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I. Summary and Statement of Purpose

Eastern New Jersey, New York City and southern Long Island beaches have not been closed due to floatable debris since 1992. The interagency implementation of the Floatables Action Plan ("FAP") has been a major contributor to this improved beach status.

Formal United States Environmental Protection Agency ("EPA") Region II assessment reports of the FAP were prepared for individual years 1989, 1990, 1991, 1992, and for the combined years 1993 and 1994. This assessment report has been prepared for the three year period of 1995 through 1997 and will assess the effectiveness of the short-term FAP in accomplishing the following objectives:

- Minimization of the amount of floatable debris escaping the Harbor Complex;

- Maintaining an effective communication network to coordinate floatable debris removal activities and to respond to the spotting of slicks;

- Ensuring timely notification of beach operators of potential wash-ups of floatable debris; and

- Minimization of beach closures due to floatable debris.

This assessment report will also discuss the required long-term implementation measures to permanently address floatable debris and provide the current status of long-term implementation measures, providing a clear understanding of what is still needed to effectively control floatable debris in the Harbor Complex.

Also included in this report is a basic description (see Attachment A), for reference purposes, of the FAP's origin.

II. Background

a) What is floatable debris?
Floatable debris is waterborne waste material that is buoyant. Examples include:

- wood

- beach litter

- aquatic vegetation

- street litter: e.g., cans, bottles, Styrofoam cups, plastics, straws, and paper products

- sewage-related wastes: e.g., condoms, sanitary napkins, tampon applicators, diaper liners, grease balls, tar balls, and fecal material

- fishing gear: e.g., nets, floats, lines and traps

- medical wastes: e.g., hypodermic needles, syringes, bandages, red bags and enema bottles

b) What are the sources that generate floatable debris?
The principal sources of floatable debris to the New York / New Jersey Harbor ("Harbor") and the New York Bight are the following:

- Combined Sewer Overflow ("CSO") Discharges: There are approximately 737 combined sewer overflow (CSO) points discharging to the open waters of the NY/NJ Harbor or to its tributaries:

460 from New York City
 29 from Westchester County
248 from New Jersey
---
737 in total

There are no CSO points discharging to the Bight or to the Back Bays.

- Storm Water Discharges: New York City, while predominantly a combined sewered City, has over 350 outfalls from its municipal separate sewer system.

Hundreds of more storm sewer outfalls in New York and New Jersey impact the Harbor Complex from industrial activity,

construction activity and highway drainage.

- Non-point source discharges including littering, landfill practices, and marine transfer practices;

- Decaying shoreline structures and sunken vessels; and

- Vessel discharges.

c) What are the impacts of floatable debris?
Discharges of floatable debris cause beach closures, have an adverse impact on recreational and commercial boating and cause harm to coastal marine species.

Large amounts of marine debris washed up on southern Long Island ocean beaches and on New Jersey ocean beaches in 1987 and 1988. In 1987, floatable washups were responsible for the closing of 25 miles of New Jersey beaches in May and 50 miles of New Jersey beaches in August. In 1988, floatable washups were responsible for the closing of 60 miles of New York beaches.

These beach closings in New Jersey and New York lasted for varying time periods from several hours to several days and had significant economic and social impacts. The State University of New York Waste Management Institute estimated an economic loss of between $900 million and $4 billion in New Jersey and between $950 million and $2 billion in New York in the 1987 - 1988 time frame.

Medical syringes, while only a tiny portion of the washups, caused a great deal of concern, prompting the passage of the Medical Waste Tracking Act by Congress in 1988.

Floatable debris, particularly driftwood, poses a hazard to shipping and recreational boating in the Harbor / Bight. The United States Army Corps of Engineers ("USACOE") conducts two programs to address floatable debris: 1) collection of debris already floating and 2) dismantling deteriorating structures before they become drift. Drift materials include timbers, pilings, plastics, rubber tires, fiberglass boats, Styrofoam, rafts, floating drums, docks, sheds, and other shore structures.

Birds, mammals and sea turtles are found seasonally throughout the Bight and portions of the Harbor. These species are vulnerable to entrapment and entanglement in plastic waste including six pack rings, fishing line, and nets. Turtles and mammals (seals and whales) are vulnerable to ingestion of plastic items, such as bags, that are mistaken for squid, jellyfish, or

other prey. This ingestion often leads to suffocation or intestinal blockage and death.

III. How effective has the FAP been in minimizing the escape of floatable debris from the Harbor Complex?

The FAP has proven to be very successful in minimizing the escape of floatable debris from the Harbor Complex. The principal means of collecting floating debris slicks has been through the utilization of USACOE skimmer vessels. More recently, the New York City Department of Environmental Protection ("NYCDEP") has supplemented the work of the USACOE with an open water skimmer vessel of its own as well as a booming and skimming program at major City CSO outfall locations. Other means have also been utilized to minimize the escape of floating debris from the Harbor Complex. The following summary of these various measures is for the period of 1995 - 1997 but also includes historical data, where appropriate, for the purpose of comparison.

a) What are the vessels that the USACOE uses to support FAP implementation?

The USACOE uses three vessels to support FAP implementation in the Harbor and these vessels are described in the table below.

USACOE Skimmer Vessel Information

Name of Vessel	Hayward	Driftmaster	Gelberman
Year Built	1974	1948	1980
Length (feet)	124	99	85
Weight (tons)	390.4	230	190.17
Crane Capacity (tons)	20	12.5	4.5

The Hayward is used to remove debris and obstructions from high use navigational channels to provide clear and safe channels for general navigation and to ensure that life and property are protected. The vessels's primary function is the collection of floating debris but more specifically the snagging of larger logs, wreckage, barges, and lifting obstructions from the waterway. The vessel tows a catamaran barge with a drift net to pick up flotsam and jetsam.

The Driftmaster is used to remove debris and obstructions from high use navigational channels to provide clear and safe channels for general navigation and to ensure that life and property are protected. The vessel's unique catamaran hull design enables the vessel to trap floating debris between its hulls before it is collected in nets. Pieces too large are towed alongside. The vessel also lifts wreckage, sections of piers and sunken derelict vessels and barges which are hazards to navigation.

The Gelberman is used to remove debris and obstructions from high use navigation projects and hard to maneuver locations. The vessel's primary function is to collect floating debris from channels and more confined areas. The vessel pulls a catamaran barge with a drift net to collect flotsam and jetsam.

These three USACOE vessels, the Hayward, the Driftmaster and the Gelberman, have been deployed in the Harbor to collect floating slicks since the initiation of the FAP in 1989.

b) <u>How much floatable debris has the USACOE collected in support of the FAP?</u>

The Water Resources Development Act ("WRDA") of 1974 was modified by WRDA 90 Section 102 (V) (Public Law 99-662) to authorize the collection of floatable debris whenever the USACOE is collecting and removing debris which is an obstruction to navigation. The USACOE estimates that 90 per cent (by volume) of its collection total consists of wood debris. Tires, plastic waste, cardboard, seaweed, sewage-related materials and street runoff-related materials constitute the remaining 10 per cent (by volume).

The USACOE drift removal vessels report collection totals in different ways. The following table indicates the total tons of floatable debris collected by the three USACOE vessels on scheduled "floatable days" for the listed calendar years. A scheduled "floatable day" is the day of and the two days following both new and full moons (Note: a listing of the USACOE scheduled "floatable days" for calendar year 1997 is attached to this report). USACOE skimmer vessels are deployed to strategic locations on these days, to locations where floatable debris historically congregates after becoming resuspended upon higher tides. For these scheduled "floatable days", the USACOE weighs its nets and reports the drift collection totals in terms of tons collected.

USACOE Skimmer Vessel
Collection Totals

For Scheduled Floatable Days

Year	Tons of Debris Collected
1989	545
1990	795
1991	701
1992	958
1993	1088
1994	1298
1995	829
1996	1407
1997	768

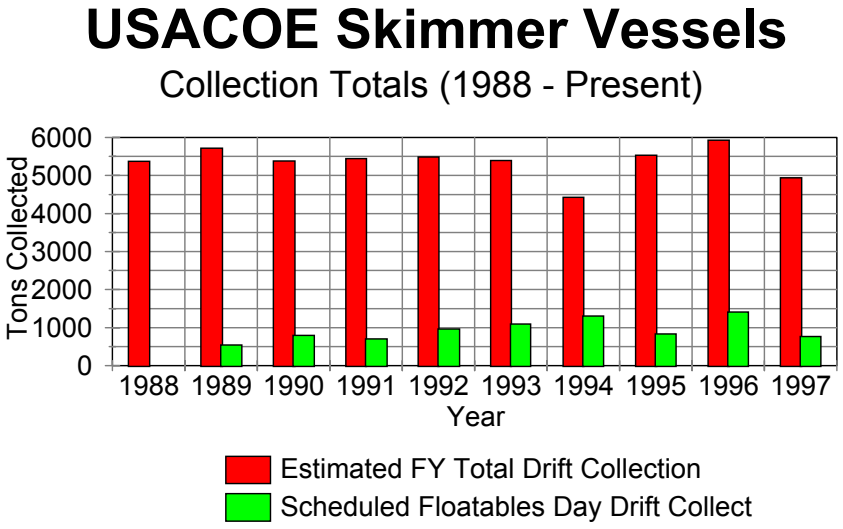
The above table only represents the drift collection performed by the USACOE on scheduled "floatable days." The USACOE reports its annual (on a fiscal year (October - September) basis) drift collection total in terms of cubic feet. The following table lists these fiscal year totals, converts them to cubic yards (for purposes of comparing with the NYCDEP skimmer vessel collection totals), and, based on discussions with the USACOE estimates a total tonnage value based on an approximate conversion factor of 100 cubic feet per ton:

Fiscal Year USACOE Total Skimmer Vessel Collection Totals

Fiscal Year	Total Drift Collection (Cubic Feet)	Total Drift Collection (Cubic Yards)	Estimated Total Drift Collection (Tons)
1988	537,353	19,902	5,374
1989	571,645	21,172	5,716
1990	537,770	19,917	5,378
1991	544,350	20,161	5,444
1992	548,970	20,332	5,490
1993	539,355	19,976	5,394

1994	442,615	16,393	4,426
1995	552,840	20,476	5,528
1996	592,450	21,943	5,925
1997	493,400	18,274	4,934

The following graph depicts the information on the USACOE drift collection as presented in the preceeding two tables:



The accuracy of the above graph hinges on the conversion factor used of "100 cubic feet per ton." This may very well be a conservative estimate (in other words, the collection total in tons is NOT overstated) and the following should be considered:

1. If a parcel of water measuring 100 cubic feet were collected

by the USACOE skimmer vessels, it would weigh (using 0.01602 cubic feet per pound of water) 3.12 tons. This may be considered as the upper limit of any collected parcel of material measuring 100 cubic feet.

2. Since the USACOE skimmer vessels are drift collection vessels, items are collected which are buoyant in water. In general then, any parcel of collected material measuring 100 cubic feet will weigh less than 3.12 tons.

3. The USACOE already routinely estimates that 90% (by volume) of its drift collection is comprised of wood. Although the wood is waterlogged and heavy, each 100 cubic feet of wood will weigh less than 3.12 tons since it was buoyant.

4. When floatable debris is collected by the USACOE skimmer vessels, the total volume includes significant "void spaces" which do not add weight. This further adds to the fact that parcels of material measuring 100 cubic feet will weigh less than 3.12 tons.

The use of the conversion factor of 100 cubic feet per ton is therefore a conservative one and is derived from actual weighing of nets on schedule "floatable days."

c) <u>How has the NYCDEP supplemented the USACOE in removing floatable debris from the Harbor?</u>
The 1992 CSO Abatement Order on Consent between the NYCDEP and the New York State Department of Environmental Conservation ("NYSDEC") required the following:

- NYCDEP was to implement a short-term booming and skimming program to address floatables pollution from approximately 50% of the City's combined sewer service area. This interim program was principally focused on the tributaries on which retention tanks will be built under the long-term CSO abatement program that the City is implementing, and will continue until that point in time. The NYCDEP was to collect and remove substantially all waterborne floatables in Bergen Basin, Thurston Basin, Paerdegat Basin, Hendrix Creek, Newtown Creek, Gowanus Canal, Coney Island Creek, and the Upper East River tributaries consisting of the Bronx River, Flushing Creek, Westchester Creek, and the Hutchinson River (if practicable). Additionally, the NYCDEP was to collect and remove substantially all waterborne floatables from 10 CSO outfalls in beach-sensitive open water areas. To accomplish this booming and skimming program, the NYCDEP was to purchase and utilize four small skimmer vessels.

The NYCDEP was also to utilize a large open water skimmer vessel (named the Cormorant), patterned after the USACOE Driftmaster skimming vessel, to patrol the waters of the Harbor. The following tables summarize the NYCDEP skimming vessels and the status of the booming and skimming locations.

NYCDEP Skimmer Vessel Information

Name	Where Used	Length (feet)	Capacity
SV Piping Plover	Tributaries	50	3,000 -12,000 lbs of wet material
SV Ibis	Tributaries	50	3,000 -12,000 lbs of wet material
SV Heron	Tributaries	50	3,000 -12,000 lbs of wet material
SV Egret	Tributaries	50	3,000 -12,000 lbs of wet material
SV Cormorant	Open Waters	100	2 nets; 1,000 cubic feet per net; 2,000 cubic feet in total; up to 5 tons of wet material per net

NYCDEP Skimming and Booming Program Locations

Booming / Skimming Site	Approximate Drainage Area (acres)	Permanent Installation Date
Westchester Creek	2039	9/96
Clason Point *	333	10/96
Bronx River	1799	7/96
Hunts Point	761	4/96

Flushing Creek 1 (CSO4)	6790	11/96
Flushing Creek 2 (CSO7) *	768	11/96
Flushing Bay 1 (CSO 2)	1225	4/96
Flushing Bay 2 (CSO3)	3053	4/96
Bowery Bay	2830	4/96
Maspeth Creek	1028	9/96
East Branch (East River)	1338	9/96
English Kills	2197	9/96
Bushwick Inlet *	771	1/97
Wallabout Channel 1	1258	9/96
Wallabout Channel 2	1093	9/96
Gowanus Canal	667	---
Owls Head *	1253	5/96
Coney Island Creek	2751	6/96
Paerdegat Basin	5787	6/93
Fresh Creek *	2110	11/88
Hendrix Canal	520	6/93
Bergen Basin	13400	6/94
Thurston Basin	4803	6/94

Sites marked with an asterisk indicate netting installations rather than booming. The total approximate drainage area impacted by the skimming and booming (and netting) program is 58,574 acres, which represents over 50 per cent of the City's combined sewer drainage area.

d) How much floating debris has the NYCDEP SV Cormorant collected?

NYCDEP SV Cormorant collection data dates back to May 1994 and is presented in the following tables and graph.

1994 NYCDEP SV Cormorant Collection Totals

(Values are Tons of Material Off-Loaded from Vessel)

Months	Wood	Plastic	Metal	Rubber	Glass	Trash	Other	Total

May - December	161.7	11.97	5.9	12.3	0.1	5.9	0	**197.87**

1995 NYCDEP SV Cormorant Collection Totals

(Values are Tons of Material Off-Loaded from Vessel)

Month	Wood	Plastic	Metal	Rubber	Glass	Trash	Other	Total
January	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0
April	16.3	1.1	0.4	1.4	0	1.2	0	20.4
May	30.8	2.5	1.3	1.9	0	1.9	0	38.4
June	29.9	1.8	1.8	2.2	0	1.5	0	37.2
July	46	3.5	2	3.5	0	4.4	0	59.4
August	0	0	0	0	0	0	0	0
September	0	0	0	0	0	0	0	0
October	18.9	0.6	0	0.6	0	0.9	0	21
November	67.6	5.3	2.9	3.3	0	6.7	0	85.8
December	0	0	0	0	0	0	0	0
Annual Total	209.5	14.8	8.4	12.9	0	16.6	0	**262.2**

1995 Notes: For January - March and August - September the SV Cormorant was dockside, undergoing repairs.

In December, adverse weather conditions was the major contributing factor in the inability to collect enough floatable debris to dump nets in December (i.e., skimming was performed but not enough floatable debris was collected to warrant removing the collected material.

1996 NYCDEP SV Cormorant Collection Totals

(Values are Tons of Material Off-Loaded from Vessel)

Month	Wood	Plastic	Metal	Rubber	Glass	Trash	Other	Total
January	49	3.3	1.9	4.6	0	6.6	0	65.4
February	34	3.3	2.1	2.2	0	2.2	0	43.8
March	123.6	8.7	3.9	9.1	0	7.7	0	153
April	17.8	1.1	0.4	0.6	0	1.1	0	21
May	38.1	2.8	3.2	2.5	0	2.6	0	49.2
June	79.1	4.6	4.1	5.4	0	8.2	0	101.4

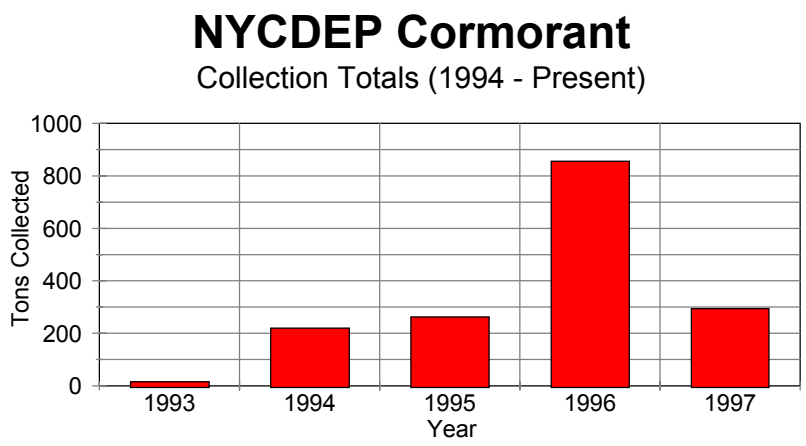
July	59.7	3.6	2.6	2.4	0	4.3	0	72.6
August	33.5	1.7	0.7	0.6	0	2.2	30.9	69.6
September	14.9	1.3	3.3	0.9	0	2.7	17.7	40.8
October	107.5	6.5	4.1	3.7	0	13	6.8	141.6
November	14.9	0.9	0.6	0.9	0	1.3	0	18.6
December	64	3.9	2.4	2.6	0	6.3	0	79.2
Annual Total	636.1	41.7	29.3	35.5	0	58.2	55.4	**856.2**

1997 NYCDEP SV Cormorant Collection Totals

(Values are Tons of Material Off-Loaded from Vessel)

Month	**Wood**	**Plastic**	**Metal**	**Rubber**	**Glass**	**Trash**	**Other**	**Total**
January	35.8	2.1	0.8	1.7	0	2.2	0	42.6
February	13.3	0.8	0.4	0.3	0	0.8	0	15.6
March	20.5	0.5	0.4	0.5	0	0.9	0	22.8
April	0	0	0	0	0	0	0	0
May	31.8	1.5	0.8	1.1	0	4.4	0	39.6
June	18.2	0.7	0	0.5	0	3.4	0	22.8
July	17.3	1.5	1.1	0.6	0	1.1	0	21.6
August	35.5	3.15	1.95	1.8	0	2	0	44.4
September	19.4	1.6	0.4	0.5	0	0.9	0	22.8
October	15.8	1.1	0.4	0.4	0	0.9	0	18.6
November	17.3	1.7	1.1	0.4	0	1.1	0	21.6
December	18.4	1.1	0.4	0.6	0	1.1	0	21.6
Annual Total	243.3	15.75	7.75	8.4	0	18.8	0	**294**

1997 Notes: During the first half of April 1997, poor weather conditions (tide and wind) inhibited vessel activity. During the second half of April the SV Cormorant was dockside, receiving repairs.



Above tonnages are based on a full net of 12 tons. The percentage of a net's capacity is estimated by the Vessel's mate and the is used to estimate the percentage of each material.

Example for Wood:

Net is estimated to be 90% full
Weight of material in net is 10.8 tons (0.9 x 12 tons)
Wood is estimated to be 90% of load
Weight of wood in net is 9.7 tons (0.9 x 10.8 tons)

(**NOTE:** The above graph includes a value for 1993 and a different value for 1994 than is indicated in the preceding table. The NYCDEP operated two of its smaller skimmer vessels (the ones that are currently utilized in the NYCDEP booming and skimming program) to collect floating debris in the open waters of Jamaica Bay and the East River in 1993 and 1994. In 1993, these two vessels collected 15 tons of floatable material in these waters and in 1994 they collected 22 tons.)

e) How much floating debris has the NYCDEP Booming and Skimming Program collected? The NYCDEP booming and skimming program dates back to 1995 and is presented in the following tables and graph.

NYC Boom and Skim Program Collection Totals for 1995 (Cubic Yards)

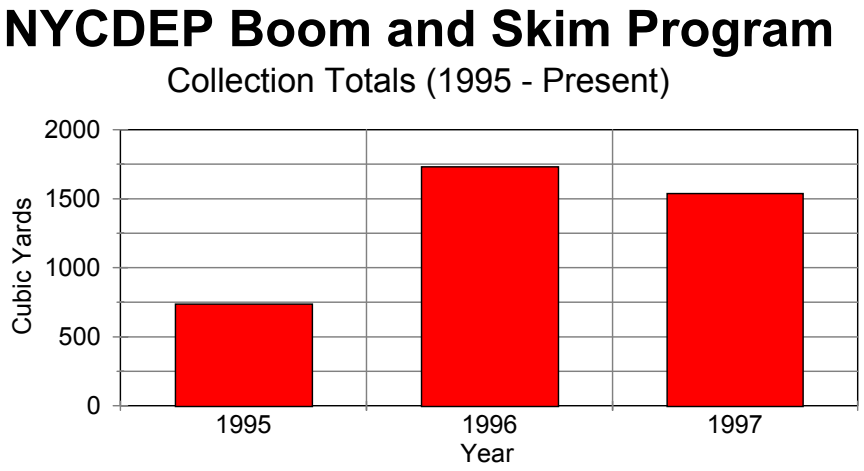
Month	Zone I [Jamaica Bay]	Zone II / III [East River and Newtown Creek]	Zone IV [Upper East River and Flushing / Bowery Bays]	Monthly Total
January	n/a	n/a	n/a	n/a
February	n/a	n/a	n/a	n/a
March	n/a	n/a	n/a	n/a
April	n/a	n/a	n/a	n/a
May	n/a	n/a	n/a	n/a
June	29	0	13.5	42.5
July	57.5	26	41.5	125
August	50	0	39	89
September	13.5	26	46.5	86
October	41	36	140.5	217.5
November	48.5	35	49	132.5
December	19	0	23	42
Annual Total	258.5	123	353	**734.5**

NYC Boom and Skim Program Collection Totals for 1996 (Cubic Yards)

Month	Zone I [Jamaica Bay]	Zone II / III [East River and Newtown Creek]	Zone IV [Upper East River and Flushing / Bowery Bays]	Monthly Total
January	40	0	42	82
February	24	6	18	48
March	10	19.5	57	86.5
April	30	20	88.5	138.5
May	44	16	25	85
June	33	19	24	76
July	64.5	18	53	135.5
August	189	15	34	238
September	173	53	50.5	276.5
October	46	5.5	164.5	216
November	25	12.5	88	125.5
December	54	11	157	222
Annual Total	732.5	195.5	801.5	**1729.5**

NYC Boom and Skim Program Collection Totals for 1997 (Cubic Yards)

Month	Zone I [Jamaica Bay]	Zone II / III [East River and Newtown Creek]	Zone IV [Upper East River and Flushing / Bowery Bays]	Monthly Total
January	31	21.5	141.5	194
February	57	7.5	44	108.5
March	52.5	32.5	68	153
April	83.5	51	60	194.5
May	39	8	45	92
June	55	20	41	116
July	120.5	59.5	66	246
August	85	3	41.5	129.5
September	25	2	22	49
October	51	9	34	94
November	48	8	52	108
December	10	0	42	52
Annual Total	657.5	222	657	**1536.5**

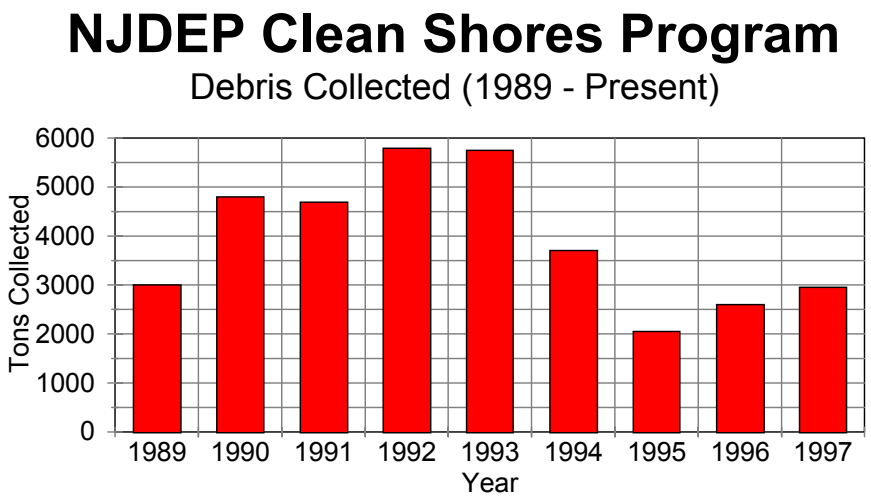


f) What role has the New Jersey Department of Environmental Protection ("NJDEP") played in minimizing floatable debris from escaping the Harbor complex?

Clean Shores Program

Beginning in 1989, the NJDEP began a program called "Operation Clean Shores", designed to collect shoreline floatable debris before it became resuspended due to tidal influences. This program has used New Jersey inmates to collect floatable debris, comprised mainly of landed drift wood, on non-recreational

shorelines in order to prevent floatable debris from being refloated during extreme high tides and washing up on recreational beaches, becoming hazards to navigation and impacting marine life. The program, now called the "Clean Shores Program", is conducted throughout the State of New Jersey, in the Hudson, Raritan and Delaware estuaries and barrier island bays. In 1993, the Clean Shores Program began to be implemented on a year-round basis whereas formerly it was only implemented during the bathing season. The Program is funded by the sale of Shore Protection license plates. Collection totals for this highly effective program are presented in the table and graph below.

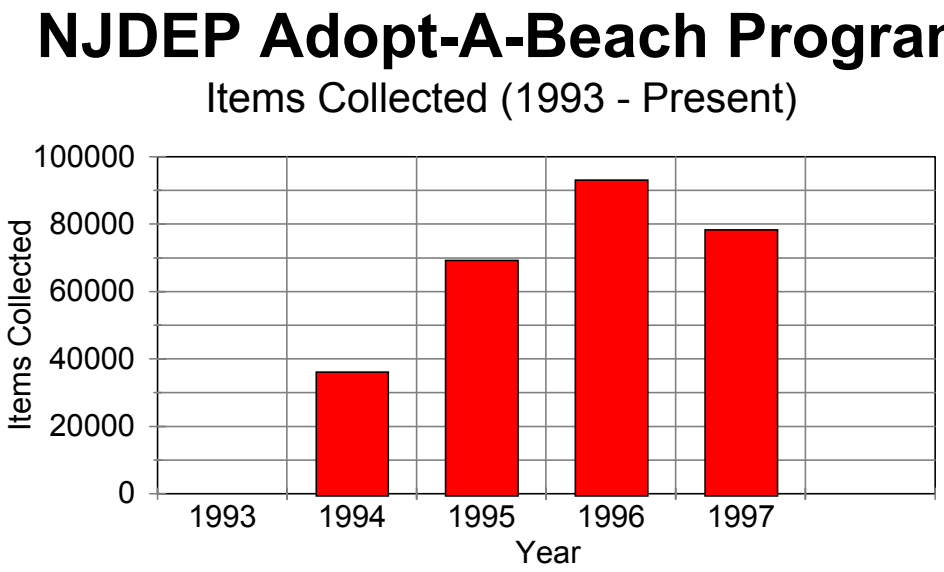


Adopt A Beach Program

The State of New Jersey enacted a law on January 7, 1993 which authorized the NJDEP to administer an "Adopt A Beach" program, fostering volunteer stewardship of coastal beaches. NJDEP is required to sponsor two statewide beach clean-ups each year. Volunteers select or "adopt" a beach for these clean-ups. Data for 1993 - 1997 are provided in the following table and graph.

NJDEP's Adopt A Beach Program Data

Year	Number of Debris Items Collected
1993	36,122
1994	69,221
1995	93,016
1996	78,282
1997	84,433



Results of the Adopt A Beach Program are forwarded to the Center for Marine Conservation ("CMC") in order to be included in the CMC's national and international marine debris database.

g) <u>What other programs are aimed at reducing floatable debris from escaping the Harbor Complex and/or entering the Harbor Complex?</u>

Besides the activities already described, the NY / NJ Harbor Estuary Program ("HEP") Comprehensive Conservation and Management Plan ("CCMP") outlines a variety of other activities related to Harbor floatable debris control and related to rainfall-induced discharges which in turn impact Harbor floatable debris control. These activities are either HEP recommendations or commitments made by responsible entities to the HEP and are summarized in the tables below, along with brief summaries of some of the more significant floatable debris control activities:

Other NY / NJ HEP CCMP Floatable Debris Control Activities

Activity	Responsible Entity or Entities	Status
1. Continue existing beach clean-ups	NY	Ongoing Commitment
2. Monitor provisions of NYCDOS permits and Consent Orders for solid waste handling at landfills and marine transfer stations for compliance	NYSDEC Interstate Sanitation Commission	Ongoing Commitment
3. Continue Solid Waste Program	NJDEP	Ongoing Commitment
4. Develop educational materials to inform the public of the proper disposal of "home sharps" (e.g., needles)	NYSDEC New York State Department of Health	Ongoing Commitment
5. Encourage local user groups to engage in storm drain stenciling activities	HEP	Ongoing Commitment
6. Enforce provisions of MARPOL V for at-sea disposal of solid waste	USCG	Ongoing Commitment
7. Develop and implement a companion program to NJDEP's Clean Shores Program	NYSDEC	Recommendation
8. Establish priority sites for the drift removal program, based on an area's potential to contribute significant quantities of flotable debris, withoug compromising habitat or navigational safety	NY NJ USACOE	Completed Commitment
9. Implement drift removal projects	NY NJ USACOE	Recommendation
10. Perform routine off-season beach clean-ups	Beach Operators (federal, state, local and private)	Recommendation
11. Expand existing beach clean-up programs to include back bays and tributary areas	NY NJ Private Sector	Recommendation
12. Conduct recycling demonstration projects at marinas	NYSDEC NJDEP	Completed Commitment
13. Expand Recycling projects at marinas	Coastal Communities in NY and NJ	Recommendation
14. Ban use of non-degradable plastic products at shore concession stands	Appropriate Government Legislators	Recommendation
15. Continue, expand and adopt effective waste handling practices at public shoreline areas, as required	Open Space Managers	Recommendation
16. Provide waste receptacles sufficient for public need and adequate to prevent debris dispersal	Open Space Managers	Recommendation
17. Inform medical and pharmaceutical industries of the need to develop educational strategies to inform the public of proper disposal techniques for home medical waste	HEP	Commitment

18. Develop educational strategies to inform the public of proper disposal techniques for home medical waste	Medical and Pharmaceutical Industries	Recommendation
19. Inform beach and marina owners and operators of the need to post signs depicting proper waste disposal methods	HEP	Commitment
20. Post signs depicting proper waste disposal methods	Beach and Marina Owners and Operators	Recommendation
21. Enclose information on marine debris in all fishing applications and / or boating licenses	NY NJ	Recommendation
22. Seek sponsors to develop and broadcast Public Service Announcements on proper disposal of beach and boating litter	HEP	Commitment
23. Develop and broadcast Public Service Announcements on proper disposal of beach and boating litter	Sponsors	Recommendation
24. Continue Clean Streets / Clean Beaches campaign	EPA NYSDEC NJDEP NYCDEP	Ongoing Commitment

These additional floatable debris control activities are largely of the "Best Management Practice" and "Public Education" types. EPA has continued to work with the NJDEP, the NYCDEP and the New York City Department of Sanitation ("NYCDOS") and the NYSDEC to promote the Clean Streets / Clean Beaches campaign. This public education campaign is focused on street-generated floatable debris and has included the following measures during the past several years: Public Service Announcements starring Lauren Hutton and airing on MTV and VH-1, poster productions (for placement in communities and on NYCDOS trucks), catch basin stenciling programs, and the development of educational materials (including a video entitled "The Adventures of Camouflage Kid") for use in elementary school grades.

The HEP recommendation that a companion program to NJDEP's Clean Shores Program be developed in New York warrants further consideration. In June 1992, a ten day pilot project was carried out in Staten Island, utilizing carefully screened inmates and correction officers from the Arthur Kill Correctional Facility (a medium security State facility located on Staten Island), the NYSDEC and the NYCDOS. 440 tons of material were collected (mostly wood waste) over a three and a half mile stretch of Raritan Bay shoreline. Given the success of the Clean Shores Program and given the success of the New York pilot project in 1992, the NYSDEC should reevaluate sponsoring such a program.

Regarding the Fresh Kills Landfill in New York City, a United States District Court judge made a ruling in 1997 that the City

would not need to construct the costly enclosed barge unloading facility that had previously been required. The facility had been estimated to cost between $50 million and $160 million. In 1979, the Interstate Sanitation Commission, a tri-State environmental group, and the Town of Woodbridge in New Jersey sued the City of New York over floatable debris entering the Arthur Kill from the Landfill. In 1993 the U.S. District Court judge ordered the construction of the costly enclosed barge unloading facility. However, this ruling was based on the Landfill being utilized for the next 15 - 20 years. However, after the New York State Legislature voted to close the Landfill by January 1, 2002, the City of New York petitioned the Court to modify the ruling, asserting that it had already reduced the amount of floatable debris exiting the Landfill to the water body and that an expensive enclosed dock would not be needed because the Landfill would be closing. The Court agreed and has ordered the City to take other far less costly measures such as extending a perimeter fence around the landfill. The Court hopes that this ruling will provide the City of New York with an incentive to close the Fresh Kills Landfill at the earliest opportunity. The amount of floatable debris escaping the Landfill and entering the water body has been dramatically reduced over the past 18 years based on the implementation of better unloading practices. The City has maintained that the Landfill is responsible for only 7.8% of the floatable debris in the Arthur Kill and that New Jersey is responsible for 77%. The Court has acknowledged that the floatable debris in the water body does originate from several different sources.

NY / NJ HEP CCMP Rainfall-Induced Discharge Control Activities

Activity	Responsible Entity or Entities	Status

1. Issue general permit for combined sewer systems in order to implement the Nine Minimum Controls outlined in the National CSO Control Policy	NJDEP	Completed Commitment
2. Modify / develop individual permits issued to POTW's for CSO's	NJDEP	Completed Commitment
3. Comply with Nine Minimum Controls outlined in the National CSO Control Policy	NYCDEP, Westchester County Department of Environmental Facilities ("WCDEF"), and New Jersey combined sewer systems	Recommendation
4. Implement Track I and Track II CSO abatement outlined in 1992 CSO Abatement Order	NYCDEP	Commitment
5. Obtain enforceable commitments from POTW owners and operators to carry out their long-term CSO abatement responsibilities	NJDEP and EPA	Commitment
6. Follow up, as necessary to obtain the commitments of the remaining responsible entities for long-term CSO abatement	NJDEP	Commitment
7. Develop and Implement long-tern CSO abatement plans	New Jersey combined sewer systems and POTW owners and operators	Recommendation
8. Issue Municipal Separate Storm Sewer System permit to NYCDEP	NYSDEC	Commitment
9. Comply with Municipal Separate Storm Sewer System permit	NYCDEP	Commitment
10. In a phased approach, negotiate permits with 46 municipalities draining to the areas of the Harbor where metals are water quality-limiting	NJDEP	Commitment
11. Issue storm water permits negotiated above	NJDEP	Commitment
12. Comply with storm water permits issued above	New Jersey municipalities	Recommendation
13. Issue industry-specific general storm water permits	NYSDEC and NJDEP	Commitment
14. Adopt requirements of the general permit to control construction discharges into local codes	NYC	Recommendation
15. Expand the geographic coverage of the New Jersey Sewage Infrastructure Improvement Act to include the Harbor core area within New Jersey. Provide adequate funding for state and local program implementation	NJ COAST committee	Recommendation
16. Implement above recommendation	NJDEP	Recommendation
17. Implement and comply with above recommendation	New Jersey dischargers and municipalities	Recommendation
18. Develop storm water control projects for potential funding under the Intermodal Surface Transportation Efficiency Act	NYSDEC and NJDEP, working with local governments as appropriate	Commitment

19. Implement Non-Point Source management program for Barnegat Bay and the Whippany River	NJDEP	Commitment
20. Complete Navesink River non-point source demonstration project	NJDEP	Commitment
21. Develop coastal non-point source management program and seek authority to implement as necessary	NYSDOS and NYSDEC with EPA and NOAA assistance, NJDEP	Commitment
22. Approve program above	EPA and NOAA	Commitment
23. Implement program	NYSDOS, NYSDEC and NJDEP	Commitment
24. Use a portion of Urban Resources partnership ("URP") to support non-point source management projects in NYC watersheds impacted by non-point source pollution	URP	Recommendation
25. Continue and enhance ongoing non-point source education programs	NYSDEC and NJDEP	Commitment

The NJDEP issued a General Permit for combined sewer systems in January 1995 (NJPDES Permit No. NJ0105023). Owners and/or operators of combined sewer systems (e.g., CSO points, regulators, combined sewers, etc...) must seek authorization under the General Permit. Authorization requests have been made by a combination of Publicly Owned Treatment Works ("POTW's") and contributing municipalities. Permittees have been directed to construct solids/floatables control measures which will capture and remove solids/floatable debris which cannot pass through a bar screen having a bar spacing of 0.5 inches (13.0 mm) from all CSO's, unless the permittee can demonstrate, to the satisfaction of the NJDEP, that an alternative control measure is more appropriate for a CSO point.

NJDEP's issuance of the General Permit for combined sewer systems, the inclusion of necessary permit requirements in POTW individual permits and the issuance of a series of Administrative Consent Orders has conformed with the National CSO Control Policy's requirements for the Nine Minimum Controls, including control of floatable debris.

The NYSDEC has achieved the same in New York City and in Westchester County through the issuance of State Pollutant Discharge Elimination System ("SPDES") permits and Administrative Consent Orders regarding CSO abatement.

The NYCDEP, New Jersey municipalities with combined sewer systems, and the WCDEF are in various stages of complying with CSO abatement requirements, including floatable debris control.

In 1998, the NYSDEC is expected to finalize permit modifications to the NYCDEP SPDES permits to include requirements for NYCDEP's

municipal separate storm sewer system. A key provision will be the inclusion of catch basins within the separate storm sewer system in the ongoing NYCDEP catch basin hood program, as outlined in the 1992 CSO Abatement Order.

IV. How effective has the FAP been in maintaining a communication network to coordinate floatable debris removal activities and to respond to the spotting of slicks?

The maintaining of an effective communication network has remained a key element of the implementation of the FAP. EPA has remained the hub of the communication network, with its Floatables Coordinator as the link with the USACOE, the United States Coast Guard ("USCG"), the NYCDEP, the NJDEP, the NYSDEC, the NYCDOS, the National Oceanic and Atmospheric Administration ("NOAA") and the public. As reports of Harbor Complex slicks (floatable debris or oil) are received by the EPA Floatables Coordinator, the reports are evaluated to determine appropriate action. Appropriate actions include the reporting of the slick information to the USACOE or the USCG (for oil slicks). For cases in which a slick report identifies a slick not large enough or too disperse to warrant the deployment of a USACOE skimmer vessel, no action is taken. The following is a table generated from the 1997 slick sightings that resulted in the contact of either the USACOE or the USCG by the EPA Floatables Coordinator:

1997 Floatables Action Plan Flyover Slick Reports

DATE	TIME	REPORT	ACTION TAKEN
5/20	9:30 AM	Floatable slick north of Verrazano Bridge, near red buoy #2; approximately 1/2 mile long, 10 feet wide; plastics and seaweed	Reported slick to the USACOE

5/28	2:00 PM	No slicks observed in the Harbor; NJDEP plane observed white substance washing up on beaches in Ocean County (Manahawkin to Island Beach State Park)	NJ Emergency Response team was dispatched and determined that white waxy substance was styrene, a non-toxic substance (later determined to be tetradecanol); beaches not closed
5/29	12:20 PM	No slicks observed in the Harbor; NJDEP plane observed algae from Sea Bright to Monmouth; NJDEP plane observed white foamy substance [tetradecanol] (first observed on 5/28)in stretch of ocean from Bay Head to the Barnegat lighthouse	NJDEP videotaped stretch of ocean that was observed to be foamy (from Bay Head to the Barnegat lighthouse)
6/5	9:30 AM	Arthur Kill, Newark Bay, Kill Van Kull: floatables throughout, in slicks and isolated (grass, wood, plastics); Hudson River: 150 yard long slick off the old train station/SE side of Liberty State Park (grass, wood, plastics) Graves End Bay: 30 yard by 50 yard patch of grass, wood, plastics. Oil slick in south end of Newark Bay. Coastal Oil from spill and are still getting sheens from that.	Reported floatables slicks to the USACOE Called USCG Pollution Response Center regarding oil slick. USCG requested verification that slick actually is an oil slick (have been getting reports of algal blooms mistaken for oil slicks). Helicopter verified it was an oil slick (rainbow sheen). USCG indicated that they have ongoing remediation at Coastal Oil from spill and are still getting sheens from that.
6/6	9:30 AM	Moderate slick about 1/2 mile long was observed in Newark Bay, with additional light debris scattered throughout. In the Upper Harbor, just south of the Verrazano Bridge, and on the east side, there was a moderate density slick about 400 yards long, which contained some large wood pieces.	Reported slicks to the USACOE
6/19	9:15 AM	Light slick in Newark Bay, off port Elizabeth: mainly grass with some wood. 300 yard slick in Upper Harbor, between red buoy 22 and red buoy 24: mainly scum with a substantial amount of plastics.	Reported floatables slicks to the USACOE

6/20	9:30 AM	Light slick in Newark Bay off Port of Elizabeth near the heliport: light density slick about 300 yards long. Newark Bay near buoys Red 6 and Green 7: medium density slick about 200 yards long with lots of wood. Kill Van Kull, NW end just east of Bayonne Bridge: 1/4 mile long slick with scattered wood. Gravesend Bay, just south of Verrazano Narrows Bridge on Brooklyn side: 400 yard slick with lots of plastics.	Reported floatables slicks to the USACOE
6/25	10:30 AM	1/4 mile long slick in Gravesend Bay, about 1/2 mile south of Verrazano Narrows bridge on east side: fairly light with paper, plastics and wood	Reported floatables slick to the USACOE
6/28	9:40 AM	2 mile long by 10 feet wide slick in Upper Hudson River, east side, running south to green buoy #3: mostly garbage	Reported floatables slick to the USACOE
7/1	9:30 AM	2 mile long by 1/2 mile wide oil slick in Gravesend Bay, beginning south of yellow buoy C and extending north to the beaches	Reported oil slick to USCG
7/8	9:30 AM	1/4 mile floatables slick observed underneath and just south of Verrazano Narrows Bridge: mostly grass, plastics and some timbers	Reported floatables slick to the USACOE
7/17	9:30 AM	1000 feet by 2-5 feet floatables slick observed under the Verrazano Narrows Bridge: mostly plastic and vegetation	Reported floatables slick to the USACOE
7/18	9:30 AM	1/4 mile floatables slick observed at red buoy 24, north of Verrazano Narrows Bridge: mostly wood, plastics, vegetation	Reported floatables slick to the USACOE
7/25	11:00 AM	7-8 large timbers were observed in the Kill Van Kull, east of the Bayonne Bridge	Reported timbers sighting to the USACOE
7/26	9:00 AM	1 - 1 1/2 mile floatable slick observed at the midpoint of the Verrazano Bridge, extending north: mostly plastics and grass; Floatable slick observed in the Arthur Kill, south of Goethals Bridge on the western bank: mostly grass and timbers	Reported floatables slicks to the USACOE
8/1	10:15 AM	Floatable slick observed 1 mile north of Verrazano Bridge in center of Harbor: approximately 1000 feet long, mostly grass	Reported floatables slicks to the USACOE

8/4	10:00 AM	1,000 foot long floatables slick observed under the Bayonne Bridge; Light density floatables slick, approximately 3 miles long observed in Upper Harbor starting from the Verrazano Bridge on Brooklyn side and extending to the north	Due to a communication error, the EPA Floatables Coordinator did not receive timely notification of these floatable slicks. USACOE were however, operating at strategic locations in the Harbor given that 8/4 is a 1997 "floatables day" , the day being the first day after the new moon.
8/6	9:30 AM	Several dispersed floatables slicks observed: a) North Bay, east side opposite the Seaport; b) at the Bayonne Bridge; and c) east of Verrazano Bridge, just west of Toys 'R Us	Reported floatables slicks to the USACOE
8/7	9:30 AM	Floatables slick observed at neck of Newark Bay just opposite Sealand terminal, stretching across Bay with Green buoys 5 and 7 and Red buoy 7 as markers. Floatables slick observed in Upper Harbor, 1/2 mile South of Port Authority, just southeast of Governor's Island.	Reported floatables slicks to the USACOE
8/11	9:30 AM	Small light floatables slick observed just east of Verrazano Bridge, 1/4 mile off shore, parallel to the shoreline, approximately 20 feet wide and 400 yards long.	Reported floatables slick to the USACOE
8/16	10:00 AM	Three floatables slicks observed: 1) In Upper Bay, between buoy 28 and green buoy 2, trash, logs, plastics; 2) 1/4 mile east of green buoy 29; and 3) 1/2 mile west of green buoy 2 to the Verrazano bridge.	Reported floatables slicks to the USACOE
8/18	10:30 AM	Floatable slick observed in the vicinity of the Bayonne Bridge, 1/4 mile to the north and south of the bridge, near red buoys 4,8,12.	Reported floatables slick to the USACOE
8/19	9:20 AM	1,000 yard floatable slick observed in lower Harbor, beginning at the middle of the Verrazano bridge and extending south, mostly wood and plastics	Reported floatables slick to the USACOE
8/20	10:30 AM	Two floatables slicks observed: 1) light/ moderate density slick, east side of Newark Bay, in the vicinity of Port Elizabeth; and 2)moderate density slick in Upper Bay, running from green buoy #3 south to the Verrazano Bridge	Reported floatables slicks to the USACOE
8/21	10:30 AM	Floatables slick observed just south of Bayonne Bridge, in Newark Bay, tires and timbers included	Reported floatables slick to the USACOE

9/12	10:40 AM	Two floatables slicks observed: a) In Newark Bay where it connects with Arthur Kill, 200 yards, fairly dense, paper, leaves, plastic and b) In the Upper Harbor, just south of Governor's Island, approximately also 200 yards, paper and plastic	Reported floatables slicks to the USACOE

V. How effective has the FAP been in ensuring timely notification of beach operators of potential wash-ups of floatable debris?

Due to the effectiveness of the FAP from 1995 to 1997 in minimizing the escaping of floatable debris from the Harbor Complex, it has not been necessary for the EPA Floatables Coordinator to notify beach operators of potential wash-ups of floatable debris. However, a notification system has been maintained and is in place whereby, based on the sighting of a floatable debris slick outside the Harbor Complex, the EPA Floatables Coordinator is to contact the following:

In New Jersey: NJDEP, which in turn notifies local beach operators; and

In New York: NYSDEC Region 1 (Nassau and Suffolk counties) or NYSDEC Region 2 (New York City), depending on the location of the spotted slick, and the New York Beach Information Network (a cooperative network of many Long Island beach operators for the obtaining of beach condition information).

Although routine clean-up operations are projected to address the significant majority of floatable debris slicks, a program is also established to address non-routine events such as the following:

- vessel accidents or illegal dumping; and

- floatable debris slicks sighted in the Bight, beyond the transect between Sandy Hook and Rockaway point.

The EPA Floatable Coordinator, upon receipt of a Bight floatable slick sighting is to notify appropriate NJDEP and NYSDEC Floatable Coordinators. Individual State Coordinators are then responsible for notifying appropriate local authorities of an impending washup, who would in turn organize resources for clean-up. NOAA has developed a forecasting program that may be used to predict the impact area for Bight-sighted floatable debris slicks based on several input parameters (wind direction, sea

conditions, etc...). This forecasting program has been used in the past, but was not used in the 1995 - 1997 time period.

VI. How effective has the FAP been in minimizing beach closures?

The FAP has been very successful in minimizing beach closures as evidenced by the fact that there were no beach closures in New Jersey or on the southern shore of Long Island between 1995 and 1997. The following information discusses this success and provides past data for the purpose of comparison.

After the floatable debris washups in New Jersey in 1987, the NJDEP's Cooperative Coastal Monitoring Program began tracking beach closures due to floatable debris washups in terms of closures of designated bathing areas. A designated bathing area is typically a stretch of beach patrolled by a lifeguard. A closure of such an area must last for a minimum of one day in order to be counted as an official closure. The following table demonstrates the success of the FAP in minimizing designated bathing area closures due to floatable debris washups.

New Jersey Floatable Debris-Related Beach Closure Data

Year	Total # of Designated Bathing Area Closures in New Jersey between May 15 and September 15
1988	19 (pre-FAP)
1989	9 (2 incidents)
1990	10 (1 incident)
1991	0
1992	0 (1 unofficial incident)
1993	0
1994	0
1995	0
1996	0
1997	0

In 1989, several Ocean City beaches were closed on July 20, 1989 due the washup of medical debris. Several Sandy Hook beaches were closed between August 18-19, 1989 due to the washup of

medical debris. The 9 closures of designated bathing areas in New Jersey in 1989 all resulted from these two washup incidents.

In 1990, several beaches were closed in Monmouth County due to the presence of floatables on June 26, 1990. The 10 closures of designated bathing areas in New Jersey all resulted from this one washup incident.

In 1992, On July 22, 1992, Spring Lake, a beach in Monmouth County was closed for a period of several hours due to a floatable debris washup. NJDEP does not regard this incident as an official designated bathing area closure due to its brevity.

As the table indicates, New Jersey has not had a closure of a designated bathing area due to floatable debris since 1990. This is due in large part to the implementation of the FAP.

Implementation of the FAP in New York has also been highly successful. After the summer of 1988, in which beaches in New York from Coney Island in Brooklyn to Tiana Beach in Suffolk were closed for varying periods of time due to floatable debris washups, the FAP has resulted in minimizing beach closures as indicated in the following table.

New York Floatable Debris-Related Beach Closure Data

Year	Total # of Beach Closure Incidents in New York between May 15 and September 15
1989	0
1990	0
1991	1
1992	1
1993	0
1994	0
1995	0
1996	0
1997	0

In 1991, Jacob Riis Park Beach in Brooklyn was closed on August 31, 1991 due to the washup of medical waste.

In 1992, the Lawrence Beach Club in Atlantic Beach, New York was

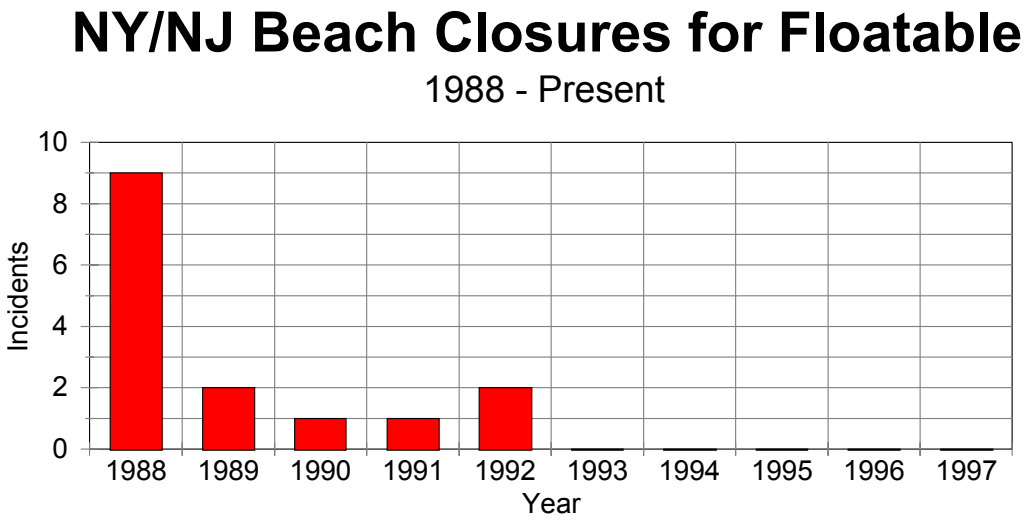
closed on July 20, 1992 due to the washup of medical waste.

The FAP has been assessed in the past on a bi-State floatable debris-based beach closure "incident" basis. Using this measure the following table indicates the success of the FAP in minimizing beach closures.

Combined NY / NJ Floatable Debris-Related Beach Closure Data

Year	Total # of Floatable Debris-Based Beach Closure Incidents in New Jersey and New York between May 15 and September 15
1988	9 (pre-FAP)
1989	2
1990	1
1991	1
1992	2
1993	0
1994	0
1995	0
1996	0
1997	0

On this basis, there has not been a floatable debris-based beach closure in either New York or New Jersey since 1992. The following graph illustrates this data.



VI I.

Rain and the FAP

What has been the impact of rainfall on the success of the FAP? Discharges from both CSO's and storm sewers are triggered by rainfall events. The correspondence, however, between rainfall events and floatable debris slick formation is based on a variety of factors including rainfall intensity, duration of rainfall, time frame between a particular rainfall event and the previous rainfall event, and the location of a rainfall event. In past FAP assessment reports, rainfall data has been included from a variety of specific locations: Newark International Airport and Sandy Hook in New Jersey, and Central Park, Dix Hills, the South Shore and John F. Kennedy International Airport in New York. In order to utilize rainfall data that more accurately reflects the broader region of Northern New Jersey and New York City, where the Harbor's CSO discharges are located, data from the National Climatic Data Center ("NCDC") has been obtained and is presented as monthly rainfall in inches for the "summer months" (May through September) for each year between 1985 and 1997 as follows:

State of New Jersey Rainfall Data: 1985 - 1997
(National Climatic Data Center New Jersey Division 1)

	MAY	JUNE	JULY	AUGUST	SEPTEMBER	Summer Total

1985	5.73	5.25	4.51	3.90	6.03	**25.42**
1986	1.72	3.39	6.04	5.23	2.78	**19.16**
1987	2.14	3.63	6.15	5.21	5.69	**22.82**
1988	5.66	0.99	8.55	3.44	2.77	**21.41**
1989	9.99	6.65	4.06	4.71	8.40	**33.81**
1990	8.81	3.38	4.40	8.82	2.33	**27.74**
1991	3.07	3.14	4.41	4.57	4.98	**20.17**
1992	3.13	6.34	4.73	4.04	3.80	**22.04**
1993	0.99	3.05	1.92	3.24	6.11	**15.31**
1994	3.67	5.27	4.69	5.91	2.74	**22.28**
1995	3.43	2.36	5.13	1.25	4.24	**16.41**
1996	3.45	5.29	7.88	2.31	6.30	**25.23**
1997	3.38	1.91	1.45	3.92	3.23	**13.89**
Average	**4.24**	**3.90**	**4.92**	**4.35**	**4.57**	**21.98**

State of New York Rainfall Data: 1985 - 1997
(National Climatic Data Center New York Division 4)

	MAY	**JUNE**	**JULY**	**AUGUST**	**SEPTEMBER**	**Summer Total**
1985	5.32	5.00	3.67	3.75	3.68	**21.42**
1986	0.95	2.64	5.04	4.86	1.62	**15.11**
1987	1.81	3.19	3.38	4.69	4.45	**17.52**
1988	4.29	1.47	6.13	2.19	3.21	**17.29**
1989	10.21	7.13	5.64	6.42	5.19	**34.59**
1990	7.70	3.02	3.57	8.51	2.70	**25.50**
1991	3.31	2.22	2.94	7.81	4.12	**20.40**
1992	3.13	4.36	5.03	5.57	3.89	**21.98**
1993	1.27	2.08	1.96	2.86	5.29	**13.46**
1994	3.81	1.52	2.72	5.80	3.78	**17.63**
1995	3.07	2.58	4.03	0.51	3.95	**14.14**
1996	3.07	4.19	6.47	2.95	5.53	**22.21**
1997	2.76	1.37	4.10	4.23	1.37	**13.83**
Average	**3.90**	**3.14**	**4.21**	**4.63**	**3.75**	**19.52**

NCDC New Jersey Division 1 includes all of Northern New Jersey, south to just north of Sandy Hook and NCDC New York Division 4 includes New York City and Nassau and Suffolk Counties.

From this information, the following general statements can be made:

- The summers of 1987 and 1988, the two years in which significant floatable debris washups occurred, were summers of average or below average rainfall.

- The summer of 1989, the first year that the FAP was implemented, was a summer of significantly above average rainfall.

- The summers of 1990, 1991 and 1992, the last three years in which floatable debris-related beach closures occurred, were generally summers of above average rainfall.

- The summers of 1993 - 1997, years in which no floatable debris-related beach closures occurred, were generally summers of below average rainfall.

That the years of 1994 (in New Jersey) and 1996 (in both New Jersey and New York) included summer months of above average rainfall for which no floatable debris-related beach closures occurred is noteworthy. The variety of activities implemented under the FAP and in concert with the FAP since 1989 have clearly resulted in far greater control of floatable debris slicks exiting the Harbor and affecting beaches.

VIII. Wind and the FAP

What role do wind speed, wind direction and currents play in the transport of floatable debris?

In past FAP assessment reports, wind speed and directions were provided for a variety of specific locations: Newark International Airport and Sandy Hook in New Jersey, and Central Park, Dix Hills, the South Shore and John F. Kennedy International Airport in New York. The value of this specific-location information is, however, minimal. Wind speeds and directions are variable from location to location and can differ between land and sea. Winds also engage in a complex interplay with tidal currents. Such data provides little conclusive correlation between the presence of floatable debris in the Harbor, its exit to the Bight and its eventual washup on Long Island and New Jersey beaches. What can be said of wind speeds and directions in regard to the movement of floatable debris is summarized as follows:

- Based on tests conducted, there appear to be four categories of floatable debris. These four categories are defined below and the major contributor(s) to their movements is indicated:

Categories of Floatable Debris

Category	Definition	Predominant Transport Cause(s)
Floating	Items that float on the top of the water surface (e.g., Styrofoam cups, plastic containers, metals cans)	Wind and Surface Current

Partially Submerged	Items that are found partially above the water surface and partially below (e.g., partially filled cans or bottles)	Wind and Surface Current
Submerged	Items that float just at or below the water surface (e.g., driftwood that has taken on water)	Surface Current
Neutrally Buoyant	Items which exist in the water column (e.g., plastic bags or plastic fragments)	Subsurface Current

- It appears that the transport of floatable debris over long distances is affected by large-scale wind and offshore current systems.

- Washups of floatable debris in 1987 and 1988 are believed to have been linked to favorable meteorological and oceanographic conditions. It is believed that persistent summer winds from the south-southwest, along with their associated mean currents to the northeast, drove floatable debris ashore, on to the Long Island beaches.

- Summertime climatological and meteorological conditions favor floatables washups on Long Island and New Jersey beaches. There is an increased frequency of winds blowing towards the west, northwest, north and northeast.

- Oceanic winds cause circulation patterns in the water which result in windrows. Windrows concentrate floatable debris within narrow bands, usually parallel to the current direction. Such floatable debris slicks can washup onto shores if given favorable short-term conditions of winds and tides.

- Once floatable debris exits the Harbor and enters the Bight, its transport is determined by the Bight's meteorological and hydrodynamical activities.

Based on this discussion, it is imperative that Harbor-generated floatable debris not be permitted to exit the Harbor and enter the Bight. The FAP has recognized this basic aim and has sought to do just that. The interagency implementation of the FAP has significantly reduced the amount of floatable debris that both enters the Harbor and exits the Harbor, as evidenced by other sections of this report.

IX. NYCDEP Long-term Floatable Debris Control

On June 25, 1992 the NYSDEC and the NYCDEP entered into an Order on Consent ("CSO Abatement Order") providing for the planning, designing and construction of a comprehensive CSO abatement program for New York City. Generally, the CSO Abatement Order requires the abatement of CSO impacts in two "Tracks." Track One consists of a series of deadlines which require the NYCDEP to plan, design, commence construction and complete construction of CSO abatement facilities designed to prevent violations of permit requirements for minimum levels of dissolved oxygen and maximum levels of coliform bacteria. End dates for these Track One facilities range from 2001 to 2006. Track Two requires the NYCDEP to plan, design, and commence construction of facilities designed to abate substantially all floatable debris and settleable solids from CSO outfalls where floatable debris will not be abated by the construction projects included in Track One. Dates for the initiation of construction of Track Two facilities are area specific and are generally specified to be within 18 months of the completion of Track One facilities.

Because the majority of the deadlines for Track One and Track Two facility construction extend into the next decade and beyond, the 1992 CSO Abatement Order also requires that the NYCDEP undertake certain interim measures to address floatable debris control. The NYCDEP was required to purchase and operate one large open water skimmer vessel, designed to supplement U.S. Army Corps of Engineers floatables skimming actions in the New York / New Jersey Harbor. NYCDEP was also required to establish a booming and skimming program (through the purchase and operation of four skimming boats) to collect and remove substantially all waterborne floatables in certain prescribed Jamaica Bay tributaries, inner / outer Harbor tributaries and from certain outfalls in beach-sensitive open waters around Staten Island, western Brooklyn and the upper East River. These interim measures are discussed earlier in this assessment report.

Another interim measure for floatables control mandated by the 1992 CSO Abatement Order was that the NYCDEP would initiate a systematic Citywide survey of catch basins (over 100,000 throughout the City) by January 1990 and complete the survey by June 1993. This survey was to consist of cleaning each catch basin that requires cleaning and determining whether the catch basin had a hood in place. If the catch basin lacked a hood, the NYCDEP was to replace the hood by no later than September 1993. The rationale behind this requirement was that although catch basins were primarily equipped with hoods for odor control purposes, the presence of a functioning hood traps floatables in the catch basin, minimizing their delivery to the downstream sewer system.

On July 6, 1994, the NYSDEC issued a Notice of Violation ("NOV") to the NYCDEP, stating that the NYCDEP had violated the 1992 CSO Abatement Order by failing to complete the Citywide survey of catch basins so as to replace missing hoods by September 1993. In order to resolve the July 6, 1994 NOV, the NYCDEP agreed to a proposed modification to the 1992 CSO Abatement Order with the NYSDEC in October 1995 (the "Modification"). This was done for the purpose of settling the matters alleged in the NOV without litigation, and the NYCDEP also waived its right to a hearing as provided by law and consented to the issuance of the proposed Modification, agreeing to its terms, provisions and conditions.

Based on a series of discussions between EPA and the NYCDEP, with the support of NYSDEC, the inclusion of the following catch basin hood program was incorporated into the Modification:

1) All City catch basins not serving sewers that overflow to boomed locations must have hoods. Specifically, this includes a) community districts identified as Phase I (approximately 33,109 catch basins) and Phase II (approximately 35,184 catch basins) in the Modification; and b) all other non-boomed areas of City, which are to be added to Phase II;

2) Catch basins in Phase I community districts will be inspected, cleaned (if necessary) and hoods repaired / installed by February, 1998;

3) Catch basins in Phase II community districts and other non-boomed areas of the City will be inspected, cleaned (if necessary) and hoods repaired / installed by February 1999.

4) Catch basins in Manhattan community districts which are classified as Phase II in the Modification will be inspected, cleaned (if necessary) and hoods repaired / installed by February 1998;

5) Upon completion of the inspection, cleaning (if necessary) and hood repair or replacement for Phase I, the NYCDEP will initiate a survey process for Phase I whereby the given catch basin will be inspected, at least every two years, to assess whether or not the respective catch basin has a functioning hood. Within ninety (90) days of inspecting a catch basin lacking a functioning hood, the NYCDEP shall install a replacement hood. Upon completion of the activity for Phase II, the NYCDEP will initiate a survey process for Phase II whereby the given catch basin will be inspected, at least every two years, to assess whether or not the respective catch basin has a functioning hood. Within ninety (90) days of inspecting a catch basin lacking a functioning hood, the

NYCDEP shall install a replacement hood. The NYCDEP may propose and substitute (subject to NYSDEC approval) an alternate to this recurring hood inspection and replacement program which will produce equivalent or enhanced floatables control, based upon technical analysis;

6) By April, 1996, the NYCDEP shall submit a scope of work to the NYSDEC, for approval, to determine an appropriate and cost-effective catch basin cleaning program for floatables capture and flood control in locations of varying levels of street litter characteristics and quantities throughout the City; and

7) By June 1997, the NYCDEP shall submit a report of the completed study, consistent with the approved scope of work pursuant to paragraph 6 above, including any proposal to incorporate a cleaning program as part of its Comprehensive Plan and the details of any such proposed cleaning program. Any delay of the Comprehensive Plan (Note: the NYCDEP was already obligated under Track Two requirements to submit a Comprehensive Plan for controlling floatable debris by June 1997) will not affect the NYCDEP obligation to submit the report by June 1997.

Under this catch basin hood program, the entire City will be covered with a short term control floatable debris control technology, either booming and skimming or catch basin hoods (Note: Catch basins not in either Phase I or Phase II are tributary to booming facilities). Floatable debris control measures were also strengthened above the original CSO Abatement Order in that there will now be a recurring hood inspection and replacement program to ensure the continued effectiveness of the hood floatable debris control technology. This revised catch basin hood program was expected to augment beach protection efforts for a number of years.

In June 1997, the NYCDEP submitted a Draft City-Wide CSO Floatables Plan (i.e., the Comprehensive Plan) to the NYSDEC for approval. The principal elements of this Plan are described in the following table:

NYCDEP's Draft Comprehensive Plan for Floatable Debris Control

Activity	Start Date	End Date	Estimated Capital Cost	Estimated Annual Cost
1. Catch Basin Hooding, Phase I/II Areas	Ongoing	February 1999	$26,000,000	N/A

2. Booming and Skimming Program	Ongoing	Ongoing or until superseded by Comprehensive Plan	$4,353,000	$840,000
3. Catch Basin Hooding of Phase III Areas	February 1999	April 2000	$3,576,000	N/A
4. City-Wide Reconstruction of Unhoodable Catch Basins	September 1999	September 2009	$120,000,000	N/A
5. City-Wide Catch Basin Re-inspections	Ongoing	N/A	N/A	$1,347,000
6. Public Education Program	December 1997	December 1998	$192,000	N/A
7. Illegal Dumping Control	December 1997	Ongoing or until superseded by Comprehensive Plan	N/A	N/A
8. Floatables Plan Reporting	Ongoing	N/A	N/A	N/A
9. Pilot Studies and Demonstration Projects	December 1997	Ongoing or until superseded by Comprehensive Plan	$4,000,000	N/A
TOTAL			**$158,121,000**	**$2,223,000**

The following provides brief descriptions of these activities:

1. Catch Basin Hooding, Phase I/II Areas: NYCDEP will continue its CSO Abatement Ordered catch basin hooding program for Phase I and Phase II areas of the City, areas largely not already controlled by the booming and skimming program.

2. Booming and Skimming Program: NYCDEP will continue its booming and skimming program at major CSO outfalls until at least until the construction of Track One facilities (between 2001 and 2006).

3. Catch Basin Hooding of Phase III Areas: NYCDEP has decided to place hoods in catch basins outside the boundaries of Phase I and Phase II, in Phase III areas, even though these basins are currently largely controlled by the booming and skimming program.

4. City-Wide Reconstruction of Unhoodable Catch Basins: Based on specific design configuration criteria, certain catch basins are termed "currently unhoodable" by the NYCDEP. In order to place a hood into these catch basins, the catch basins must be rebuilt. NYCDEP has identified this activity as the most costly of all its Track II floatable debris control activities.

5. City-Wide Catch Basin Re-inspections: NYCDEP will continue its 2-year cycle of catch basin inspecting it ensure that hoods are still in place.

6. Public Education Program: NYCDEP will develop a multi-faceted public education program to include a) the development of a public relations and advertising plan for promoting public participation in keeping litter out of CSO's; b) the initiation of a CSO Litter Abatement Education Program for schools; c) the investigation of a potential collaborative effort with other agencies such as the NYCDOS and the EPA; d) the establishment of a Catch Basin Stenciling Committee; and e) the establishment of a Public Education Advisory Committee.

7. Illegal Dumping Control: NYCDEP will coordinate with the NYCDOS police in cases where there is evidence of illegal shoreline dumping of floatable debris.

8. Floatables Plan Reporting: NYCDEP is committed to ongoing reporting of the progress of its floatable debris control program.

9. Pilot Studies and Demonstration Projects: NYCDEP selected the above activities to control floatable debris based on their implementability and overall effectiveness in achieving a substantial reduction in discharges of floatable debris from CSO discharges. Other promising technologies were not selected because their implementability and effectiveness are unknown. NYCDEP plans to test a variety of these technologies to determine if any could replace or augment the technologies presently selected. The technologies to be tested include baffles, catch basin inserts, vortex technologies, horizontal mechanical screens, in-line netting and continuous deflective separators.

Another major activity of the recommended Draft Comprehensive Plan is the continuation of the program started by the NYCDEP to increase the amount of wet weather flow captured and treated at its water pollution control plants. It is estimated that implementation of the Plan will reduce the discharge of floatable debris to the Harbor Complex by 85 to 87 per cent City-wide relative to the levels which existed prior to the implementation of the Plan (before the booming and skimming program was implemented). Differences in this estimate are based on the effectiveness of the City's public education program.

X. NJDEP Long-term Floatable Debris Control

The NJDEP, under its 1995 general permit for combined sewer

systems, requires permittees with combined sewer systems to develop, evaluate and implement at least one interim solids/floatables control measure for each CSO point from either of the categories listed below:

Screening Technologies: This category includes, but is not limited to, baffles, trash racks, static screens, end-of-pipe netting and mechanical screens. All solids/floatables screening technologies control measures are to be designed to comply with the performance criteria (no solids/floatables are to be discharged that can pass through a screen having square openings of 0.5 inches) specified for long-term solids/floatables control measures.

Skimming Technologies: This category includes, but is not limited to, the placement of booms around an outfall or groups of outfalls, skimming open water areas with "skimming boats" and flow balance method containment. Selected interim solids/floatables control measures shall be implemented, operated and/or maintained until the long-term solids/floatables control measures are in place.

On a long-term basis, permittees are directed to construct solids/floatables control measures which will capture and remove solids/floatables which cannot pass through a bar screen having a bar spacing of 0.5 inches (13.0 mm) from all CSO's, unless the permittee can demonstrate, to the satisfaction of the NJDEP, that an alternative control measure is more appropriate for a CSO point. A detailed table is attached to this report describing the status of compliance with these interim and final floatable debris abatement requirements.

XI. Notes on the Floatables Action Plan

The following are miscellaneous notes regarding the implementation of the FAP:

1. EPA helicopter surveillance for floatable debris started in May 1989 and operated six days a week until mid-September. From mid-September until the following May, floatable debris surveillance flights occurred around the new and full moon cycles. This year-round surveillance continued until EPA fiscal year 1996 budget crisis (federal furloughs). No floatable debris surveillance flights were conducted from October 1995 until May 19, 1996. Flights were resumed on May 20, 1996 and continued until September 11, 1996. Due to a lack of funding, EPA helicopter surveillance flights were not continued during the September 1996 to May 1997 period, the non-beach season months. Funding was approved for flights covering the May 15 - September 15, 1997 time frame. It is expected that funding for such beach

season month surveillance will continue in the future.

2. For several years, the NJDEP has used an airplane to patrol the Harbor Complex and the Jersey Shore for floatable debris slicks. This was continued in 1997. The route used by the NJDEP starts in the Arthur Kill to the Fresh Kills Landfill, moves into Raritan Bay (the airplane would alternate between the middle of the Bay, the New Jersey bayshore or along the Staten Island coast) to the tip of Sandy Hook and continues southward to either Barnegat Inlet or Cape May Point (on Thursdays and Sundays). On Sundays, when the EPA helicopter does not fly, the NJDEP patrols the Upper Bay of the Harbor Complex. In July 1997 the NJDEP plane broke down and NJDEP used a helicopter for the rest of the summer, following the route described from south to north. In general the NJDEP patrols the shoreline approximately 1/2 mile our into the waterway.

3. In the past, the EPA vessel "Clean Waters" and the USCG vessels have routinely participated in floatable debris surveillance. This is no longer being done.

XII. References

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U. S. Environmental Protection Agency, 1996. "The Helicopter Monitoring Report: A Report of the New York Bight Water Quality", summer of 1996. Region II, Division of Environmental Science and Assessment, Edison, New Jersey.

XIII. Attachments

a) Background Information on Floatables Action Plan
b) Map: Boundaries of the Harbor Complex
c) Table: Implementation Status of Floatables Abatement Programs of New Jersey Communities
d) USACOE "Floatable Days-1997"
e) National Climatic Data Center rainfall areas 1 through 4