

Historical Water-Quality Data from the Harlem River

2016 National Water-Quality Monitoring Council conference

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*In cooperation
with*



Urban Waters Federal Partnership

- Revitalize watershed
- Improve water quality
- Connect community with their natural resource



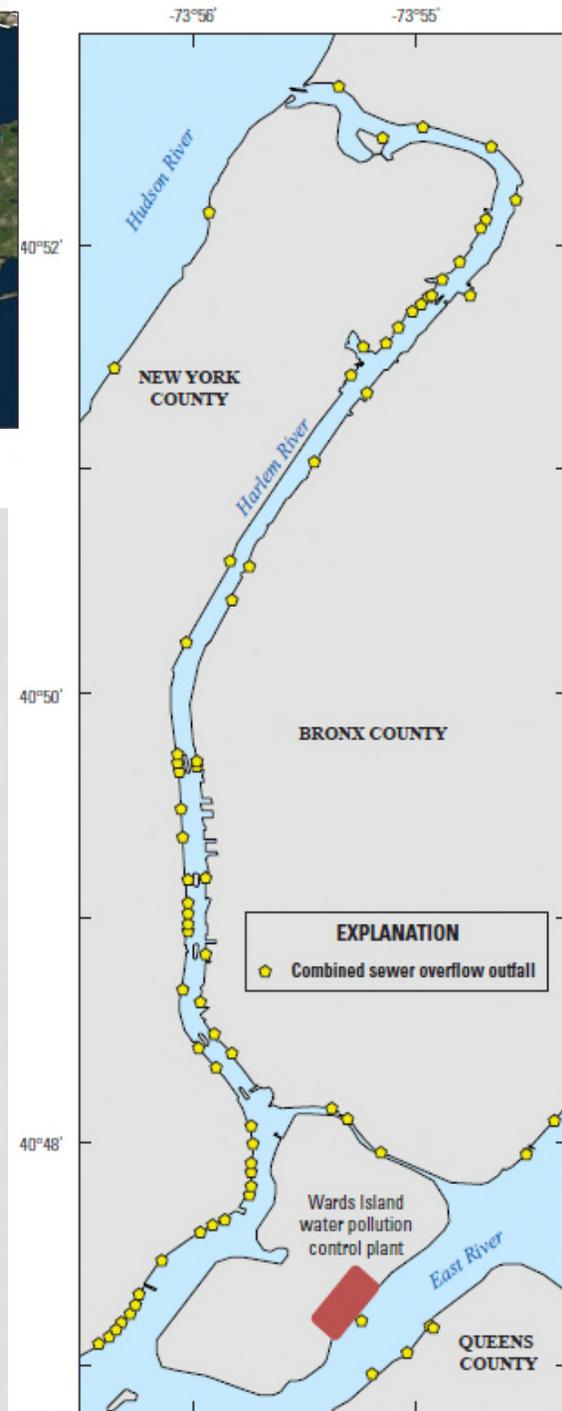
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Harlem River

- 8-mile stretch converted to tidal strait as urbanization of Bronx County increased
- Currently, accessibility to the Harlem River for community enjoyment is limited
- Highly urbanized “sewershed”
 - Combined sewer systems (CSS) are designed to collect stormwater runoff, domestic sewage, and industrial wastewater in the same pipe and bring it to the treatment works facilities



Base from Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Base from digital data NOAA's Medium Resolution 1:70,000 scale Digital Vector Shoreline Lambert Conformal Conic Projection North American Datum of 1983 (NAD83)

Harlem River Water-quality Concerns

- Combined sewer overflow (CSO) is discharge from a CSS caused by snowmelt or stormwater runoff overwhelming passive controls that normally diverts wastewater to a treatment plant
- CSO discharges result in
 - Increased **Fecal coliform** and **Enterococci** concentrations
 - Decreased **dissolved oxygen**
 - Increased **nutrient** and **suspended solids** loading
- Infrastructure improvements have decreased the number of CSO events throughout the years



Photo credit: Phillip Orton, <http://www.seaandskyny.com>

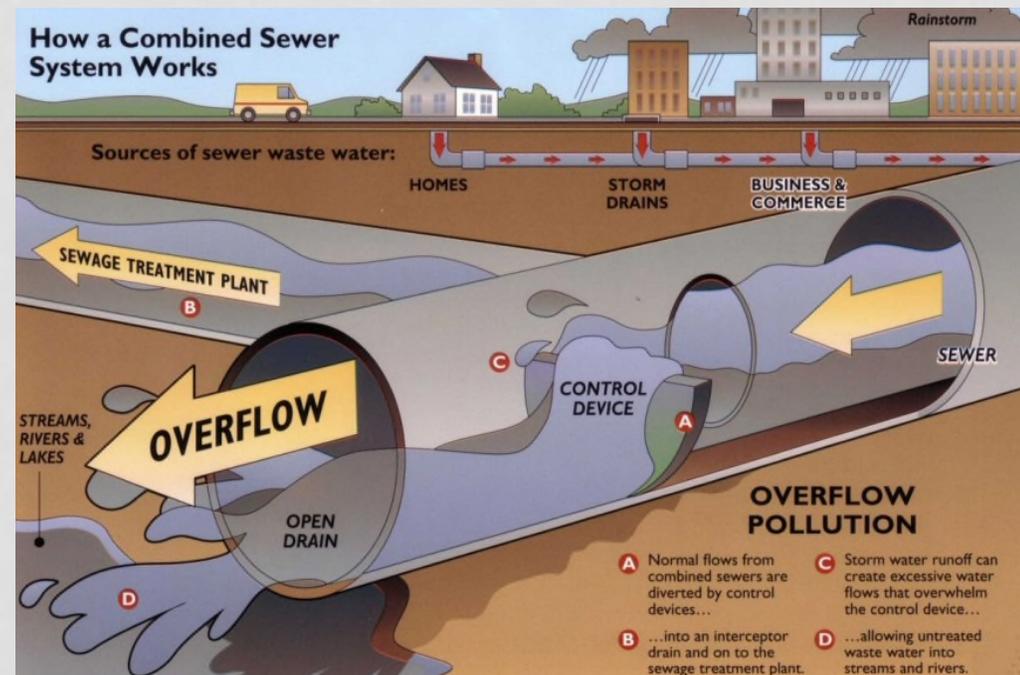


Image credit: City of Moundsville, West Virginia,
http://www.moundsvillewwtp.com/combine_sewer_overflows.htm

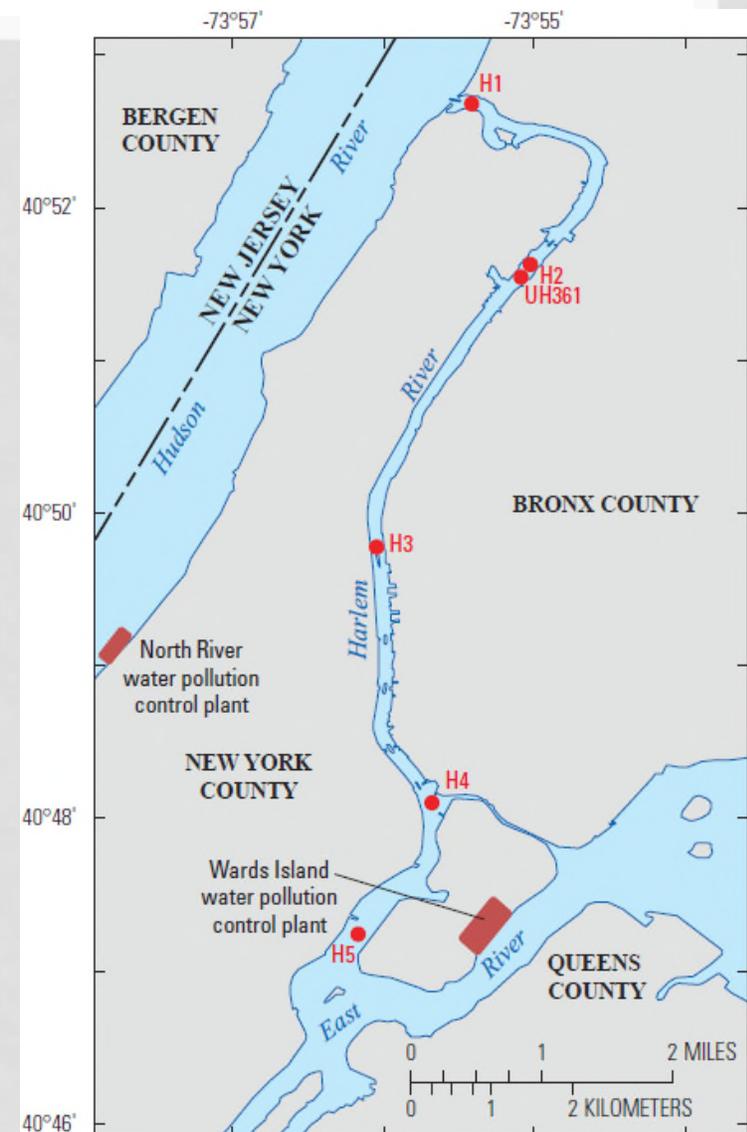
Harlem River Water-quality Data

Study Objective

- Compile and review existing water-quality and hydrologic data on the Harlem River
- Highlight water-quality issues in Harlem River and compare known sources to results—trends in water-quality data over the years
- Identify gaps in data and indicate potential water-quality monitoring opportunities
- Work with other Federal partners to promote activities that help the neighboring communities to invest in protecting the Harlem River

Harlem River DEP Monitoring stations

- Five (sites **H1-H5**) water-quality monitoring stations along the Harlem River from **1945 to 1999**
- Down to three (sites **H1-H3**) from **2000 to 2012**
- Currently, only **H3** is monitored



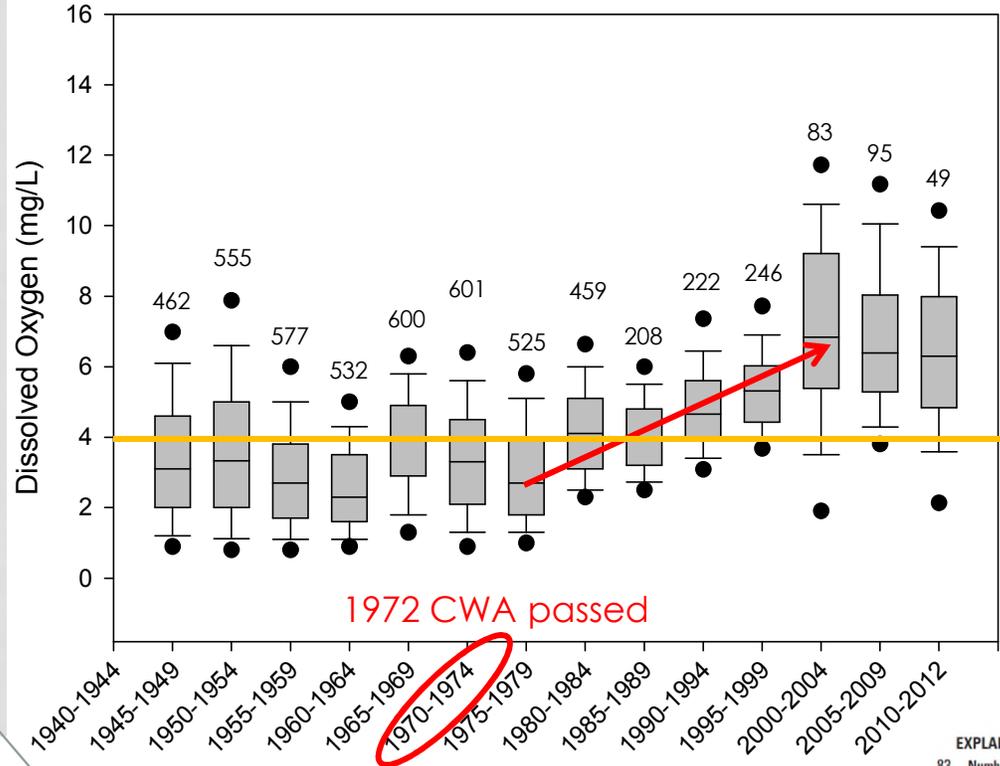
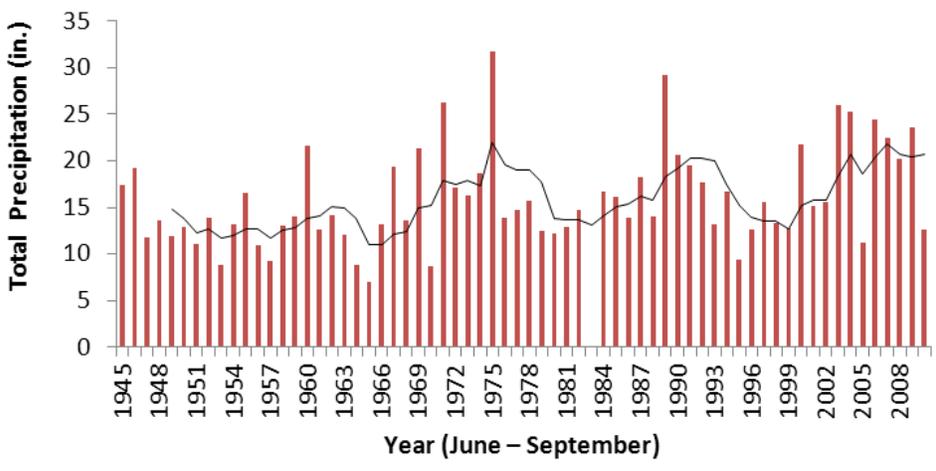
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Harlem River – DEP water quality

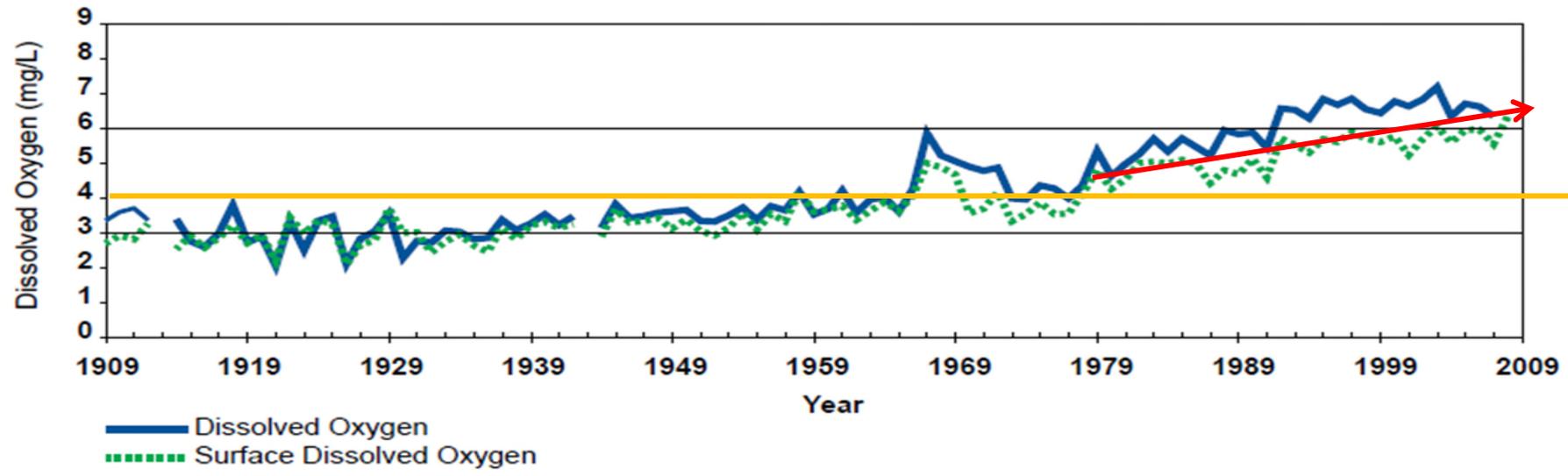
Dissolved oxygen

Dissolved oxygen (Surface) in 5-year increments

Seasonal Precipitation Totals (June – Sept)



Summer average dissolved oxygen from 1909 to 2009
Harbor-wide, seasonal geometric average



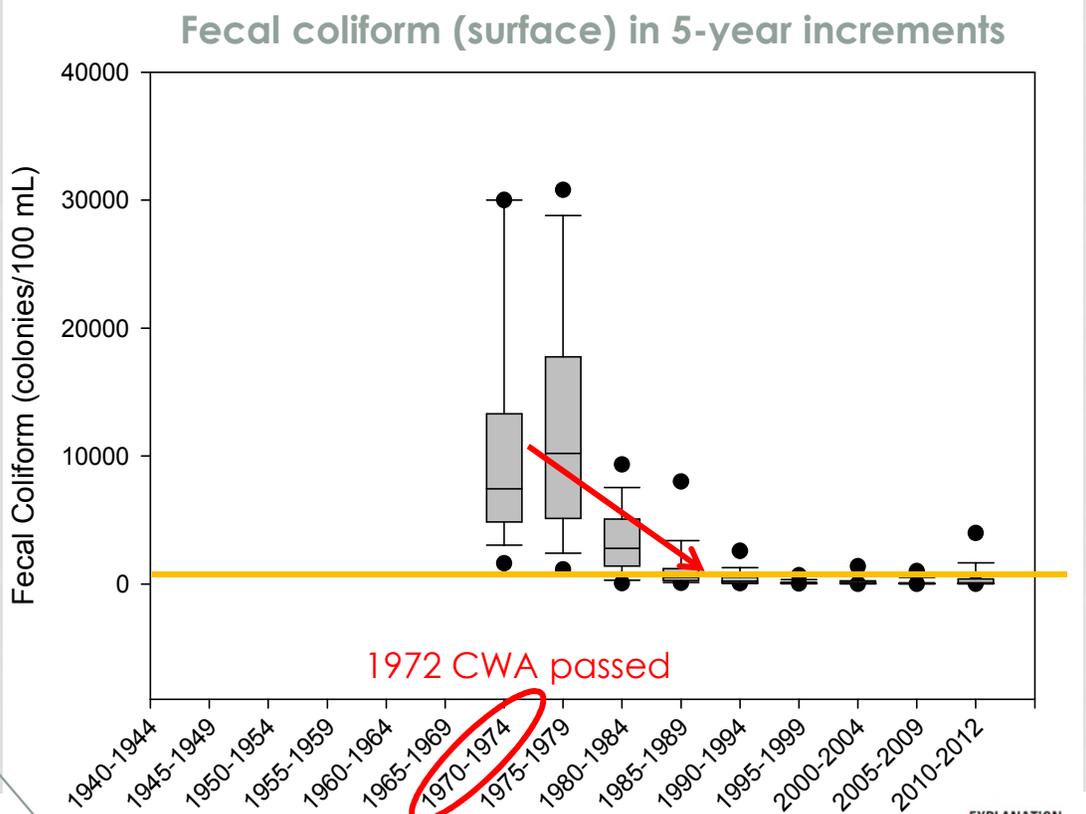
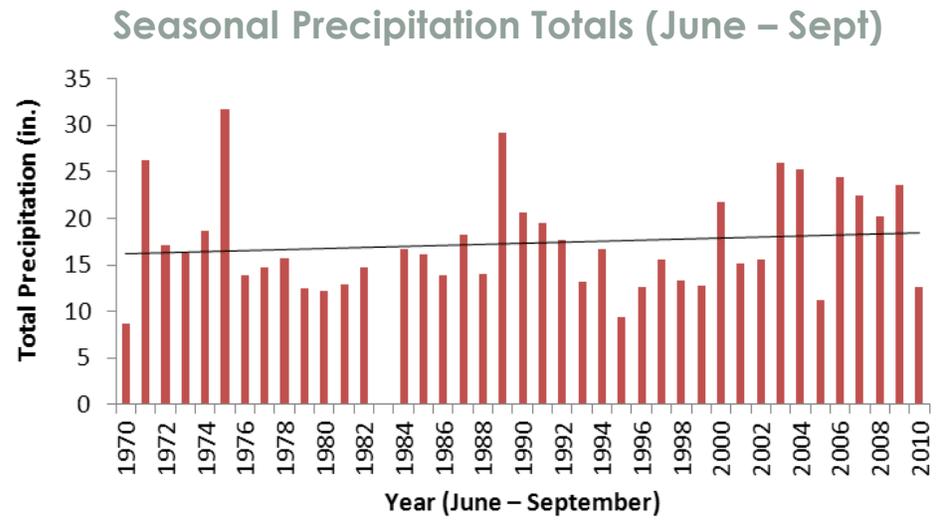
EXPLANATION

- 83 Number of samples
- 95th percentile
- 90th percentile
- 75th percentile
- Median value
- 25th percentile
- 10th percentile
- 5th percentile

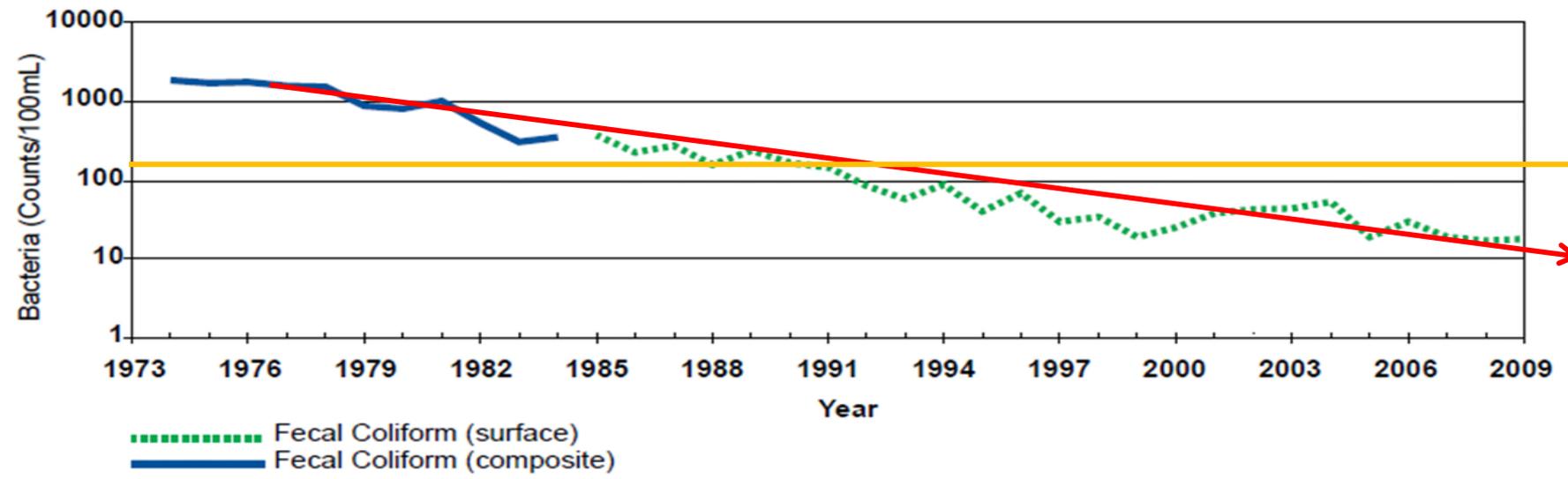
>4 mg/mL
NYS DEC
Aquatic life
Threshold
(Class I)

Harlem River – DEP water quality

Fecal coliform



Summer average Fecal coliform from 1909 to 2009 Harbor-wide, seasonal geometric average



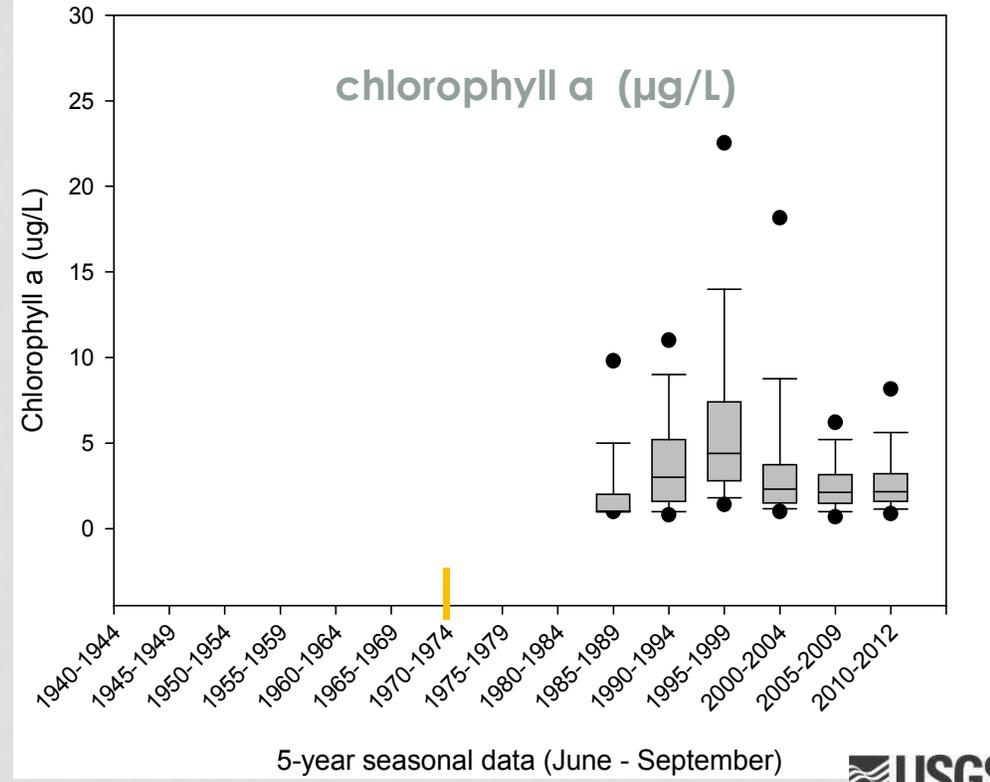
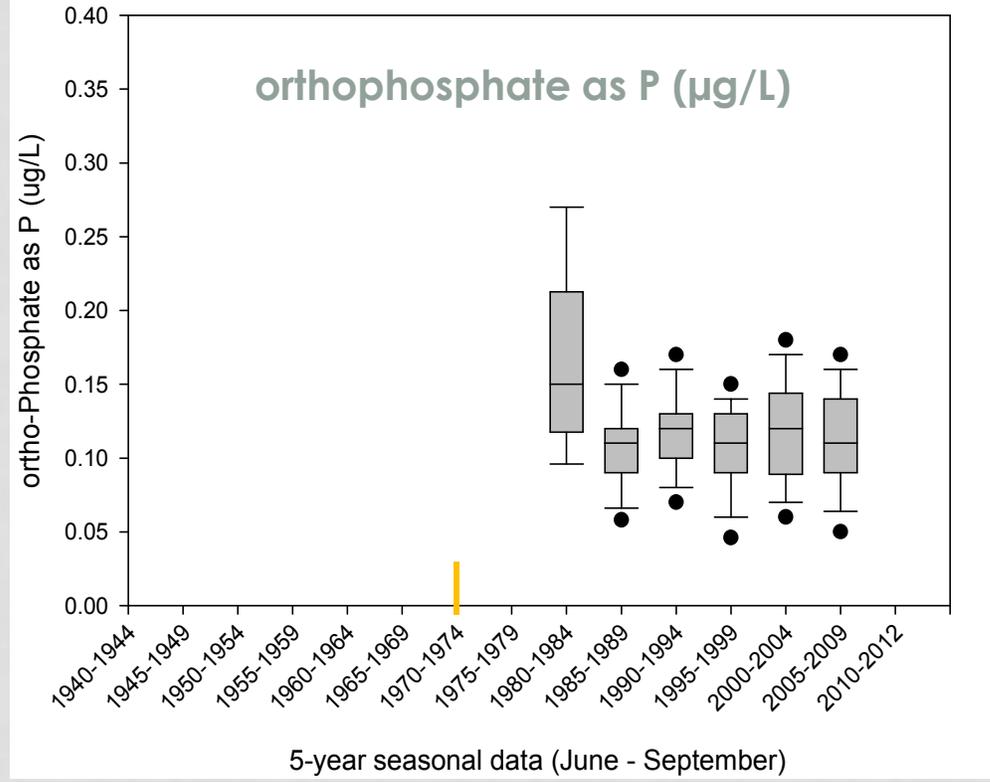
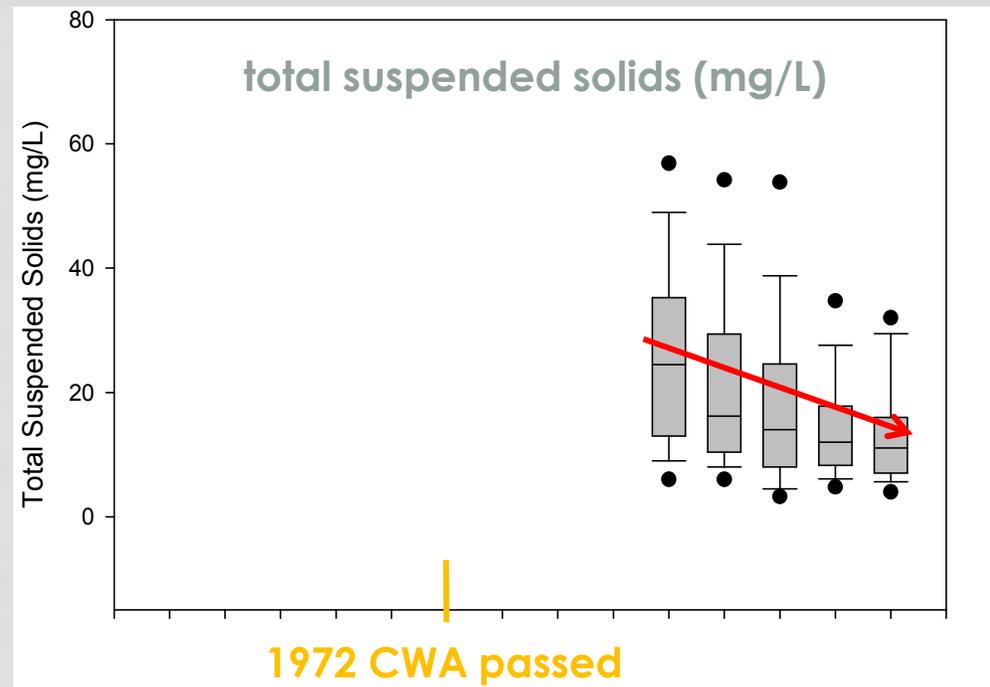
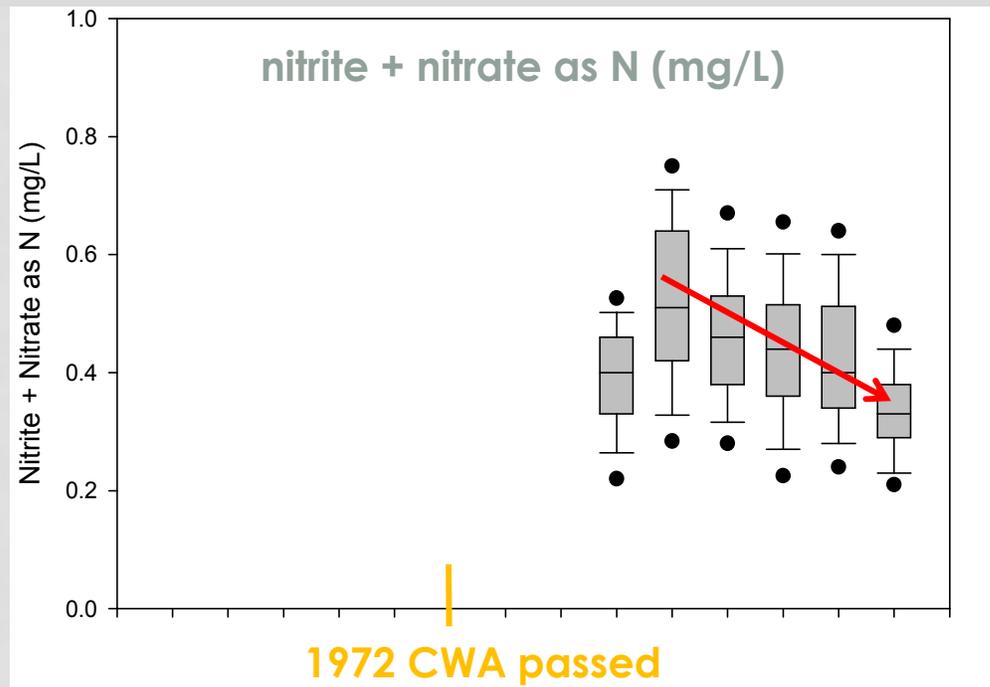
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NYC DEP, 2009, N.Y. Harbor Survey Program – Celebrating 100 years 1909-2009, 32 p.



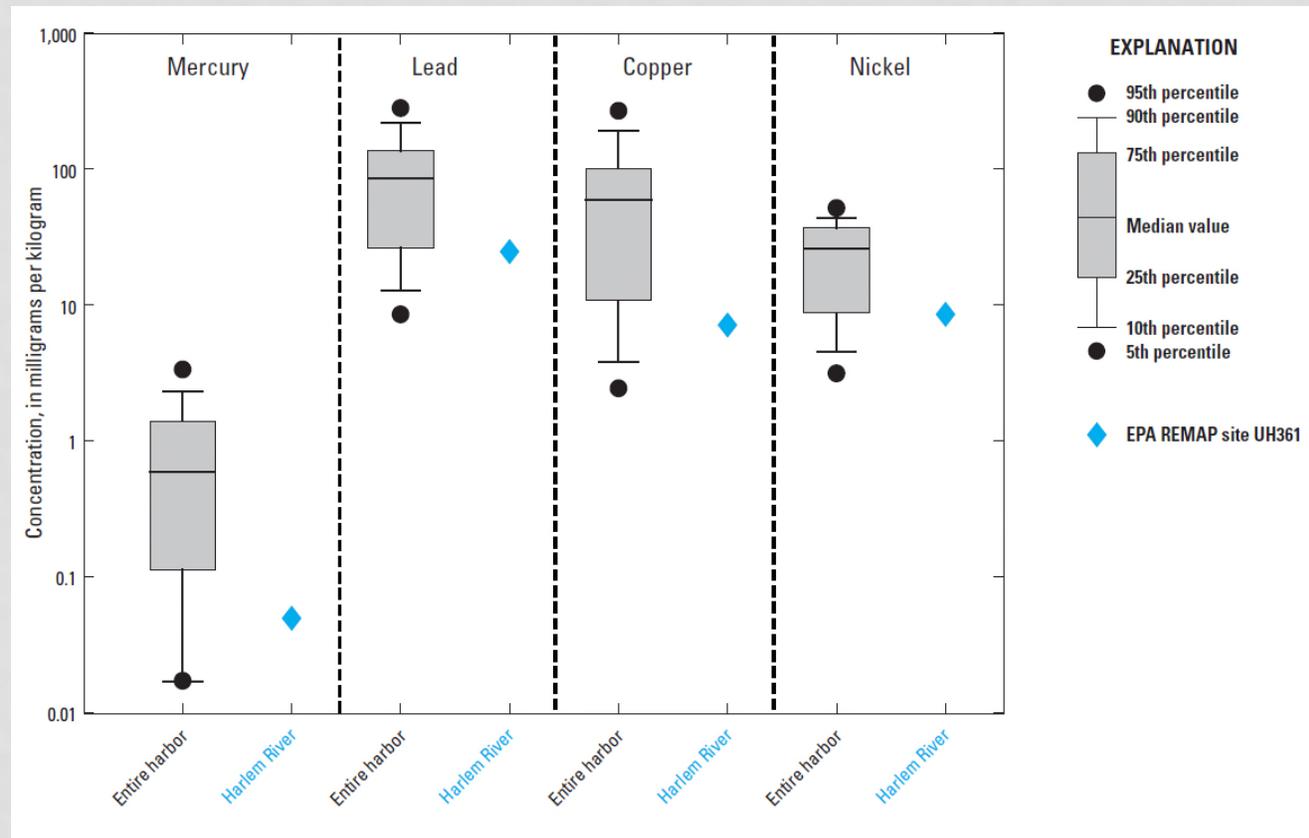
Harlem River – DEP water quality



Harlem River

Bed sediment quality

- EPA Regional Environmental Monitoring and Assessment Program (REMAP) collected bed sediment samples from 112 sites in 2003
- 2003 was the only year to include a site in the Harlem River



Harlem River Summary

- Improvements to WWTP have improved the water quality significantly over the past 40 years, but still times when thresholds are exceeded
- Changing NYS DEC classification from chronically impaired to swimmable would require
 - Eliminating the possibility of a CSO event
 - Significant sediment remediation

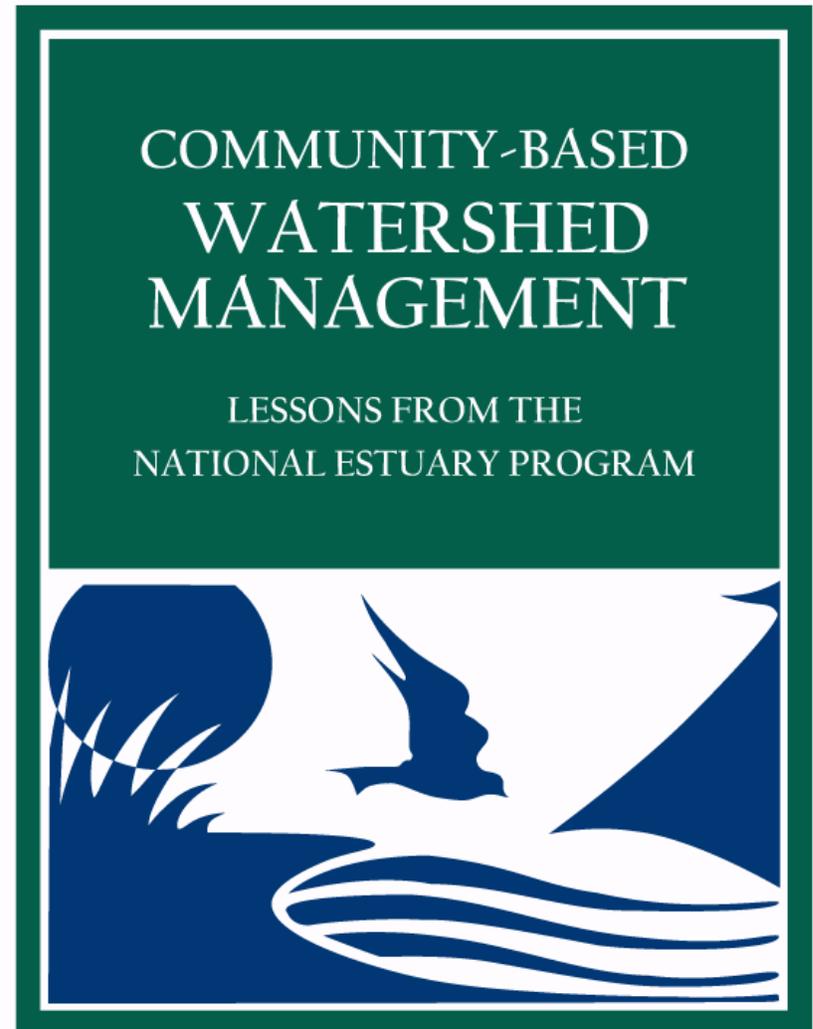


From EPA's Urban Waters website

Harlem River

What's Needed

- Need for a Total Maximum Daily Loads (TMDL)
 - Nitrogen
 - Pathogens
- Need continuous monitoring along the Harlem River (preferably at a location where weekly samples are collected)



Harlem River

What's Next?

- DEP working to revise the past datasets for entire NYC Harbor for release
- DEP plans to release all historical water-quality data via the **Water Quality Portal**
- Discussion about USGS/DEP collaboration for Harbor-wide interpretation of historical data

NYC Environmental Protection

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Water Utilities

- › Drinking Water
- › Wastewater
- › Stormwater
- › Harbor Water

- Harbor Water Sampling Data
- Harbor Water Quality Report
- Current NYC Waterbody Advisories
- Superfund Listings
- Combined Sewer Overflows
- Nitrogen Control Program
- Jamaica Bay Watershed
- Pump Out Stations
- Floatables Reduction Program
- › Long Term Control Plan

The Watershed

- › Watershed Protection
- › Watershed Recreation

Citywide Initiatives

- › Regulatory Reform
- › Environmental Education
- › Conservation Programs

Harbor Water Sampling Data

DEP collects and analyzes data from a total of 70 sampling stations harborwide to monitor water conditions and understand how water quality can be improved.

- [NYC Harbor Sampling Station Coordinates \(XLS\)](#)

Most Recent Harbor Sampling Data Report

DEP collects harbor samples at stations throughout NYC waterways weekly from June through September, while October through May sampling occurs monthly. Interruptions in data availability may occur due to weather conditions. The most recent report shows results of tests for Dissolved Oxygen (DO), Fecal Coliform (FC), Enterococcus, and Secchi Transparency (for definitions see PDF below). The **Site** column in the weekly report indicates the location the sample was collected; the sampling stations map shows the location of each site.

- [Most Recent Harbor Sampling Data](#)
- [NYC Harbor Sampling Station Map](#)
- [Harbor Sampling Test Definitions](#)

Past Harbor Water Sampling

Harbor water sampling information is provided in spreadsheet format, downloadable by year. Complete year files contain all data collected by DEP for the entire year. YTD file contains only the four samples of the weekly file.

- [2016 Harbor Sampling Data \(YTD\)*](#)
- [2015 Harbor Sampling Data](#)
- [2014 Harbor Sampling Data](#)
- [2013 Harbor Sampling Data](#)
- [2012 Harbor Sampling Data](#)
- [2011 Harbor Sampling Data](#)
- [2010 Harbor Sampling Data](#)
- [2009 Harbor Sampling Data](#)
- [2008 Harbor Sampling Data](#)

*Data subject to modest changes due to quality assurance process.

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THANK YOU!

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Prepared in cooperation with the
New York City Department of Environmental Protection

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U.S. Geological Survey

<https://pubs.er.usgs.gov/publication/sir20165044>