# Hutchinson River Combined Sewer Overflow Long Term Control Plan

Public Meeting #2

Co-op City

September 9, 2014

# Welcome & Introductions

Christopher Villari
DEP

# Agenda

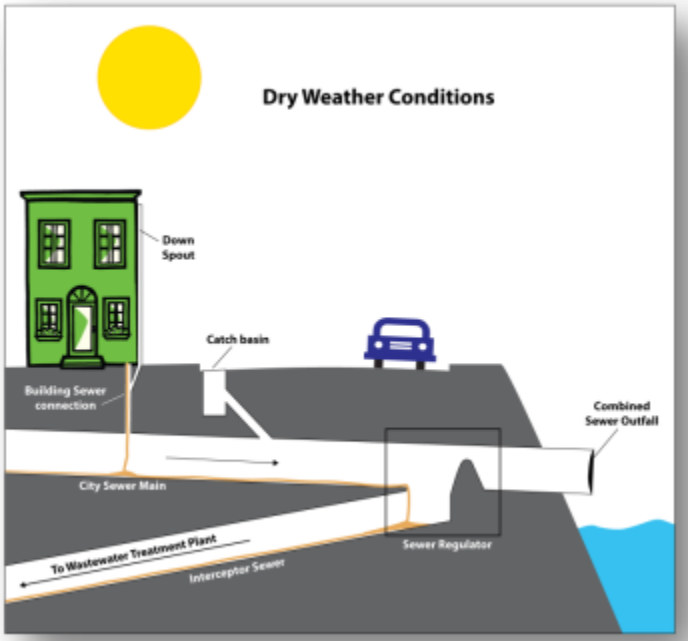
| | Topic |
|---|---|
| 1 | Welcome and Introductions |
| 2 | Combined Sewer Overflow and Long Term Control Plan (LTCP) Process |
| 3 | Waterbody/Watershed Characteristics |
| 4 | Water Quality – Current Improvement Projects |
| 5 | Draft Alternatives for LTCP |
| 6 | Next Steps |
| 7 | Discussion and Q&A Session |

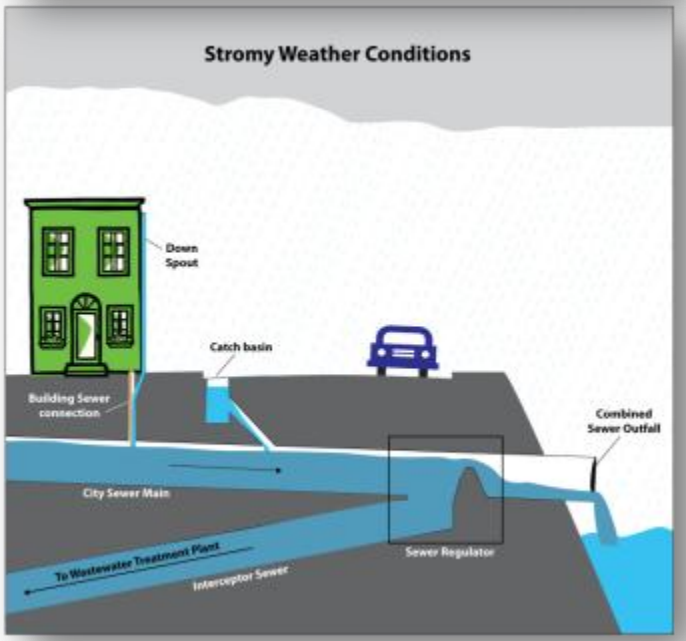
# Overview of Combined Sewer Overflow Long Term Control Plan Process

Christopher Villari
DEP

# What is a Combined Sewer Overflow?

- Approximately 60% of NYC's sewer system is combined, which means it is used to **convey both sanitary and storm flows**.
  - Heavy rain and snow storms can lead to higher than normal flows in combined sewers
  - As it was designed to work, when the sewer system is at full capacity, a very diluted mixture of rain water and sewage, also known as combined sewage, are released into local waterways. This is called a combined sewer overflow (CSO).
  - CSOs become a concern when they occur too frequently or in large amounts. When they do, they can effect water quality and recreational uses in local waterways.



# NYC CSO Long Term Control Plans (LTCPs)

## What is a Long Term Control Plan?

- Comprehensive evaluation of long term solutions to reduce combined sewer overflows and improve water quality in NYC's waterbodies and waterways.
- Required by state pollution control permits in accordance with the Clean Water Act (CWA) and Federal CSO Control Policy; an agreement between the state and city of New York establishes the time frame for submittal of LTCPs.

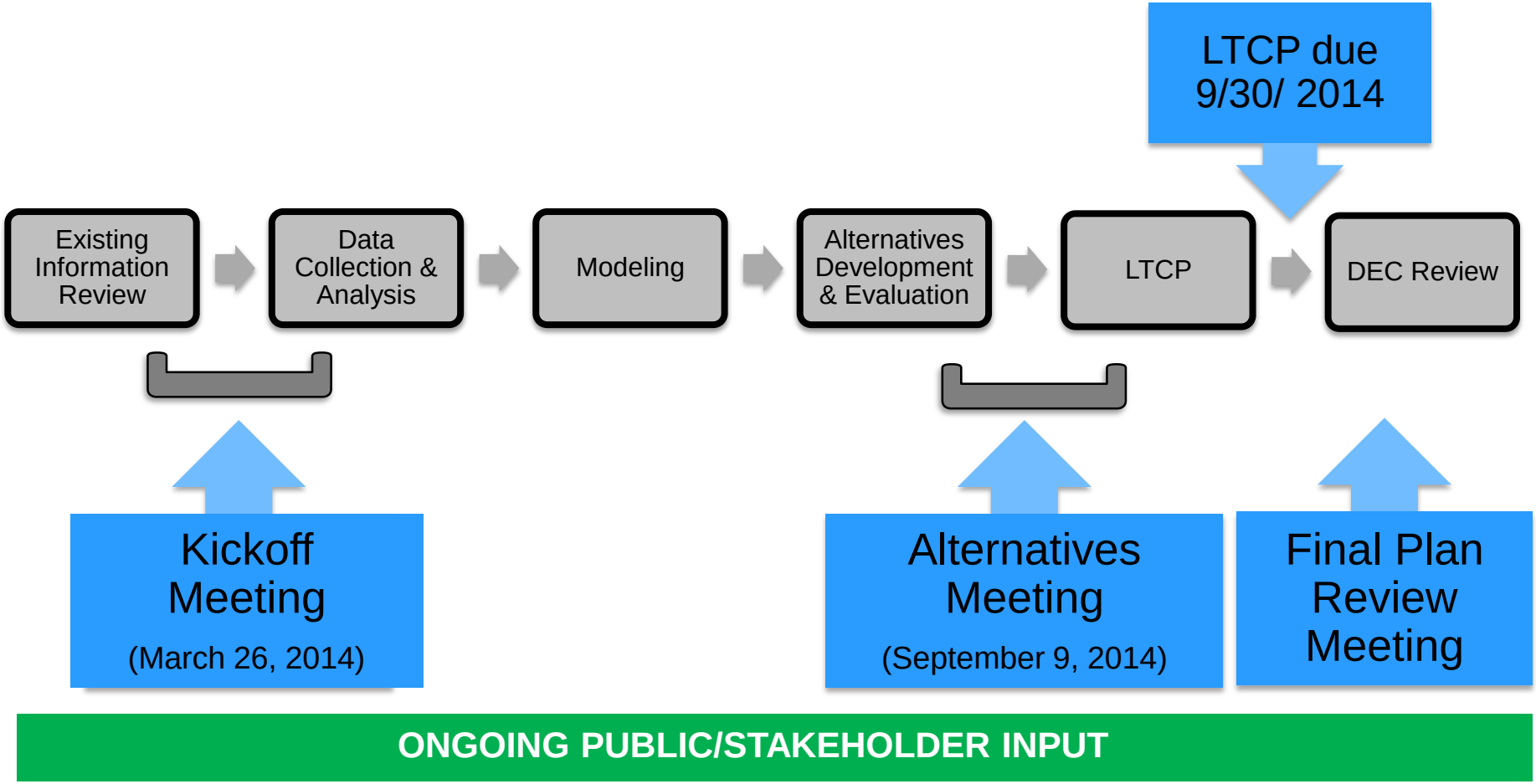
## The Long Term Control Plan Process:

- Looks at our current ability to meet water quality standards and fishable/swimmable goals
- Builds on previous planning efforts and infrastructure investments
- Identifies grey-green* infrastructure balance for different watersheds; and
- Includes a public engagement process

*Green: sustainable pollution reducing practices that also provide other ecosystem services.

*Grey: traditional practices such as pipes and sewers.

# Public Involvement and LTCP Process

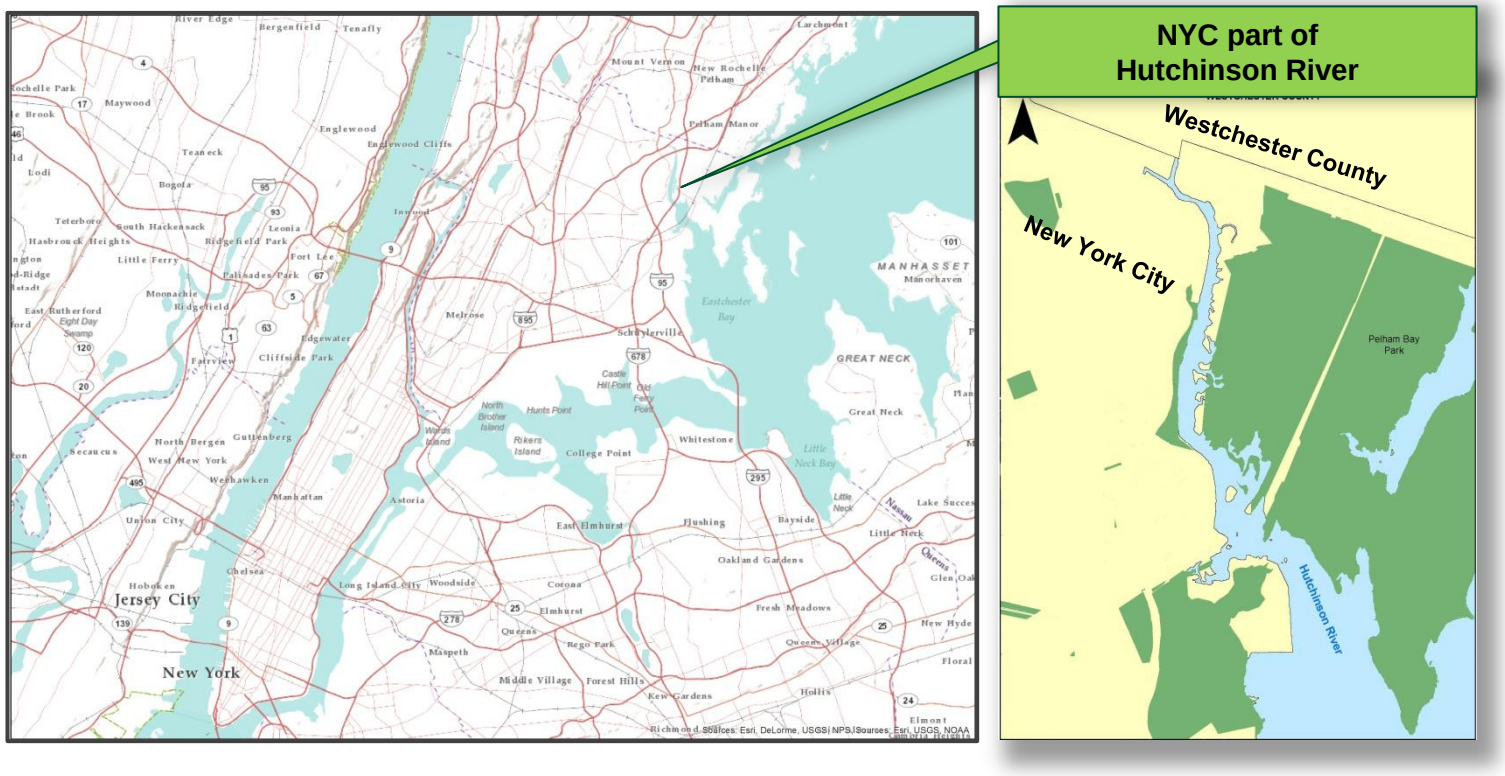


# Waterbody & Watershed Characteristics

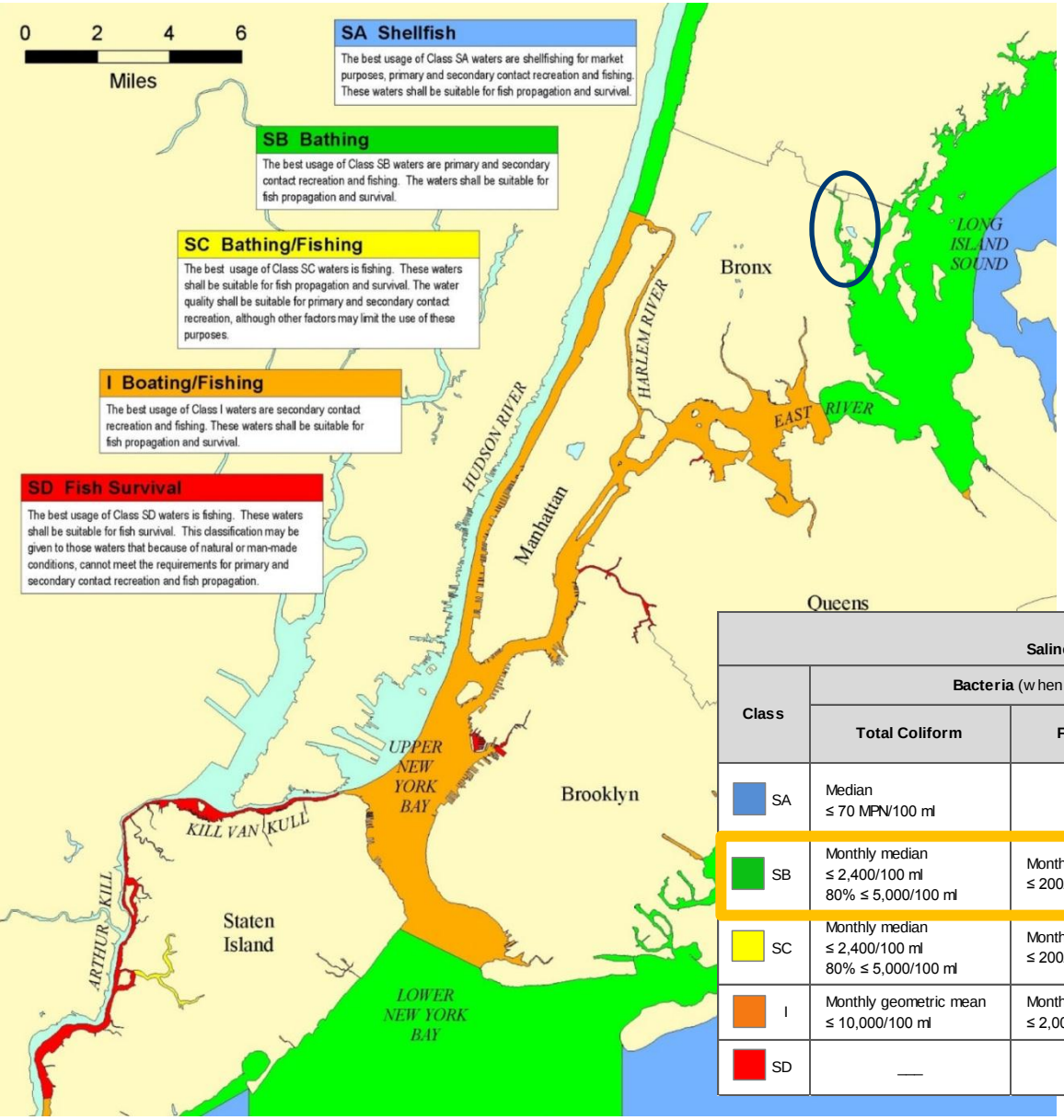
Lily Lee
DEP

# Hutchinson River Waterbody Characteristics

- Begins in Westchester County, flows through the Bronx into Eastchester Bay Tributary to East River
- Hutchinson River is a complex waterbody affected by multiple pollutant sources and jurisdictions:
  - Freshwater portion – impacted by multiple Westchester County municipalities
  - Tidal portion – impacted by both Westchester County and NYC



# Current Water Quality Standards




- Best Use Designations
- Saline Surface Water Quality Standards
- **Hutchinson River– Class SB**
  - DO ≥ 4.8 mg/L (chronic) and
    DO ≥ 3.0 mg/L (acute, never less than)
  - Fecal Coliform ≤ 200 col /100 mL
  - Total Coliform ≤ 2,400 col /100 mL
  - Entero not applicable because Hutch River is Tributary

**New York State**
**Saline Surface Water Quality Standards**

| Class | Bacteria (when disinfection is practiced) | | | Dissolved Oxygen |
|---|---|---|---|---|
| | Total Coliform | Fecal Coliform | Enterococci | |
| SA | Median ≤ 70 MPN/100 ml | — | Geometric mean ≤ 35/100 ml | $DO_i = \frac{13.0}{2.80 + 1.84e^{-0.1i_i}}$ ≥ 3.0 mg/l (acute, never less than) |
| SB | Monthly median ≤ 2,400/100 ml 80% ≤ 5,000/100 ml | Monthly geometric mean ≤ 200/100 ml | Geometric mean ≤ 35/100 ml | $DO_i = \frac{13.0}{2.80 + 1.84e^{-0.1i_i}}$ ≥ 3.0 mg/l (acute, never less than) |
| SC | Monthly median ≤ 2,400/100 ml 80% ≤ 5,000/100 ml | Monthly geometric mean ≤ 200/100 ml | Geometric mean ≤ 35/100 ml | $DO_i = \frac{13.0}{2.80 + 1.84e^{-0.1i_i}}$ ≥ 3.0 mg/l (acute, never less than) |
| I | Monthly geometric mean ≤ 10,000/100 ml | Monthly geometric mean ≤ 2,000/100 ml | — | ≥ 4.0 mg/l (acute, never less than) |
| SD | — | — | — | ≥ 3.0 mg/l (acute, never less than) |

$DO_i$ = DO concentration in mg/l between 3.0 – 4.8 mg/l

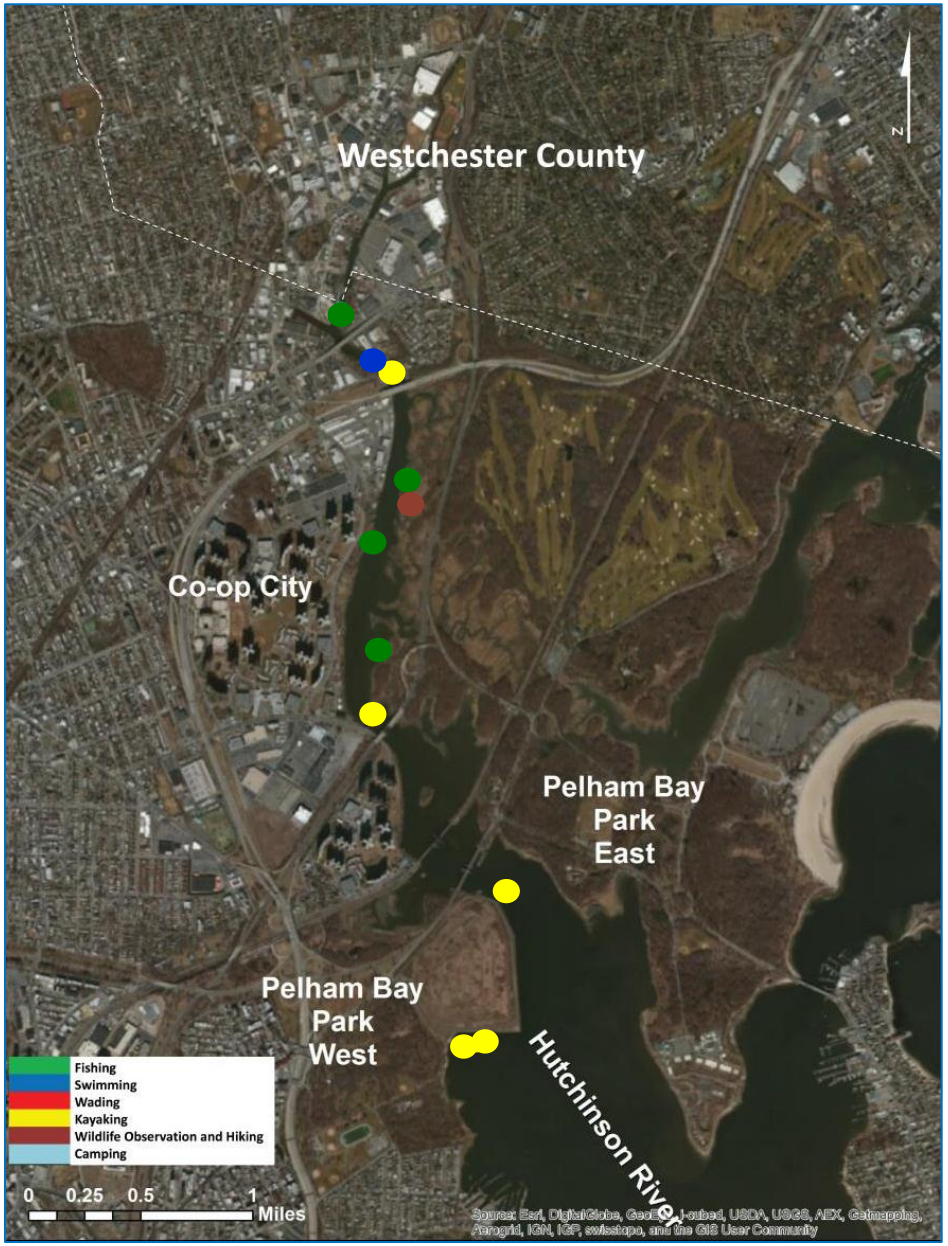
# Hutchinson River Designated & Recreational Uses

- New York State DEC classifies the best use of the river as being suitable for bathing and fishing

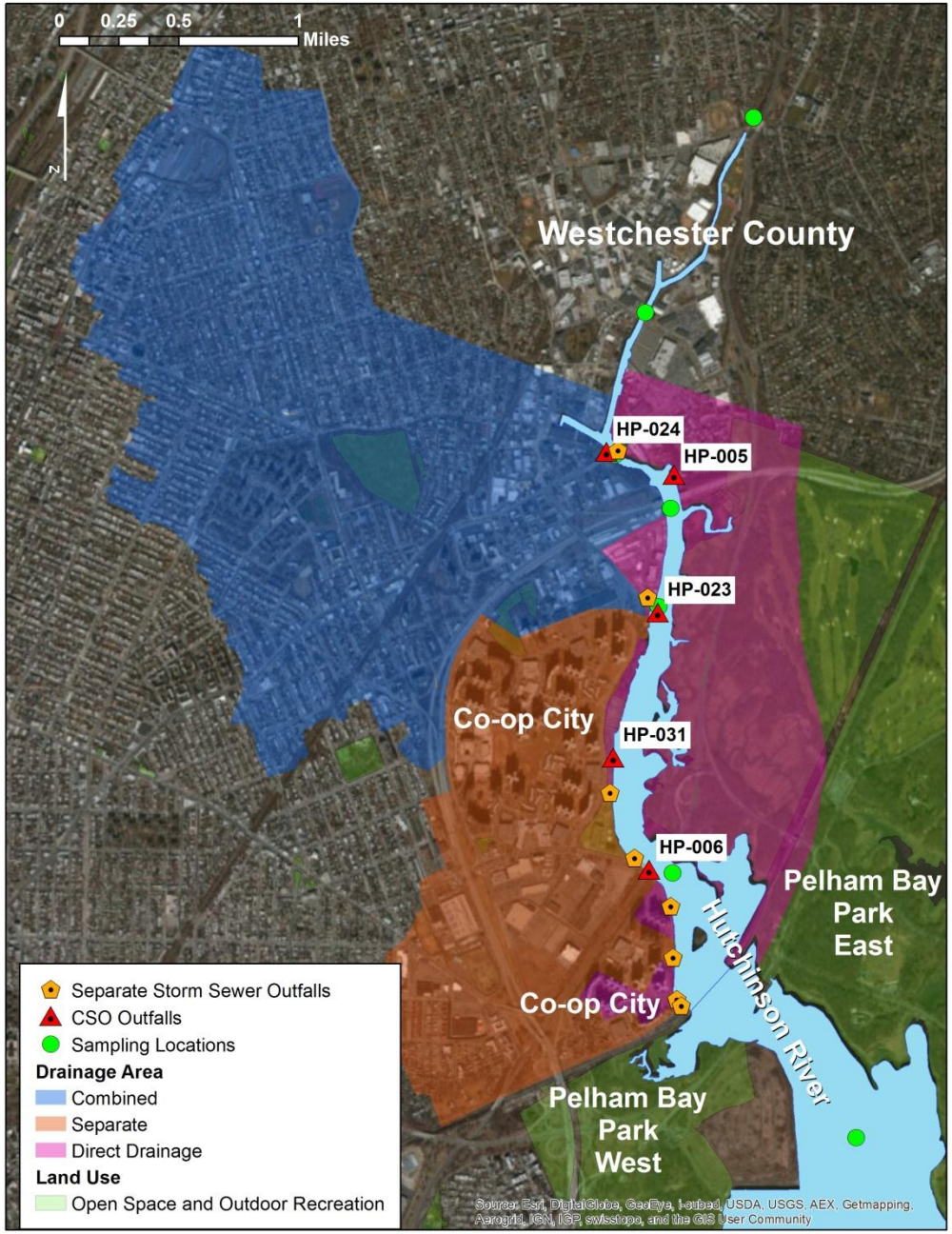
- Current Water Uses:
  - Commercial/recreational boating
  - Fishing
  - No designated access for swimming

Existing Recreational Uses identified during Public Meeting No. 1:

| |
|---|
| Fishing |
| Swimming |
| Wading |
| Kayaking |
| Wildlife Observation and Hiking |
| Camping |



# Hutchinson River Drainage Area Characteristics




- Total NYC watershed drainage area is approximately 2,552 acres
  - Combined 1,410 ac.
  - Separate Storm Sewer 610 ac.
  - Direct Drainage 532 ac.

- DEP wet weather discharges include:
  - 5 CSO Outfalls
  - 8 Separate Storm Sewer Outfalls
  - Combined sewer overflow volume around 325 million gallons per year

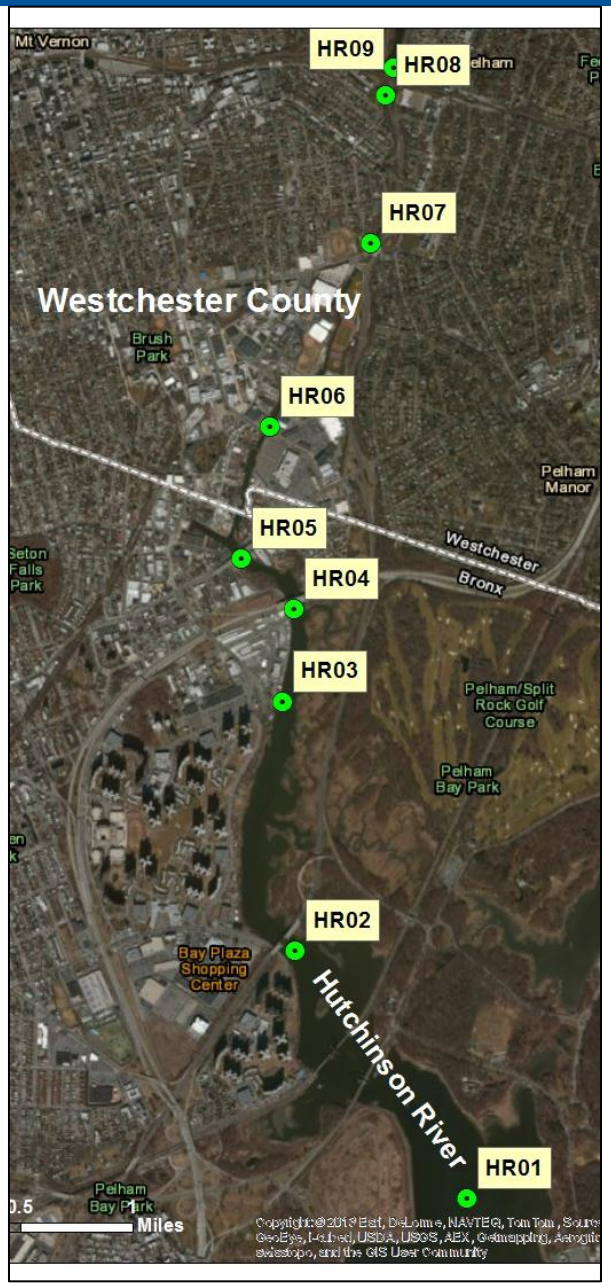
- Active CSO Outfalls Overflow Volumes:
  - HP-024: 170 MG/yr
  - HP-023: 132 MG/yr
  - HP-031: 21 MG/yr

# Hutchinson River: Water Quality Sampling Results

- Approximately 10 Dry samples per station
- Approximately 48 Wet samples per station
- Results show bacteria concentrations above Water Quality Standards; highest bacteria concentrations in Westchester County

**Geomean of 2012 Sampling Data**
(Shaded portion is Westchester County)

| River Station | *Enterococci* (#/100ml) | | | Fecal Coliform (#/100ml) | | |
|---|---|---|---|---|---|---|
| | Dry | Wet | All | Dry | Wet | All |
| **HR09** | 179 | 618 | 510 | 589 | 1,495 | 1,314 |
| **HR08** | 7,606 | 4,964 | 6,882 | 12,253 | 10,132 | 10,482 |
| **HR07** | 1,010 | 2,264 | 1,905 | 3,973 | 5,377 | 4,908 |
| **HR06** | 55 | 313 | 239 | 140 | 1,134 | 779 |
| **HR05** | 31 | 207 | 150 | 184 | 684 | 546 |
| **HR04** | 34 | 112 | 92 | 467 | 521 | 512 |
| **HR03** | 38 | 92 | 80 | 670 | 773 | 754 |
| **HR02** | 26 | 58 | 50 | 381 | 516 | 490 |
| **HR01** | 17 | 26 | 24 | 53 | 95 | 86 |



# Hutchinson River Water Quality – Current Improvement Projects Green Infrastructure

Area-Wide Contracts
Neighborhood Demonstration Area
Edenwald Houses

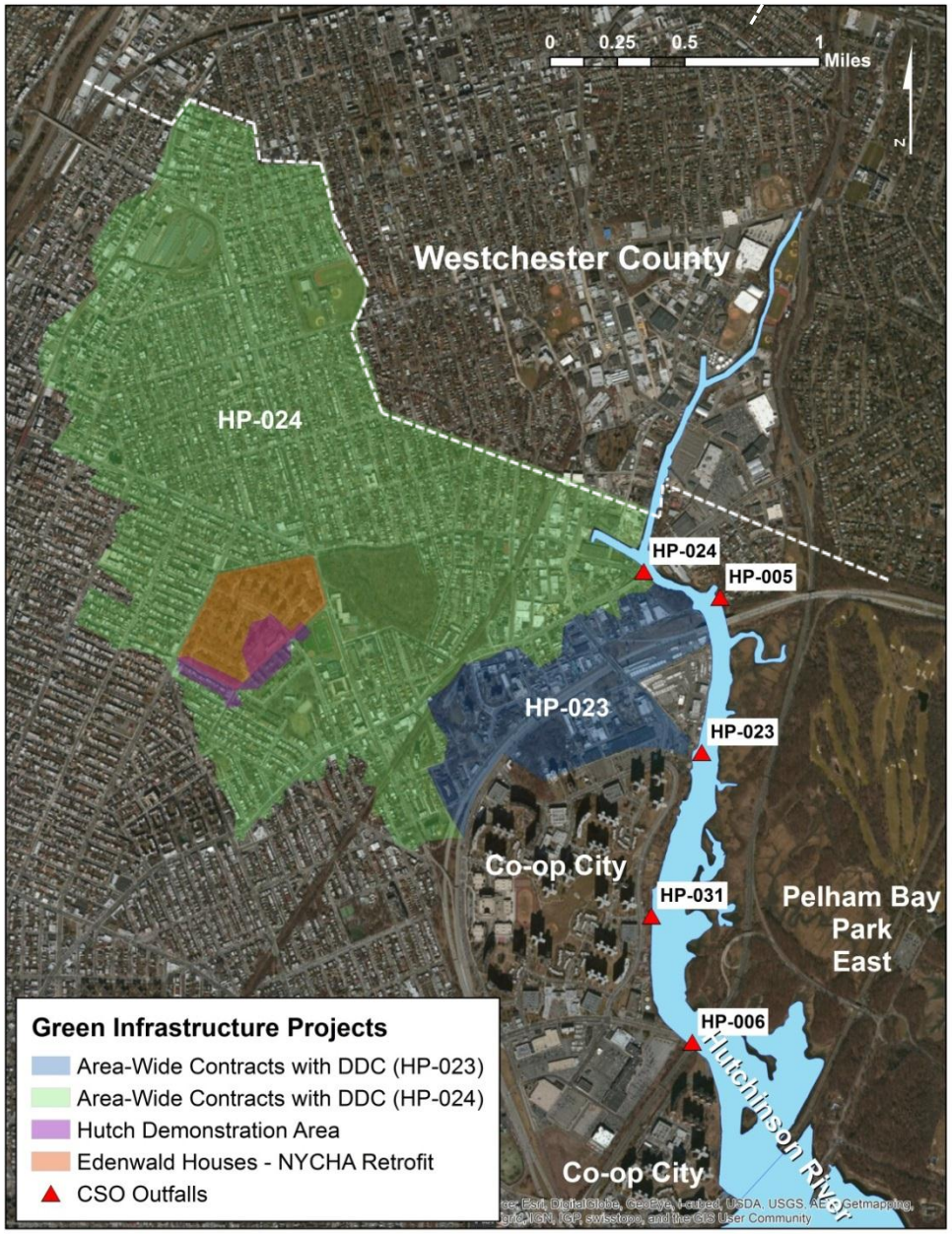
Mikelle Adgate
Lily Lee
DEP

# Hutchinson River: Current Improvement Projects

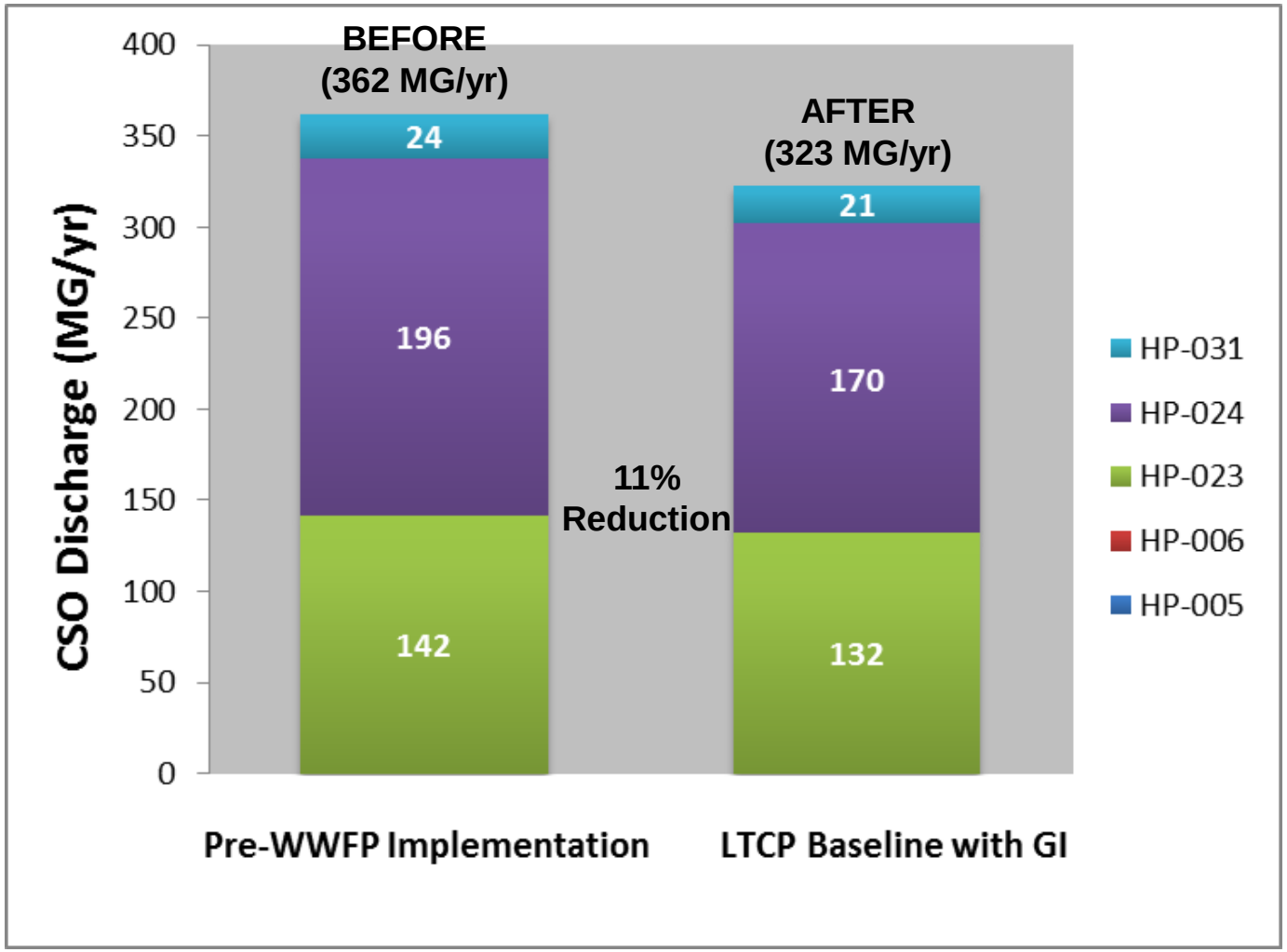
- DEP is investing approximately $18 million dollars in three large projects:
  - Edenwald Houses – NYCHA Retrofit
  - Hutchinson River Neighborhood Demonstration Area*
  - Area-wide contracts with DDC

- Area-wide contracts allow DEP to:
  - Focus resources on these specific outfall tributary
  - Saturate these areas with as much Green Infrastructure as possible
  - Achieve efficiencies in design and construction

* This project was undertaken in connection with the settlement of an enforcement action taken by New York State and DEC for violations of New York State law and DEC regulations



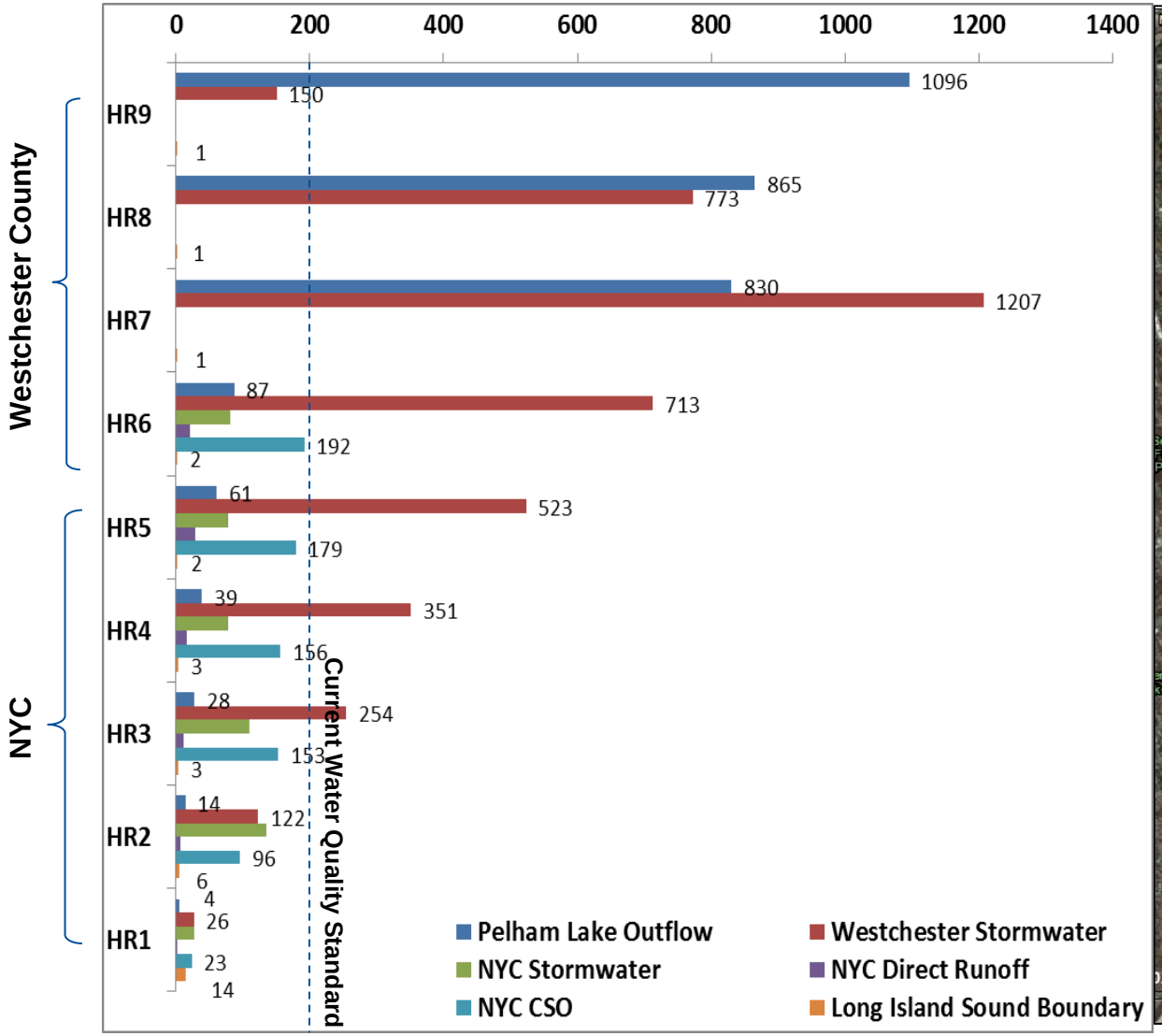
# Hutchinson River: Modeling Baseline

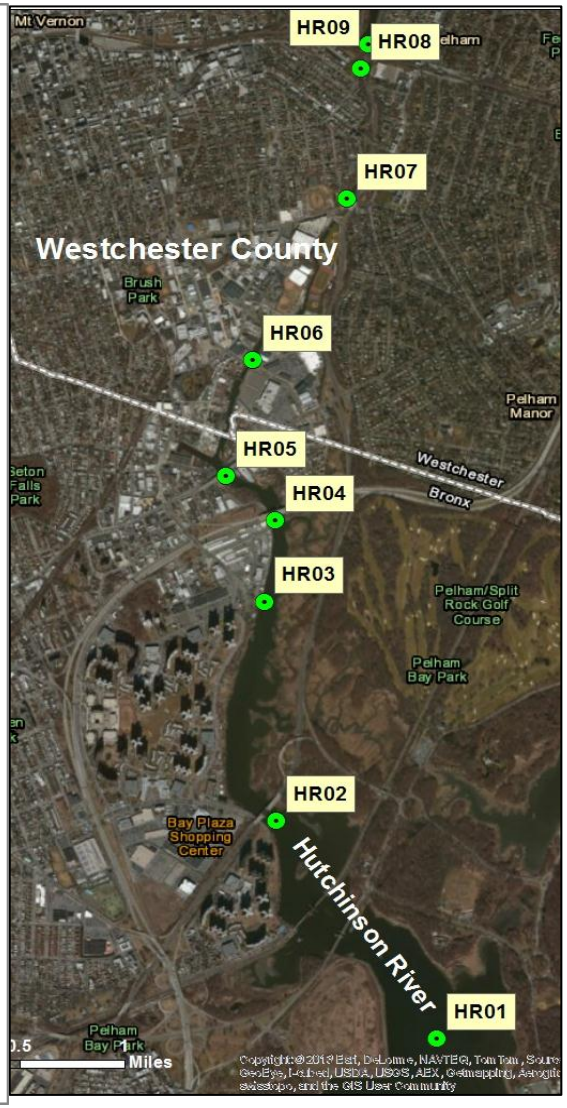



*Updated using 2008 rainfall data

# Hutchinson River Contributing Sources (Baseline with GI Implemented)

**Fecal Coliform (CFU/100 mL) Annual 30-day GM Maximum - February 2008**



# Summary of Water Quality Considerations

- Upstream flows from Westchester County are major component causing non-attainment of SB criteria

- NYC combined sewer overflows, separate storm sewer and direct drainage also contributes to non-attainment

| Target | Water Quality Standards | At Baseline | Complete CSO Elimination |
|---|---|---|---|
| **Existing Water Quality Standard** | Class SB (Fecal only) | • Annual attainment with fecal coliform standard not achieved except at downstream end. | • Minimal improvement over baseline<br>• Would not result in annual attainment in most of the river |
| **Future Standard: Fishable/Swimmable Goal** | Class SB with RWQC[1]<br>(1) Recreational Water Quality Criteria | • Significant non-attainment | • Minimal improvement over baseline |

# Alternatives Evaluation for Hutchinson River

Lily Lee
DEP

# Summary of Preliminary Technology Screening

| Technology | Detail | Screen Out | Carry Forward |
|---|---|---|---|
| 1. Source control/Inflow Control/ Additional GI | | ✓ | |
| 2. System Optimization | Raise Weirs/RTC/DWF Connection Relief | ✓ | |
| 3. Sewer separation | | ✓ | |
| Storage | 4. Tanks | | ✓ |
| | 5. Tunnel | | ✓ |
| | 6. Storage Shafts | ✓ | |
| Treatment | 7. RTB w/Disinfection | | ✓ |
| | 8. High-Rate Treatment | ✓ | |
| | 9. Vortex Separation | ✓ | |
| 10. Enhanced Conveyance | | ✓ | |
| 11. Receiving Water Improvements | | ✓ | |
| 12. Floatables Control | | | ✓ |

# Hutchinson River: Alternatives Evaluated

- Storage Tanks at HP-023 and HP-024
- Storage Tunnel for HP-023, HP-024 and HP-031
- Consolidated Retention/Treatment Basin (RTB) with Disinfection Facility for HP-023/ HP-024
- Individual RTB with Disinfection Facilities for HP-023 and HP-024
- Construct a new outfall for HP-024 and add disinfection
- Floatables Control for HP-023 and HP-024


Proposed storage tank/RTB locations

CSO Outfalls

# Storage Tanks at HP-024 and HP-023

**Concept:**

- Construct tanks at HP-024 and HP-023 for CSO storage, then pump stored CSO back to the sewers after it rains.

**Design:**

- Large Tanks for 45% CSO volume control
  - 4.9 MG Storage Tank at HP-024
  - 2.9 MG Storage Tank at HP-023
- Small Tanks for 25% CSO volume control
  - 1.7 MG Storage Tank at HP-024
  - 1.0 MG Storage Tank at HP-023

# Storage Tanks at HP-024 and HP-023 (Details)

**Benefits:**

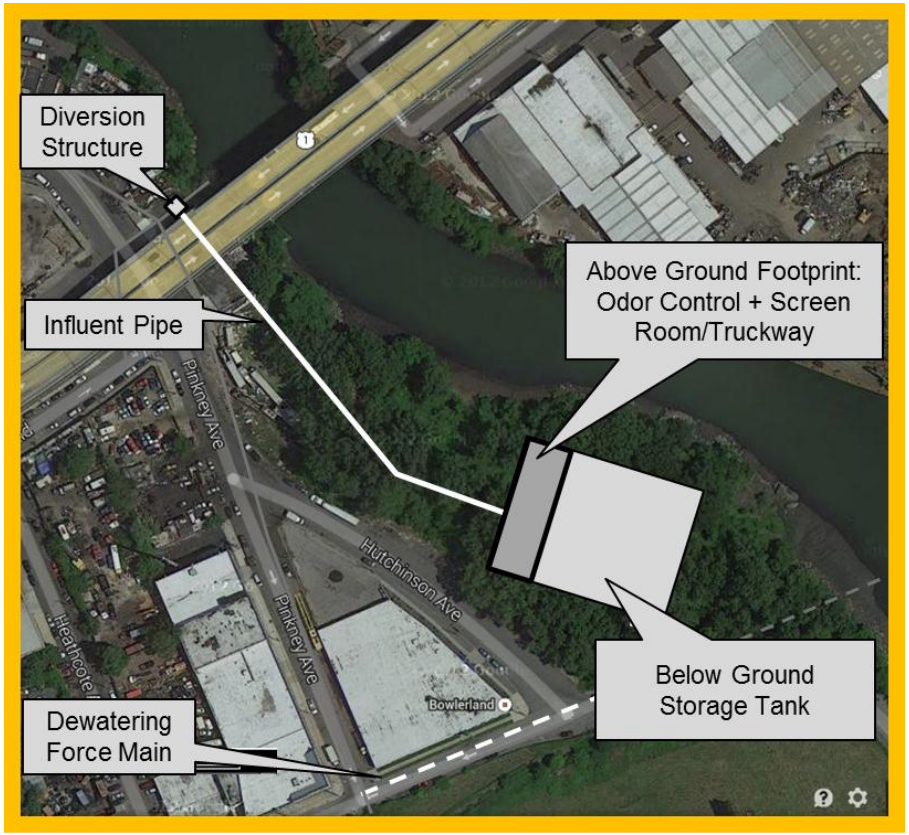
- Large Tanks for 45% CSO control
  - Reduces Annual CSO Volume by 154 MG
  - No change in % attainment in 8 of 9 locations
- Small Tanks for 25% CSO control
  - Reduces Annual CSO Volume by 85 MG
  - No change in attainment in all locations

**Challenges:**

- Site acquisition and soil contamination
- Coordination with DOT operations at HP-023 site
- Limited space for structures and a reliable power source
- Operation and maintenance for two remote facilities

**Capital Costs:**

- Large Tanks: $249 million
- Small Tanks: $170 million




**Site Example of Storage Tank at HP-024**

# Storage Tunnel for HP-023, HP-024, HP-031

**Concept:**

- Construct deep storage tunnel to capture CSO at HP-023, HP-024 and HP-031 for storage, then pump stored CSO back to the sewers after rain stops

**Design:**

- Tunnel Dimensions
  - Length: 5,400 ft.
  - Diameter:
    - 39 ft for 100% CSO control
    - 24 ft for 75% CSO control
    - 16 ft for 50% CSO control

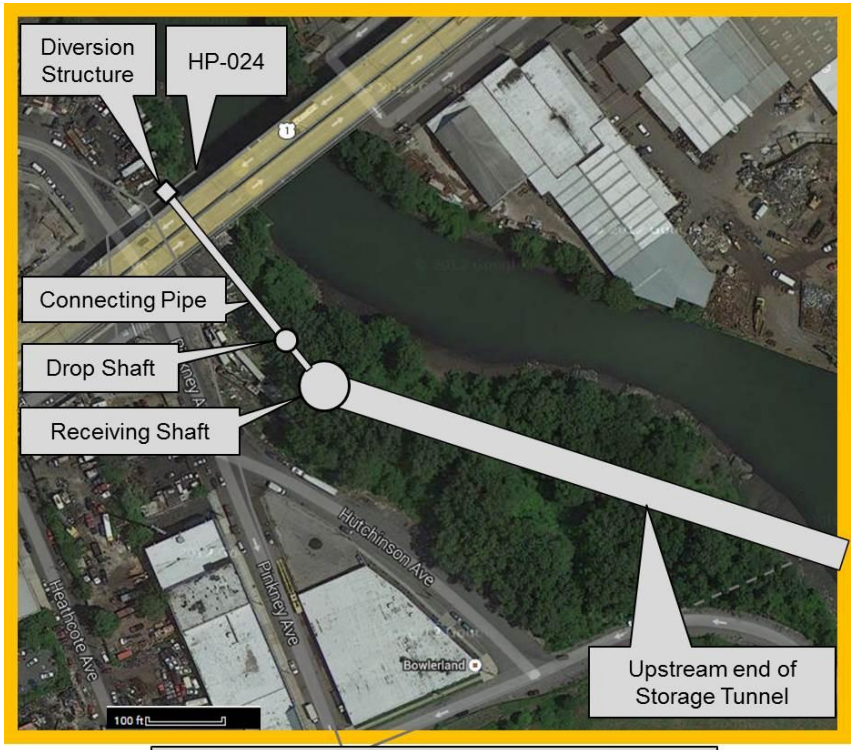
# Storage Tunnel for HP-023, HP-024, HP-031(Details)

**Benefits**

- 100% CSO Control
  - Reduces Annual CSO Volume by 323 MG
  - No change in % attainment in 8 of 9 locations
- 75% CSO Control
  - Reduces Annual CSO Volume by 247 MG
  - No change in % attainment in 8 of 9 locations
- 50% CSO Control
  - Reduces Annual CSO Volume by 160 MG
  - No change in % attainment in 8 of 9 locations

**Challenges**

- Site acquisition for shafts and contaminated soil issues
- Limited space for new structures and a reliable power source
- Difficult to access deep equipment and clear out sediment




Site Example of Upstream End of Storage Tunnel

**Capital Costs:**

- 100% control: $818 million
- 75% control: $ 697 million
- 50% control: $ 630 million

# Combined RTB with Disinfection for HP-024/HP-023

**Concept:**

- Construct facility to screen and disinfect consolidated CSO from HP-024 and HP-023, with tank to provide contact time for disinfection. Treated flows discharged to Hutchinson River. Disinfection system to operate in recreational season (May – October).

**Design:**

- 88% Seasonal Bacteria Reduction
  - 2.1 MG RTB Tank at HP-023
  - 3,250 LF, 6.5 ft diameter conduit from HP-024
- 78% Seasonal Bacteria Reduction
  - 1.3 MG RTB Tank at HP-023
  - 3,250 LF, 6.0 ft diameter conduit from HP-024
- 62% Seasonal Bacteria Reduction
  - 0.64 MG RTB Tank at HP-023
  - 3,250 LF, 4.0 ft diameter conduit from HP-024

Potential Route for Consolidation Conduit Between HP-024 and HP-023

# Combined RTB with Disinfection for HP-024/HP-023 (Details)

## Benefits

- Approximately 60 to 90% bacteria load control in recreational season, depending on facility size:
  - Reduces Bacteria in CSO during recreational season

## Challenges

- Site acquisition and contaminated soil on site
- Limited space for new diversion structure and reliable power source
- Chemical storage and handling
- Potential chlorine residual issues
- Operation and maintenance
- Environmental permitting


Site Example of HP-023/HP-024 Consolidated RTB with Disinfection Facility

## Capital Costs:

- 87% bacteria load seasonal reduction: $278
- 78% bacteria load seasonal reduction: $231
- 62% bacteria load seasonal reduction: $169

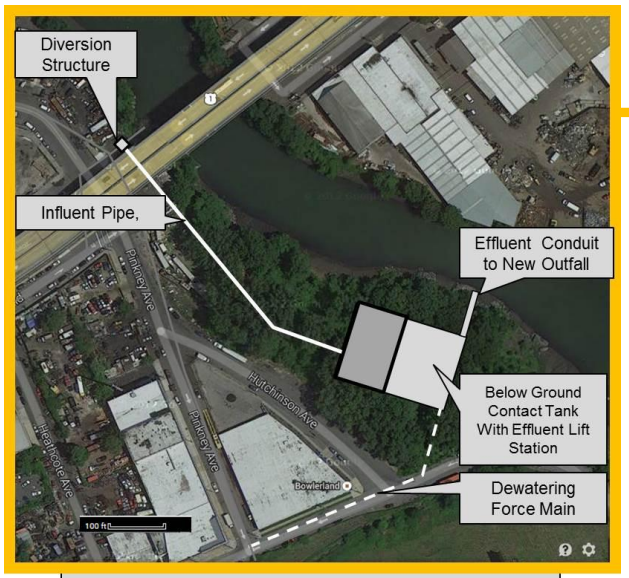
# Individual RTB with Disinfection for HP-024, HP-023

**Concept:**

- Construct facility to screen and disinfect CSO from HP-024 or HP-023, with tank to provide contact time for disinfection. Treated flows discharged to Hutchinson River. Disinfection system to operate in recreational season (May – October).

**Design:**

- Individual RTB with Disinfection at HP-024
  - 0.73 MG RTB Tank at HP-023
  - 40% seasonal bacteria load reduction
- Individual RTB with Disinfection at HP-023
  - 1.6 MG RTB Tank at HP-023
  - 50% seasonal bacteria load reduction




Site Example HP-024 RTB with Disinfection Facility



Site Example of HP-023 Consolidated RTB with Disinfection Facility

# Individ. RTB with Disinfection for HP-024, HP-023 (Details)

**Benefits:**

- 40% bacteria load control in recreational season for facility at HP-024
  - Reduces Bacteria in CSO during recreational season
- 50% bacteria load control in recreational season for facility at HP-023
  - Reduces Bacteria in CSO during recreational season

**Challenges:**

- Same as previously shown for tanks at HP-024, HP-023

**Capital Costs:**

- HP-024: $221 million
- HP-023: $144 million

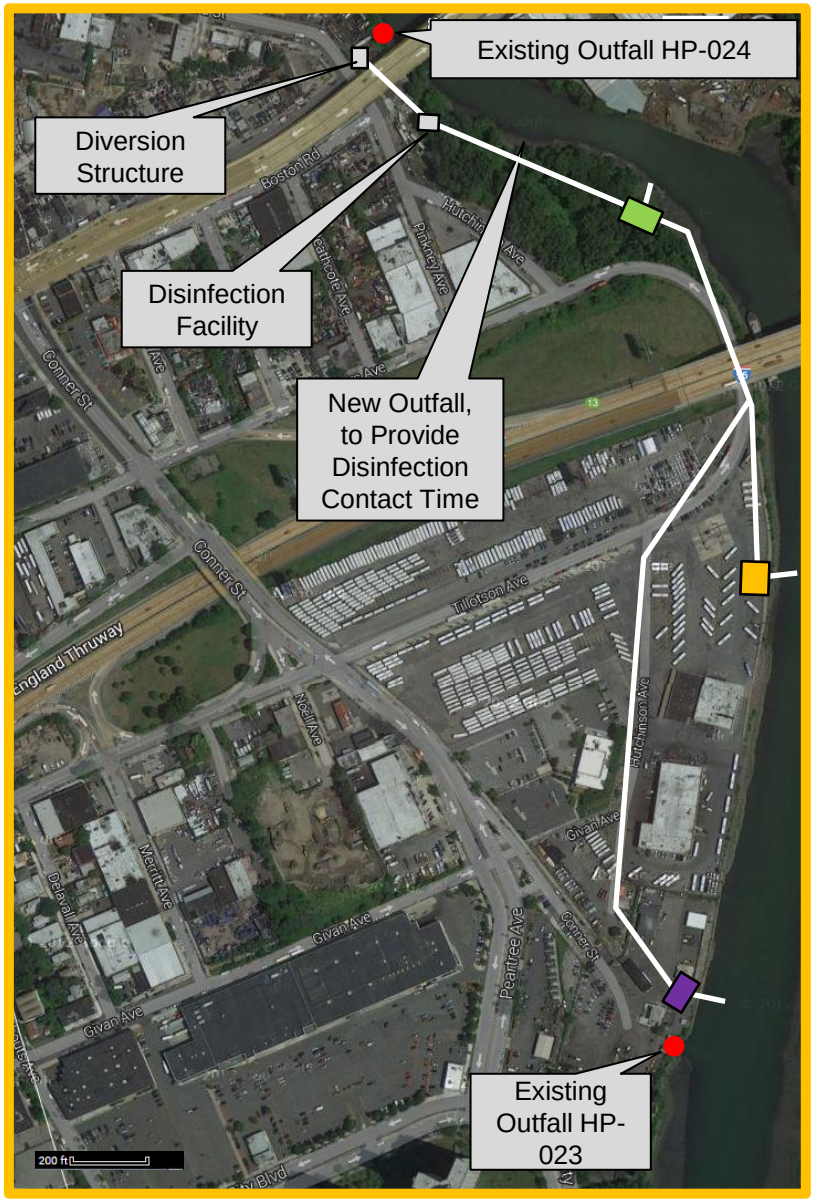
# Disinfection of New Outfall HP-024

**Concept:**

- Construct new outfall from HP-024, running south parallel to river. Apply disinfection to upstream end of new outfall.

**Design:**

- New Outfalls:
  - 25 MGD Recreational Season Disinfection
  - 16% seasonal bacteria load reduction
  - 75 MGD Recreational Season Disinfection
  - 30% seasonal bacteria load reduction
  - 150 MGD Recreational Season Disinfection
  - 37% seasonal bacteria load reduction



# Disinfection of New Outfall HP-024 (Details)

**Benefits:**

- Low-cost approach to meet Waste Load Allocation target
- No effluent pumping

**Challenges:**

- Solids deposition in outfall
- Outfall drain discharge
- Impact on DOT bus facilities during construction
- Site acquisition for disinfection facility
- Contaminated soils
- Permitting of new outfall

**Capital Cost:**

- 25MGD: $32.2 million
- 75MGD: $55 million
- 150MGD: $77.6 million

# Floatables Control

**Concept:**

- Retrofit floatables control on outfall to reduce CSO impact to waterbody

**Benefits:**

- Reduces CSO floatables load
- May improve waterbody aesthetics

**Challenges:**

- Not a CSO reduction strategy
- Does not remove bacteria
- Siting would be a challenge
- Operation and maintenance

# Hutch River: Alternatives Consideration

| Alternative | CSO/Bacteria Load Reduction | Capital Cost (millions) |
|---|---|---|
| **Storage Tanks:** | | |
| 2.9 MG at HP-023 and 4.9 MG at HP-024 | 45% CSO | $249 |
| 1.0 MG at HP-023 and 1.7 MG at HP-024 | 25% CSO | $170 |
| **Storage Tunnels:** | | |
| HP-023/HP-024/HP-031 Storage Tunnel | 100% CSO | $818 |
| HP-023/HP-024/HP-031 Storage Tunnel | 75% CSO | $697 |
| HP-023/HP-024/HP-031 Storage Tunnel | 50% CSO | $630 |
| **Combined Retention/Treatment Basin (RTB) with Disinfection Facility:** | | |
| HP-023/HP-024 RTB with Disinfection | 87% bacteria load seasonal reduction | $278 |
| HP-023/HP-024 RTB with Disinfection | 78% bacteria load seasonal reduction | $231 |
| HP-023/HP-024 RTB with Disinfection | 62% bacteria load seasonal reduction | $169 |
| **Individual Retention/Treatment Basin (RTB) with Disinfection Facility:** | | |
| Individual HP-024 RTB with Disinfection | 40% bacteria load seasonal reduction | $221 |
| Individual HP-023 RTB with Disinfection | 50% bacteria load seasonal reduction | $144 |
| **Disinfection of new outfall HP-024:** | | |
| 25 MGD Seasonal Disinfection | 16% bacteria load seasonal reduction | $32.2 |
| 75 MGD Seasonal Disinfection | 30% bacteria load seasonal reduction | $55 |
| 150 MGD Seasonal Disinfection | 37% bacteria load seasonal reduction | $77.6 |
| **Floatables Control at HP-023 and HP-024** | ----- | $20 |

# Next Steps

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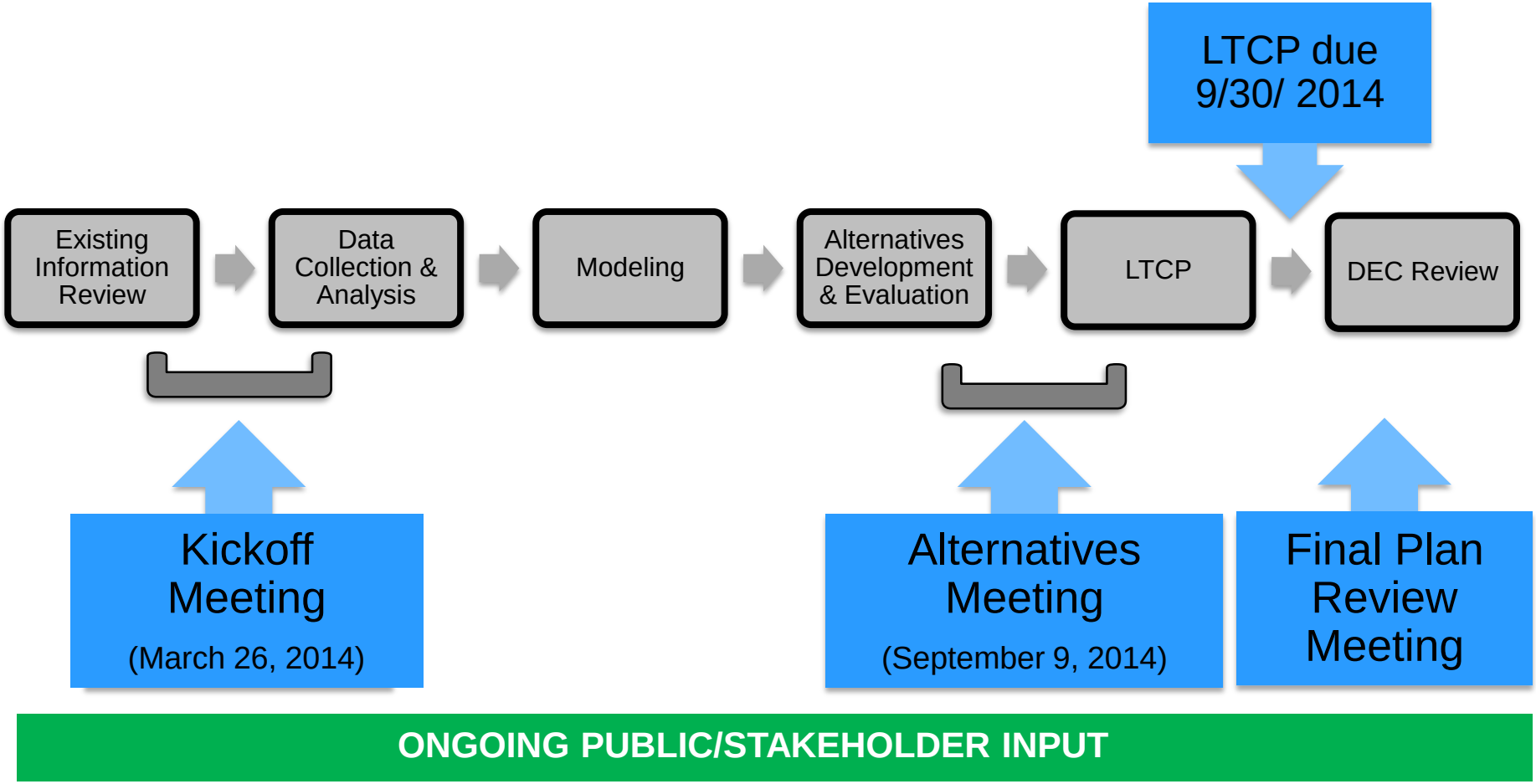
DEP

# Public Involvement and LTCP Process



# Next Steps

- Public comments on alternatives due 9/19/2014
- Comments can be submitted to:
  - New York City DEP at: ltcp@dep.nyc.gov
- Hutchinson River LTCP Public Meeting #3
  - Objective & Topics: Present and review proposed Draft LTCP

# Additional Information & Resources

- Visit the informational tables tonight for handouts and poster boards with detailed information

- Go to www.nyc.gov/dep/ltcp to access:
  - LTCP Public Participation Plan
  - Presentation, handouts and poster boards from this meeting
  - Links to Waterbody/Watershed Facility Plans
  - CSO Order including LTCP Goal Statement
  - NYC's Green Infrastructure Plan
  - Green Infrastructure Pilots 2011 and 2012 Monitoring Results
  - Real-time waterbody advisories
  - Upcoming meeting announcements
  - Other LTCP updates

# Discussion and Q&A Session