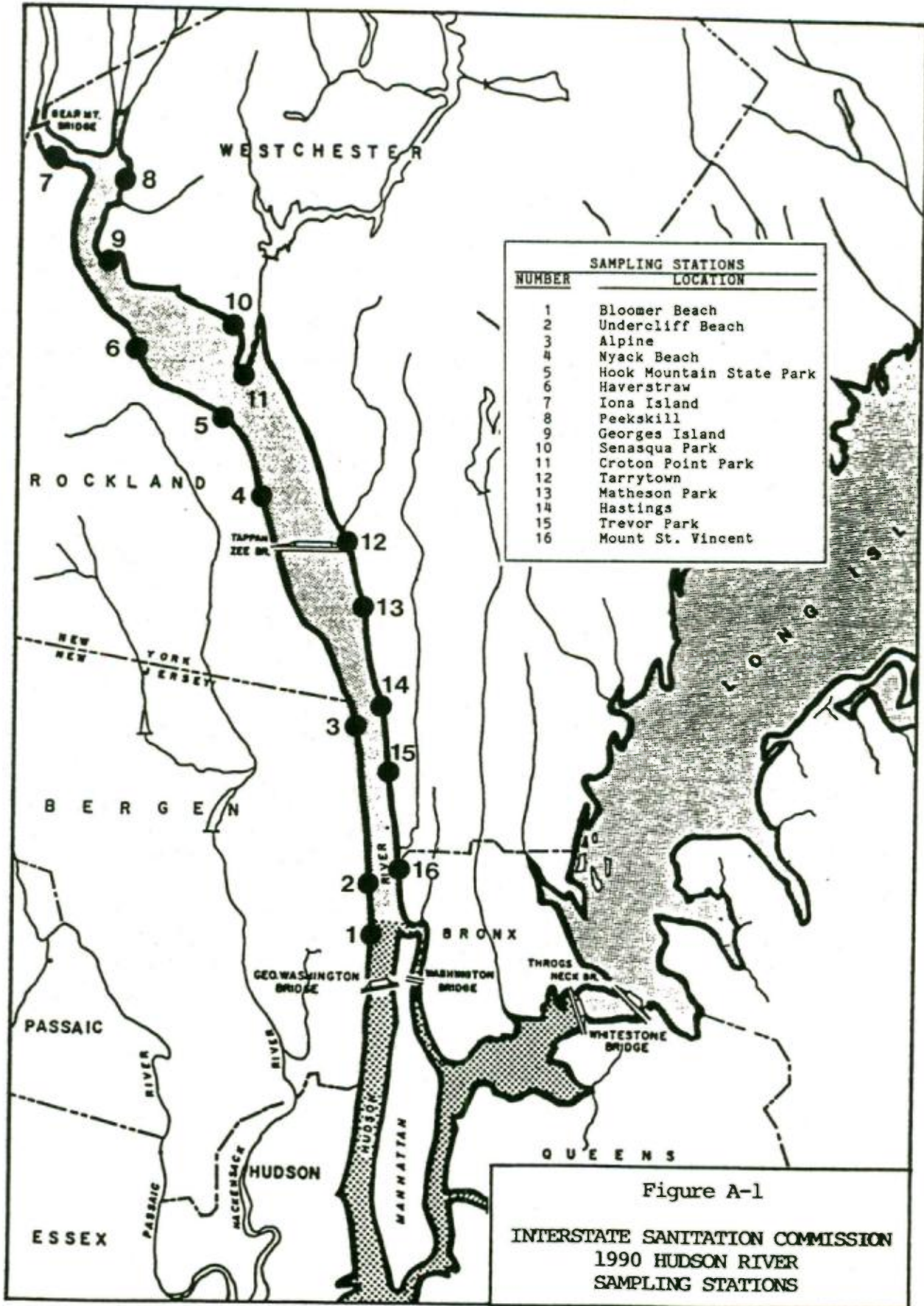


Figure A-1  
 INTERSTATE SANITATION COMMISSION  
 1990 HUDSON RIVER  
 SAMPLING STATIONS



Table A-1

INTERSTATE SANITATION COMMISSION  
1990 HUDSON RIVER COLIFORM SAMPLING STATION LOCATIONS

Station Number	Bank of Hudson River	Station Location (City, County, State)	Station Description
1	West	Englewood Cliffs, Bergen County, NJ	Bloomer Beach
2	West	Englewood Cliffs, Bergen County, NJ	Undercliff Beach
3	West	Alpine, Bergen County, NJ	Alpine Boat Basin
4	West	Upper Nyack, Rockland County, NY	Nyack Beach
5	West	Congers, Rockland County, NY	Hook Mountain State Park
6	West	Haverstraw, Rockland County, NY	Foot of Main Street
7	West	Stony Point, Rockland County, NY	Iona Island Bird Sanctuary
8	East	Peekskill, Westchester County, NY	Riverfront Green
9	East	Cortlandt, Westchester County, NY	George's Island Park
10	East	Croton-on Hudson, Westchester County, NY	Senasqua Park
11	East	Croton-on-Hudson, Westchester County, NY	Croton Point Park
12	East	Tarrytown, Westchester County, NY	Tarrytown Boat Club
13	East	Irvington, Westchester County, NY	Matheson Park
14	East	Hastings-on-Hudson, Westchester County, NY	Hastings Boat Club
15	East	Yonkers, Westchester County, NY	Trevor Park
16	East	New York City, Bronx County, NY	Mount Saint Vincent College

Table A-2

COLIFORM STANDARDS FOR BATHING BEACHES

NEW JERSEY

Fecal coliform levels shall not exceed a geometric average of 200/100 ml nor should 10 percent of the total samples taken during any 30-day period exceed 400/100 ml.

NEW YORK

The total number of organisms of the coliform group shall not exceed a logarithmic mean of 2400/100 ml for a series of 5 or more samples in any 30-day period, nor shall 20 percent of total samples during the period exceed 5000/100 ml.

The fecal coliform density from at least five successive sets of samples collected daily on five different representative days shall not exceed a logarithmic mean of 200/100 ml.



Table A-3

INTERSTATE SANITATION COMMISSION  
1990 COLIFORM SAMPLING RESULTS  
IN THE HUDSON RIVER

SUMMARY OF RESULTS

STATION	FECAL COLIFORMS			TOTAL COLIFORMS		
	GEOMETRIC	% OF VALUES	MEETING	GEOMETRIC	% OF VALUES	MEETING
	MEAN (1)	EXCEEDING	SWIMMING	MEAN (3)	EXCEEDING	SWIMMING
	400/100 ml (2)	CRITERIA		5000/100 ml (4)	CRITERIA	
1	540	50	No	990	--	---
2	490	60	No	>1,300	--	---
3	<160	20	No	900	--	---
4	<210	--	No	740	10	Yes
5	<150	--	Yes	520	0	Yes
6	<300	--	No	980	20	No
7	<240	--	No	610	0	Yes
8	>2,600	--	No	>4,900	50	No
9	<240	--	No	730	0	Yes
10	>810	--	No	>1,800	40	No
11	<93	--	Yes	290	0	Yes
12	>4,600	--	No	>9,300	80	No
13	<320	--	No	790	10	Yes
14	<520	--	No	1,200	10	Yes
15	>1,300	--	No	>3,400	50	No
16	>1,600	--	No	>3,900	40	No

- Notes: (1) Criterion of  $\leq 200/100$  ml applicable in NY and NJ waters  
(2) Criterion of  $\leq 10$  % applicable in NJ waters  
(3) Criterion of  $\leq 2,400/100$  ml applicable in NY waters  
(4) Criterion of  $\leq 20$  % applicable in NY waters

Table A-4

INTERSTATE SANITATION COMMISSION  
COMPARISON OF 1988 AND 1990 COLIFORM SAMPLING RESULTS  
IN THE HUDSON RIVER

STATION	FECAL COLIFORMS			TOTAL COLIFORMS			
	GEOMETRIC	% OF VALUES	MEETING	GEOMETRIC	% OF VALUES	MEETING	
	MEAN (1)	EXCEEDING	SWIMMING	MEAN (2)	EXCEEDING	SWIMMING	
	400/100 ml (2)	CRITERIA		5000/100 ml (4)	CRITERIA		
1	1988	<170	30	No	820	--	---
	1990	540	50	No	990	--	---
2	1988	200	30	No	800	--	---
	1990	490	60	No	21,300	--	---
3	1988	<76	20	No	830	--	---
	1990	<160	20	No	900	--	---
4	1988	<44	--	Yes	510	0	Yes
	1990	<210	--	No	740	10	Yes
5	1988	<80	--	Yes	500	0	Yes
	1990	<150	--	Yes	520	0	Yes
6	1988	200	--	Yes	1,200	10	Yes
	1990	<300	--	No	980	20	No
7	1988	73	--	Yes	830	10	Yes
	1990	<240	--	No	610	0	Yes
8	1988	27,300	--	No	214,000	80	No
	1990	22,600	--	No	24,900	50	No
9	1988	<56	--	Yes	430	0	Yes
	1990	<240	--	No	730	0	Yes
10	1988	<67	--	Yes	450	10	Yes
	1990	2810	--	No	21,800	40	No
11	1988	<38	--	Yes	280	0	Yes
	1990	<93	--	Yes	290	0	Yes
12	1988	<150	--	Yes	770	20	No
	1990	24,600	--	No	29,300	80	No
13	1988	<160	--	Yes	800	10	Yes
	1990	<320	--	No	790	10	Yes
14	1988	<100	--	Yes	630	10	Yes
	1990	<520	--	No	1,200	10	Yes
15	1988	<330	--	No	21,300	10	Yes
	1990	21,300	--	No	23,400	50	No
16	1988	120	--	Yes	22,700	30	No
	1990	21,600	--	No	23,900	40	No

- Notes: (1) Criterion of 200/100 ml applicable in NY and NJ waters  
(2) Criterion of 10 % applicable in NJ waters  
(3) Criterion of 2,400/100 ml applicable in NY waters  
(4) Criterion of 20 % applicable in NY waters