

## Comprehensive Conservation and Management Plan Actions Pathogens

### **P-1. Reduce loadings of pathogens from CSOs, stormwater discharges, and non-point sources to levels protective of public health (See Rainfall-Induced Discharges section)**

**Key Elements:** Three sources of pollution to the Harbor/Bight (CSOs, stormwater discharges, and non-point source runoff) are associated with runoff induced by rainfall. Effective abatement of these sources is important in reducing pathogenic use impairments in the Harbor/Bight.

#### **Description of Activities to Date**

HEP's Pathogens Work Group has been working towards the development of a TMDL for pathogens in the Estuary. Recently, the Pathogen Allocation Tool (PAT) has been finalized and is currently being used to run management scenarios based upon NYC's CSO plan and NJ CSO general permit.

**Planned Activities:** A draft TMDL is expected by summer 2009.

(EPA—James Olander 2009)

HEP's Pathogens Work Group is also involved in reevaluating the potential for shellfish harvest areas in the harbor and currently established safety zones, using available models. The statement of work will be reviewed by state shellfishing authorities. (EPA—James Olander 2009)

New York City is constructing and planning a number of CSO abatement projects, including sewer system improvements and construction of storage facilities to hold overflow during rainstorms so it can be treated during dry weather. Other measures have already been taken to reduce CSO impacts such as a citywide educational campaign promoting water conservation and other BMPs as part of the City's Nine Minimum Controls required by the national CSO Control Policy. NYC DEP completed the upgrade of the Spring Creek CSO Facility in April 2007. The Flushing Bay CSO Facility was completed in May 2007.

**Planned Activities:** Many other CSO abatement projects and the BMP program are ongoing

(NYCDEP 2003, NYCDEP—Dorothy Chao 2009)

NYCDEP samples stormwater outfalls to determine the presence and quantity of contaminants, and then develops plans to control or eliminate the contaminant input as required by the MS4 section of its SPDES permits. NYCDEP has recently completed the monitoring program and the data is currently being reviewed by the Regulatory Planning Section.

**Planned Activities:** A report will be developed once the analysis is completed

(NYCDEP 2003, NYCDEP—Leslie Lipton 2009)

IEC conducts dry weather investigations of CSOs and MS4s throughout the Interstate Environmental District. When field inspections reveal outfalls flowing, NY DEC and/or NJDEP are contacted for remediation. For the period 2006-2008, 97 inspections were made; 20 outfalls were observed flowing.

***Planned Activities:*** Ongoing

(IEC—Pete Sattler 2009)

All activities to reduce wet-weather discharges (see Section on Rainfall-Induced Discharges) contribute to the reduction of pathogens from CSOs, stormwater discharges and non-point sources. (HEP Office 2009 )

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## **P-2. Reduce or eliminate the discharge of raw or inadequately treated sewage due to STP malfunctions and illegal connections**

**Key Elements:** Consistent with the requirements of the Clean Water Act and regional disinfection policy, all municipal sewage treatment plants in the region must meet secondary treatment requirements and year-round disinfection requirements. Since all of the region's sewage treatment plants are meeting year-round disinfection requirements, they are no longer major sources of bacterial indicators. There are, however, continuing problems associated with occasional bypasses of raw sewage caused by sewage treatment plants and collection system malfunctions, and with scattered, illegal connections of sanitary sewage to storm sewers and to combined sewers.

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### **Description of Activities to Date**

The Beach/Shellfish Closure Action Plan was first implemented in 1989 as a short-term strategy to prevent and mitigate beach and shellfish closures. In 1997, the Regional Bypass Workgroup (RBWG) was formed by the states environmental and health departments, NYCDEP, and other federal agencies to address raw and partially treated sewage discharges or releases to the harbor (see action P-5). The group continues to function, led by the Interstate Environmental Commission (IEC). IEC acts as the coordinator and the warehouse of all bypasses in the tri-state area. They maintain a database of all of the bypasses and the specifics of each, which includes the waters that were affected, as well as bathing and shellfish areas. Bypass events and notifications also include sludge, chemicals, fuel and fish kills. Annual reports are available. There have been many reported bypasses in NY and NJ since the inception of this workgroup. There have been more bypasses in NYC because the majority of the treatment facilities, pump stations, regulators and gravity sewers and force mains exist in NYC. Multi-funding partners were identified to pay for software, which is a predictive tool for impacts from bypasses. Additional funds were allocated from a subset of the members and the Bypass Model Version 2.0 was released in 2008. The new software was made available to all members of the RBWG. The new model was updated with calibrated enterococcus and total/fecal coliform kinetics; a spatial domain encompassing NY-NJ Harbor, LIS, the New Jersey coastline south to Cape May and the Passaic/Hackensack/Raritan Rivers; discharge to any segment; multiple discharges; time of discharge with proper position in the tidal cycle and temperature conditions; temperature assignment and specific duration and quantity. In addition, notification protocols have been maintained since the inception of the workgroup; annual meetings prior to the official bathing season are held and contacts are updated.

**Planned Activities:** Continue all aspects of the RBWG

(IEC 2003, IEC—Pete Sattler 2009)

In October 1998, the Monmouth County Bayshore Outfall Authority (MCBOA) signed an Administrative Consent Order (ACO), which required them to construct and maintain pipeline and pump stations according to a set schedule so as to eliminate unpermitted discharges; submit progress reports; and pay fines and stipulated penalties. The shellfish harvest areas in Raritan Bay were automatically closed by the State in accordance with the National Shellfish Sanitation Program. In January 1999, MCBOA reconstructed the pipeline and pump stations to eliminate the unpermitted discharges; MCBOA submitted reports and paid fines and stipulated penalties. The NJDEP issued a "Notice to Resume Harvest" on February 15, 1999. Cost of repairs was over \$545,000. There have been no unpermitted discharges at MCBOA since the reconstruction in 1999. (NJDEP 1999- HEP tracking files)

NYCDEP has conducted the Shoreline Survey to identify and catalog all discharge pipes including both those belonging to the city as well as those belonging to any other public or private entity and continues to help eliminate any illegal discharges into the Harbor. This effort has matured into the Sentinel Monitoring Program, under which the harbor and its tributaries are evaluated on a quarterly basis to quickly identify and abate any new dry-weather discharges.

**Planned Activities:** Ongoing

(NYCDEP 2003, NYCDEP—Leslie Lipton 2009)

NYCDEP has completed installation of telemetry at 91 City pumping stations since 1998, improving monitoring and communications between these facilities and NYCDEP operators. This system enables NYCDEP personnel to view from computers historical or real-time data for all connected pump stations. Automatic alarms notify shift engineers as to condition changes. Currently, telemetry is being installed at 102 regulators to further improve monitoring of the system and reduce potential bypassing.

**Planned Activities:** Ongoing. NYCDEP continues to install telemetry to further improve monitoring of the system.

(NYCDEP 2003, NYCDEP—Dorothy Chao 2009)

NYCDEP has installed signs at CSO outfalls in response to the "Fisherman's Right to Know" Act of 1995. These signs allow the public to notify the DEP of dry-weather discharges, or other problems, to ensure a timely response and abatement of outfall problems.

**Planned Activities:** This is an ongoing program and new CSO Outfall signs are being updated.

(NYCDEP 2003, NYCDEP—Dorothy Chao 2009)

NYCDEP completed new or replacement sanitary sewer projects to eliminate direct discharges of sewage to Jamaica Bay or its tributaries.

**Planned Activities:** Ongoing

(NYCDEP 2003, NYCDEP—Dorothy Chao 2009)

NYCDEP is continuing its design for sewer expansion in the Eastern Jamaica Bay areas. The dry weather discharge from approximately 90 homes in the communities of Warnerville & Meadowmere, located at the mouth of Thurston Basin, will be abated through the construction of sanitary sewers, a pumping station and force main.

**Planned Activities:** Warnerville/Meadowmere Dry Weather Discharge Abatement Project is in construction and scheduled to be completed in 2009.

(NYCDEP—Dorothy Chao 2009)

NYCDEP has instituted an annual Enhanced Beach Protection Program (EBPP) to implement increased levels of surveillance, and improved corrective maintenance procedures for critical pumping stations and regulators.

**Planned Activities:** Ongoing

(NYCDEP 2003)

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### **P-3. Establish marina pumpout facilities and no discharge zones to reduce impacts of vessel discharges.**

**Key Elements:** Marine vessel discharges can have local adverse effects on pathogenic water quality, particularly in tributary areas and small embayments where tidal flushing action is minimal. Marine pumpout stations and no discharge zones are ways to decrease pathogens that could potentially be discharged from vessels.

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#### **Description of Activities to Date**

NYCDEP is in the process of installing boat pump-out facilities in Little Neck, Flushing and Jamaica Bays. This is made possible through a grant from the U.S. Department of the Interior, Fish and Wildlife Service under the Clean Vessel Act Program. In addition, other locations are currently being evaluated for potential pump-out facilities.

**Planned Activities:** Ongoing

(NYCDEP 2003)

There are 12 pumpout stations at marinas in the New York City Metropolitan area. A list and map of these stations can be found at [http://www.nycgovparks.org/sub\\_things\\_to\\_do/facilities/marinas/html/pumpout\\_locations.htm](http://www.nycgovparks.org/sub_things_to_do/facilities/marinas/html/pumpout_locations.htm) l. (HEP Office 2009)

There are 35 pumpout stations in the NJ portion of the Harbor. A list and map of these stations can be found at <http://www.state.nj.us/dep/fgw/cvadir.htm>. (HEP Office 2009)

The US Congress has not completed the amendment to the Clean Water Act to allow “No Discharge” zone designations by the states (P-3.2). (HEP Office 2009)

The 153 mile stretch of the Hudson River between Battery Park in Manhattan and the City of Troy Dam in Rensselaer County has been designated a No Discharge Area by the USEPA, NY State of State, NYSDEC, and Hudson Riverkeeper. USEPA and NJDEP designated the Navesink and Shrewsbury rivers in NJ as No Discharge Areas and are also considering Sandy Hook Bay and adjacent areas in Raritan Bay. EPA is trying to encourage the designation of NJ’s portion of the Hudson as a No Discharge Areas. (HEP Office 2009, EPA—James Olander 2009)

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#### **P-4. Develop additional indicators of pathogenic contamination**

**Key Elements:** HEP recognizes the need to develop additional indicators of pathogenic contamination. The USEPA issued a new pathogenic indicator, enterococci, to determine beach closures for marine waters.

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#### **Description of Activities to Date**

NJ adopted enterococcus criteria for primary contact in marine waters. EPA promulgated the enterococcus standard for NY. (USEPA—James Olander 2009)

The final report HRF 004/R was issued in February 1997, titled "Evaluation and Verification of Pathogenic Indicators in the NY/NJ Harbor System." The Hudson River Foundation funded the study. The study has been completed. (NJDEP- HEP tracking files)

HEP intends to use the existing fecal coliform, total coliform, and Enterococci indicators for TMDL development. Enterococci die-off study has been completed by the EPA. The Pathogen Model has been revised to incorporate this information into the enterococci module. (HEP Office 2005)

Research on the relay/depuration process (P-4.4) has not been funded in NY or NJ waters. (HEP Office 2003)

A comprehensive epidemiological study of beaches across the Harbor/Bight region (P-4.5) has not been funded. (HEP Office 2003)

The IEC conducted wet and dry weather ambient water quality surveys throughout the harbor Complex from 2001 to 2003. This study gathered data on enterococci. All data has been transmitted to the HEP's Pathogen Workgroup and modeler. (IEC 2004)

During 2005, IEC conducted pathogen sampling at 5 transects across the Hudson River to determine the microbiological content and distribution following a rain event, as well as die-off rates. Four storm events were sampled between November 2005 and May 2006. All data was disseminated to the Pathogens Workgroup and its modeling contractor. During 2006, 8 stations on the Hudson River between Yonkers and Bear Mountain, New York, were monitored during dry and wet conditions (3 events each) to create a data base for fecal and total coliform, enterococcus and E.coli. During 2007 and 2008, these surveys were repeated, but the surveys were expanded to 9 stations with 4 events per dry and wet weather scenarios.

**Planned Activity:** Continue the water quality surveys.

(IEC 2004, IEC—Pete Sattler 2009)

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## **P-5. Continue interstate dialogue on beach closure policies to ensure a reasonably consistent approach**

**Key Elements:** New York and New Jersey have similar beach closure policies. Both states comply with the BEACH Act of 2000 and monitor their beaches once per week using enterococci as the indicator. In addition, NYCDOH & Mental Hygiene may issue a wet weather advisory after heavy rainfall, which could lead to sewer overflows and storm runoff. The states will continue their dialogue in order to ensure the protection of public health and to ensure effective risk communication.

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### **Description of Activities to Date**

In 1998, the Regional Bypass Workgroup (RBWG) was funded and began using a model designed to predict the impact of sewage bypass events on bathing beaches and shellfish beds. This predictive model is a tool used to assess potential risks by estimating bacteria concentrations and the spatial area the discharge may affect. The model accurately predicted the observed concentrations of coliform in selected sensitive areas of the Harbor. Additional funds were pooled from a subset of the members of the RBWG and in 2008 the Bypass Model version 2.0 was released. For model details see P-2. (IEC 1999- HEP tracking files, IEC—Pete Sattler 2009)

During each spring (1998-2008) since the RBWG's inception (1997), the RBWG meet to discuss unique events, the model, model updates, and notification protocols. (IEC 2000- HEP tracking files, IEC—Pete Sattler 2009)

IEC and the College of Staten Island hosted a Regional Beach Conference in 2001 that brought together environmental and health officials from all levels of government, environmentalists, and beach goers to discuss the bathing beach criteria. (HEP 2003)

**Planned Activities:** IEC will continue dialogue amongst the Commission's member states—NY, NJ, and CT— to promote consistent beach closure policies.

(IEC 2003, IEC—Pete Sattler 2009)

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## P-6. Optimize disinfection practices

**Key Elements:** Disinfection of treated effluent is one way to control the input of pathogenic agents to the Harbor/Bight system. Chlorination as a disinfection method is more effective against indicator bacteria than it is against pathogenic viruses. NYSDEC has included new Total Residual Chlorine (TRC) requirements in NYCDEP's SPDES permit that will require NYCDEP to evaluate the new more stringent TRC limits and if necessary, evaluate and implement either enhancements to the current disinfection system or pursue alternative disinfection methods.

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### Description of Activities to Date

NYCDEP has implemented a Citywide Total Residual Chlorine (TRC) Program to evaluate the proposed TRC limits and optimize disinfection practices at the City's 14 WPCPs in order to comply with marine waters TRC standards.

**Planned Activities:** This program will identify methods for optimizing disinfection practices as well as evaluating alternate disinfection technologies necessary to comply with stricter TRC limits and possibly needed to comply with new pathogen indicator limits such as Enterococci. The Citywide TRC program will ultimately lead to the development and implementation of these new disinfection facilities at the 14 NYC WPCPs.

(NYCDEP 2004, NYCDEP—Dorothy Chao 2009)

The NYCDEP has submitted the Scope of Work for the Citywide TRC Management Program to the NYSDEC that includes a number of deliverables specified in the SPDES Permit. (NYCDEP 2004, NYCDEP—Dorothy Chao 2009)

The NYCDEP has compiled a number of studies previously performed by the NYCDEP, some of which were used to develop NYSDEC's proposed effluent TRC limits needed to achieve EPA's acute and chronic TRC standards in the receiving water of 7.5 and 13 µg/L, respectively. The Citywide TRC Management Team evaluated these reports and the CORMIX model runs used in developing these TRC limits and submitted a report to the NYSDEC. This has been completed. (NYCDEP 2004, NYCDEP—Dorothy Chao 2009)

Several NJ WPCPs that discharge to the Harbor Complex use UV disinfection: e.g., Linden Rosselle, Hoboken.

Under NJ's Long-term CSO control plan, feasibility studies of cost to treat pathogens have been completed. Reports were submitted to EPA Region 2 and shared with HEP. NY NJ and EPA are working together to evaluate the feasibility of pathogen treatment.

**Planned Activities:** Next steps are linked to pathogen TMDL development and establishing waste load allocations for CSOs.

(NJDEP—Dan Zeppenfeld 2009)

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**P-7. Continue appropriate research, environmental monitoring, and modeling to identify remediation activities and support recovery of uses.**

**Key Elements:** Billions of dollars have been expended over the past 25 years on the improvement of sanitary water quality in the Harbor/Bight region, and recent monitoring results attest to the effectiveness of those measures. There are various pathogen monitoring programs throughout the Harbor that are being conducted by the NYC Department of Environmental Protection, NJ Department of Environmental Protection, and Interstate Environmental Commission. Modeling is also being conducted by the Pathogens Workgroup.

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**Description of Activities to Date**

In the fall of 1999, a cooperative effort between EPA and NJDEP began sampling targeted areas in the Raritan Bay for toxic contamination in shellfish. Four seasonal sampling events were required (fall 1999, winter 2000, spring 2000, and summer 2000). The analysis results have been completed. (USEPA and NJDEP 1999- HEP tracking files)

Based on a recent review of pathogenic outbreaks, NJDEP will begin sampling in Spring 2001 for vibrio parahaemolyticus. This pathogen is associated with illnesses in oysters in southern states. NJDEP has an ongoing monitoring program for vibrio parahaemolyticus. (NJDEP 1999- HEP tracking files)

An engineering study, which began during July 1998, includes mixing zone analysis and a biological survey to determine the effects of chlorinated municipal wastewater on the marine environment. This three-year study was conducted at the Monmouth County Bayshore Outfall Authority. and was completed late 2002. (NJDEP 1999- HEP tracking files, IEC 2003)

From 2001 to 2003, IEC conducted pathogen monitoring for the HEP Pathogen Workgroup on the ambient waters: 58 stations throughout the HEP core area collected during wet and dry weather. Pathogens analyzed for include fecal and total coliform, fecal strep and enterococcus. Effluent samples were collected at over 30 WPCPs and analyzed for enterococci. Additional pathogen sampling was conducted between 2004 and 2008 on the Hudson River (see P- 4 for details).

IEC conducts unannounced effluent surveys at municipal and industrial facilities to check compliance with federal and state (NY-NJ-CT) permit limitations. The IEC Water Quality Regulations are incorporated in the three states' NPDES permits. Annually since 1995, IEC conducts 24-hour industrial compliance monitoring at major dischargers only.

**Planned Activities:** Continue ambient and effluent monitoring of pathogens

(IEC 2003, IEC—Pete Sattler 2009, HEP Office 2009)

IEC conducts pathogen monitoring for NPDES/SPDES, as well as IEC Water Quality Regulations compliance. Unannounced effluent surveys conducted at all WPCPs discharging to the District (29 plants in the HEP core area).

(IEC 2003, IEC—Pete Sattler 2009)

Continue to assist the States compliance monitoring in collecting the water quality data required by the US FDA's National Shellfish Sanitation Program (NSSP).

(IEC 2003, IEC—Pete Sattler 2009)

IEC responds to citizen complaints dealing with ambient water and air pollution. (IEC 2003, IEC—Pete Sattler 2009)

HEP's Ad Hoc Committee chaired by IEC brought together the NJHDG, NYCDEP, EPA, and others to plan and initiate a Harbor-wide water quality monitoring survey. As part of this effort, the NJHDG expanded the water quality sampling on the New Jersey side of the Harbor to mirror the effort being conducted on the NY side by NYCDEP. HEP produced the first Harbor-Wide Water Quality Survey report in 2008, which is available on the HEP website. NJHDG published a water quality report in 2007 tracking trends in a series of indicators. This report contains data from 2004-2006 and integrates NJHDG and NYCDEP data; it can be found online at [www.pvsc.com](http://www.pvsc.com). Data collected through this program will be used to validate the pathogens model.

**Planned Activities:** NJHDG and NYCDEP will continue the monitoring program and will generate future reports.

(PVSC 2004, HEP Office 2009, PVSC—Ashley Pengitore 2009, IEC—Pete Sattler 2009)

IEC conducts water quality surveys over the New Jersey waters of Raritan Bay in support of the NJ DEP's shellfish program. These surveys are conducted during the winter-spring seasons subsequent to wet weather. (IEC 2003, IEC—Pete Sattler 2009)

IEC spearheaded and chairs the Regional Bypass Workgroup that established notification protocols amongst state and health environmental departments in regards to sewage bypasses. There are now 20 federal, state, local, and county members.

**Planned Activities:** Continue to chair the Regional Bypass Workgroup.

(IEC 2003, IEC—Pete Sattler 2009)

NYCDEP's contractor has developed a Regional Bypass Water Quality Model for pathogens with various inter-state agencies to evaluate spills of raw sewage and impacts on beaches and shellfish areas.

**Planned Activities:** The Regional Bypass Model was modified and upgraded to incorporate enterococci bacteria in addition to the sanitary indicator bacteria of total and fecal coliform during 2008.

(NYCDEP 2003, NYCDEP—Dorothy Chao 2009, IEC—Pete Sattler 2009)

Current water quality monitoring programs of the NYCDEP's Harbor Survey include the collection of enterococcus samples in New York Harbor waters for identifying compliance with EPA recommended criteria. NYCDEP completed the 2003 NYC Harbor Survey Report.

**Planned Activities:** NYCDEP will continue the NYC Harbor Survey Program. NYC DEP issues a New York Water Quality Harbor Survey Report each year.

(NYCDEP 2003, 2004, NYCDEP—Dorothy Chao 2009)

IEC is the Chair of the Ad Hoc Committee to determine who is conducting water quality monitoring in the HEP core area, where samples are being collected and what parameters are being analyzed.

**Planned Activities:** Continue to chair the Ad Hoc Committee on a harbor water quality monitoring.

(IEC 2003, IEC—Pete Sattler 2009)

An annual report is compiled by the NJ Bureau of Marine Water Monitoring documenting the sanitary conditions of the shellfishing areas. IEC assists the Bureau by collecting additional data in Raritan and Sandy Hook Bays. (HEP Office 2003)

In 1999, the HEP Pathogens Workgroup (PWG) recommended that the NYC CSO model, which is being upgraded to include the hydrodynamics of the Nutrients SWEM model, be used to develop a pathogen TMDL. Additional sampling for fecal coliform and enterococci was conducted by IEC from 2001 to 2005. The PWG is currently scheduling additional activities leading up to the use of the model for development of TMDLs by 2009. (HEP Office 2009, IEC—Pete Sattler 2009)

NYCDEP has developed a New York Harbor CSO Model for pathogens, based on SWEM, to assist in the planning for CSO abatement requirements

**Planned Activities:** NYCDEP has donated the CSO Model to HEP for TMDL development and regional planning to control pathogens. Work is currently underway to collect more input data for the model including characterization of Enterococci WPCPs and wet weather CSO events.

(NYCDEP 2004)