

Stormwater & NYC
雨水とニューヨーク市

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Stormwater & NYC

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Origin of Stormwater Program

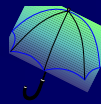
- 1987 Clean Water Act Amendments mandate nationwide Stormwater Management initiative - Phased Approach
- Stressed "Best Management Practices" (BMPs) controls, not numeric limits
- USEPA: Phase 1
 - November 1990: USEPA promulgates specific control requirement for
 - Medium and large Municipal Separate Storm Sewer Systems (MS4s)
 - 11 categories of industrial activity including construction activity that disturbs > 5 acres



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Stormwater Program Background

- USEPA: Phase 2
 - December 1999: USEPA requires permit coverage for
 - Small MS4s
 - Construction activity between 1 and 5 acres
- Six Minimum Control Measures
 1. Public education and outreach
 2. Public involvement and participation
 3. Illicit discharge detection and elimination
 4. Construction site runoff control
 5. Post-construction stormwater management
 6. Pollution prevention & Good Housekeeping
- NYSDEC incorporates into NYC SPDES permits (1998)



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1998 NYC SPDES Requirements

- Management Programs
 - Public Outreach
 - Shoreline Survey & Sentinel Monitoring
 - Emergency Spill Response
 - Industrial & Commercial MS4 Controls
 - Persistent Pollutants Trackdown
 - Floatables
 - Blue Belt Initiative
- Stormwater Sampling & Monitoring
 - Baseline & Trend Analysis
- Assessment of Controls



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Public Outreach

- A program to promote, publicize and facilitate public reporting of illicit discharges or water quality impacts on MS4
 - Environmental Education
 - school workshops
 - Brochures, pamphlets, mailings
 - DEP Website: www.nyc.gov/dep
 - Citizen's Advisory Committees
 - Community Board Meetings
 - Trade Shows, Information Booths



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Shoreline Survey & Sentinel Monitoring

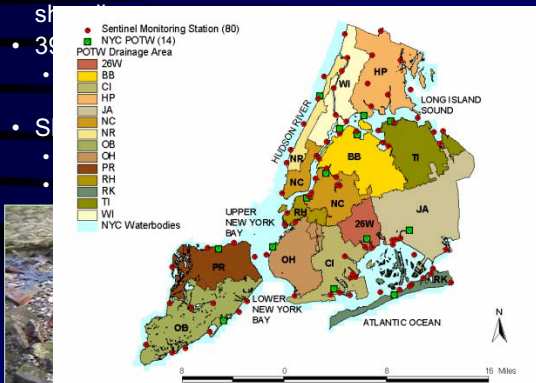
- NYC: 425 miles of shoreline
- 3900+ outfalls
 - ~700 municipal, plus private and highway
- Shoreline Survey
 - 1988 began
 - 1995 diminishing returns



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Shoreline Survey & Sentinel Monitoring

- NYC: 425 miles of shoreline
- 80 sentinel stations



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Shoreline Survey & Sentinel Monitoring

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- Both Programs Together
 - Extremely effective and efficient
 - Abated 3.6 MG of illegal raw sewage discharges

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Emergency Spill Response

- GOAL: prevention of spills reaching treatment plants and receiving waters
- Primary causes
 - Improper disposal of oil and grease, chemicals
 - Spills during vehicle accidents, fuel delivery, chemical handling
- 99% of spill complaints were investigated within 6 hours (2003)
- Over 700 spill responses (2003)
- Remediation, enforcement



Industrial & Commercial MS4 Controls

- For industries already permitted by NYC, evaluate stormwater controls
- Evaluate 11 industrial categories identified by USEPA
- NYC added dry-cleaners and automotive repair and salvage shops
- Evaluate need for BMPs



Typical Industrial Sites with Potential to Pollute

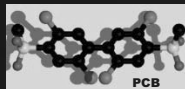


BMP Development

- Phase 1: data gathering
 - Prioritization by industrial category and pollutants
 - Field screening
 - Detailed surveys
- Phase 2: develop control mechanism
 - Include stakeholders
 - Schedule implementation
- Phase 3: implement controls & enforcement
 - Initial focus: transportation and automotive-related facilities

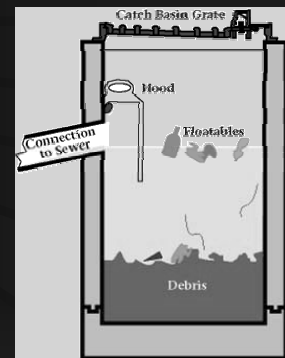
Persistent Pollutant Trackdown

- Example: PCBs
 - Known sources: transformers, public utilities, high voltage users
 - Establish database
 - Survey and inspections
- Results
 - PCB transformers removed/retrofitted
 - Contamination clean-ups
 - > 1,000 lbs were eliminated - ongoing



Floatables Control

Catchbasins



Floatables Control

Catchbasins

- Cleaning



Floatables Control

Catchbasins

- Cleaning
- Retrofitting & Repair



Floatables Control

Catchbasins

- Cleaning
- Retrofitting & Repair
- Stenciling



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Floatables Control

Catchbasins

- Cleaning
- Retrofitting & Repair
- Stenciling
- Hooding



Catch Basin Without Hood
0% Retention



Catch Basin With Hood
50%-85% Retention

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Floatables Collection

- Booms in 23 sites in 3 zones covering combined sewer discharges from 83,500 acres



Containment Boom

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Floatables Collection

- Booms in 23 sites in 3 zones covering combined sewer discharges from 83,500 acres
- 4 belt-type skimmers for use in tributaries and creeks (each has 20 cubic yard capacity)
- Cormorant: large net-type vessel for open waters (24 ton capacity)



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Stormwater Management in New Development

- South Richmond, Staten Island: Last large un-sewered area of New York City



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Stormwater Management in New Development

- South Richmond, Staten Island: Last large un-sewered area of New York City
- Last significant stand of wetlands
- Failing septic systems and street flooding
- Need for new drainage plans that
 - Provide necessary infrastructure and
 - Preserve wetlands



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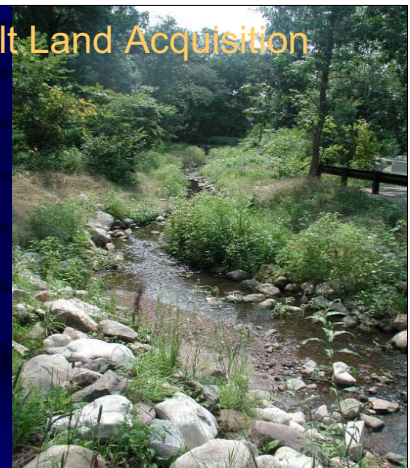
Staten Island Bluebelt: Strategy

- Develop storm water management system using existing wetlands
- Build separate sanitary sewer system
- Use BMPs to mitigate impacts/flooding



Bluebelt Land Acquisition

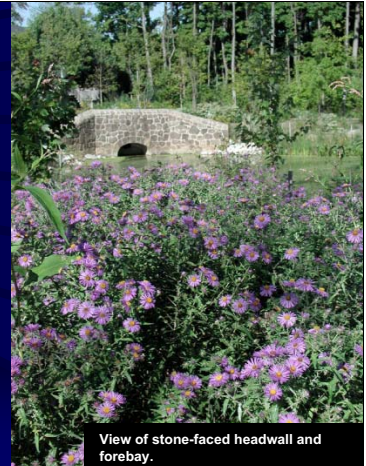
- 335 acres acquired to create drainage corridors
- Additional acquisition underway in three mid-island watersheds



BMP: Outlet Stilling Basin



BMP: Extended Detention Basin



View of stone-faced headwall and forebay.

BMP: Extended Detention Basin

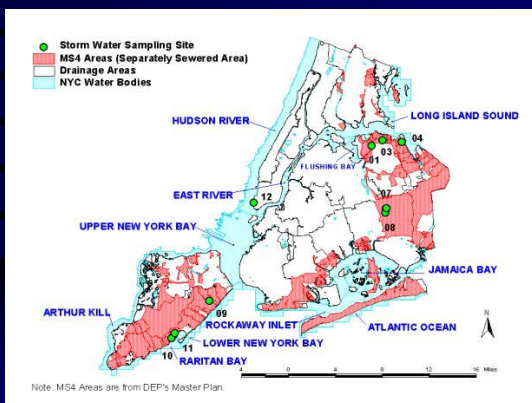


Functioning constructed wetland after one growing season.

BMP: Reconstructed Culvert



Stormwater Sampling & Monitoring



Data Highlights Summary

Land Use Category	Pollutants of Note
High-Density Residential	Copper
Low-Density Residential	None
Commercial	BOD, Oil & Grease, some metals
Highway	Some metals
Heavy Industry	Most pollutants except for Organics

* Most of the Organic Pollutants were non-detects (i.e.: VOC, Pesticides)

Assessment Program: New York Harbor Water Quality Survey



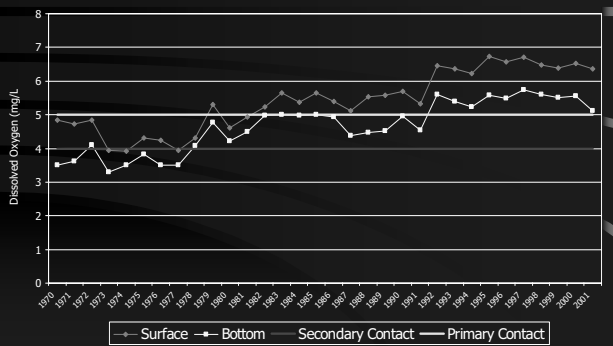
- Dissolved oxygen improvements in harbor
- Fecal coliform concentrations decreased by 2 orders of magnitude since 1974

Harbor Survey: 53 Sampling Sites



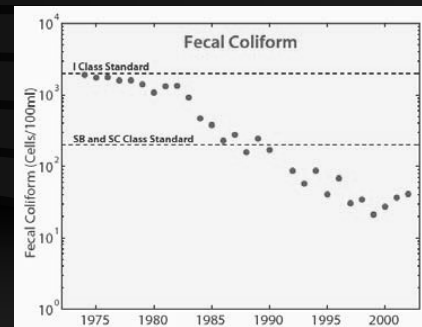
Average Summer Dissolved Oxygen

Harborwide Annual Trends



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Fecal Coliform in Harbor



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Resulting Water Quality Improvements

- All NYC beaches have remained open during the bathing season
 - Beaches closed for 20 years **now open**
- No major fish kills have been reported in the last 2 years
- Return to the harbor of several species of birds, such as egrets and herons, and fish, such as sturgeon, as well as the "wood-borers"
- Elimination of 99% of dry weather discharges
- Over 95% reduction of toxic metals
- Capture of 72% of rainfall



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