Albany Pool Combined Sewer System
Long-Term Control Plan Development

Public Information Meeting
November 10, 2009

Joint Venture Team
albany pool
CDM MALCOLM PIRNIE CHA

Albany Cohoes Green Island Rensselaer Troy Watervliet

Agenda

- Introductions – *Rocky Ferraro*, *CDRPC*
  - Public Participation Plan Overview
- Long-Term Control Plan Development – *APJVT*
  - Regulatory Activities Recap
  - Receiving Waters Conditions
  - Combined Sewer System (CSS) Flow Monitoring
  - CSS Modeling and Baseline Results
  - Moving Forward / Next Steps
- Questions and Comments

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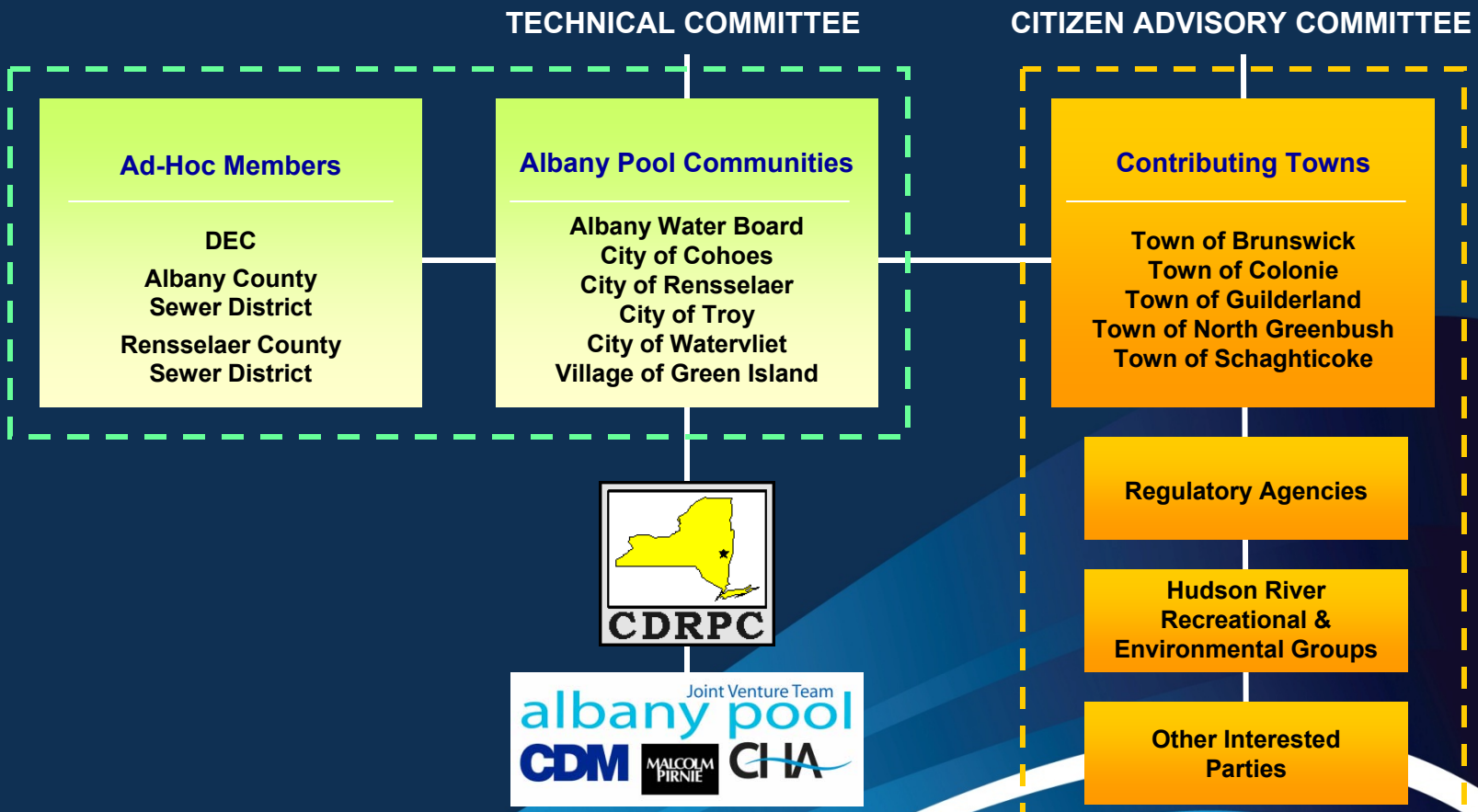
Project Organization Framework



Public Participation Plan

- Target Audiences
  - Albany Pool Communities' Ratepayers/Taxpayers and Residents
  - Elected and Appointed Leadership of Albany Pool Communities
  - Environmental Groups and Recreational Users Associated with the Hudson River
  - Leadership and Residents of Communities Contributing Flows to the Albany Pool CSS
  - Riverfront Business Operators

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Public Participation Plan

- Goals and Objectives
  - Provide Albany Pool Municipal Officials with Public Input
  - Establish Early Communication with the Public
  - Encourage Dialogue Between NYSDEC and the Public
  - Solicit Public Concerns During LTCP Development
  - Make Technical Aspects of the Project Clear
  - Build Awareness of Issues Associated with CSOs

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Previous Regulatory Activities

- Combined Sewer System Modeling Workplan - September 2007 (Approved)
- Receiving Water Quality Sampling Plan - October 2007, Revised April 2008 (Approved)
- Combined Sewer System Monitoring Plan - February 2008, Revised April 2008 (Approved)

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Recent Regulatory Activities

- Receiving Waters Condition Assessment – February 2009 (Approved)
- Request for Schedule Extension – August 2009 (Approval Pending)
  - Additional CSS Monitoring Locations
  - Additional Tributary Sampling (2009)
  - Expanded DO Modeling
- Combined Sewer System Baseline Modeling Report – Submitted October 2009 (Approval Pending)

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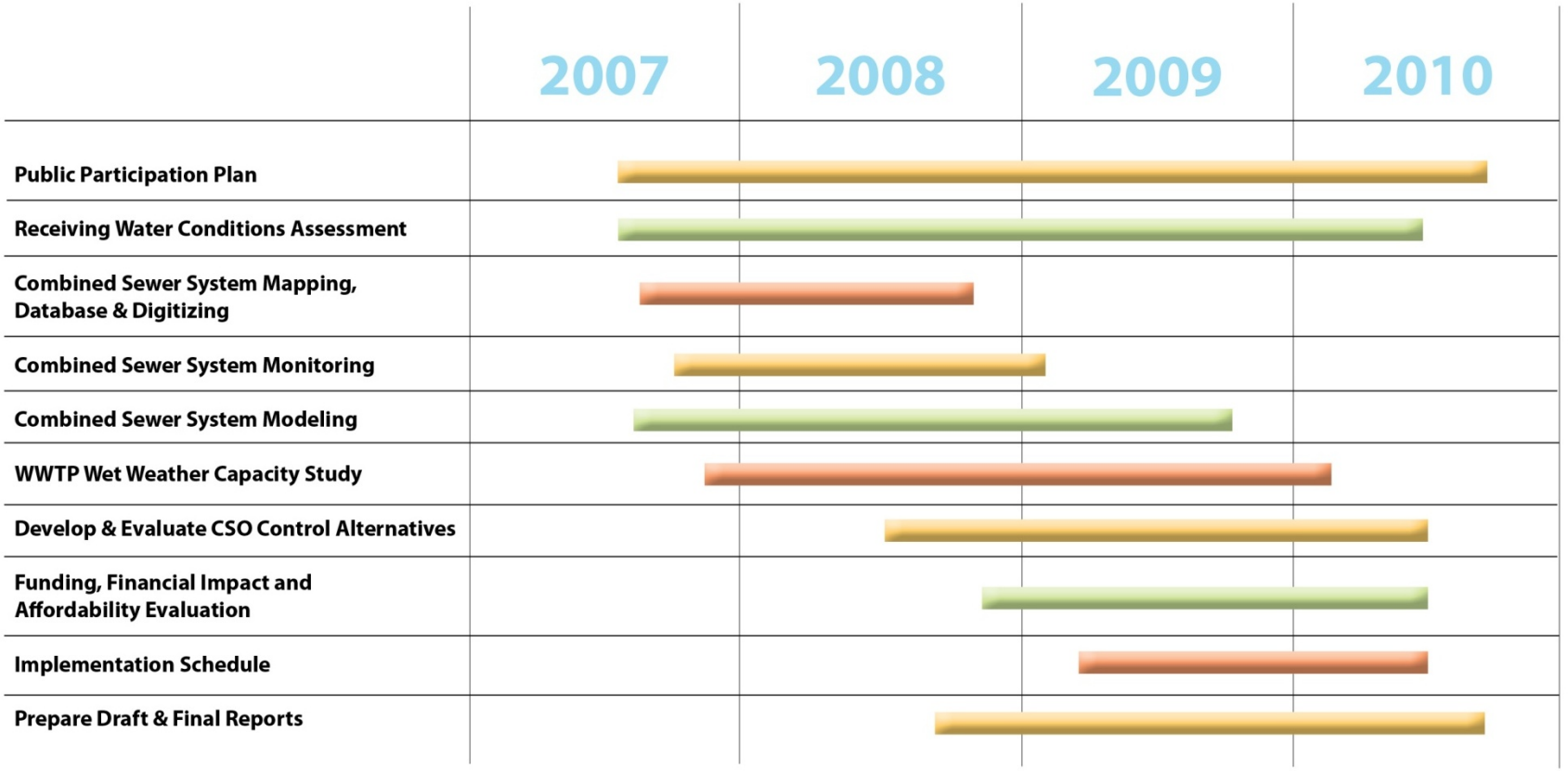

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Overview of LTCP Development Process

PUBLIC PARTICIPATION

CSS CHARACTERIZATION

Mapping, Database & Digitizing

Receiving Waters Condition Assessment

CSS Monitoring & Sampling

CSS Modeling

WWTP Wet-Weather Capacity Study

LTCP DEVELOPMENT

Develop & Evaluate CSO Control Alternatives

Funding, Financial Impact & Affordability

Implementation Schedule

Prepare LTCP Report

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Project Update…

Receiving Waters Conditions Assessment

- Water Quality Sampling Recap
- Dry/Wet Weather Data Review
- Summarize Major Findings

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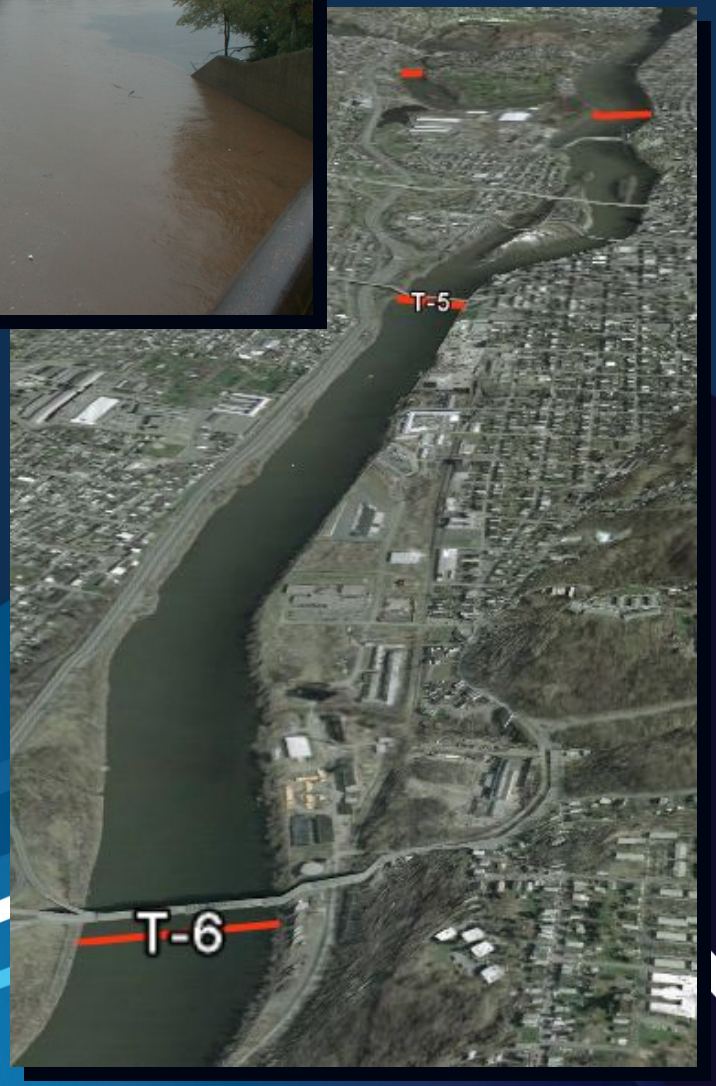
Receiving Waters Conditions Assessment

- Most comprehensive Albany Pool Sampling Program to date
  - Dry Weather
  - Wet Weather
- Approximately $1M program
  - $350K for analytical services
  - $280K for WBE field assistance



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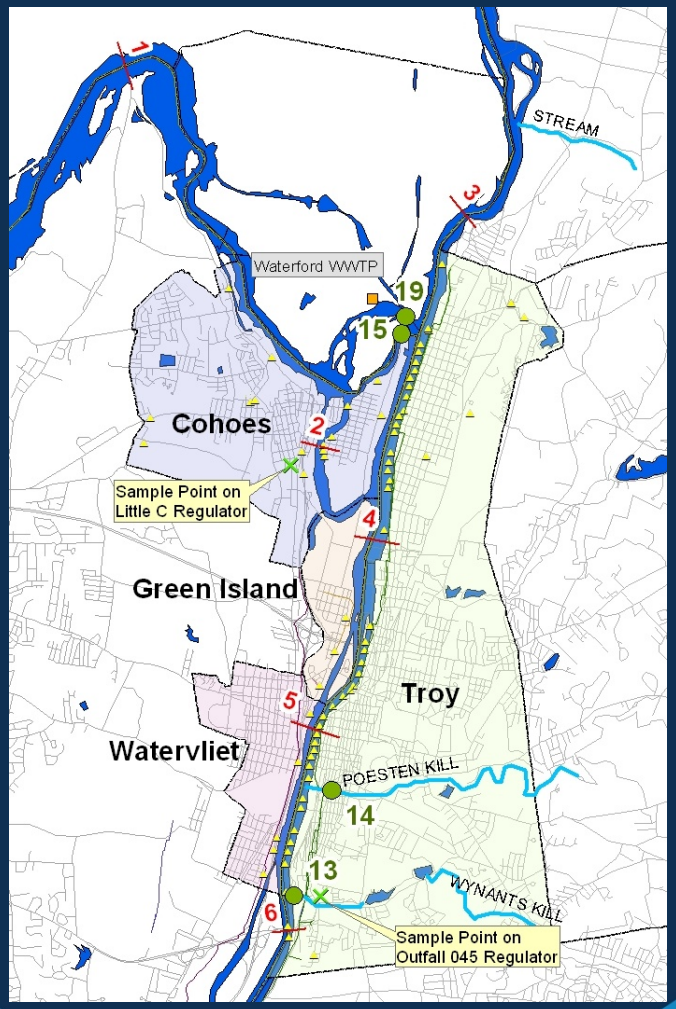
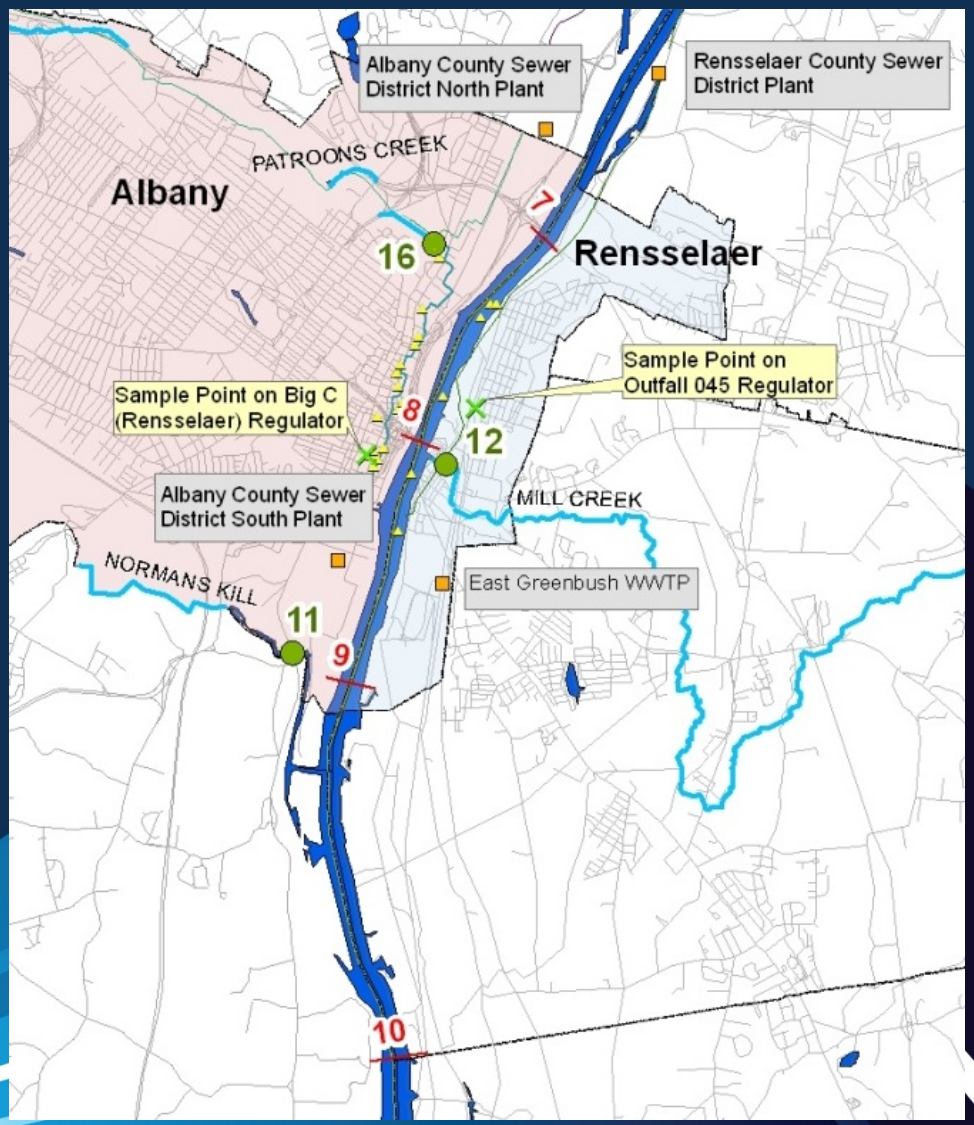
Sampling Locations





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Dry Weather Sampling

- 15 events preceded by 72 hours of dry weather
- 1 sample circuit of 44 locations per event
  - 10 river transects (30 locations)
  - 7 tributaries
  - 2 potential beach sites
  - 5 treatment plants
- Fecal Coliform, E. Coli, pH, Conductivity, Temperature, Dissolved Oxygen

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Wet Weather Sampling

- 4 events preceded by 72 hours dry weather
- Community-wide storm event
- Target rainfall 0.25 to 0.75 inches
- Target duration 3 to 9 hours
- CSS sampling in:
  - Albany – Big C
  - Troy – Cross Street
  - Cohoes – Little C/Saratoga Street
  - Rensselaer - Partition Street

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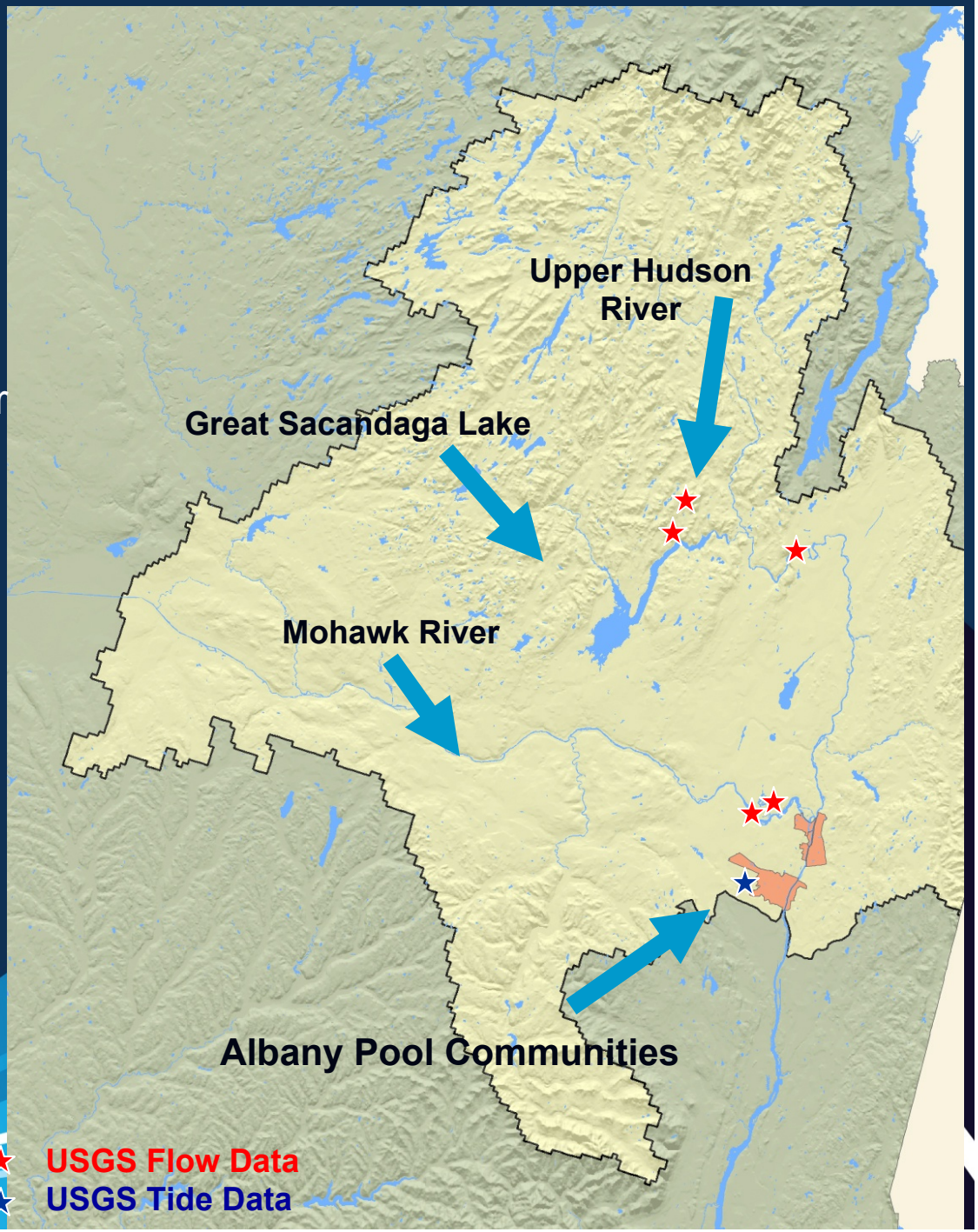
Hydrodynamics of "Albany Pool"

- Watershed
  - 8500 square miles
  - 3500 miles^2 – Mohawk River
- Hydropower
  - 16 Upper Hudson Facilities
  - EJ West at Sacandaga
- Tidal
  - Below Federal Dam
  - 6 foot average range



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Bacteria Standards

- NYS Fecal Coliform Standard for Class A, B and C Waters
  - Geometric Mean of 5 samples < 200 cfu / 100 ml
- USEPA Proposed Standard for E. Coli
  - Geometric Mean of 5 samples < 126 cfu / 100 ml
  - Single Sample Maximum < 235 cfu / 100 ml for designated beach area

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Geometric Mean

$$\text{Geo mean} = \sqrt[5]{(y_1 * y_2 * y_3 * y_4 * y_5)}$$

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Dry Weather Summary

- Fecal Coliform and *E. Coli* exhibit similar trends
- Rivers well mixed laterally
- Hudson and Mohawk Rivers generally in compliance with fecal coliform standard at upstream limits of study
- Most transects meet fecal coliform standards
- Significant bacteria counts in Patroons Creek

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Dry Weather Summary, continued

- Wynants Kill and Poesten Kill generally exceed fecal coliform compliance limits
- Normans Kill and Mill Creek exceed fecal coliform standard in last period
- Apparent accumulation of bacteria through Albany/Rensselaer reach
- Beaches compliant with fecal coliform standards

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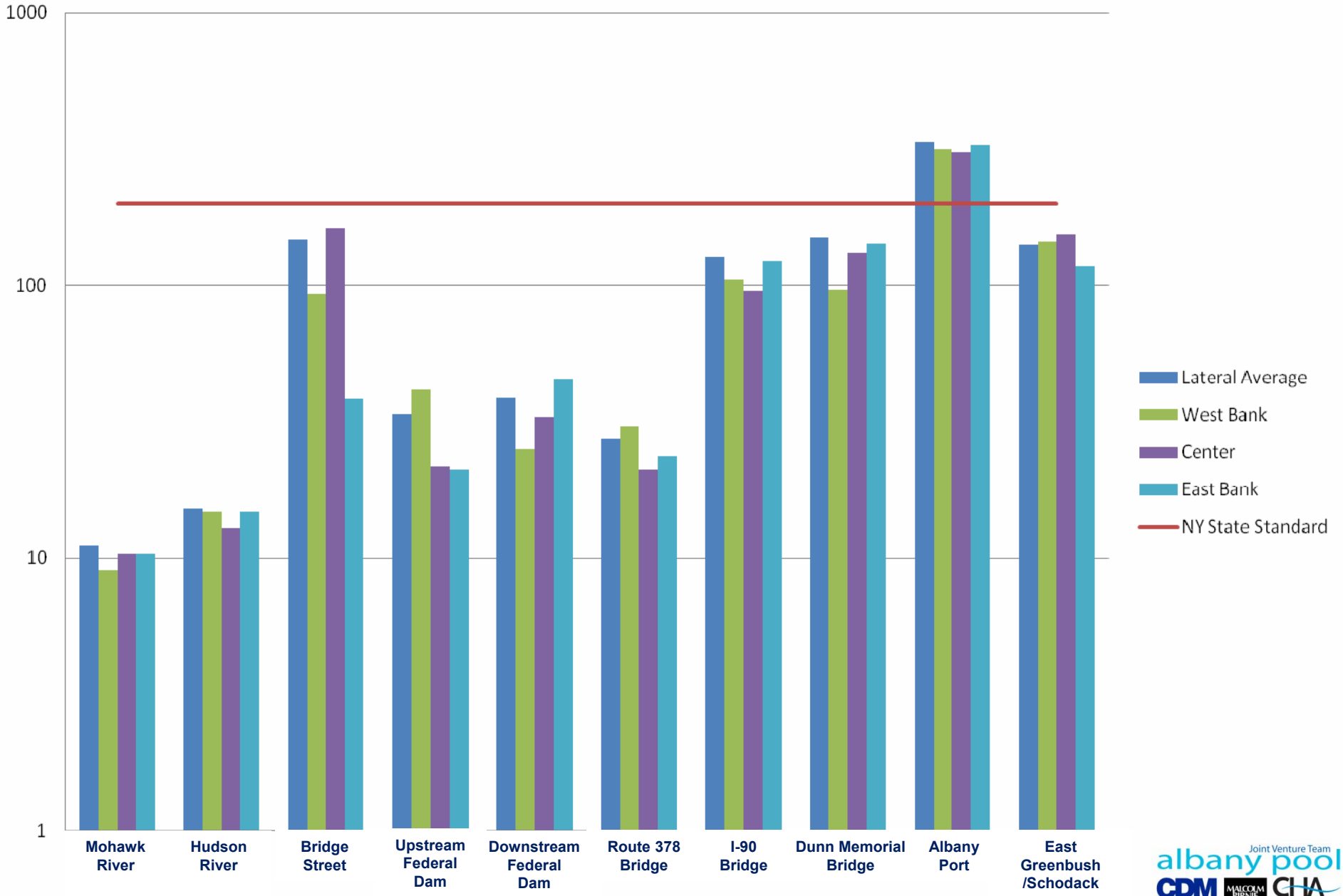
River Transects - Fecal Coliform

First 30 day Period (5/13/2008 - 5/27/2008)



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River Transects - E.Coli

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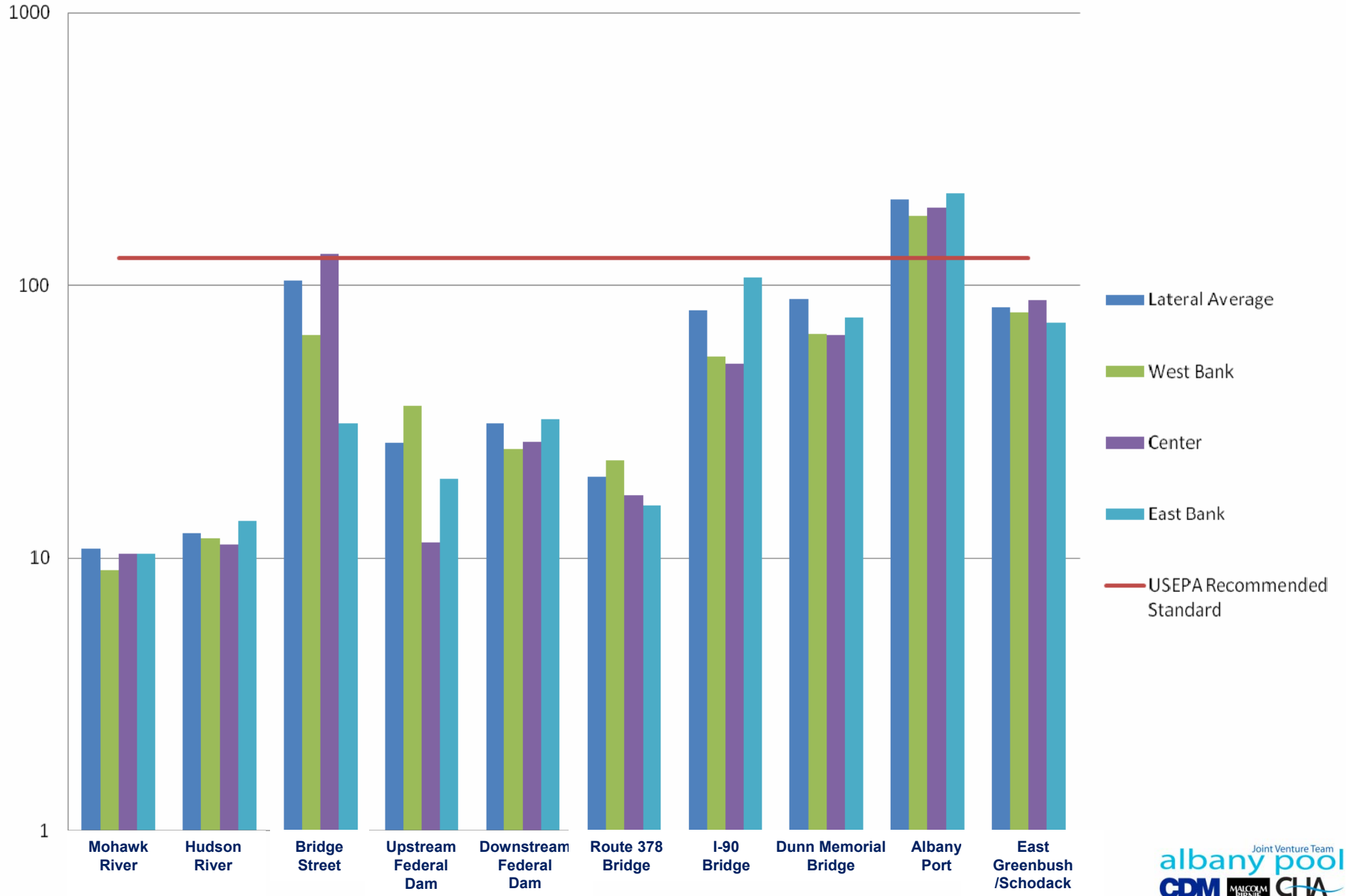

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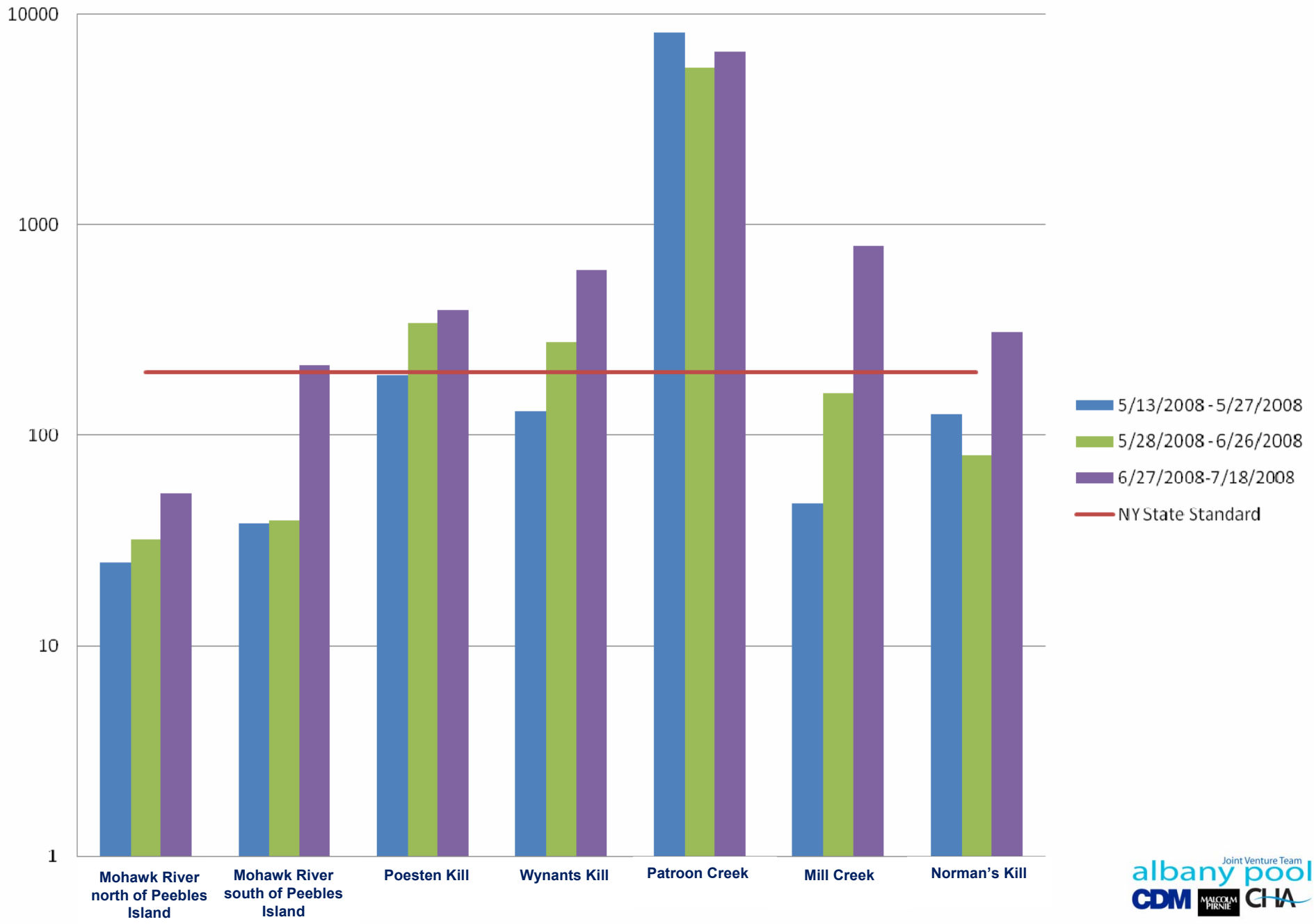
Tributaries-Fecal Coliform



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Dry-Weather Implications for LTCP

- River Well Mixed
  - Defined modeling approach for fecal coliform loading
    - WWTP disinfection
    - Patroons Creek, Wynants Kill and Poesten Kill impact
- Beaches compliant with fecal coliform standards during dry weather
- Additional tributary sampling summer 2009

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Wet Weather Summary

- Fecal Coliform and *E. Coli* exhibit similar trends
- River well mixed laterally
- Hudson and Mohawk Rivers generally compliant with fecal coliform standards at upstream limits of study
- Larger storms produce greater fecal counts

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Wet Weather Summary, Continued

- Dunn Memorial Bridge and Port of Albany transects exceed fecal coliform standard for all events
- Tributaries generally exceed fecal coliform limits
- Apparent accumulation through Albany / Rensselaer reach
- Beaches compliant with fecal coliform geometric mean standards

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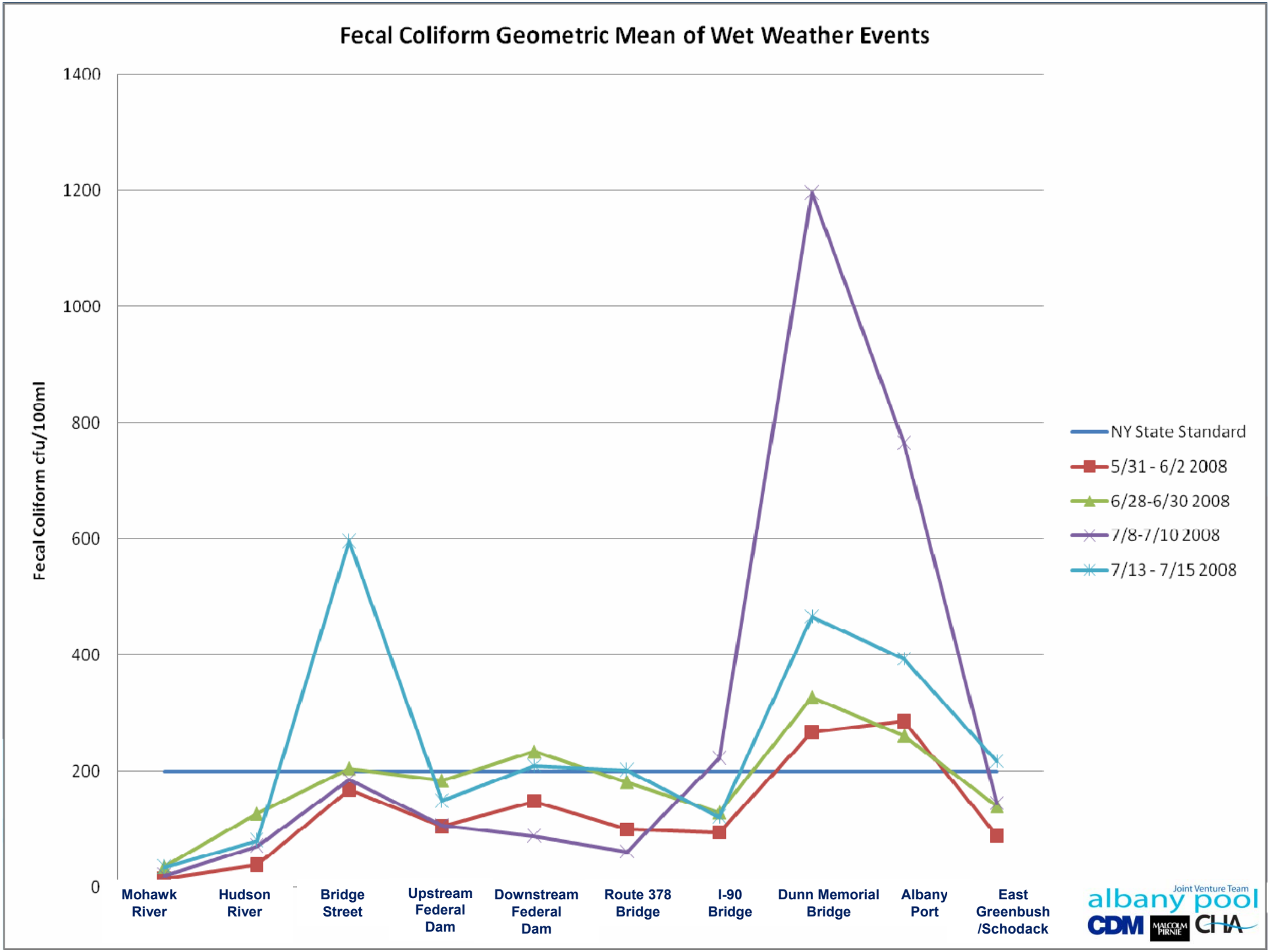
Fecal Coliform Geometric Mean of Wet Weather Events
Fecal Coliform cfu/100ml
1400
1200
1000
800
600
400
200
0
Mohawk River
Hudson River
Bridge Street
Upstream Federal Dam
Downstream Federal Dam
Route 378 Bridge
I-90 Bridge
Dunn Memorial Bridge
Albany Port
East Greenbush /Schodack
NY State Standard
5/31 - 6/2 2008
6/28-6/30 2008
7/8-7/10 2008
7/13 - 7/15 2008
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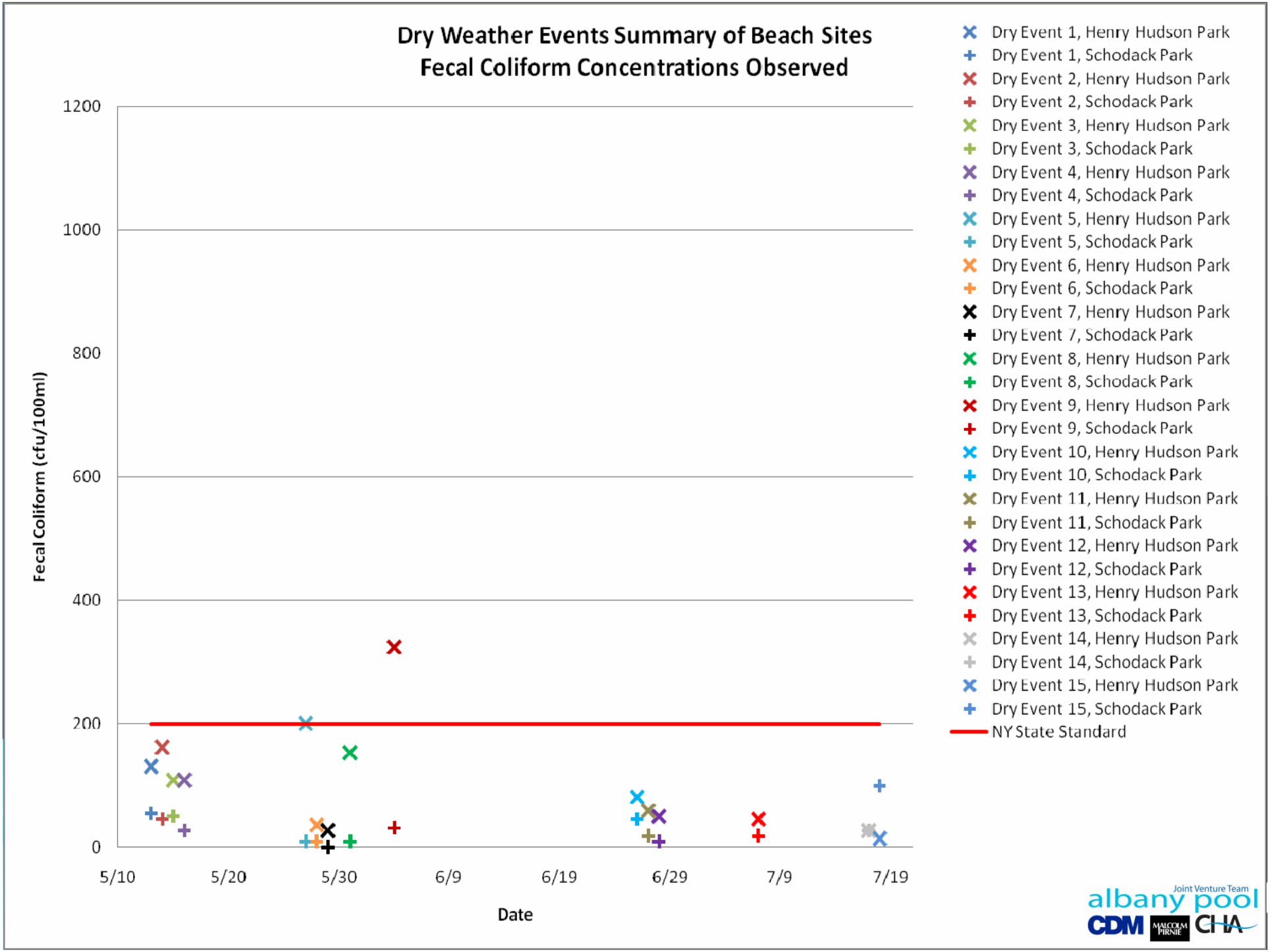
Dry Weather Events Summary of Beach Sites
Fecal Coliform Concentrations Observed
Fecal Coliform (cfu/100ml)
1200
1000
800
600
400
200
0
5/10
5/20
5/30
6/9
6/19
6/29
7/9
7/19
Date
Dry Event 1, Henry Hudson Park
Dry Event 1, Schodack Park
Dry Event 2, Henry Hudson Park
Dry Event 2, Schodack Park
Dry Event 3, Henry Hudson Park
Dry Event 3, Schodack Park
Dry Event 4, Henry Hudson Park
Dry Event 4, Schodack Park
Dry Event 5, Henry Hudson Park
Dry Event 5, Schodack Park
Dry Event 6, Henry Hudson Park
Dry Event 6, Schodack Park
Dry Event 7, Henry Hudson Park
Dry Event 7, Schodack Park
Dry Event 8, Henry Hudson Park
Dry Event 8, Schodack Park
Dry Event 9, Henry Hudson Park
Dry Event 9, Schodack Park
Dry Event 10, Henry Hudson Park
Dry Event 10, Schodack Park
Dry Event 11, Henry Hudson Park
Dry Event 11, Schodack Park
Dry Event 12, Henry Hudson Park
Dry Event 12, Schodack Park
Dry Event 13, Henry Hudson Park
Dry Event 13, Schodack Park
Dry Event 14, Henry Hudson Park
Dry Event 14, Schodack Park
Dry Event 15, Henry Hudson Park
Dry Event 15, Schodack Park
NY State Standard
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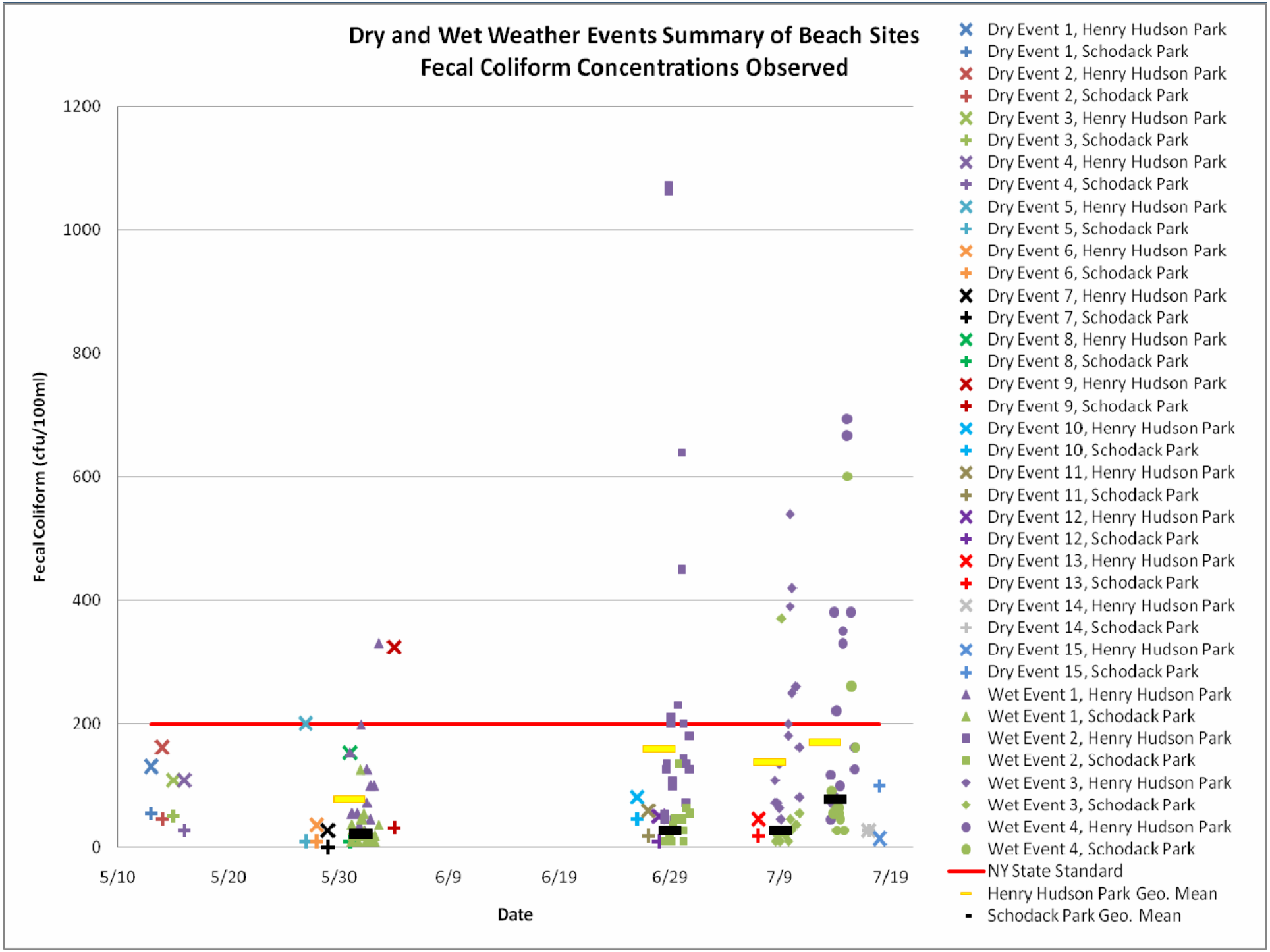
Dry and Wet Weather Events Summary of Beach Sites
Fecal Coliform Concentrations Observed
Fecal Coliform (cfu/100ml)
1200
1000
800
600
400
200
0
5/10
5/20
5/30
6/9
6/19
6/29
7/9
7/19
Date
Dry Event 1, Henry Hudson Park
Dry Event 1, Schodack Park
Dry Event 2, Henry Hudson Park
Dry Event 2, Schodack Park
Dry Event 3, Henry Hudson Park
Dry Event 3, Schodack Park
Dry Event 4, Henry Hudson Park
Dry Event 4, Schodack Park
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Dry Event 6, Henry Hudson Park
Dry Event 6, Schodack Park
Dry Event 7, Henry Hudson Park
Dry Event 7, Schodack Park
Dry Event 8, Henry Hudson Park
Dry Event 8, Schodack Park
Dry Event 9, Henry Hudson Park
Dry Event 9, Schodack Park
Dry Event 10, Henry Hudson Park
Dry Event 10, Schodack Park
Dry Event 11, Henry Hudson Park
Dry Event 11, Schodack Park
Dry Event 12, Henry Hudson Park
Dry Event 12, Schodack Park
Dry Event 13, Henry Hudson Park
Dry Event 13, Schodack Park
Dry Event 14, Henry Hudson Park
Dry Event 14, Schodack Park
Dry Event 15, Henry Hudson Park
Dry Event 15, Schodack Park
Wet Event 1, Henry Hudson Park
Wet Event 1, Schodack Park
Wet Event 2, Henry Hudson Park
Wet Event 2, Schodack Park
Wet Event 3, Henry Hudson Park
Wet Event 3, Schodack Park
Wet Event 4, Henry Hudson Park
Wet Event 4, Schodack Park
NY State Standard
Henry Hudson Park Geo. Mean
Schodack Park Geo. Mean

Field Measured Parameters

- Hand held probe used to measure
  - Temperature
  - pH
  - Conductivity
  - Dissolved Oxygen

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Other Conclusions

- Temperature, Conductivity, pH all in typical ranges
- Unseasonably low Hudson River spring dry weather DO
- Periodic low wet weather DO values at potential beach sites and tributaries

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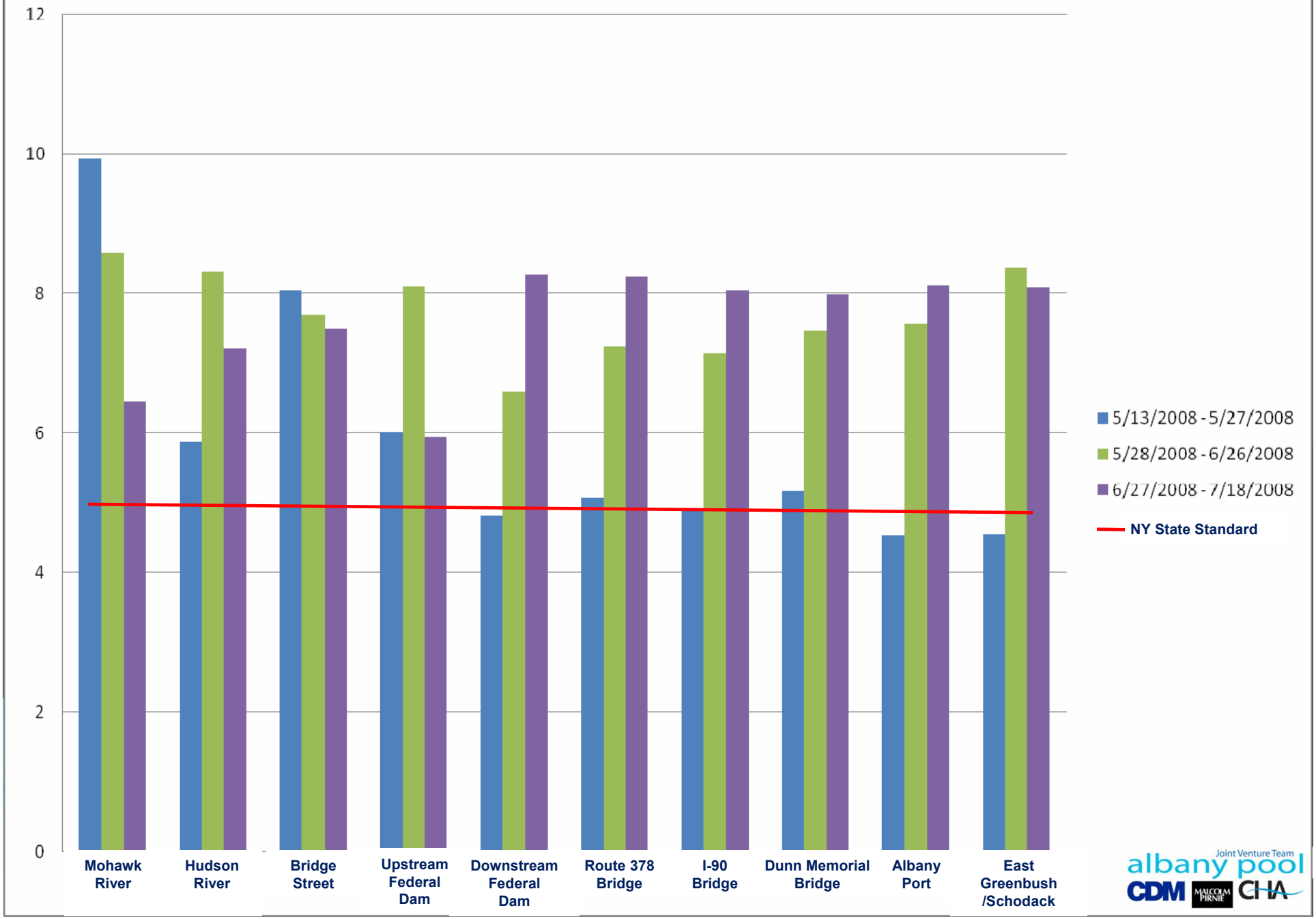
Dry Weather River Transects – Dissolved Oxygen (mg/l)



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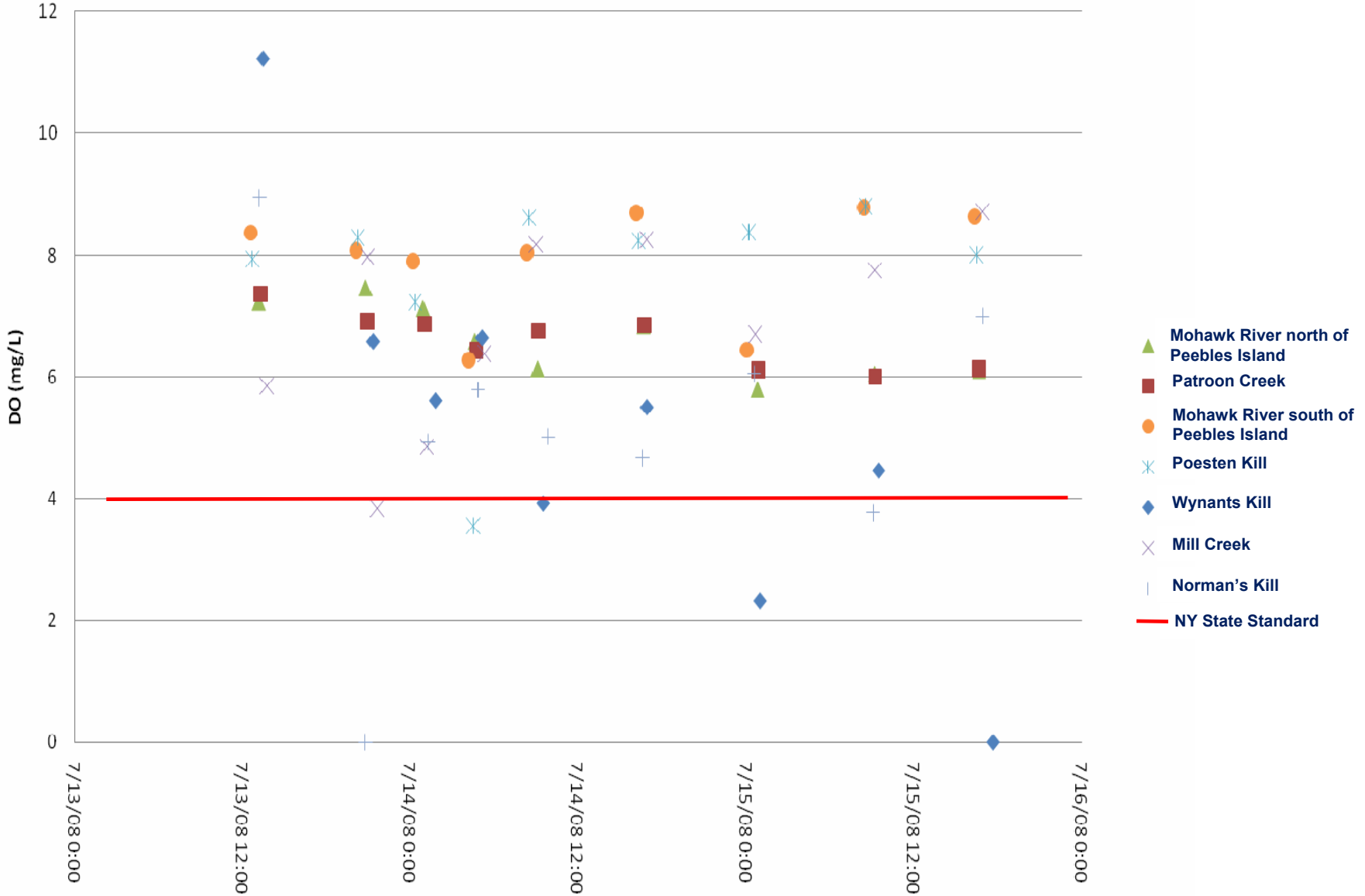
Tributary Wet Weather DO Event 4



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CSO Characterization

- CSOs Sampled for:
  - Fecal Coliform
  - *E. Coli*
  - Total Suspended Solids (TSS)
  - Biological Oxygen Demand (BOD)
  - Ammonia Nitrogen
  - Total Kjeldahl Nitrogen (TKN)
  - Total Phosphorous

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CSO Sampling Frequency

- 15 samples planned
- CSOs sampled at initiation of overflow
- Sampled at 15, 30, 45, 60, 90 minutes
- Then at 2, 4, 6, 8, 12, 16, 24, 32, and 48 hours

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CSO Conclusions

- CSO constituents generally consistent among sites and typical for CSO communities
- Concentrations diminish through overflow event

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Wet-Weather Implications on LTCP Program

- River Well Mixed
  - Defined modeling approach for fecal coliform loading
    - WWTP disinfection
    - Patroons Creek , Wynants Kill and Poesten Kill impact
- Despite significant dry and wet weather loading, areas where standards are consistently exceeded are spatially small
- Beaches compliant with geometric mean fecal coliform standard
- Dry weather improvements could reduce CSO control requirements

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Combined Sewer System Monitoring

- DEC Approved Plan
  - 25 flow meters and 4 rain gages
  - May – August 2008 metering
  - September 2008 Deliverable
- Implemented Plan
  - 45 flow meters and 4 rain gages
  - Additional $176,000 committed
  - June 4 – September 6, 2008
  - Completed November 2008

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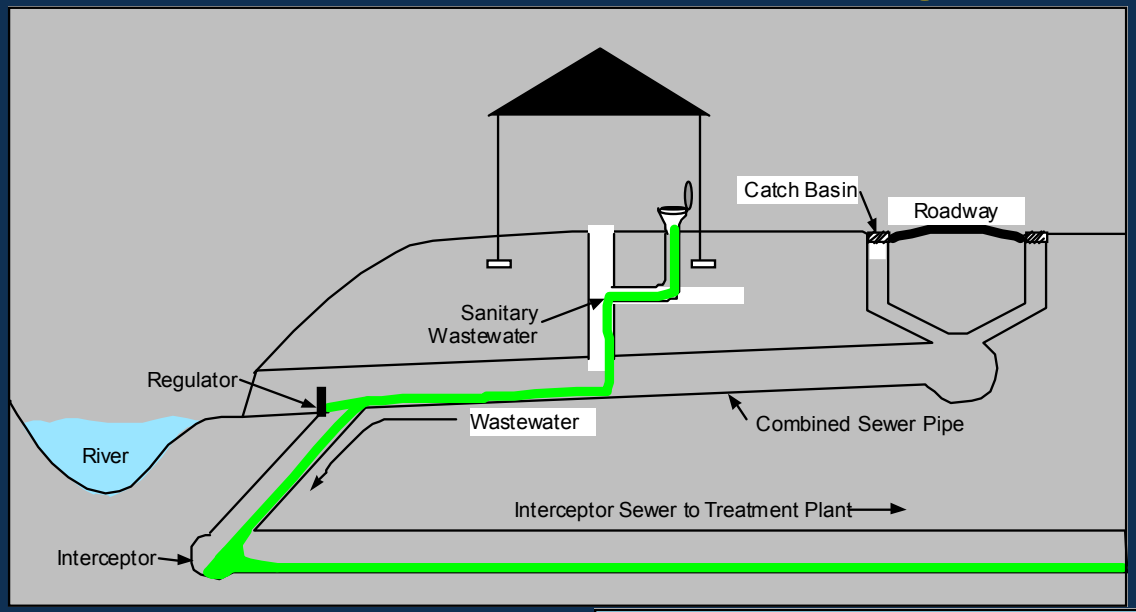
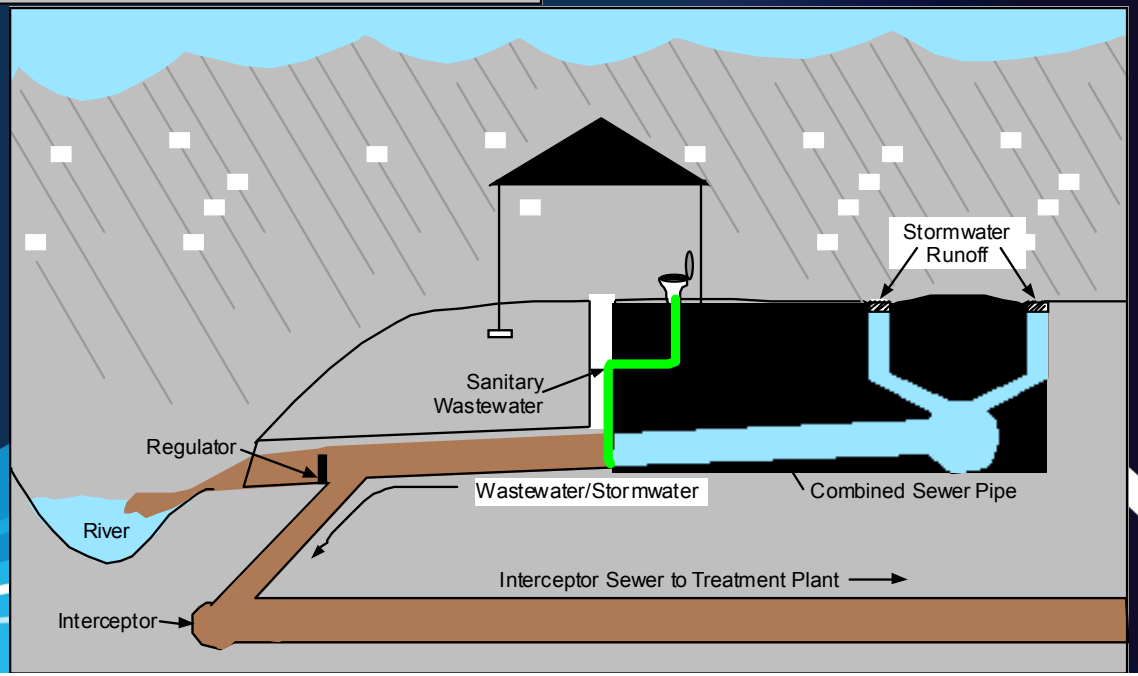
Combined Sewer System Modeling





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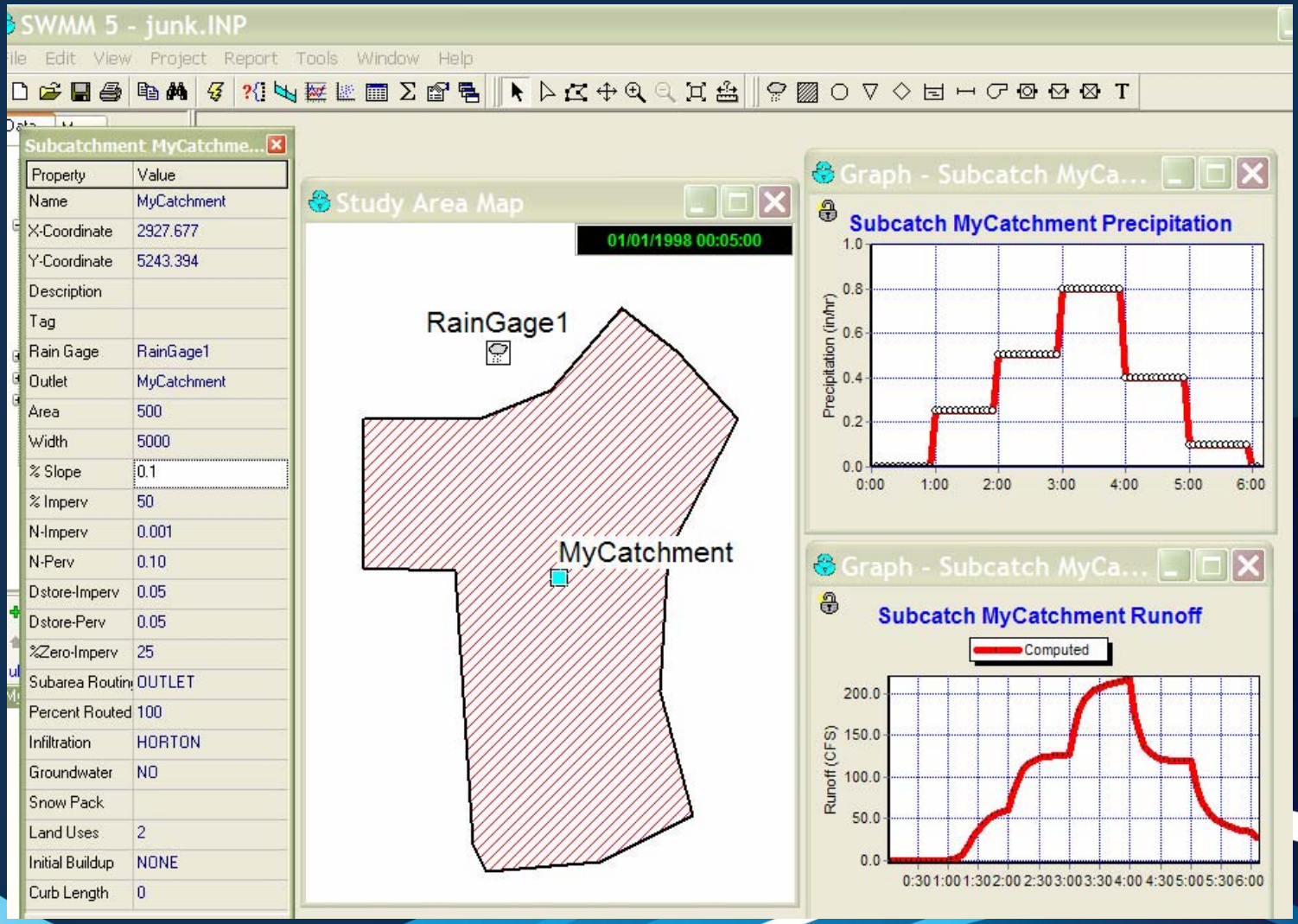
SWMM Hydrologic Modeling



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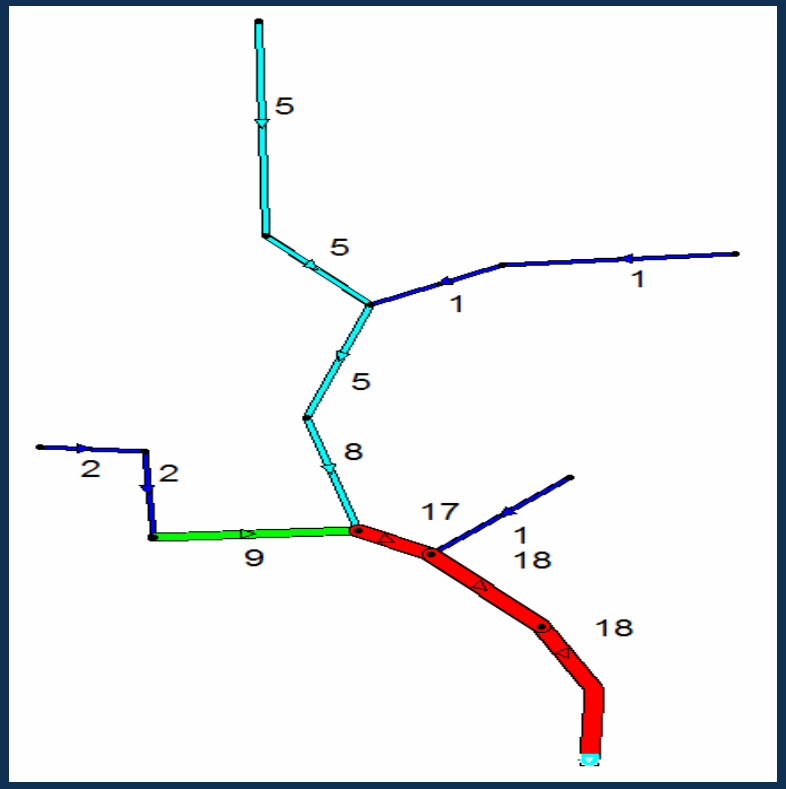
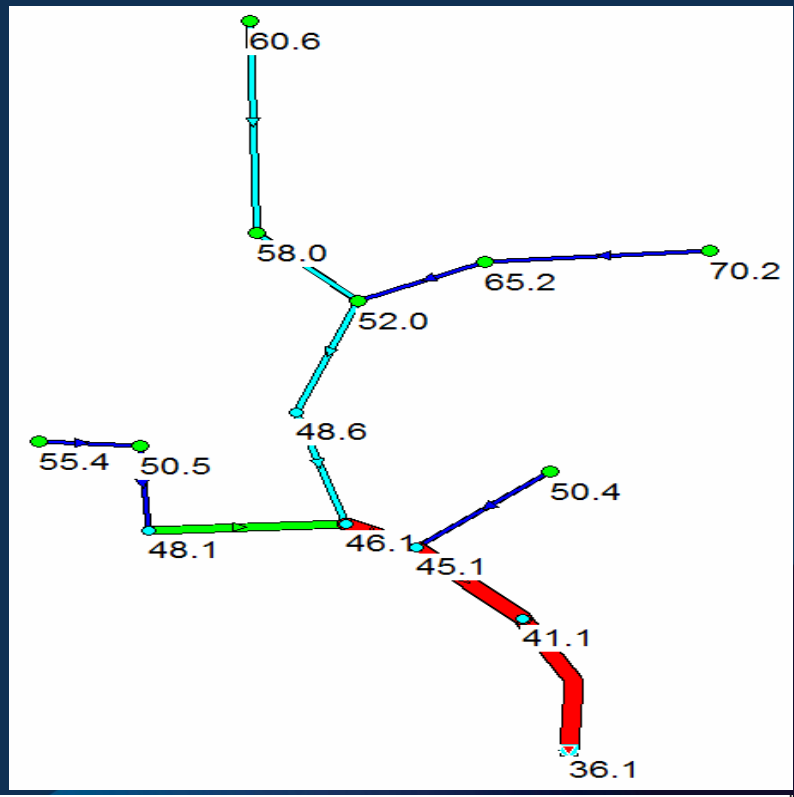
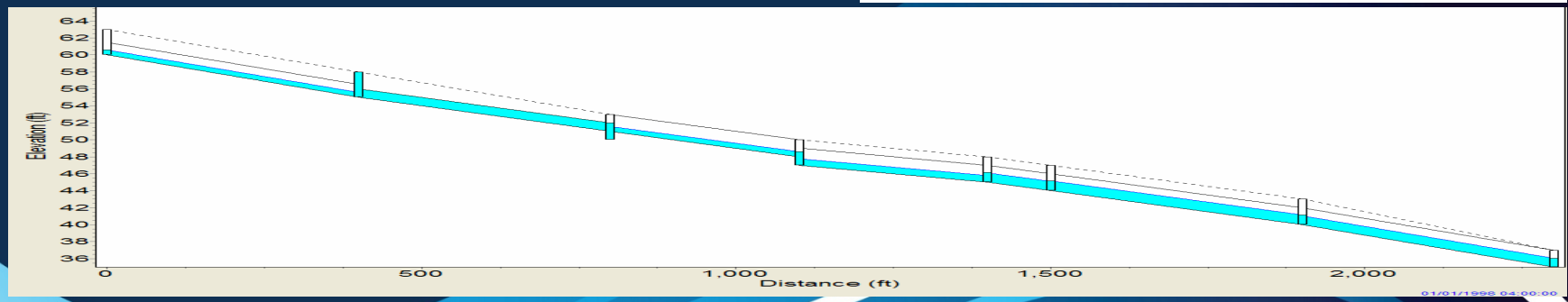
SWMM Hydraulic Modeling







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Model Components

- Pipe hydraulics
  - All CSO regulators
  - All interceptor sewers
  - Principal trunk sewers
- Dry weather flow
  - Sanitary wastewater
  - Base infiltration
- Runoff hydrology
  - Combined and direct drainage
  - Sanitary sewer infiltration/inflow

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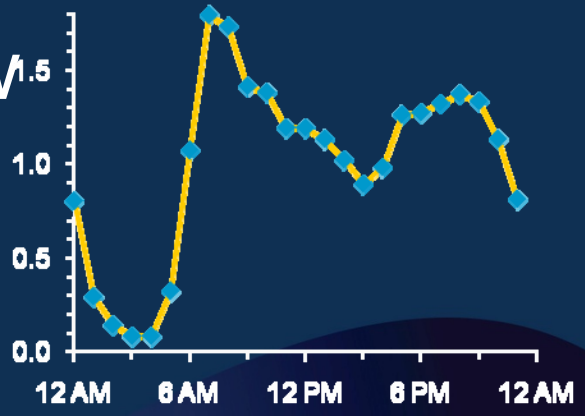
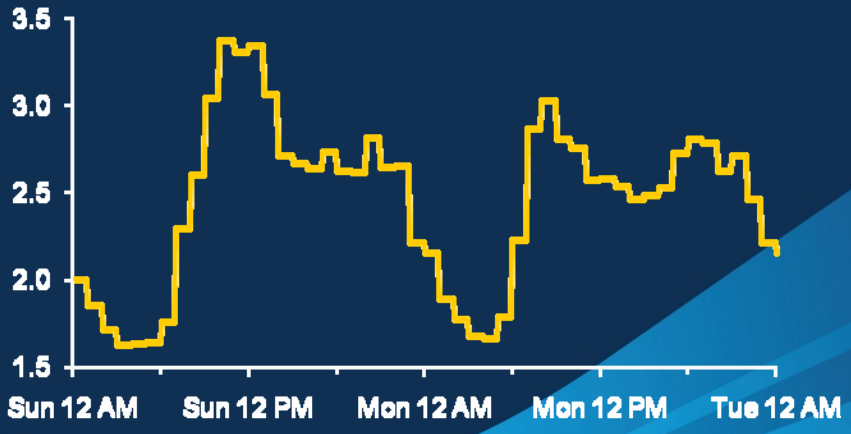
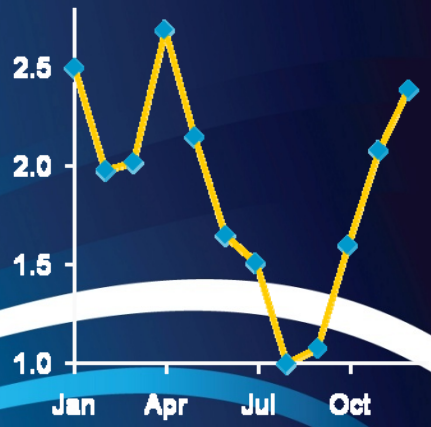
Dry Weather Flow

- Average sanitary and baseflow
- Diurnal patterns
- Baseflow variation







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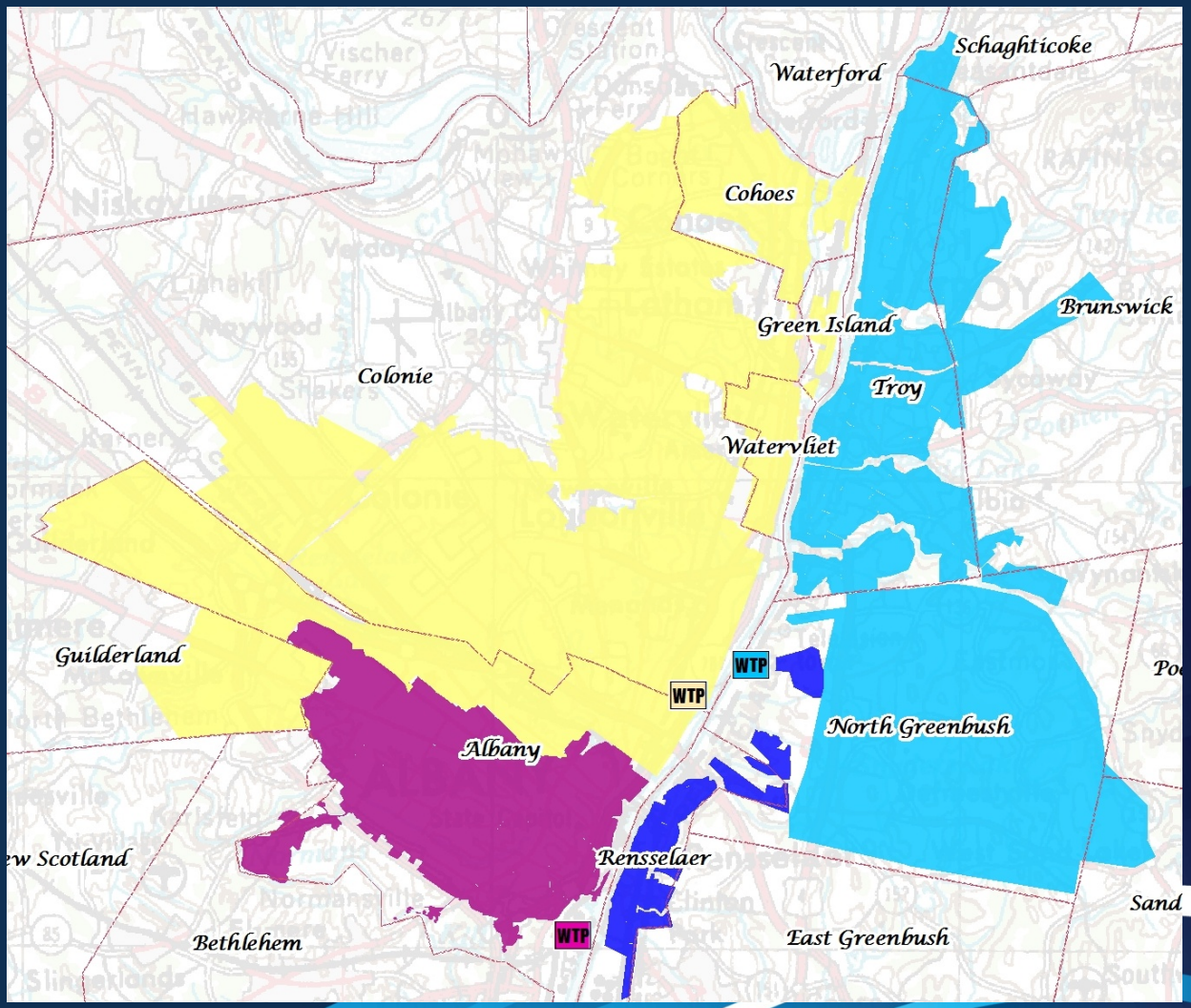
Model Areas

Albany North

Albany South

RCSD Troy

RCSD Rensselaer



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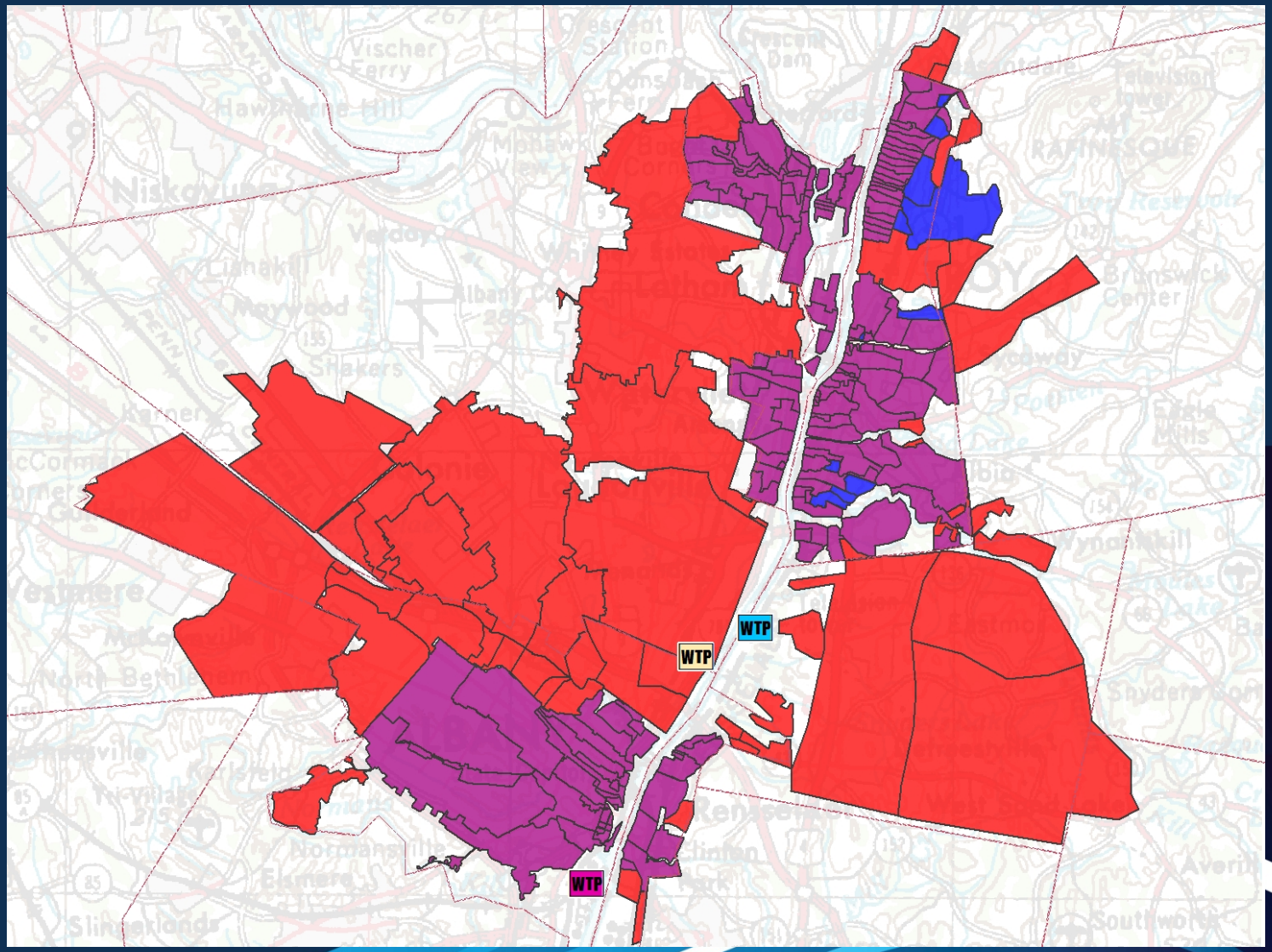
Sewersheds



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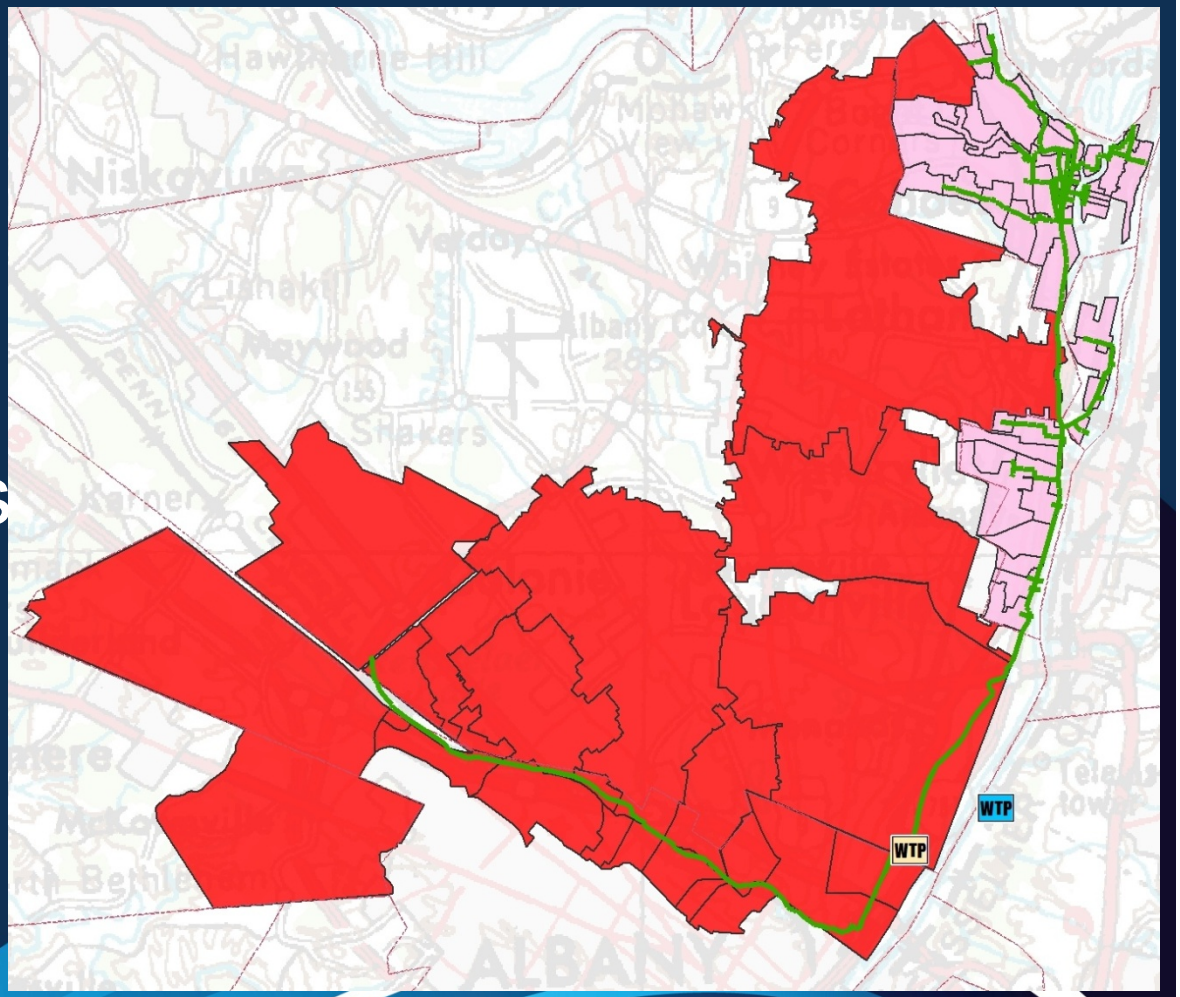
Albany North Model

- 600 pipes
- 68 catchments
- 24 CSOs
- 13 pump stations
- Patroons Creek Interceptor



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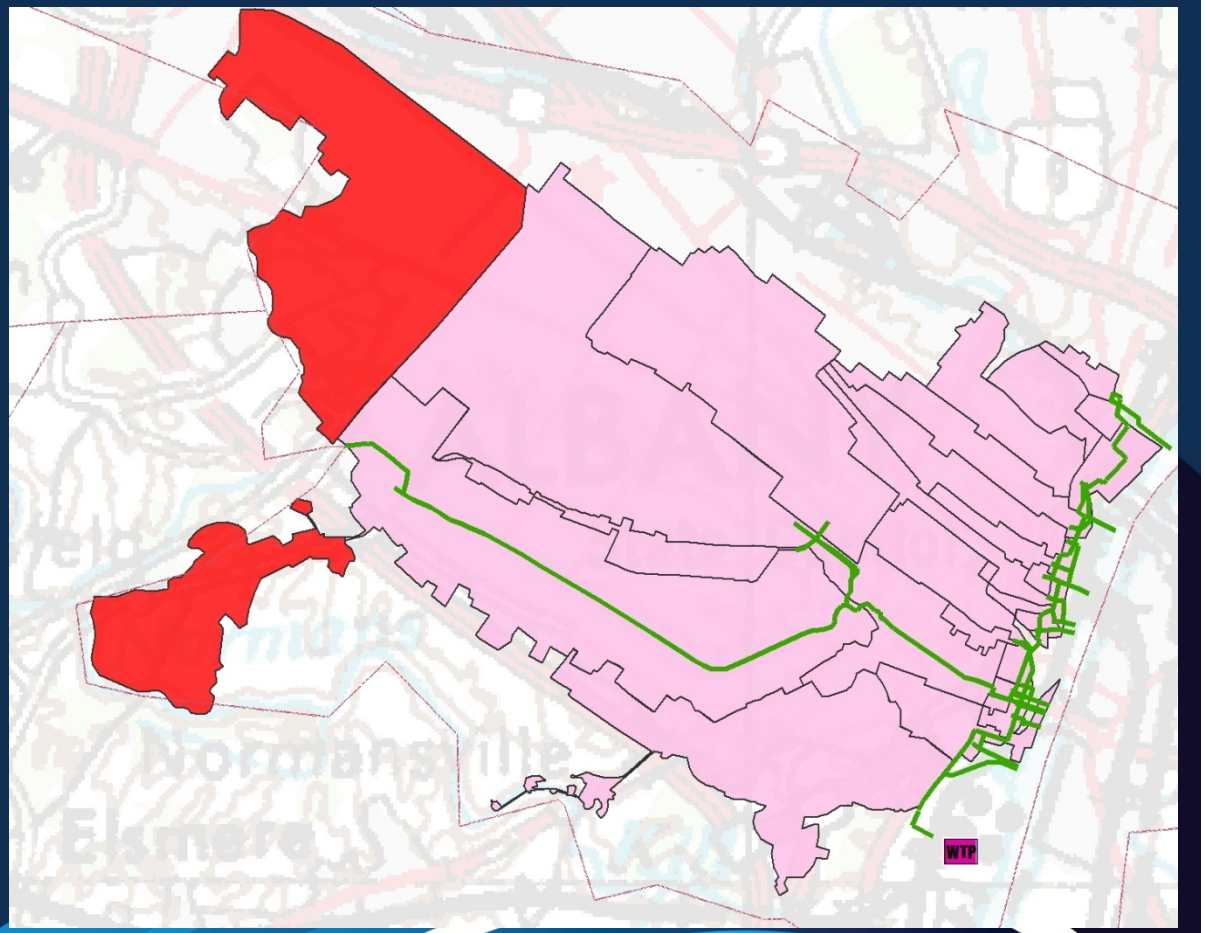
Albany South Model

- 220 pipes
- 30 catchments
- 20 regulators
- 12 CSOs
- Tidal influence
- Significant I/I below Big C



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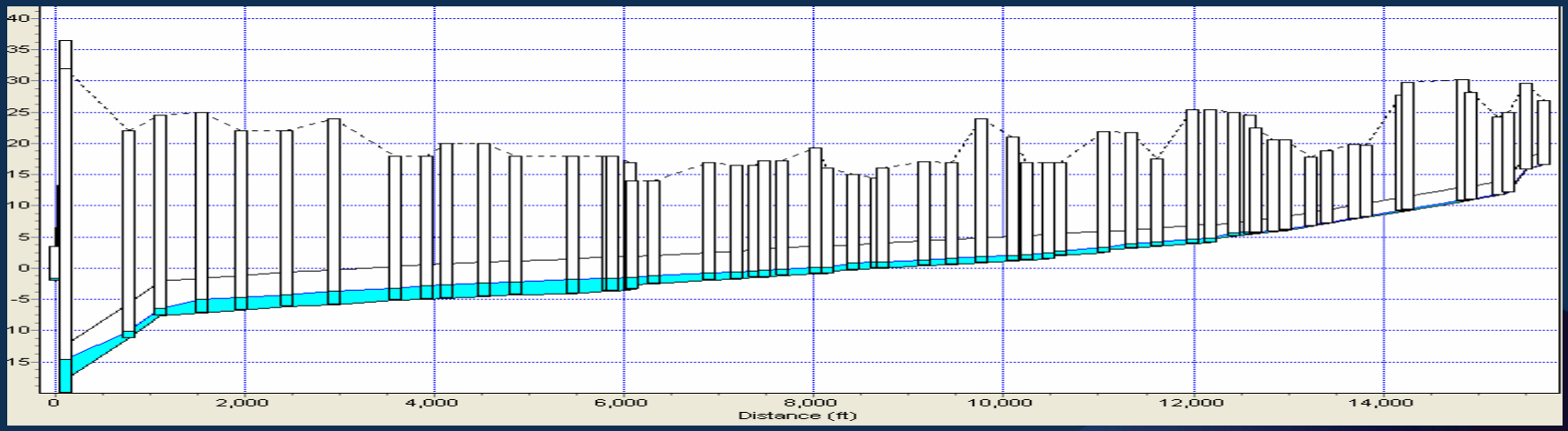
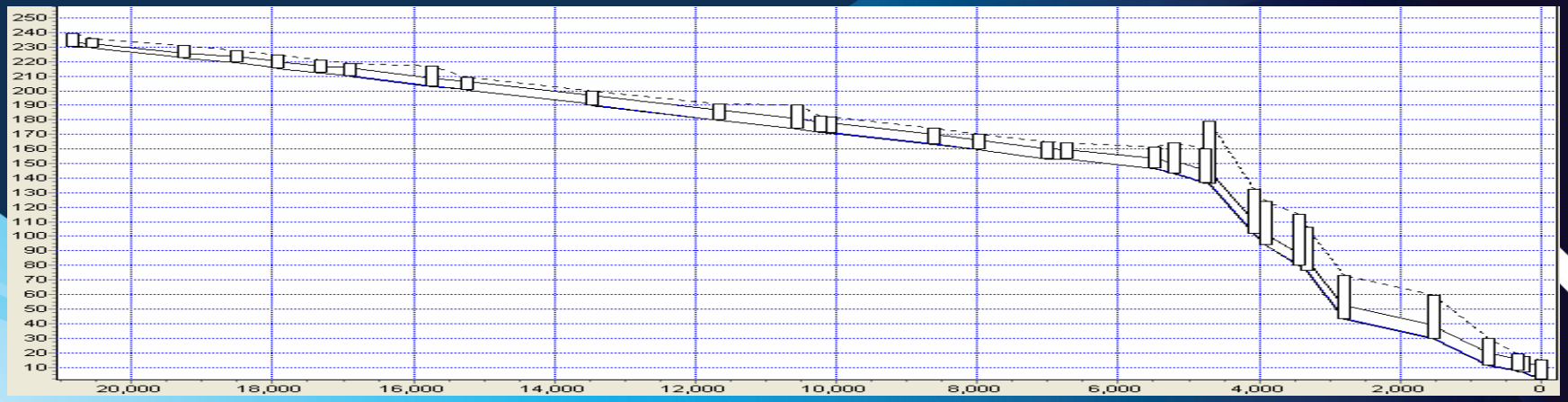
ACSD Interceptor Profiles

- Hudson River

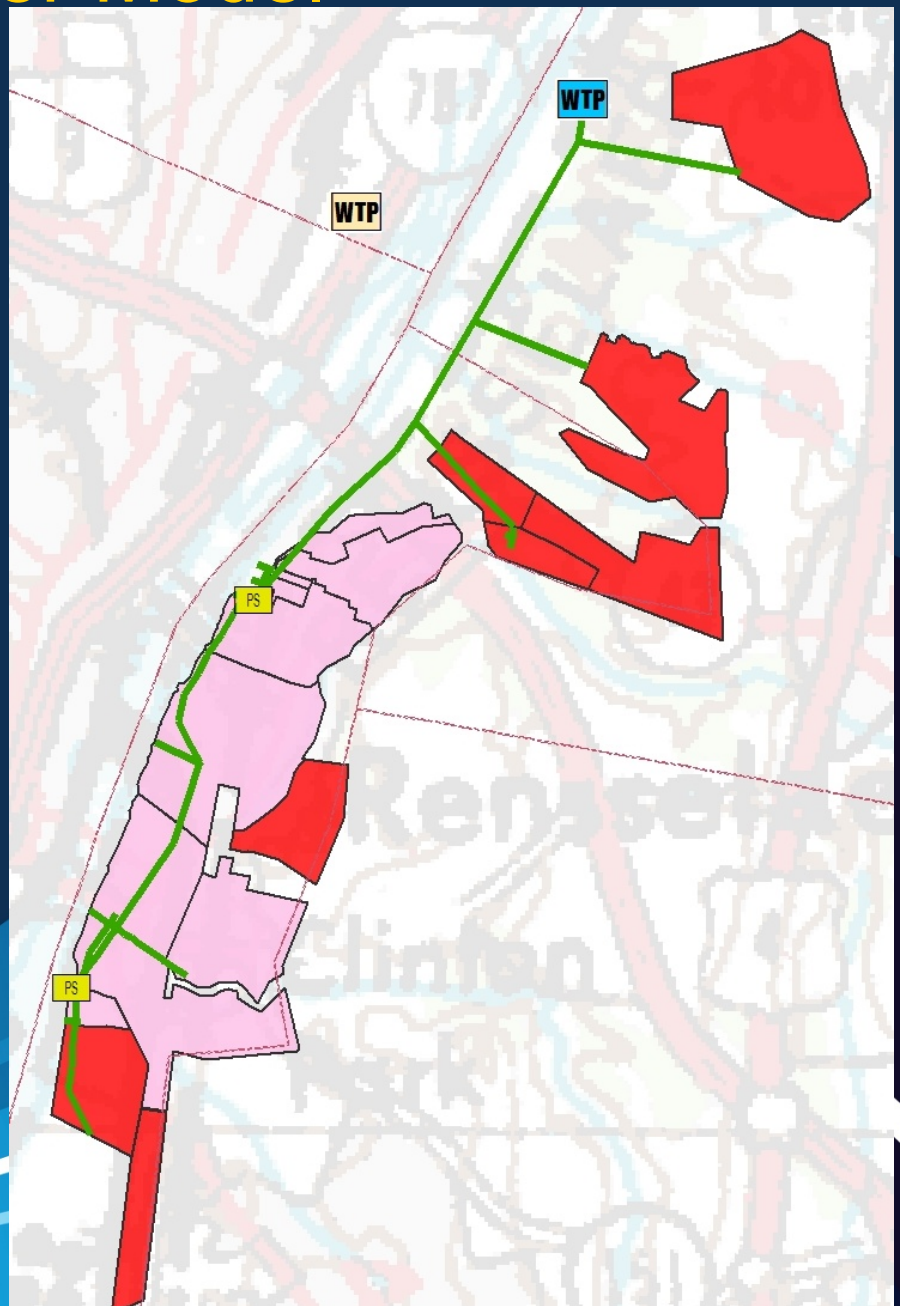


- Beaver Creek



Rensselaer Model

- 90 pipes
- 17 catchments
- 9 CSOs
- Aiken, Forbes PS
- CSOs to tidal zone
- Considerable separation



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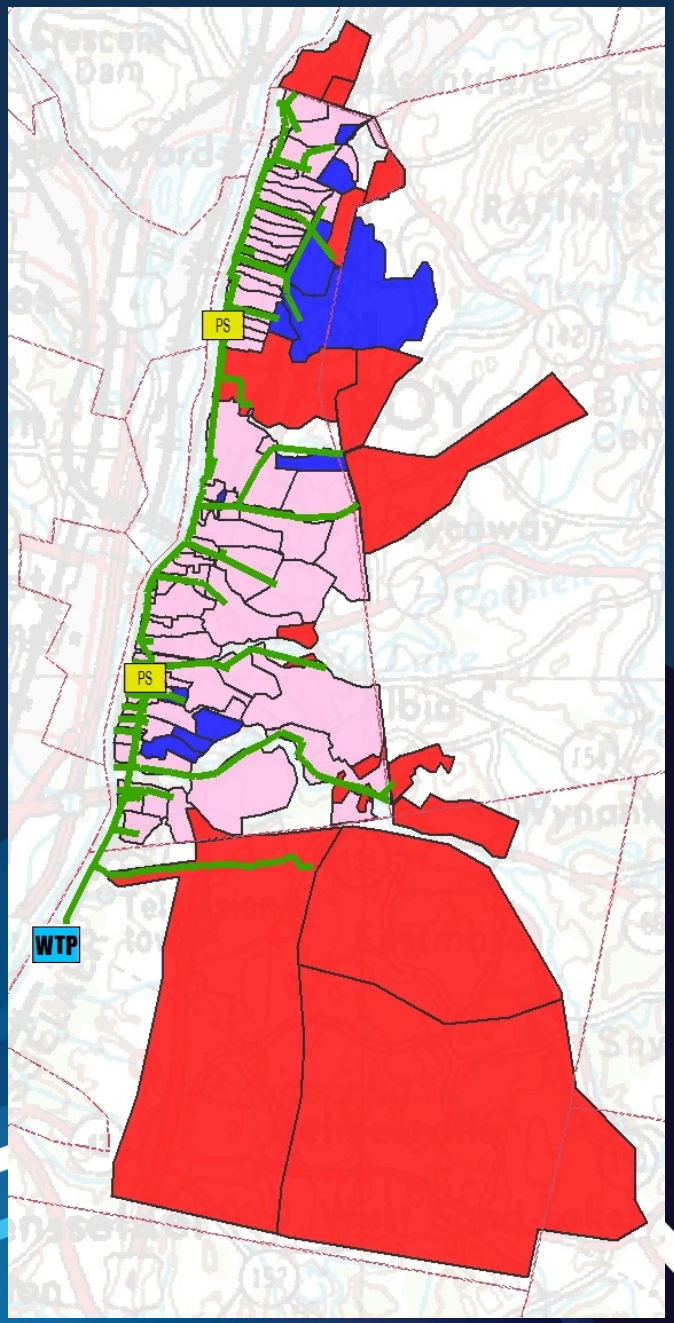
Troy Model

- 470 pipes
- 100 catchments
- 49 CSOs
- 106th, Monroe St. PS
- CSOs above and below Federal Dam
- Sanitary flows from Schaghticoke, Brunswick, and North Greenbush



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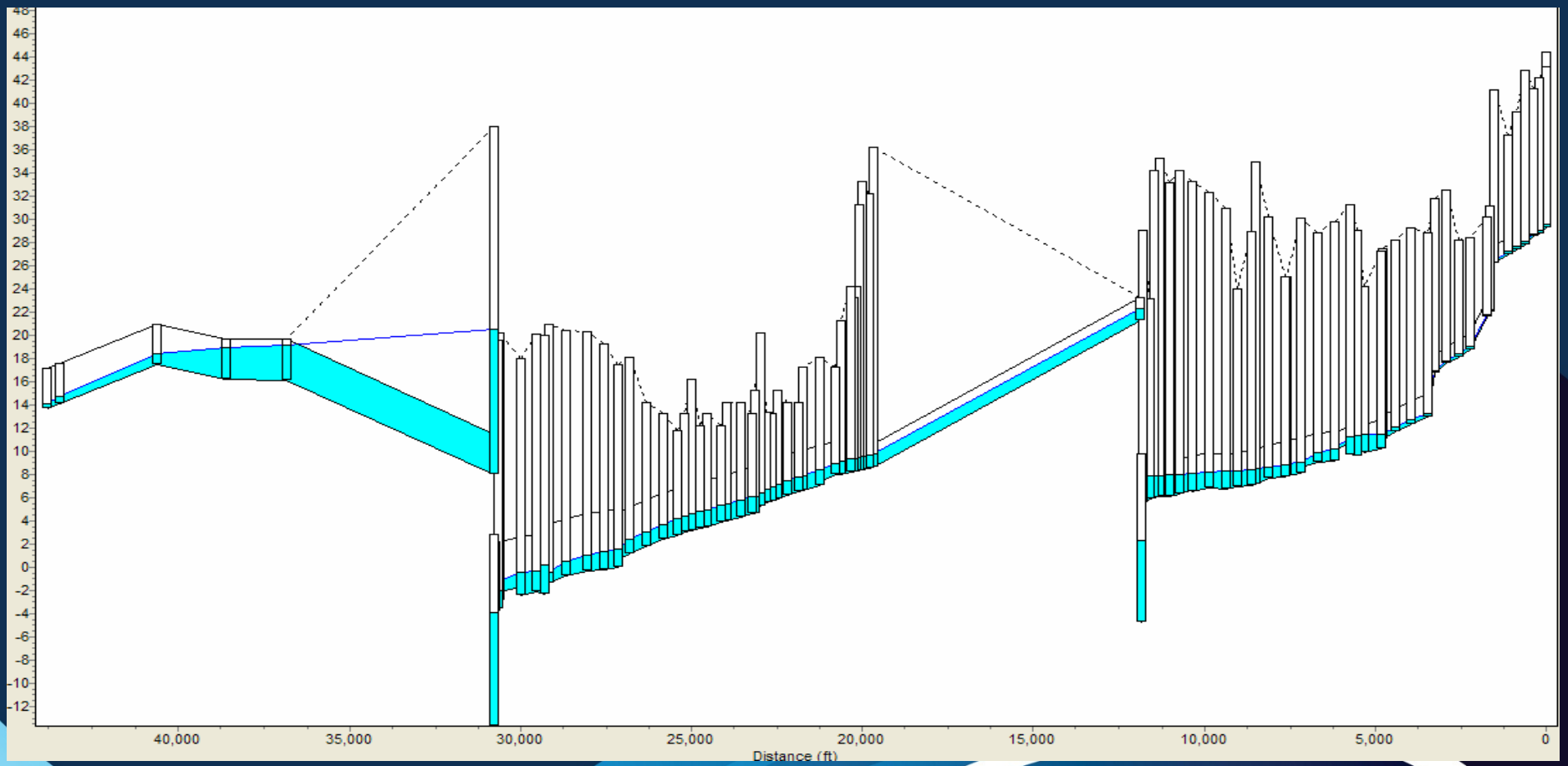
RCSD Interceptor Profile



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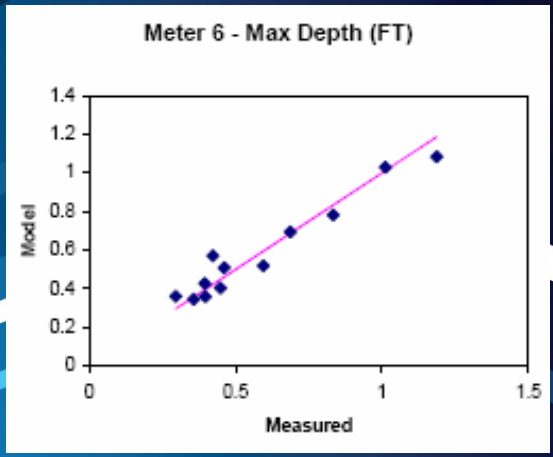
Calibration and Application

- Calibrate to summer 2008 flow metering
- Perform 5-year continuous simulations
- Obtain annual statistics for each CSO
  - Volume
  - Duration
  - Frequency



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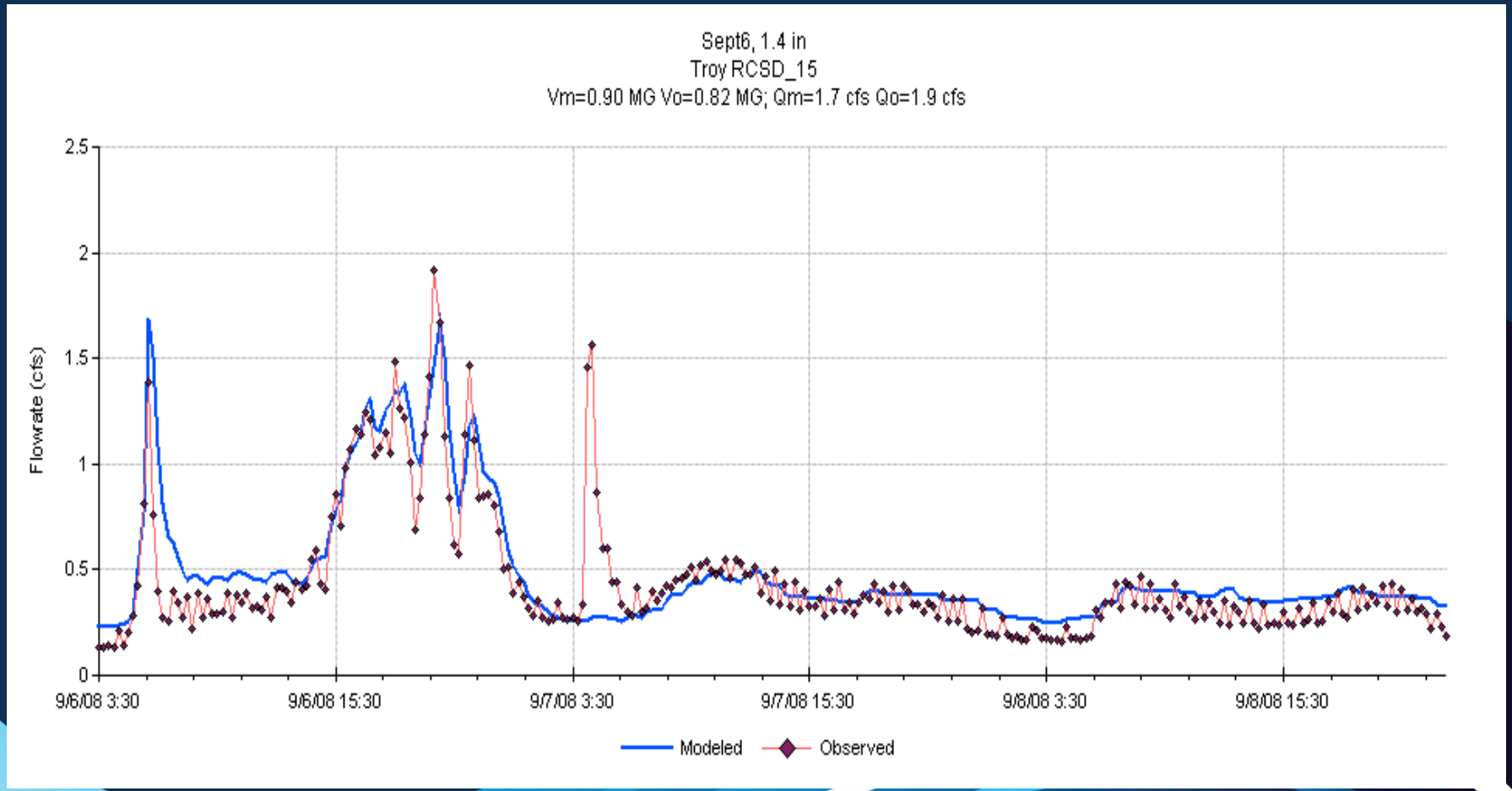
Calibration Time Series Hydrographs



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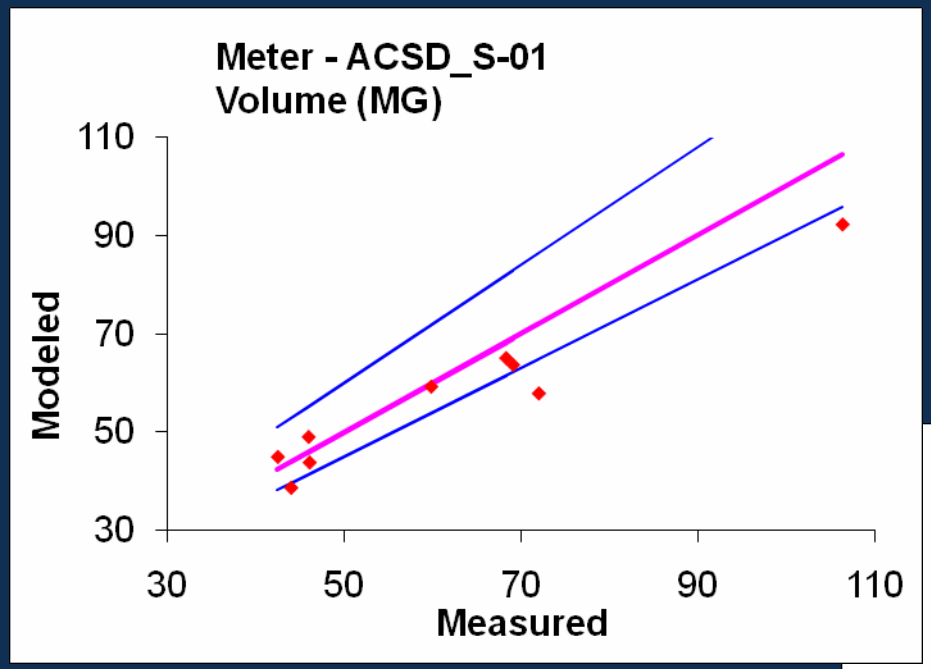
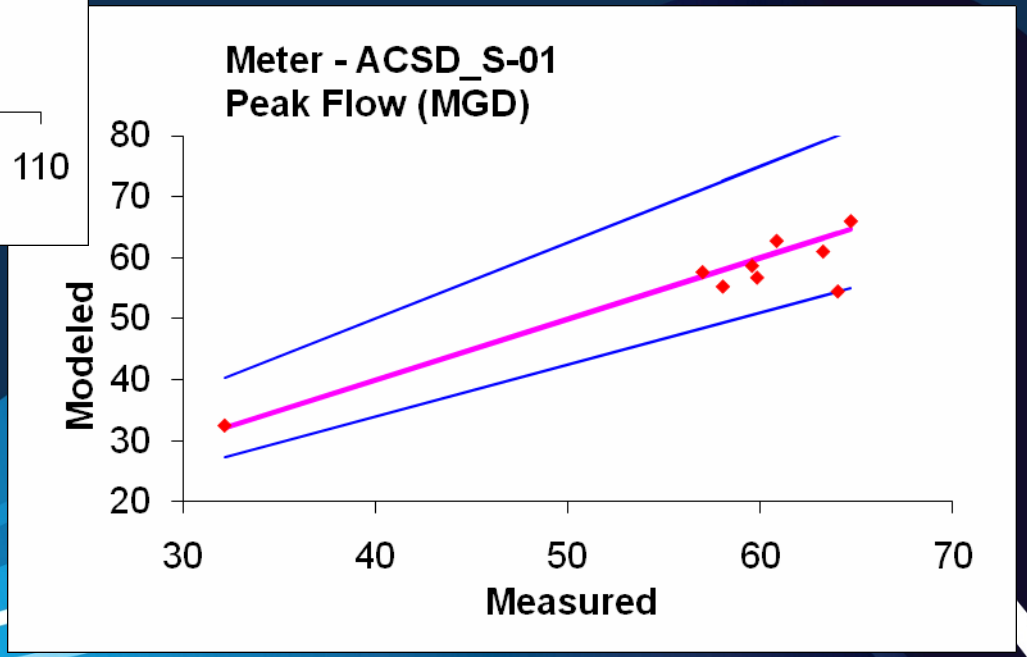
Calibration Multi-Storm Scatterplots





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Baseline CSO Statistics for 5-Year Simulation

Year	Precipitation (inches)	Percentile
1985	30	13%
1986	44	86%
1987	39	68%
1988	30	10%
1989	40	72%
Average	37	
Long-term	37	

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Albany Pool Annual CSO

System	MG/year	Hours	Events	% Capture
Albany North	30	380	61	91
Albany South	753	640	58	65
Rensselaer	20	190	52	88
Troy	448	720	65	67
Total	1251			

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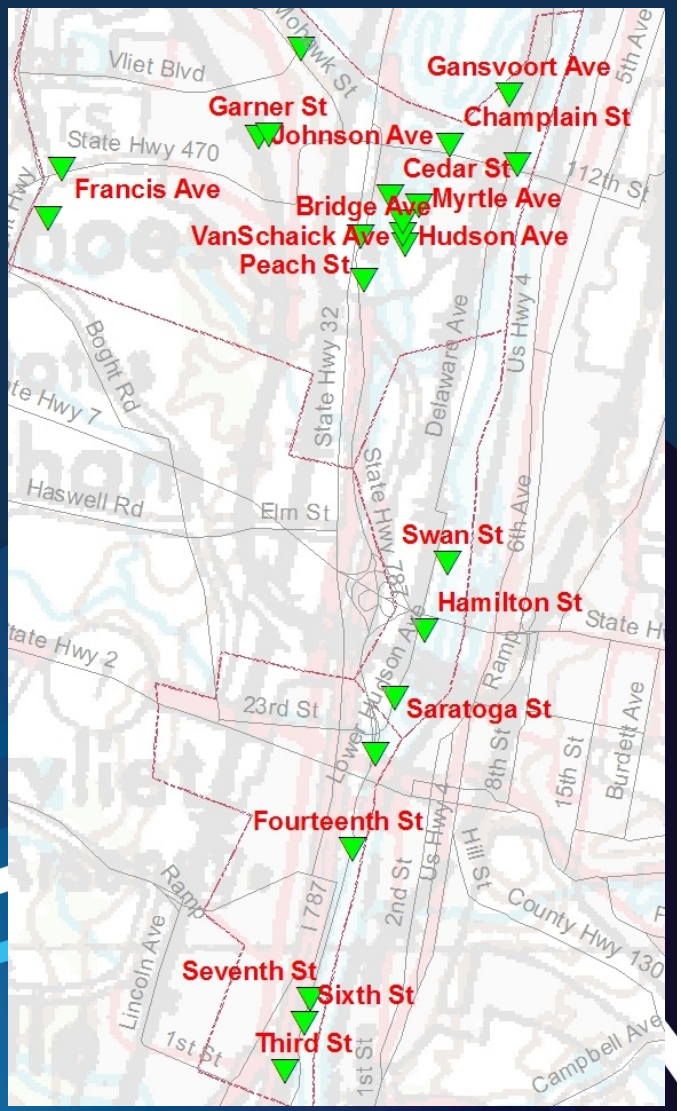
Most Active CSOs - Albany North

Location	SPDES	Mgal	Hours	Events
Little C	008	8.6	30	11
7th Street		4.5	330	44
Mohawk Street	007	4.2	380	21
Swan Street		4.0	209	41
Continental Ave	005	2.9	23	11

Five CSOs active ≥40 events/year



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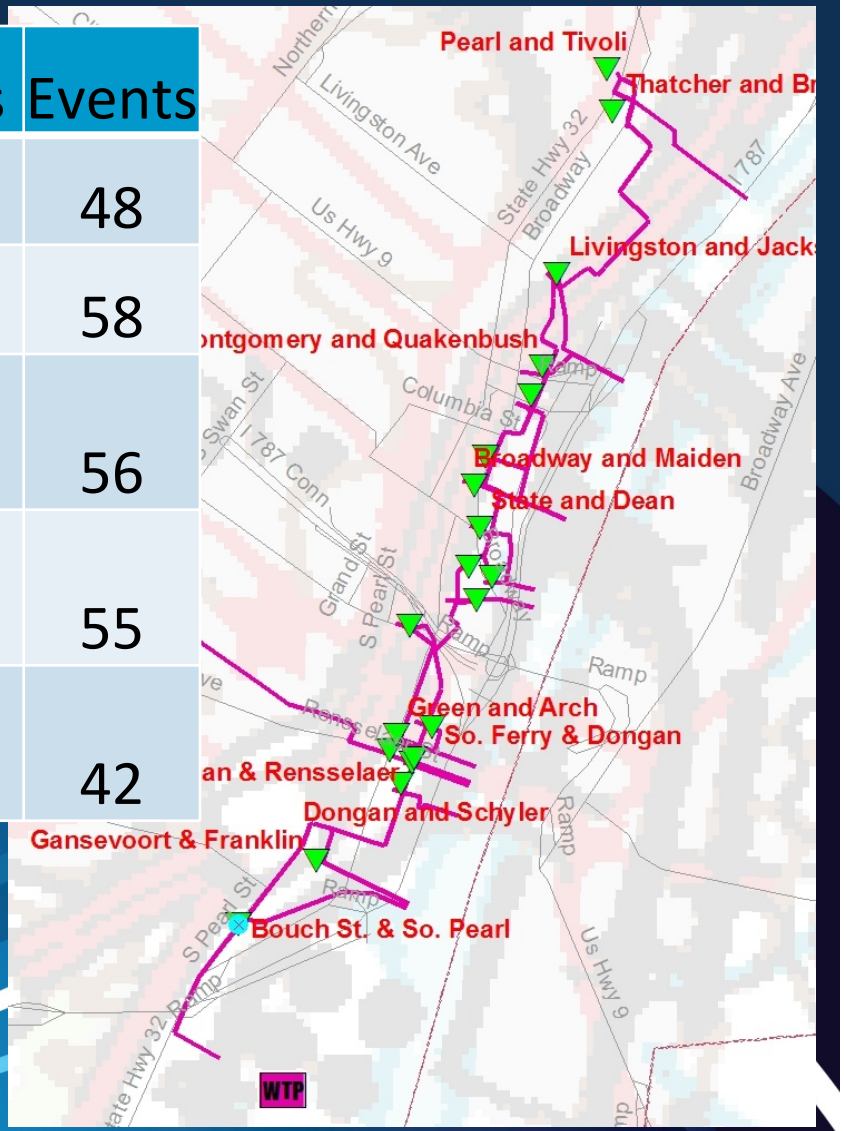
Most Active CSOs – Albany South

Location	SPDES	Mgal	Hours	Events
Big C	017	547	513	48
Bouck	013	94	637	58
Maiden/ Orange/ Steuben	029	48	496	56
Livingston/ Jackson/ Quackenbush	031	36	260	55
Division/ State/ Hudson	025	19	213	42



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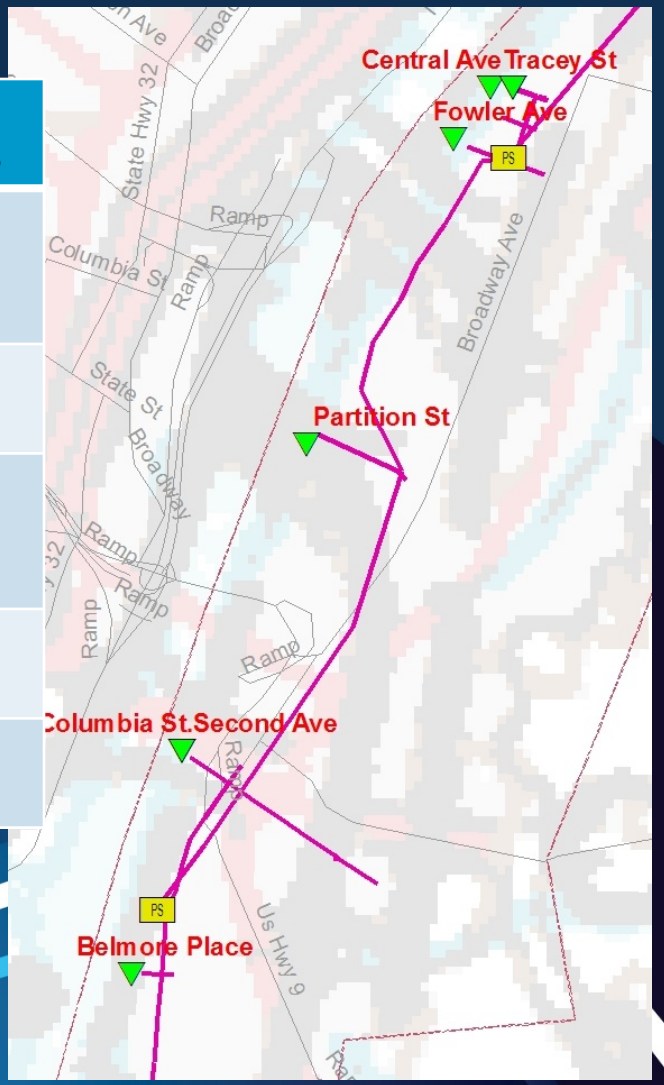
Most Active CSOs – Rensselaer

Location	SPDES	Mgal	Hours	Events
Columbia/ Second	003	8.5	109	41
Partition	006	5.6	192	40
Central/ Barnet	010	3.2	158	52
Fowler	007	1.8	108	42
Belmore	002	0.5	39	27



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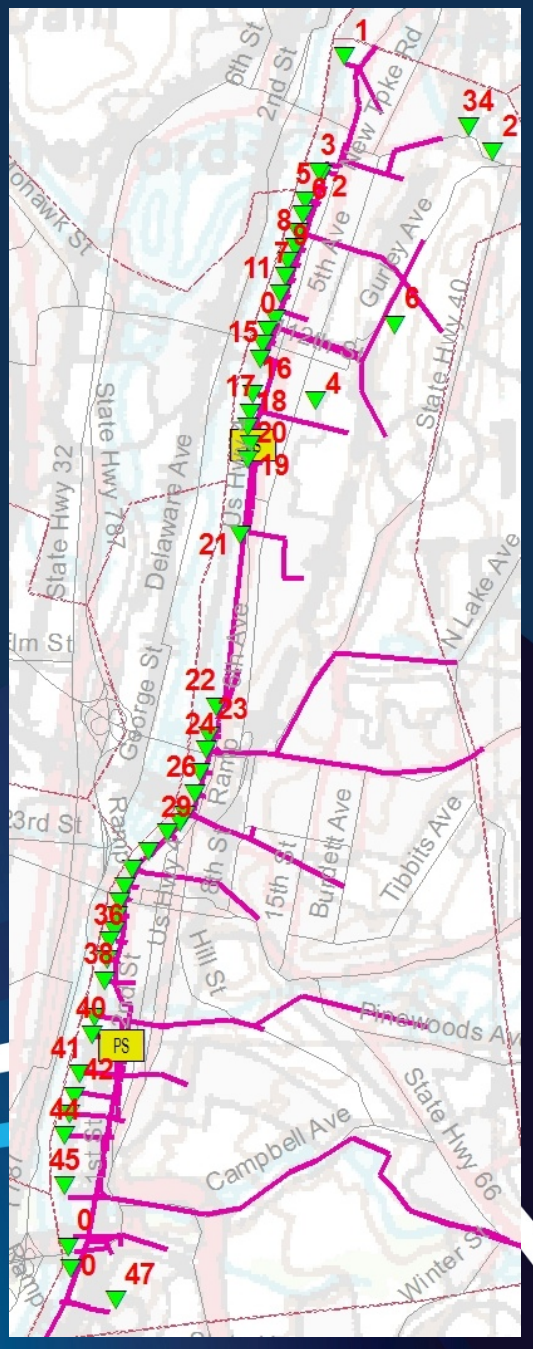
Most Active CSOs – Troy

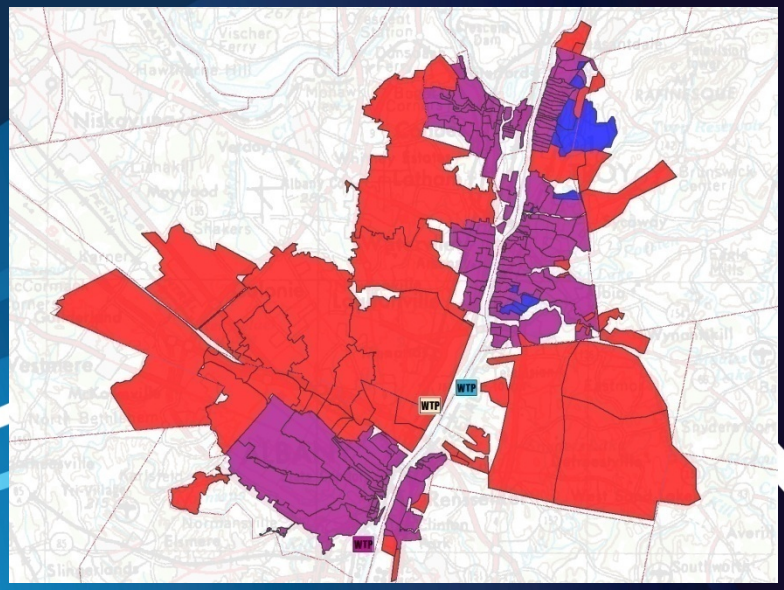
Location	SPDES	MGal	Hours	Events
Liberty	035	55	518	53
State	031	54	414	52
Hoosick	024	25	99	33
Adams	037	25	346	50
Jacob	026	23	429	62
Federal	027	19	217	51

- Four CSOs active 500-700 hours/y
- 17 CSOs ≥50 events/y



Findings

- 1,250 MG CSO per year, mostly in Troy and Albany South
- DWOs in Troy; solutions identified
- Limited opportunities for optimization
- Few low-cost solutions



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LTCP Development Overview

PUBLIC PARTICIPATION

CSS CHARACTERIZATION

Mapping, Database & Digitizing

Receiving Waters Condition Assessment

CSS Monitoring & Sampling

CSS Modeling

WWTP Wet-Weather Capacity Study

LTCP DEVELOPMENT

Develop & Evaluate CSO Control Alternatives

Funding, Financial Impact & Affordability

Implementation Schedule

LTCP Report Preparation

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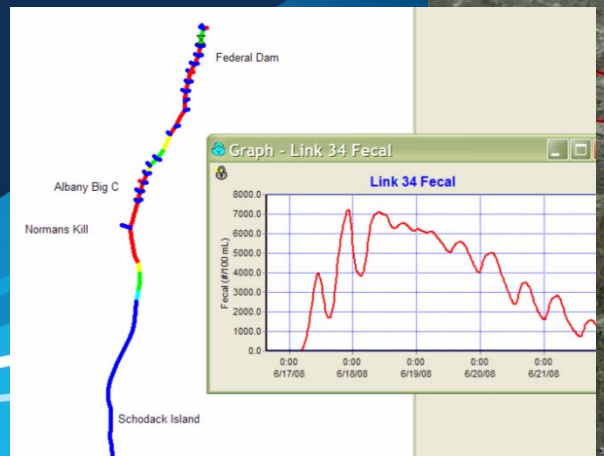
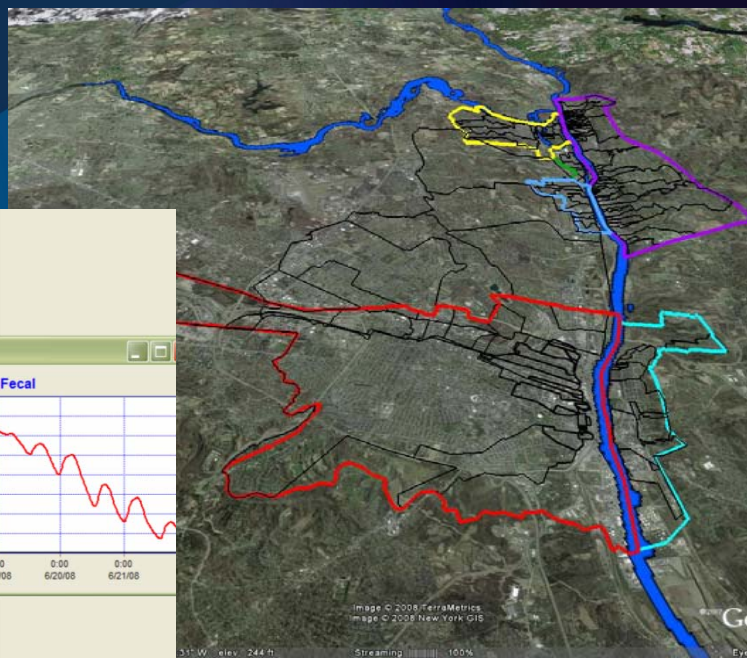
Moving Forward…

Moving Forward…

- Ongoing Activities
  - Finalize Additional Tributary Sampling Results
  - Hudson River Water Quality Model Development
  - Meet with DEC in December to discuss Receiving Water Quality Model calibration and baseline conditions
  - WWTP Evaluations
  - CSO Control Screening
- Future Activities
  - Control Activities Development
    - Local
    - East Side/West Side
    - Regional
- Public Participation
  - CAC/Public meetings





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Moving Forward…

Public Information Meeting Schedule

- Round 1 - Project Introduction and Overview
  HVCC March 31, 2008
- Round 2 - CSS Characterization Findings Overview
  November 10, 2009
- Round 3 - Mitigation Alternatives Evaluation
  Spring 2010
- Round 4 - LTCP Final Draft Presentation
  Summer 2010

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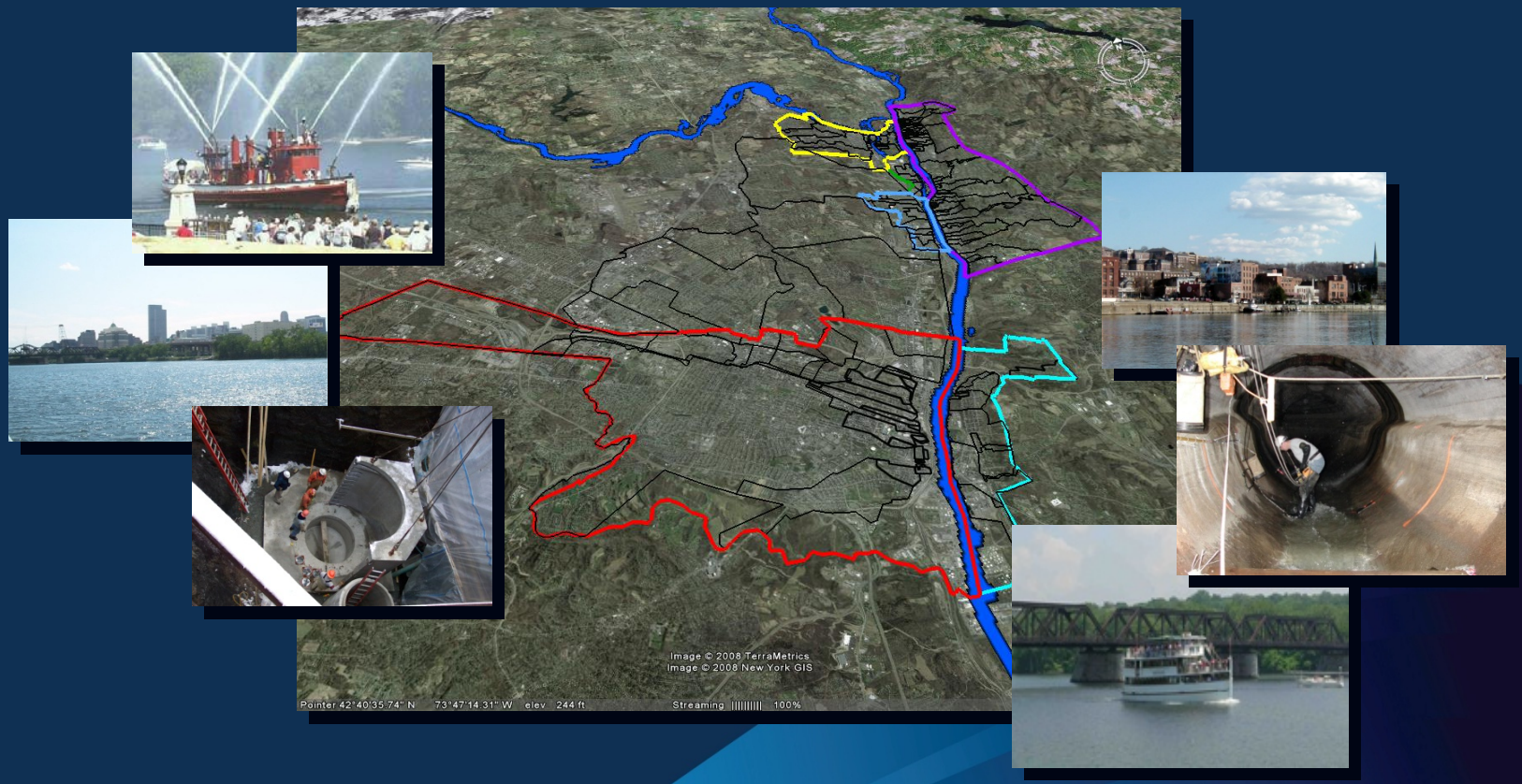
Albany Pool Combined Sewer System
Long-Term Control Plan Development



Questions and Comments

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