



# **Jamaica Bay & Tributaries Combined Sewer Overflow Long Term Control Plan**

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**Public Kickoff Meeting**

**Jamaica Chamber of Commerce  
September 22, 2016**

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	<b>Topic</b>	<b>Speaker</b>
1	<b>Welcome &amp; Introductions</b>	Mikelle Adgate
2	<b>Waterbody &amp; Watershed Characteristics and Water Quality Sampling</b>	Keith Mahoney
3	<b>Water Quality Improvement Projects</b> <ul style="list-style-type: none"><li>• Grey Infrastructure</li><li>• Green Infrastructure</li></ul>	Keith Mahoney Pinar Balci
4	<b>LTCP Modeling &amp; Alternative Development Process</b>	Keith Mahoney
5	<b>Next Steps</b>	Mikelle Adgate
6	<b>Discussion and Q&amp;A Session</b>	All

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# Welcome & Introductions

Mikelle Adgate  
Director of Stormwater Outreach  
DEP

# Jamaica Bay: Historical Context

1800's



- Green shading represents shoreline of Jamaica Bay in late 1800's – system has since been drastically altered.

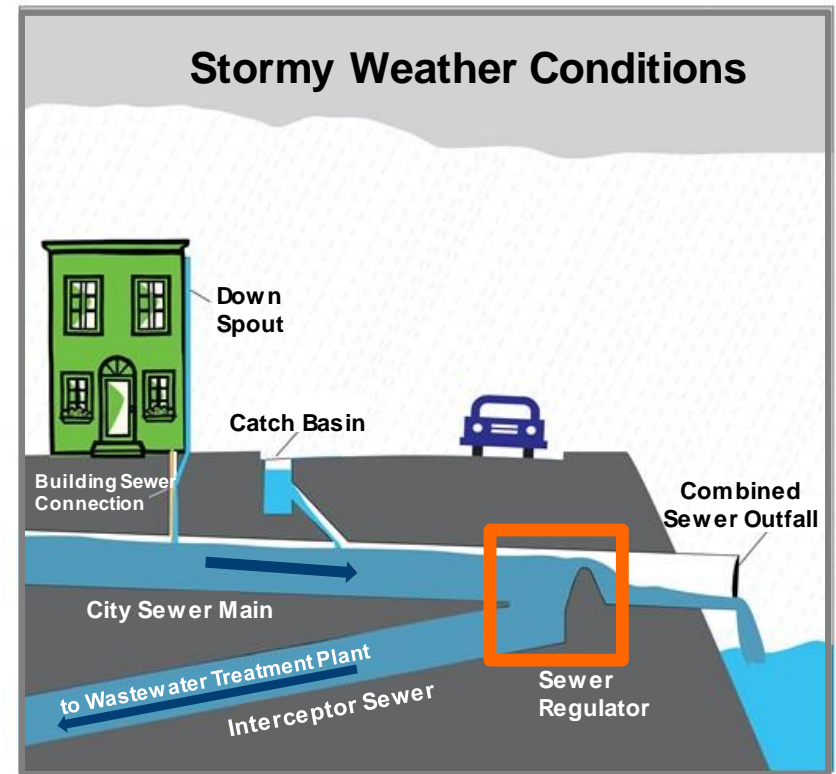
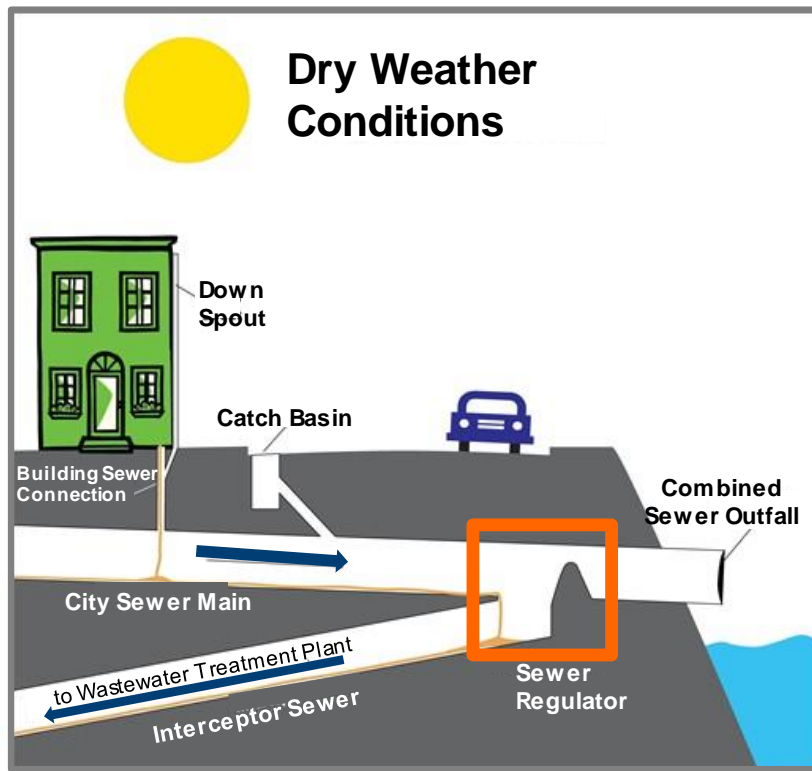
TODAY



- Urban development throughout the decades has led to a highly impervious watershed in Jamaica Bay. Approximately 1,200-acres remain of the original 16,000-acres of tidal wetland.

# What is a Combined Sewer Overflow (CSO)?

- NYC's sewer system is approximately 60% combined, which means it is used to **convey both sanitary and storm flows**.



- 65% to 90% of **combined** sanitary & storm flow is captured at treatment plants.
- When the sewer system is at full capacity, a diluted mixture of rain water and sewage may be released into local waterways. This is called a combined sewer overflow (CSO).



➤ Rainfall characteristics that trigger a CSO event at Jamaica Bay and Tributaries:

- 0.5 to 1-inch of constant rainfall over a period of 2 to 10 hours

➤ **Not every rainfall causes a CSO event:**

- Of the average 100 rainfall events per year about 40% may trigger a CSO at Jamaica Bay and Tributaries



Photo Credit: Baptisete Pons  
<https://www.flickr.com/photos/bpt/2882285636/>

## Long Term Control Plan (LTCP)

**identifies appropriate CSO controls to achieve applicable water quality standards**

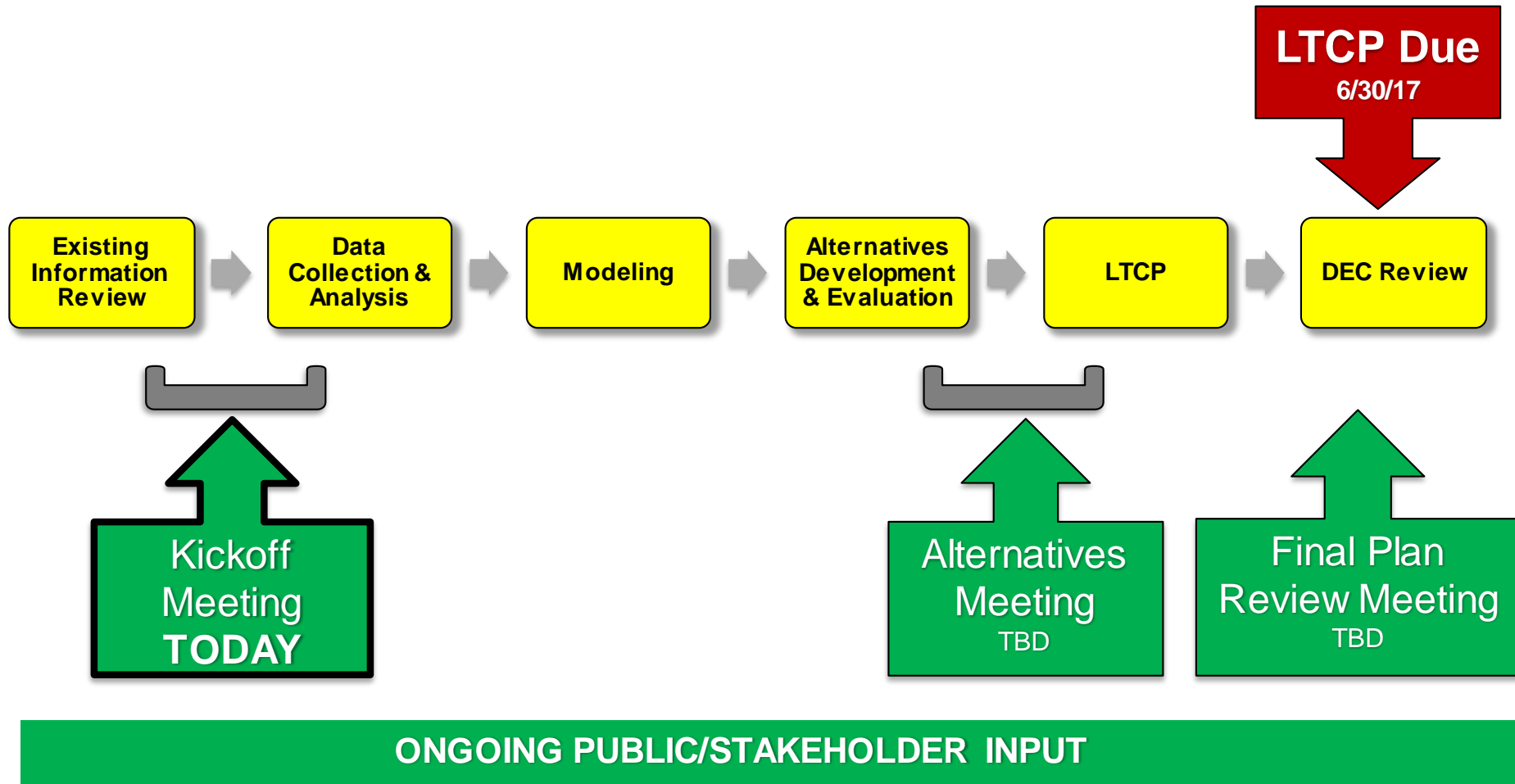
consistent with the Federal CSO Policy and Clean Water Act

## CSO Consent Order

**an agreement between NYC and DEC that settles past legal disputes without prolonged litigation**

DEC requires DEP to develop LTCPs and mitigate CSOs

# LTCP Process and Public Involvement



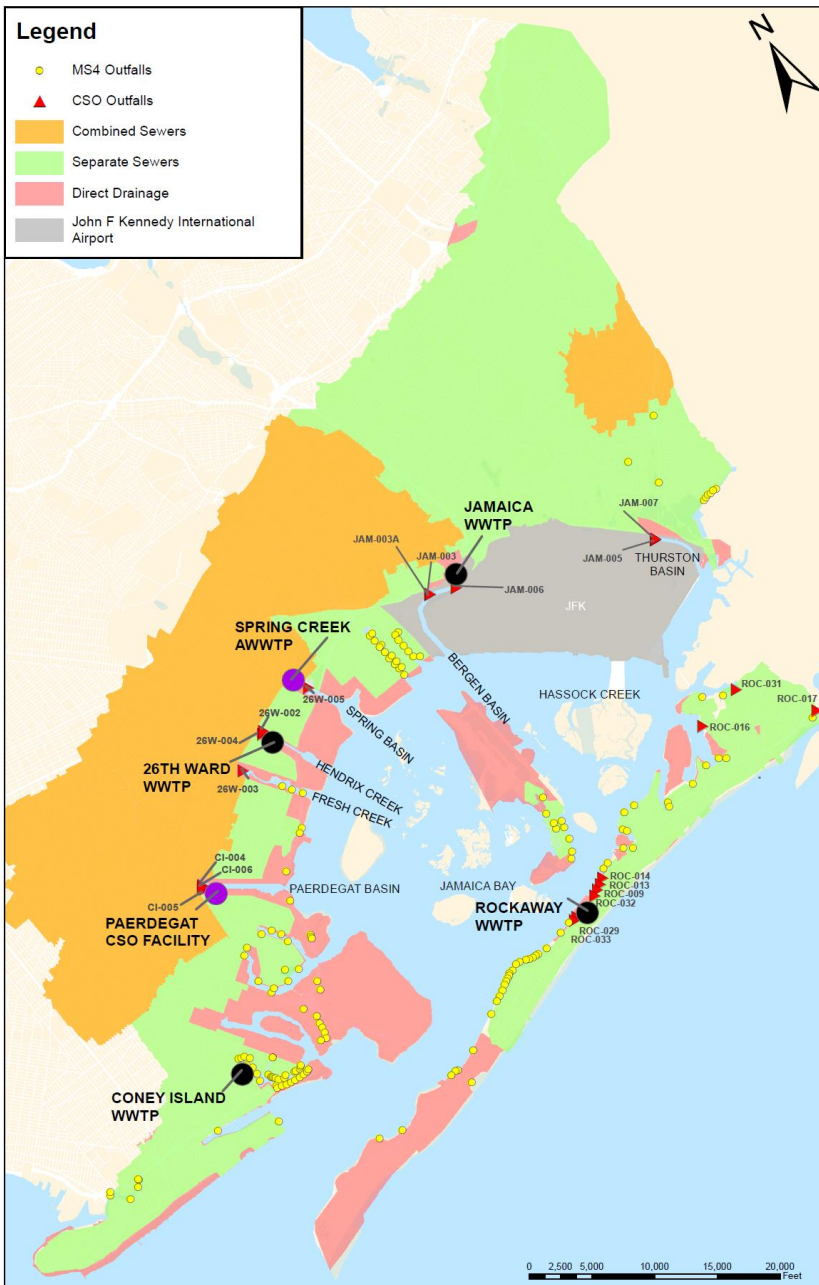


**Questions?**

# **Waterbody & Watershed Characteristics and Water Quality Sampling**

Keith Mahoney, P.E.  
Director  
DEP

# Jamaica Bay Drainage Area



## ➤ 6 Urban CSO Tributaries

- Paerdegat Basin
- Spring Creek
- Fresh Creek
- Bergen Basin
- Hendrix Creek
- Thurston Basin

## ➤ Sewer System

- 20 CSO Outfalls (▲)
- 149 MS4 Outfalls (●)

## ➤ 4 Wastewater Treatment Plants (●)

- Jamaica, 26<sup>th</sup> Ward, Rockaway, Coney Island

## ➤ 2 CSO Facilities (●)

- Spring Creek, Paerdegat

## ➤ Significant stormwater discharge in area

Drainage Area	
Total Acres	52,200
Served by Combined Sewers	31%

## CLASS SB

Bathing

The best usages of Class SB waters are **primary and secondary contact** recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.

## CLASS I

Boating/Fishing

The best usages of Class I waters are **secondary contact** recreation and fishing. These waters shall be suitable for fish, shellfish, and wildlife propagation and survival.



Waterbody	Class	Dissolved Oxygen (mg/L)	Fecal Coliform* (col/100 mL)	Total Coliform* (col/100 mL)
Jamaica Bay	SB	$\geq 4.8$ (daily average) $\geq 3.0$ (acute, never less than)	Monthly Geometric Mean $\leq 200$	Monthly Median $\leq 2,400$ and 80% $\leq 5,000$
Tributaries	I	$\geq 4.0$ (acute, never less than)		

\*Note: Based on new rulemaking promulgated by DEC on November 14<sup>th</sup>, 2015.

EPA has also recommended future RWQC for enterococcus of 30 day rolling GM  $\leq 30$  col/100 mL.

## Receiving Water Sampling

Program	Sampling Period	Sampling Frequency	Parameters		
			Fecal	Enterococci	*YSI
<b>LTCP</b>	10/1/2015 – 11/22/2015	Two 4-day events			
<b>HSM</b>	1/1/2015 – 3/30/2016	Monthly (Oct – May) Weekly (Jun – Sept)			
<b>SM</b>	1/1/2015 – 3/30/2016	Quarterly			

\*YSI Parameters include: Dissolved Oxygen, Temperature, Conductivity, and Salinity.

### CSO Sampling

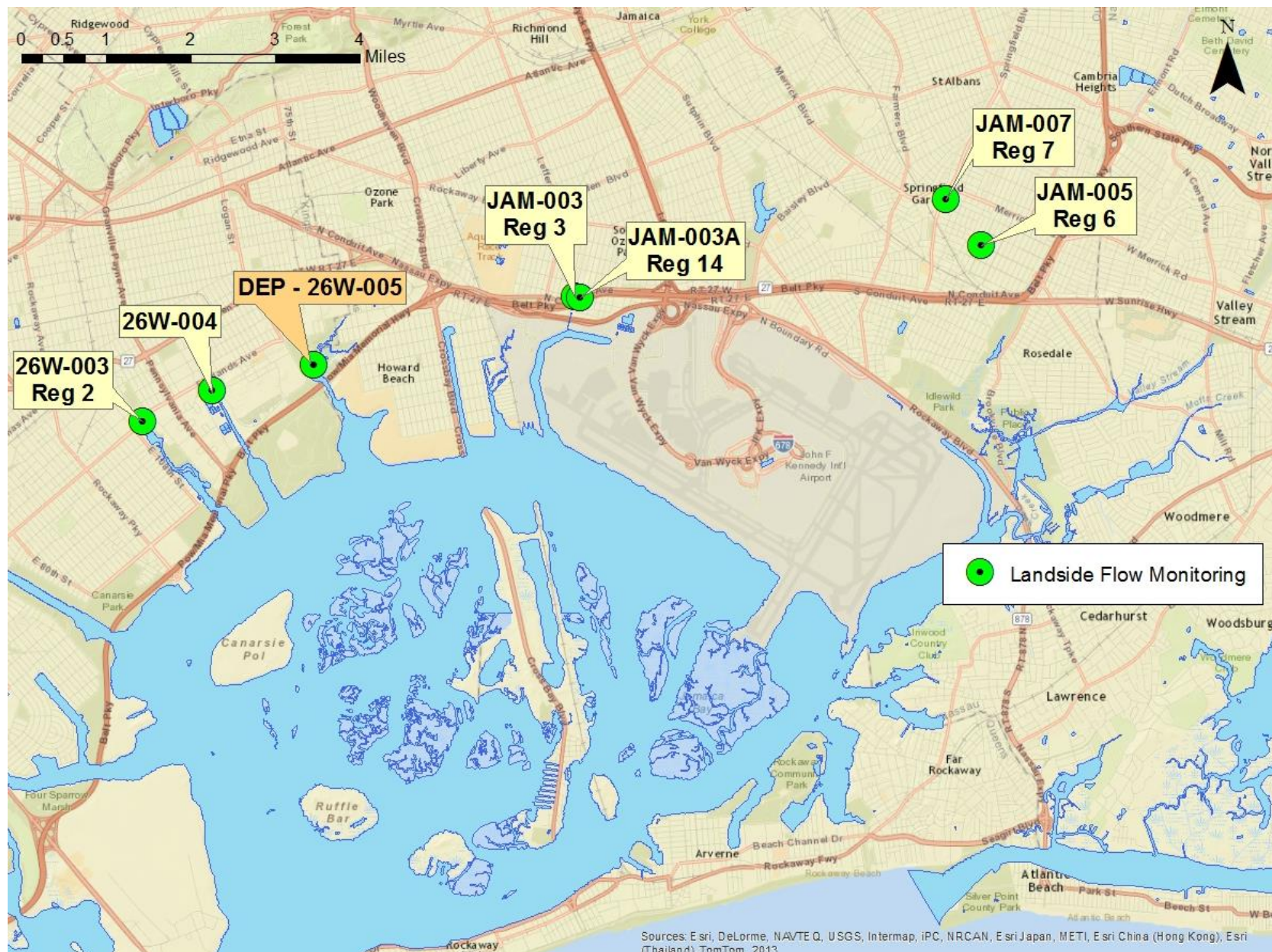
- 8/1/2015 – 12/31/2015
- 6 CSO locations
- 9 wet weather events
- Fecal, Enterococci, YSI

### Flow Monitoring

- 9/1/2015 – 12/31/2015
- 5 locations
- Continuously monitored
- Depth & Velocity measurements



# Landside Flow Monitoring Locations





# Jamaica Bay Sampling Locations

## 1. Northern Shore:

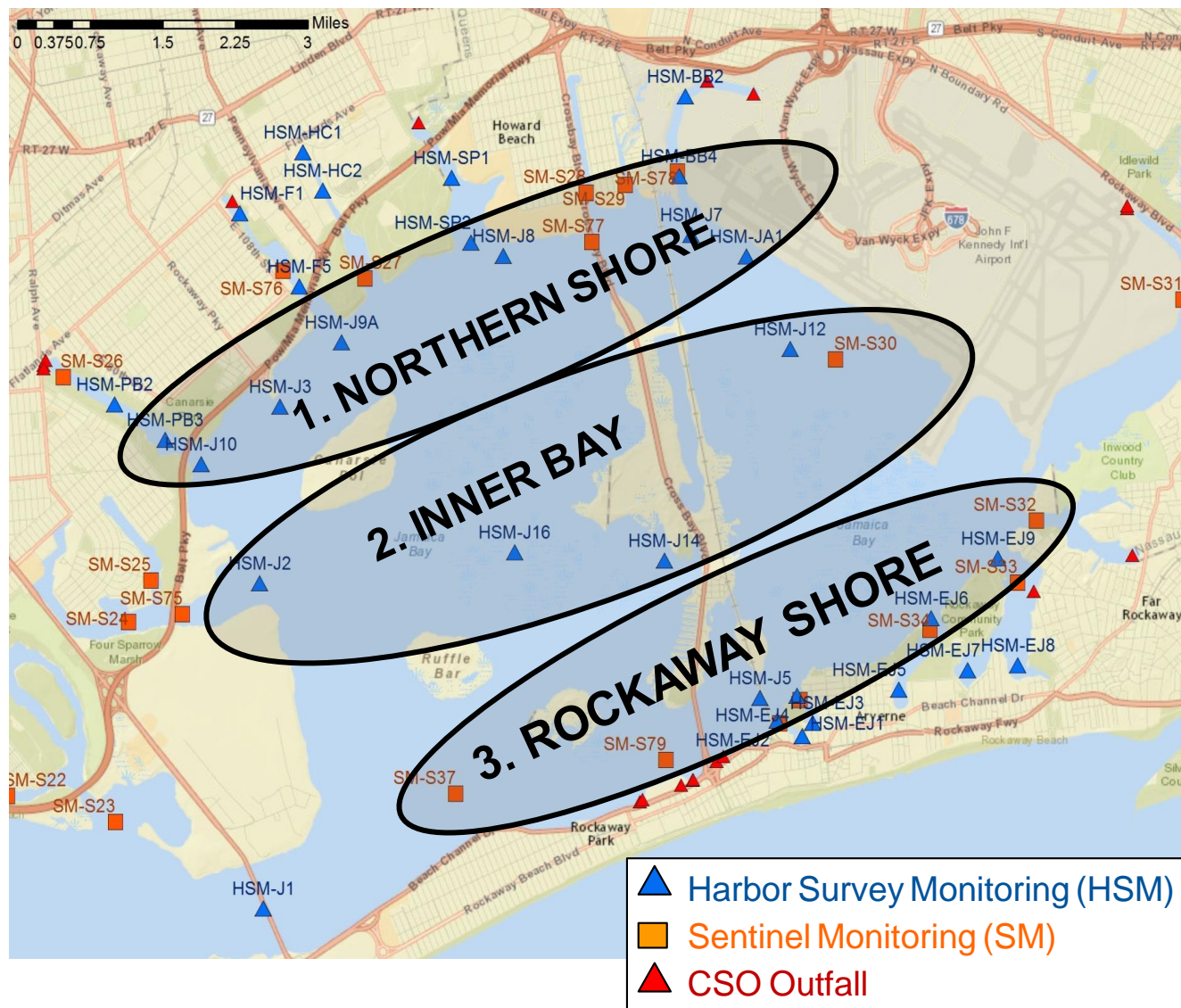
- 7 locations
- 6 HSM, 1 SM

## 2. Inner Bay:

- 5 locations
- 4 HSM, 1 SM

## 3. Rockaway Shore:

- 9 locations
- 3 HSM, 6 SM



# Tributary Sampling Locations

## Paerdegat:

- 4 locations
- 3 HSM, 1 SM

## Hendrix:

- 3 locations
- 2 HSM, 1 SM

## Spring:

- 3 locations
- 3 HSM

## Thurston:

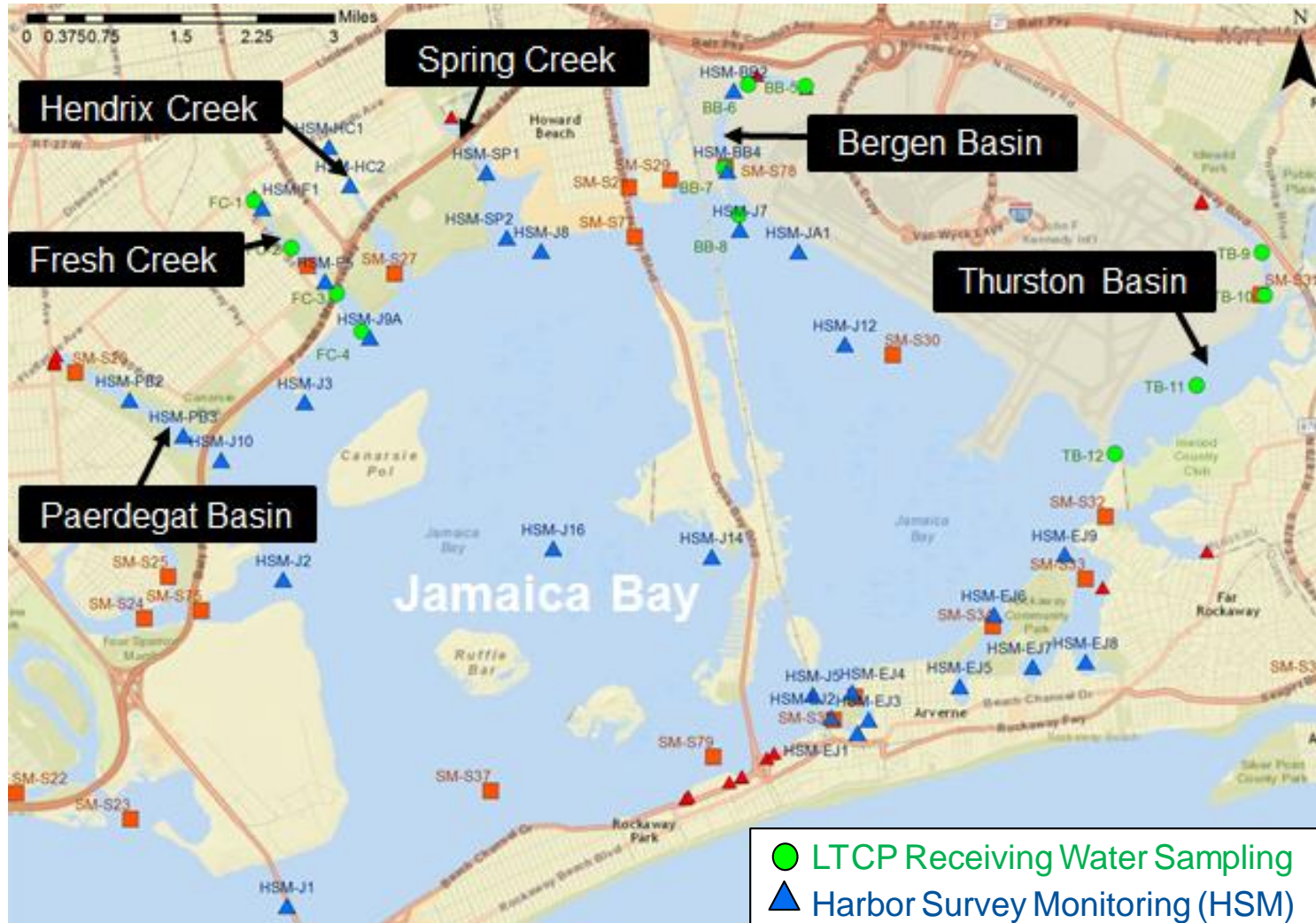
- 5 locations
- 1 SM
- 4 LTCP

## Bergen:

- 8 locations
- 3 HSM, 1 SM
- 4 LTCP

## Fresh:

- 8 locations
- 3 HSM, 1 SM
- 4 LTCP





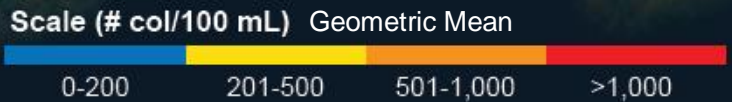




# Fecal Coliform – Sampling Results – Wet Weather

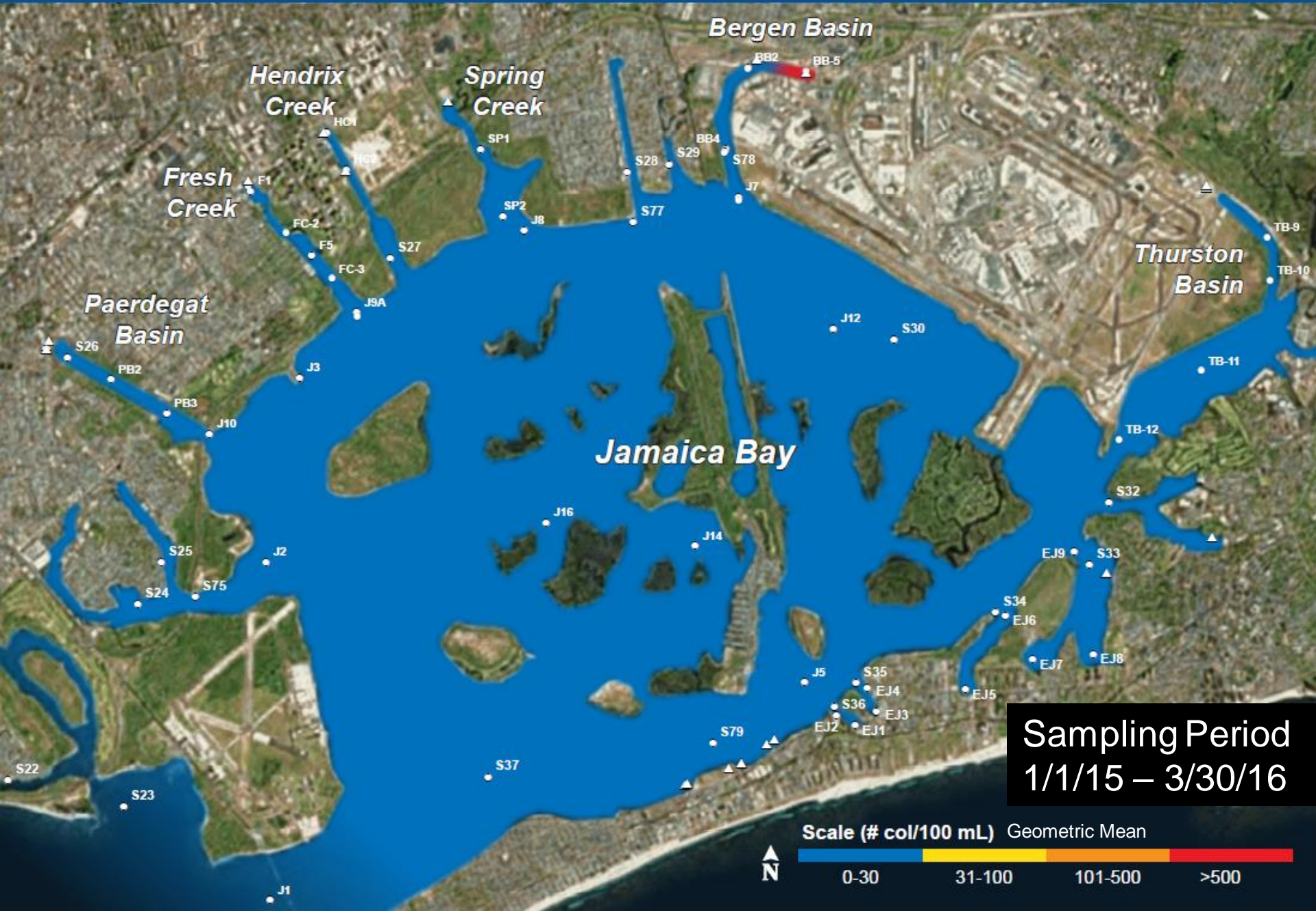


Sampling Period  
1/1/15 – 3/30/16





# Entero – Sampling Results – Dry Weather



Sampling Period  
1/1/15 – 3/30/16

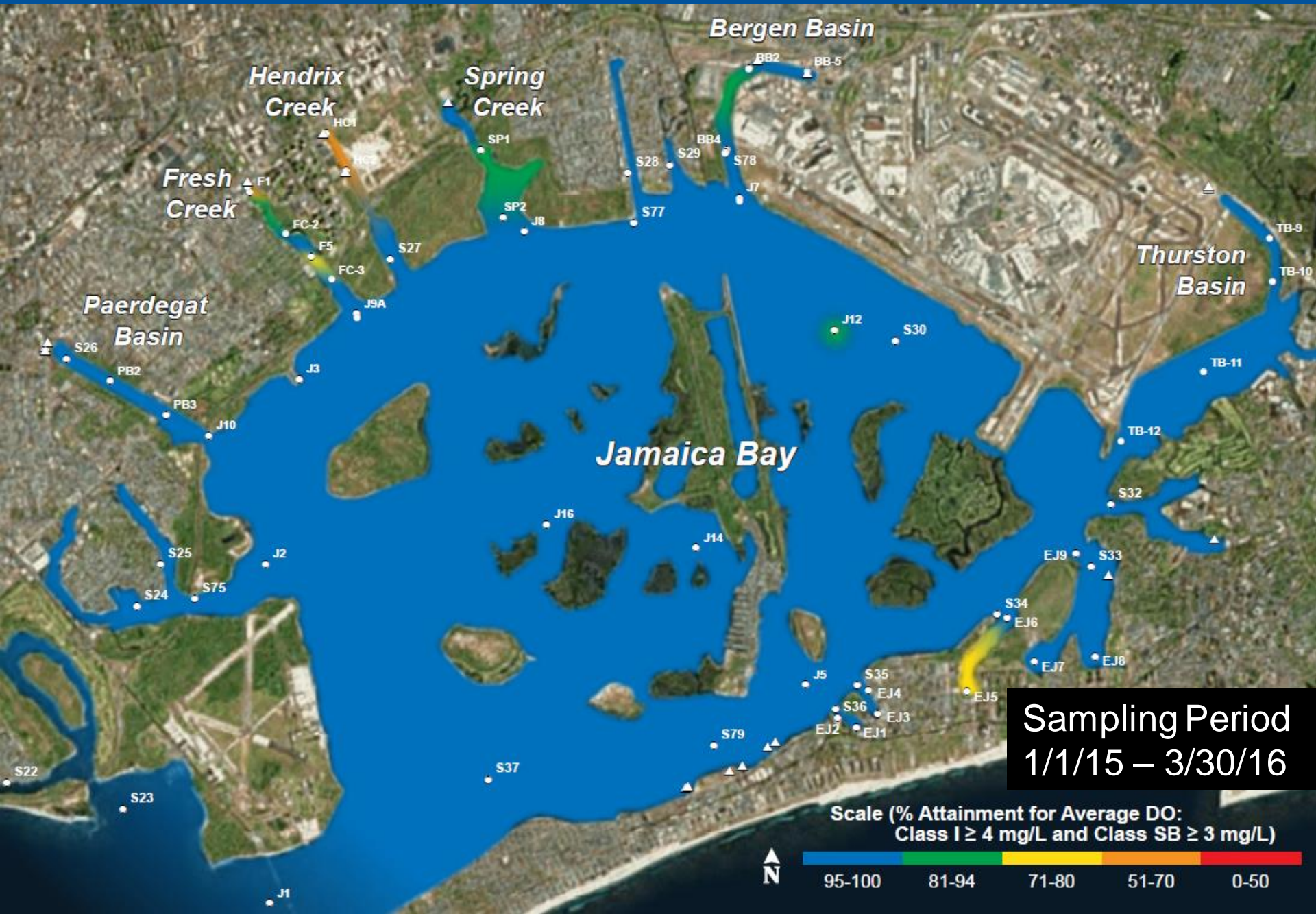


# Entero – Sampling Results – Wet Weather





# DO – Sampling Results – Dry Weather





# DO – Sampling Results – Wet Weather



Good WQS Compliance	Potential WQS Compliance Issues
Jamaica Bay	Bergen Basin
Paerdegat Basin	Thurston Basin
Spring Creek	Fresh Creek
	Hendrix Creek

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Additional Water Quality Improvement will be evaluated for **Bergen Basin, Thurston Basin, Fresh Creek, and Hendrix Creek**

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# Water Quality Improvement Projects

## Grey and Green Infrastructure

Keith Mahoney, P.E.  
Director  
DEP

Pinar Balci  
Assistant Commissioner  
DEP

- Nitrogen Reduction Upgrades at 4 Treatment Plants
  - Jamaica and 26<sup>th</sup> Ward Treatment Plants are currently operating in Step Feed BNR mode
  - Coney Island and Rockaway Treatment Plants are planned to be upgraded to Step Feed BNR in near future

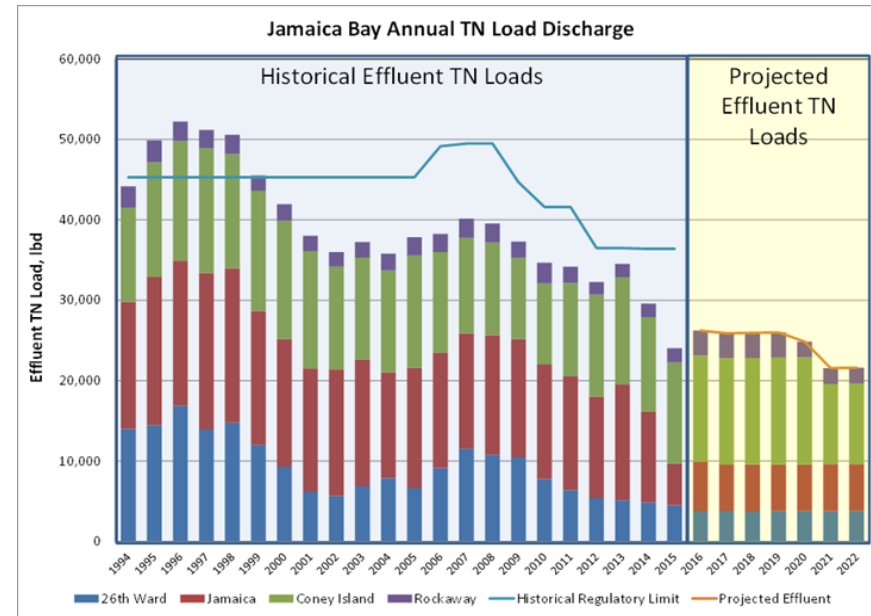
- Watershed Restoration Pilot Studies
  - Bivalve & Eelgrass Restoration, Algae and Sea Lettuce Harvesting, Salt Marshes and Beach Habitats, and Marsh Island Wave Attenuator Study

- 3 Year Nitrogen Post-Construction Water Quality and Ecological Study

- Marshland Restoration Projects

- Army Corp of Engineers Resiliency Planning

- Jamaica Bay Science & Resiliency Institute



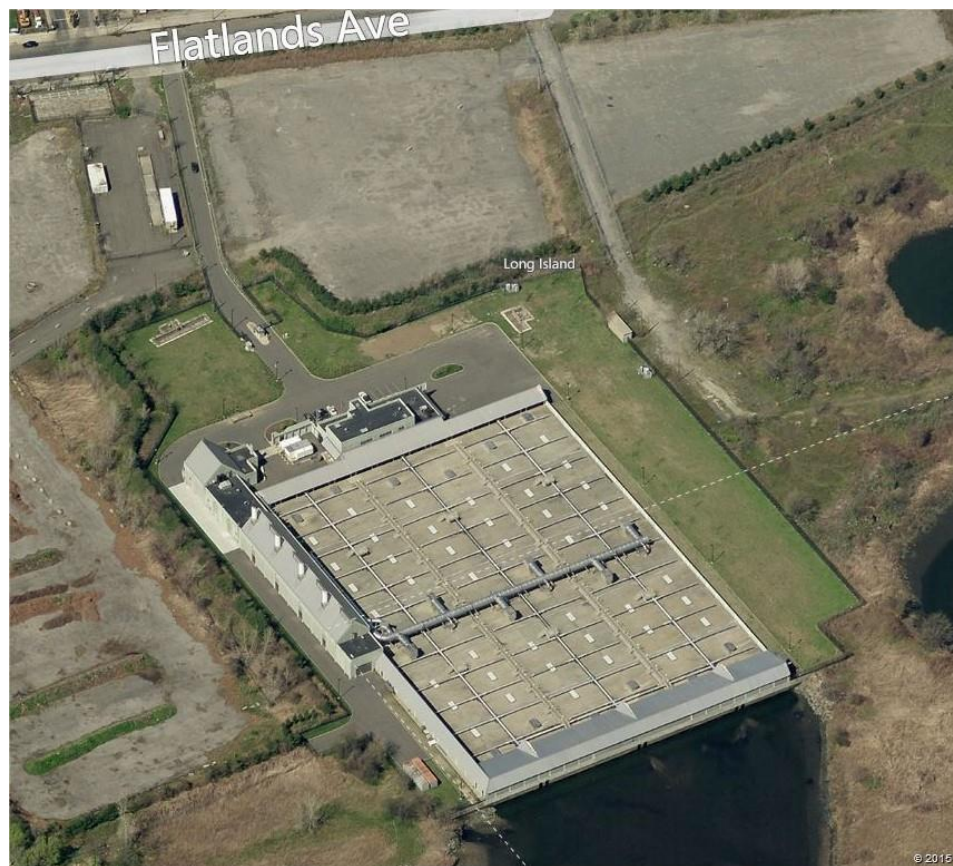


Recommended Project	Net Present Worth (\$ Millions, 2011)	Status
Paerdegat Basin CSO Facility (50 MG Storage)	\$397	Complete
Automation of Regulator JA-2	\$2.3	Complete
Upgrade the Spring Creek AWWTP	\$87	Complete
Sewer Cleaning in the 26 <sup>th</sup> Ward WWTP Drainage Area	\$4	Complete
Hendrix Creek Dredging	\$13	Complete
Regulator Improvements at J3, J6 and J14	\$7	Complete
New 48" Parallel Sewer Jamaica WWTP	\$20	In Construction thru 2016
26 <sup>th</sup> Ward WWTP Wet Weather Stabilization	\$128	In Construction thru 2020
26 <sup>th</sup> Ward High Level Sewer Separation	\$164	Ongoing thru 2022

**Total = \$822 M**



- Constructed early 1970s
- Upgraded in 2007 (\$87 M)
- CSO Storage Capacity: 19 MG
- Drainage Area: 3,256 Acres
- Connected to 26<sup>th</sup> Ward WWTP
- **Disinfection Pilot Study**
  - Aug 2016 to Jan 2018
  - Assess feasibility of disinfecting CSOs and impact on chlorine byproducts



# Paerdegat Basin CSO Facility

- In-Service since 2011
- Construction Cost = \$397 Million
- CSO Storage Capacity: 50 MG
- CSO retained in underground tanks until weather subsides then pumped to Coney Island WWTP
- Significantly improved water quality in Paerdegat Basin





➤ Floatable Controls currently implemented at:

- Bergen Basin
- Thurston Basin
- Hendrix Creek



- **Green Infrastructure (GI)** collects stormwater runoff from impervious surfaces, such as streets and roofs, reducing flow to sewers
- **\$1.5 billion** committed for GI Citywide to manage 1" of stormwater runoff from 10% of impervious combined sewered areas by 2030
- DEP will meet this goal through:
  - Area-Wide Contracts
  - Public Property Retrofits
  - Grant Program for Private Property Owners
  - Stringent Detention Rule for New Development



**Rain Gardens**



**Permeable Pavers**

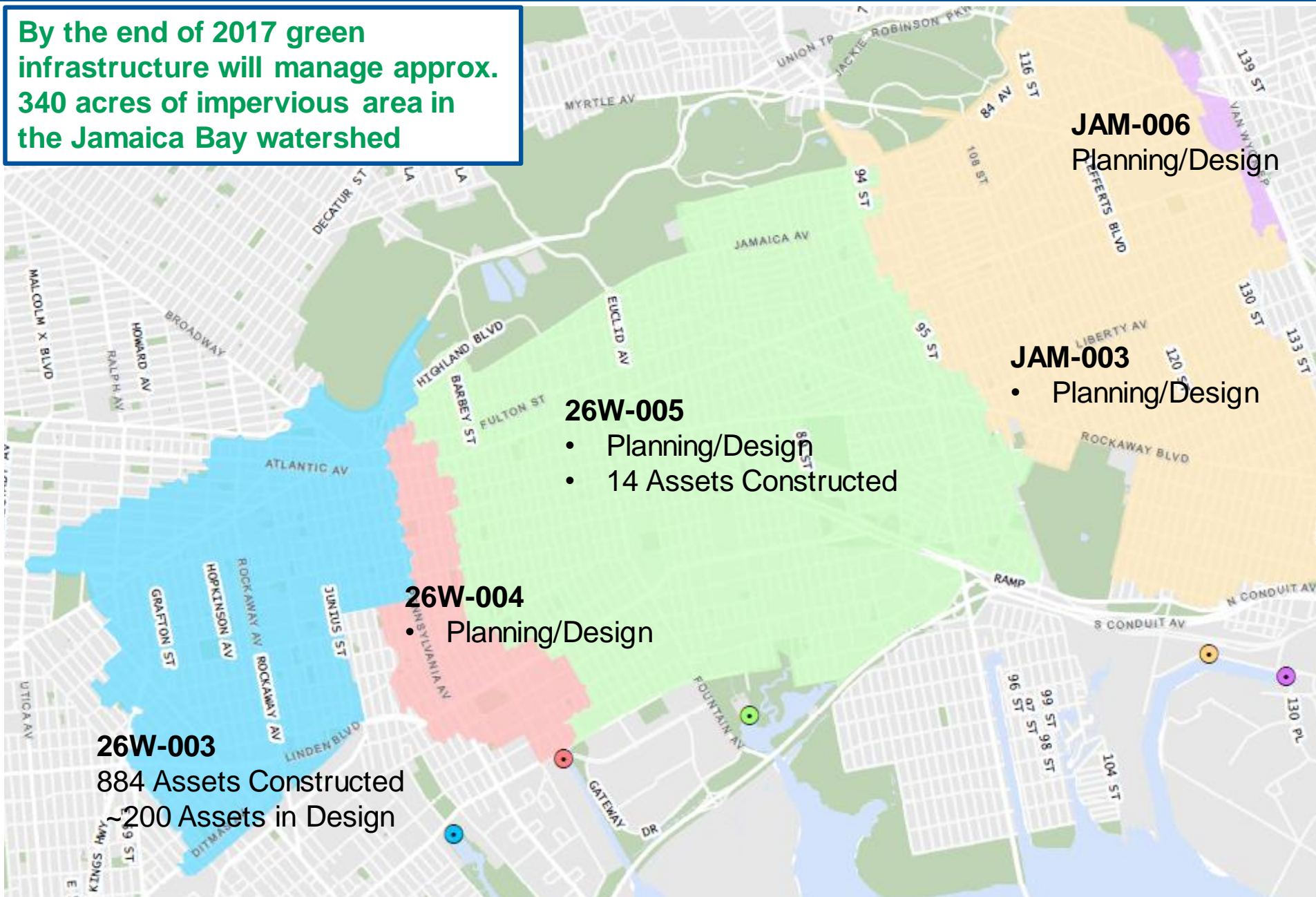


**Green Roofs**



# Green Infrastructure Projects in Jamaica Bay

By the end of 2017 green infrastructure will manage approx. 340 acres of impervious area in the Jamaica Bay watershed



# Public Property Retrofits in Jamaica Bay



**JHS 218 – Before**



**JHS 218 – After**

Status	Parks and Recreation	Department of Education	NYC Housing Authority	Grand Total
Potential	8	15	15	38
Preliminary	11	7	2	20
Contract Plans	1	0	0	1
Constructed	2	2	1	5
<b>Grand Total</b>	<b>22</b>	<b>24</b>	<b>18</b>	<b>64</b>



➤ **Green Infrastructure Grant Program:**

DEP provides funding for the design and construction costs of green infrastructure on private property in combined sewer areas of the City.

➤ **Green Roof Tax Abatement:**

The City provides a one-year property tax abatement for private properties that install green roofs. The abatement value is \$5.23 per square foot (up to the lesser of \$200,000 or the building's tax liability) and is available through March 15, 2018.

➤ **New Private Incentive Program:**

DEP is currently developing a new private property green infrastructure retrofit initiative to augment its current efforts on stormwater management on private property. There will be an RFI released on 9/19 in which the Agency is seeking ideas on innovative program management structures for this new initiative.

➤ **2012 Stormwater Rule:**

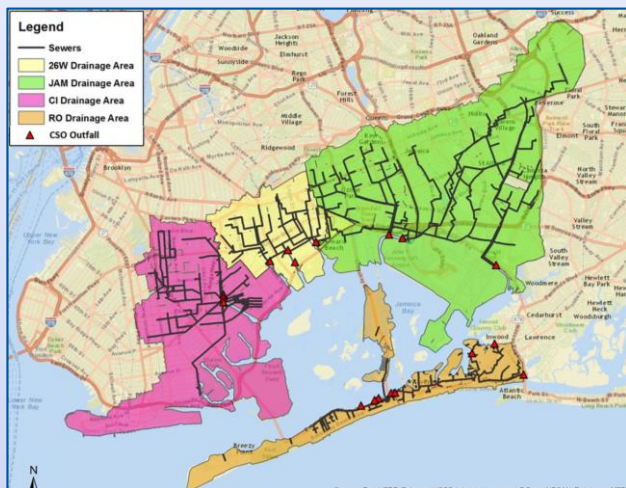
In 2012, DEP amended the allowable flow rate of stormwater to the City's combined sewer system for new and existing development. Site Connection Proposals may include green infrastructure technologies to meet the new allowable rate.

**Questions?**

# **LTCP Modeling and Alternatives Development Process**

Keith Mahoney, P.E.  
Director  
DEP

# Integrated Modeling Framework



**FRESHWATER INFLOW & POLLUTANT LOADS**

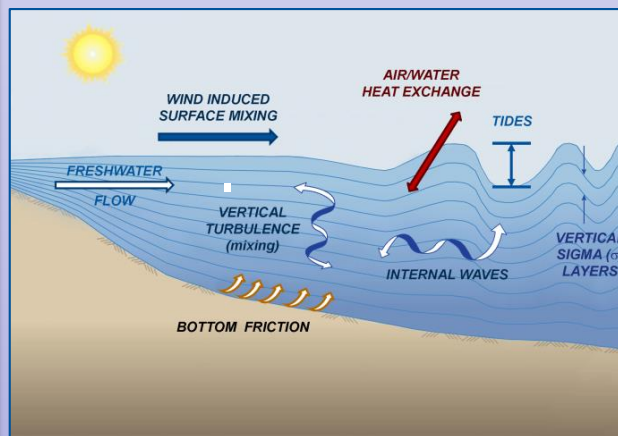


**CIRCULATION & TRANSPORT**

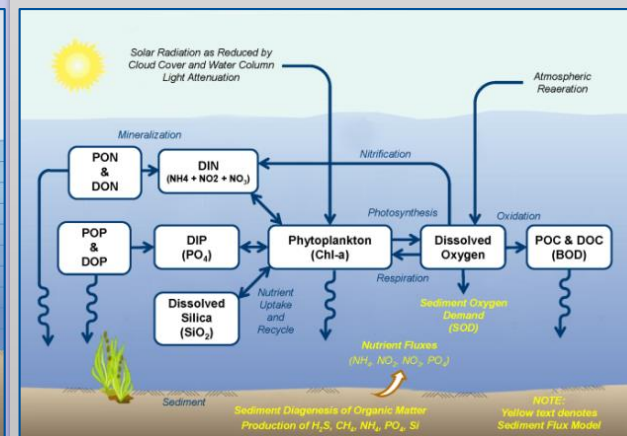
**CHEMICAL & BIOLOGICAL REACTIONS**



**WATERSHED  
MODEL**



**HYDRODYNAMIC  
MODEL**

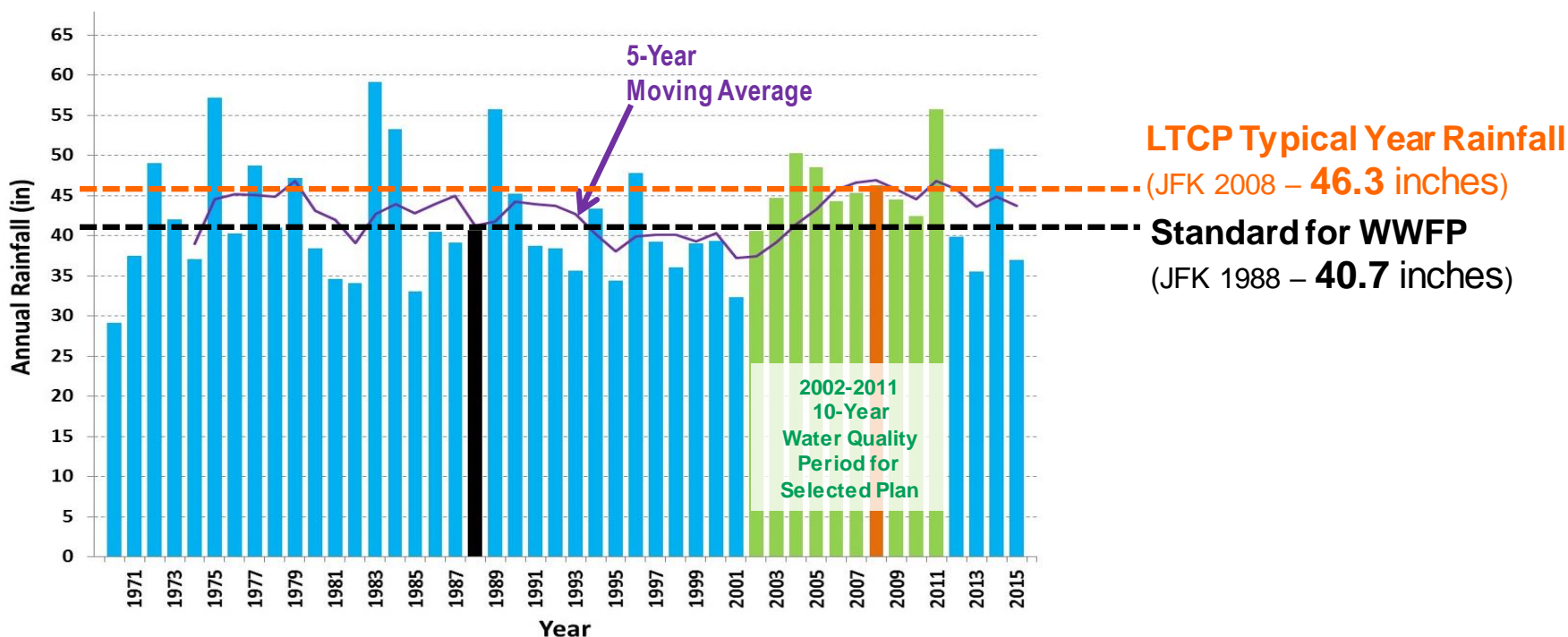


**WATER QUALITY  
MODEL**



# Model Inputs and Assumptions

- **Landside Model** calibrated based on flow monitoring data, gauge adjusted radar rainfall data, and satellite flyover impervious data
- **Water Quality Model** calibrated with Harbor Survey and LTCP sampling data
- Calibrated modeling inputs and assumptions include:
  - Committed CSO and BNR projects
  - 2040 sanitary flows and loads
  - JFK 2008 “Typical Year Rainfall” for Alternative Analysis
  - JFK 10-yr data (2001 to 2011) for baseline and selected alternatives



## 1. Bacteria Source Component Analysis

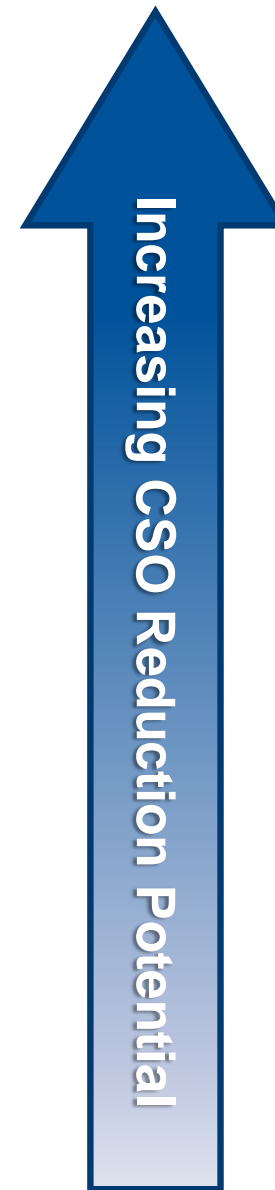
- CSO, stormwater and direct drainage

## 2. Gap Analysis for Water Quality Standard (WQS) Attainment

- Calculate bacteria and dissolved oxygen for:
  - Baseline Conditions
  - 100% CSO Control Conditions

## 3. Assess Levels of CSO Control Necessary to Achieve WQS

## 4. Identify Technologies to Cost-Effectively Achieve the Required Level of CSO Control



### *Sample Technologies:*

- **Storage**
- **Treatment**
- **System Optimization**
- **Source Control**

# CSO Mitigation Toolbox

INCREASING COMPLEXITY 

INCREASING COST 

<b>Source Control</b>	<b>Additional Green Infrastructure</b>		<b>High Level Sewer Separation</b>	
<b>System Optimization</b>	Fixed Weir	<b>Bending Weirs / Control Gates</b>	Pump Station Optimization or Expansion	<b>Parallel Interceptor / Sewer</b>
<b>CSO Relocation</b>	Segregate CSO and Storm Outfalls	<b>Flow Tipping to Other Watersheds</b>	Diversion Sewer to Existing CSO Facilities	Diversion Sewer to WWTP
<b>Water Quality / Ecological Enhancement</b>	<b>Floatables Control</b>	Environmental Dredging	<b>Mechanical Aeration</b>	Flushing Tunnel
<b>Treatment</b>	Outfall Disinfection	Retention Treatment Basin (RTB)	High Rate Clarification (HRC)	WWTP Expansion
<b>Storage</b>	<b>In-System</b>	Shaft	<b>Tank</b>	Tunnel

 Completed or underway per Waterbody / Watershed Facility Plan (WWFP)



**Questions?**

# Next Steps

Mikelle Adgate  
Director of Stormwater Outreach  
DEP

- Jamaica Bay LTCP Public Meeting #2, Spring 2017
  - LTCP Submittal to NYSDEC in June 2017
  
- Public Comments will be accepted through **Oct. 31<sup>st</sup>, 2016**
  - There will be subsequent comment periods following the alternative and final plan review meetings.
  
- Comments can be submitted to:
  - New York City DEP at: [ltcp@dep.nyc.gov](mailto:ltcp@dep.nyc.gov)



- Visit the informational tables tonight for handouts and poster boards with detailed information
  
- Go to [www.nyc.gov/dep/ltcp](http://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
  - NYC Waterbody Advisory Program
  - Upcoming meeting announcements
  - Other LTCP updates