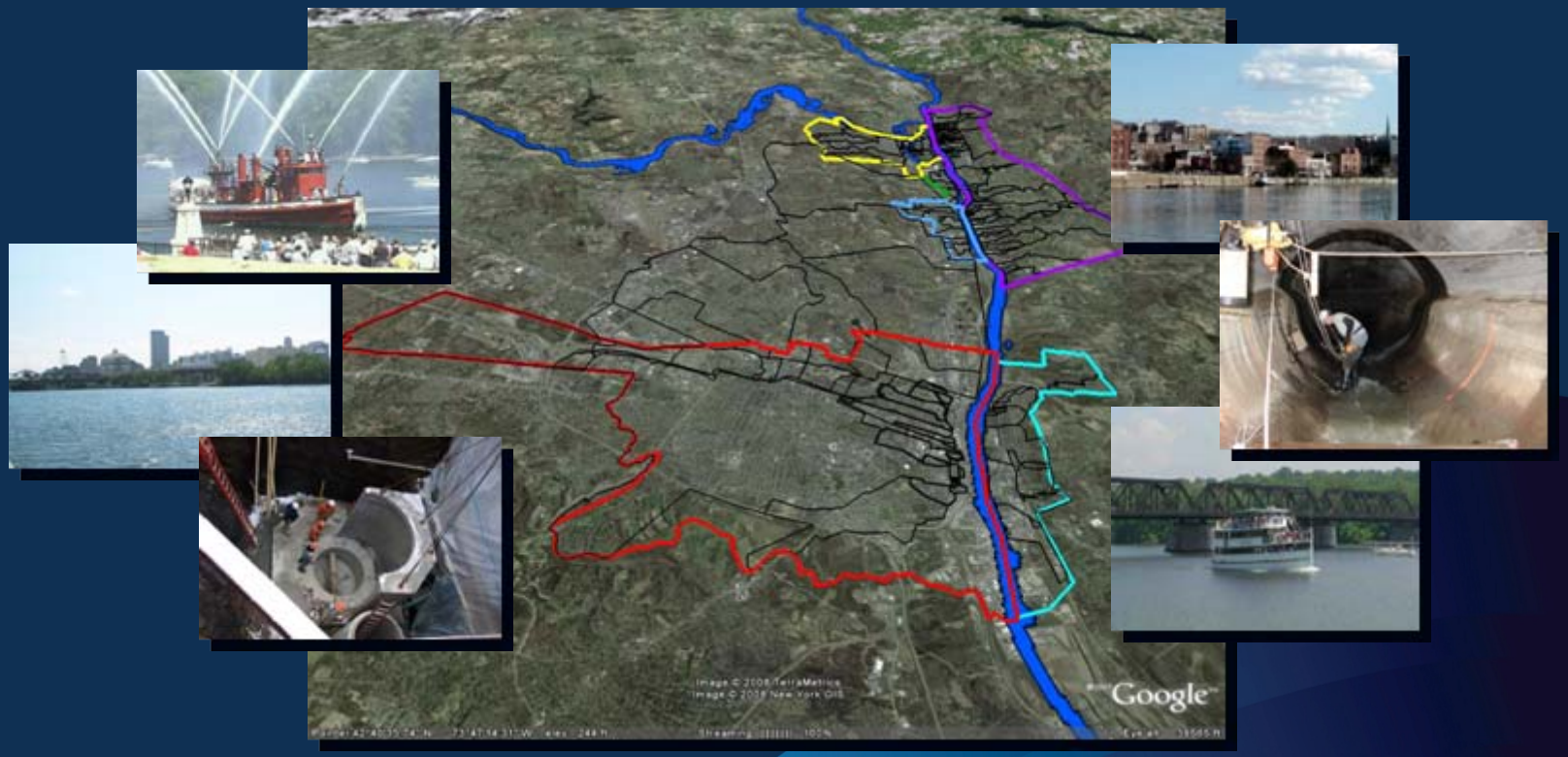
Albany Pool Combined Sewer System
Long-Term Control Plan Development



Community Advisory Committee Meeting
March 30, 2009

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Albany Cohoes Rensselaer Troy Watervliet Green Island

Agenda for March 30, 2008 CAC Meeting

- Recap of Activities
- Receiving Waters Condition Assessment
  - Water Quality Sampling Recap
  - Hydrodynamics
  - Dry/Wet Weather Data Review
  - Summary of Major Findings
- Report on CSS Flow Monitoring

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Regulatory Activities to Date

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

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Receiving Waters Conditions Assessment

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

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Municipal Employees Required

Municipality	Total Employees	First Shift	Second Shift	Third Shift
City of Albany	4	2	1	1
City of Cohoes	3	1	1	1
Village of Green Island	1	0	0	1
City of Rensselaer	3	1	1	1
City of Troy	12	4	4	4
City of Watervliet	1	0	1	0
Albany County Sewer District	12	4	4	4
Total	36	12	12	12

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Subcontractors

St. Peter's Bender Laboratory
A Member of St. Peter's Health Care Services

Analytical Lab

John Wilson, Supervisor

Brian Collins, QA/QC

19 Warehouse Row
Albany, NY 12205
(518) 525-5475

Environmental Laboratory Services

Anne Lee, Manager

7280 Caswell St.
Hancock Air Park,
North Syracuse, NY
13212
(315) 476-4410

Watershed Assessment Associates
Environmental Services / Biomonitoring / Invertebrate Taxonomy / Professional Training

Field Sampling

J. Kelly Nolan, Aquatic Biologist

28 Yates Street
Schenectady, NY
12305
(518) 346-0225
www.rwaa.us

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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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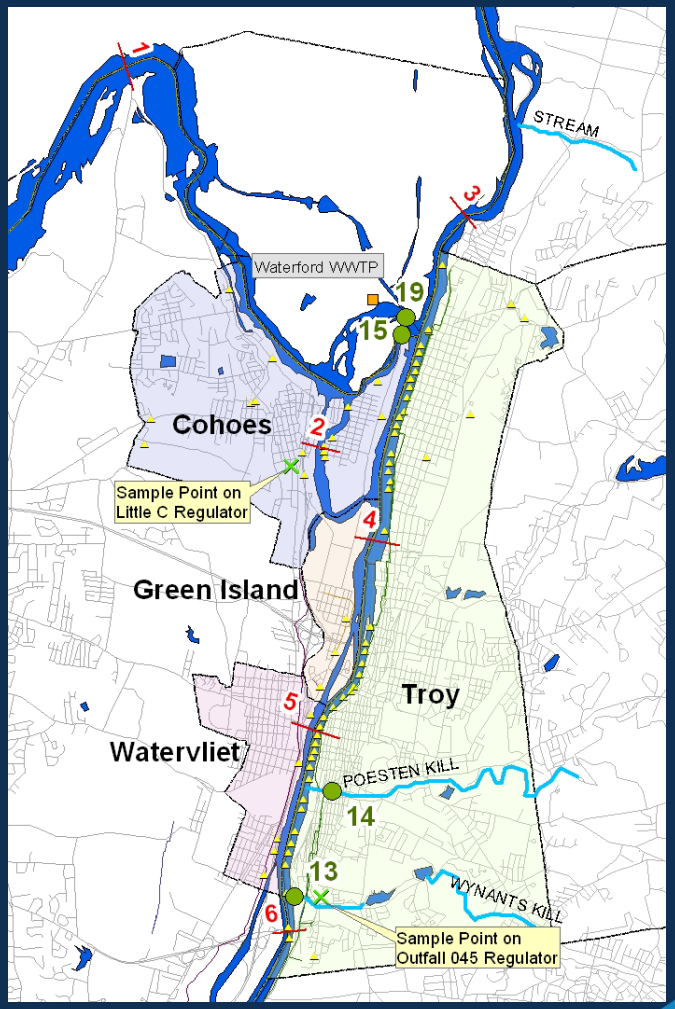
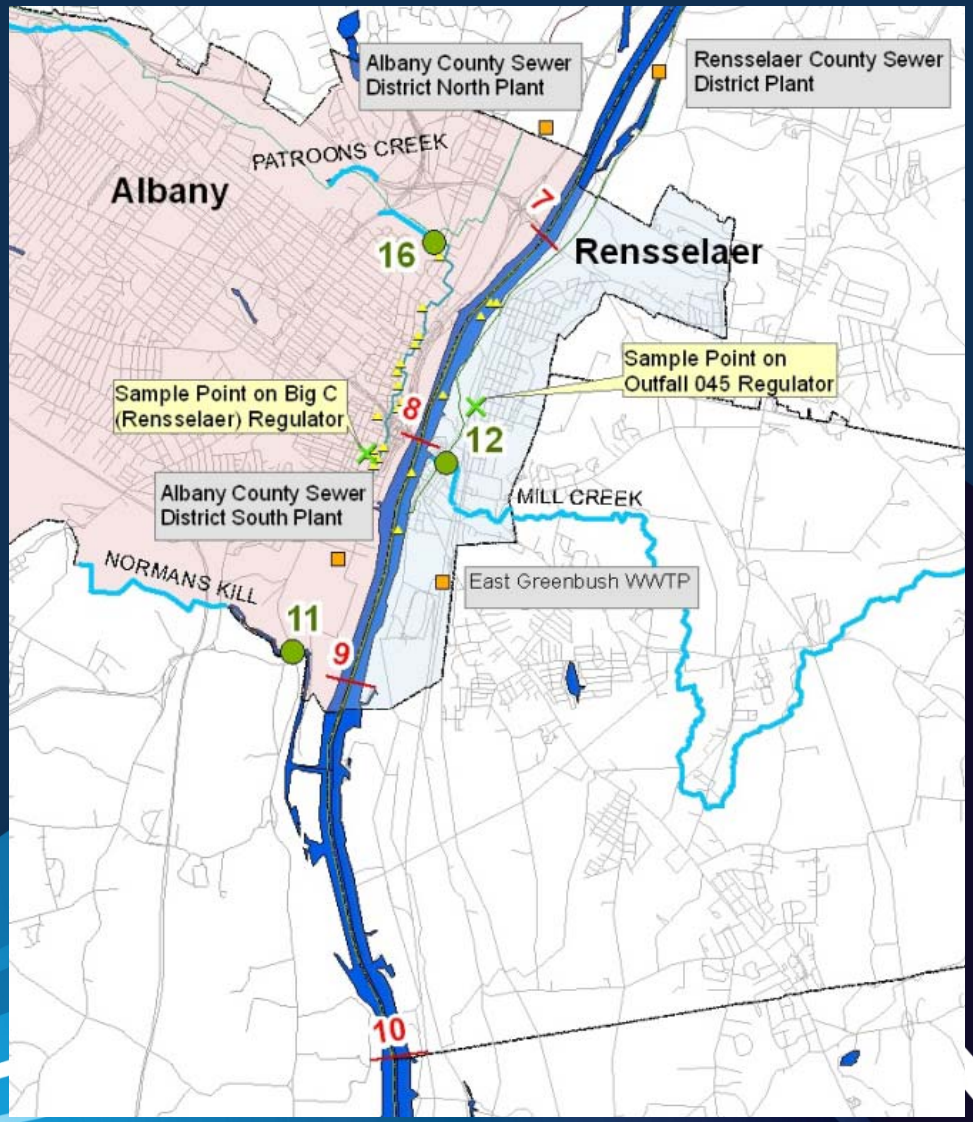
Sampling Locations





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Wet Weather Sampling

- 4 events preceded by 72 hours dry weather
- Community-wide storm event
- Target rainfall of 0.25 to 0.75 inches
- Target duration of 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 Summary

- Hudson River Flows strongly regulated
  - Little correlation with CSO discharges
- Mohawk River generally shows more response to rainfall

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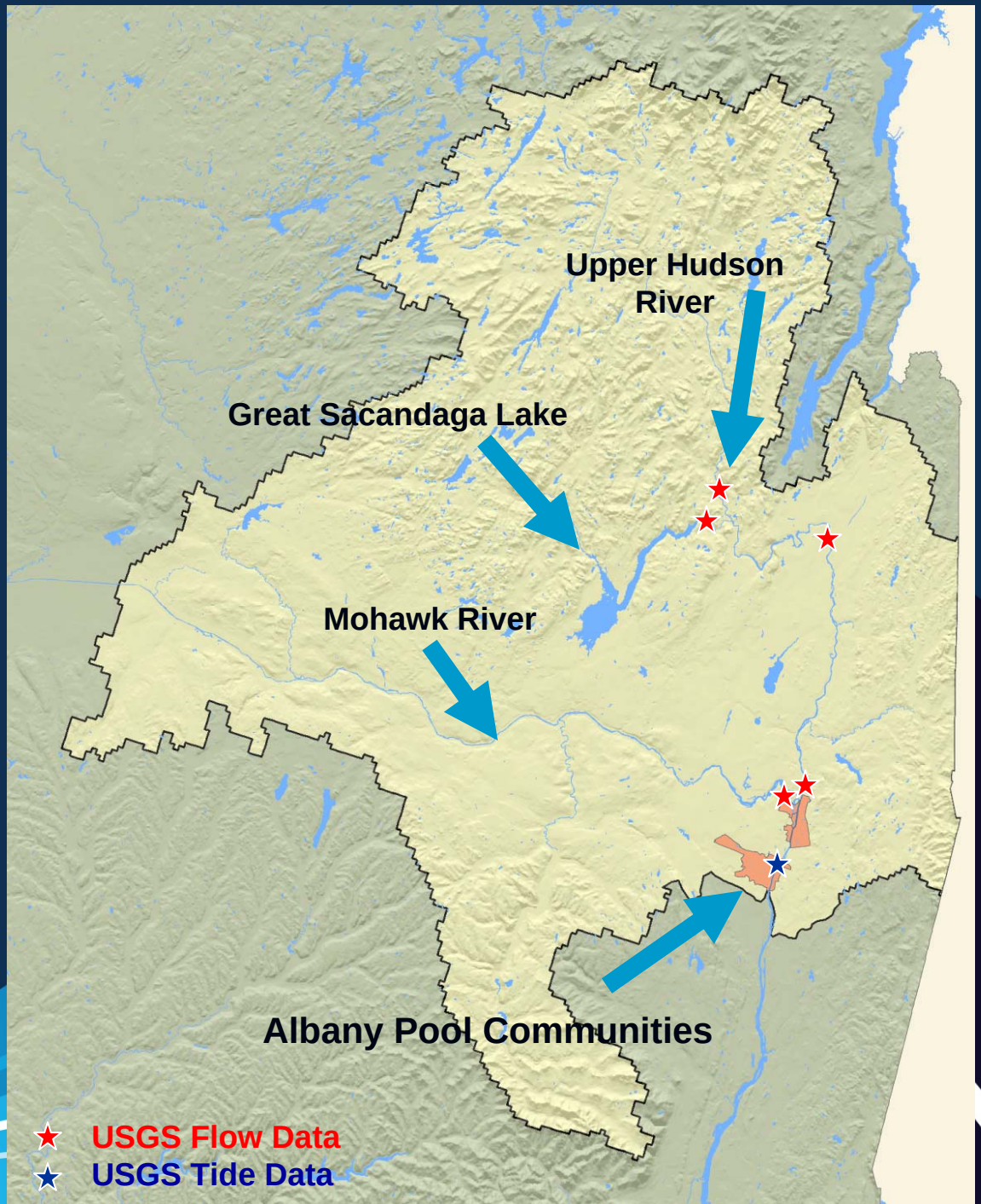
Hydrodynamics of the "Albany Pool"

- Large Watershed
  - 8500 Miles^2
  - 3500 Miles^2 – Mohawk River
- Hydropower
  - 16 Upper Hudson Facilities
  - EJ West at Sacandaga
- Tidal
  - Below Federal Dam
  - 6 foot flux typical



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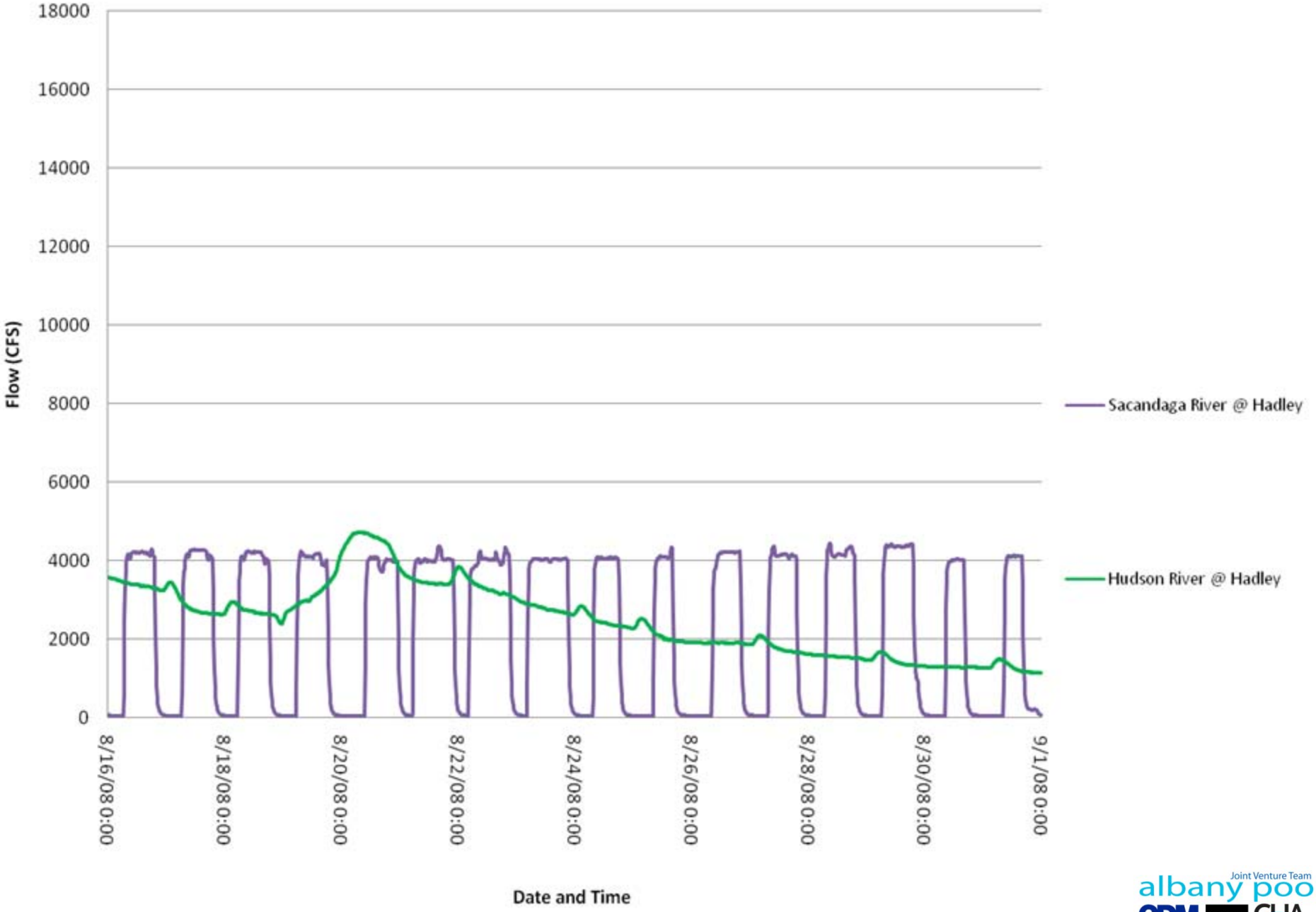
Dry Weather Flow 8/16-8/31



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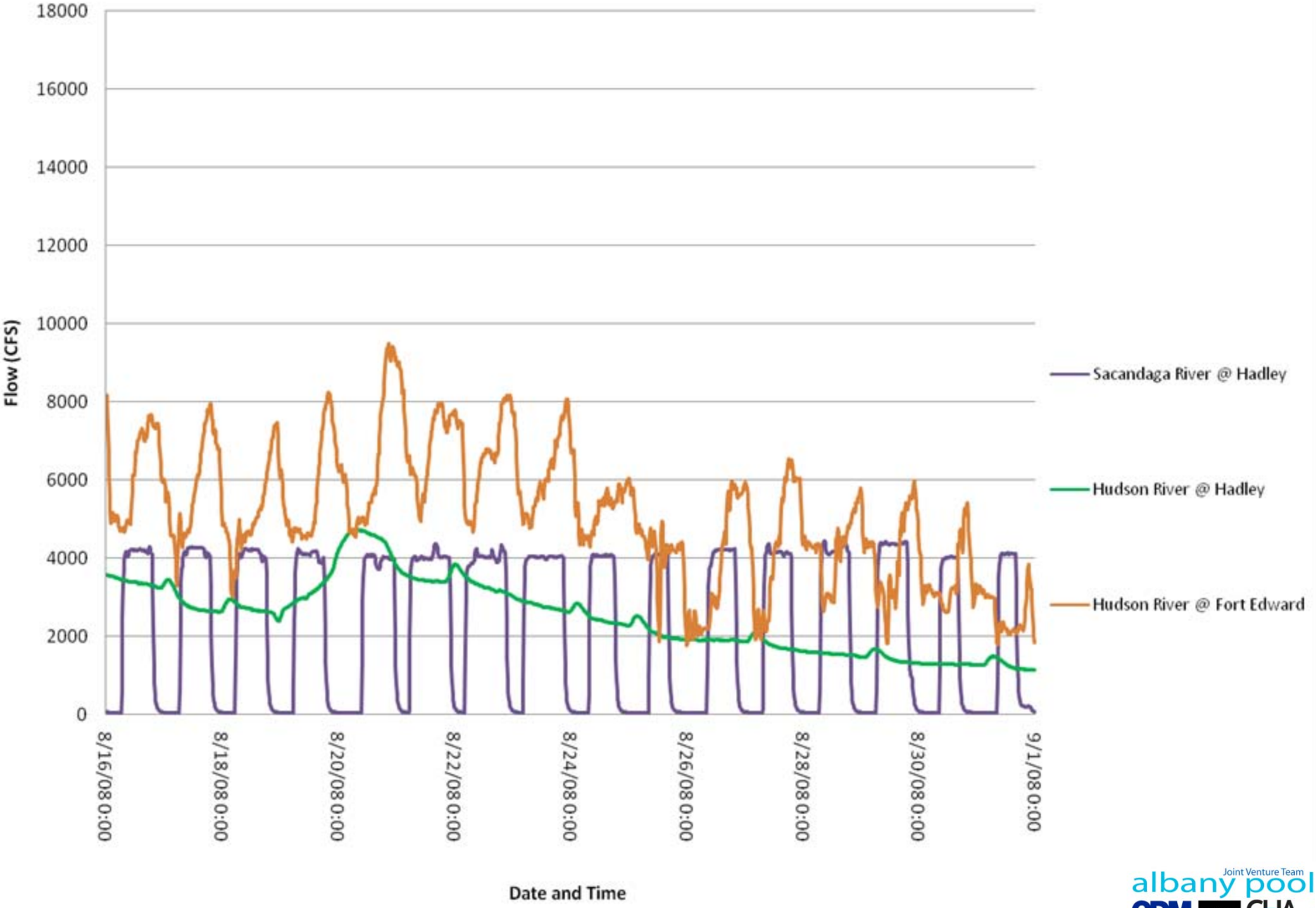
Dry Weather Flow 8/16-8/31



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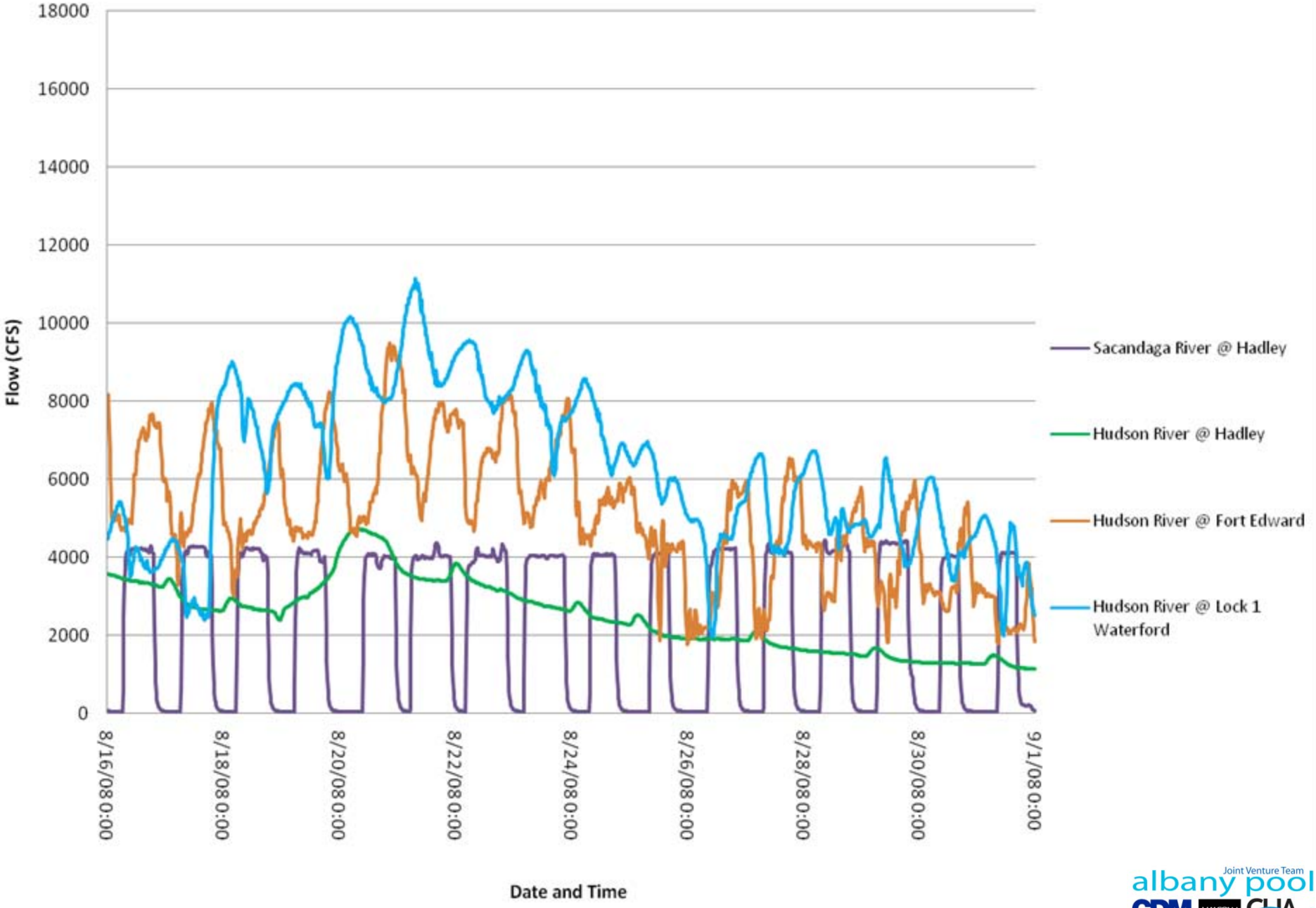
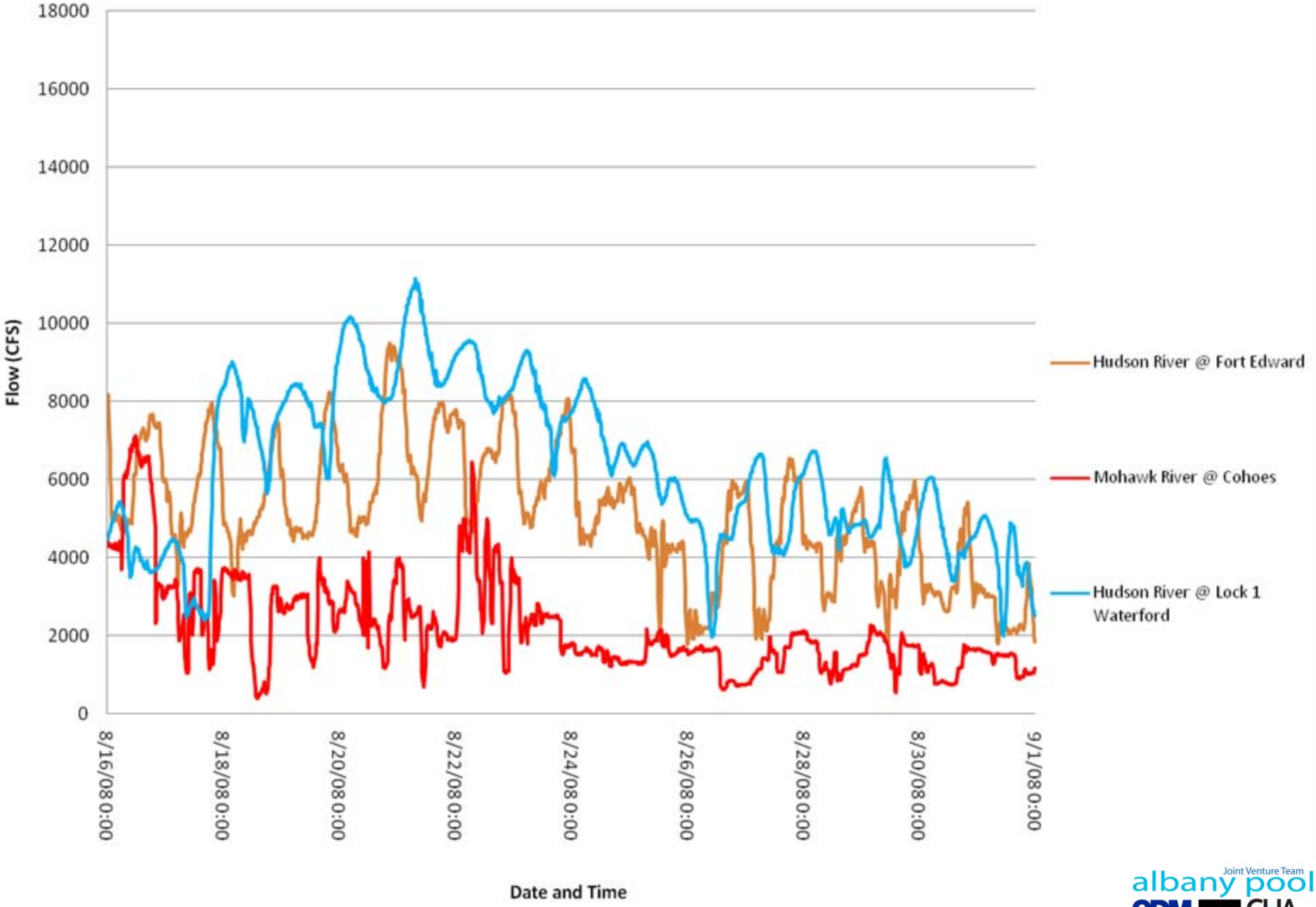
Dry Weather Flow 8/16-8/31



Dry Weather Flow 8/16-8/31



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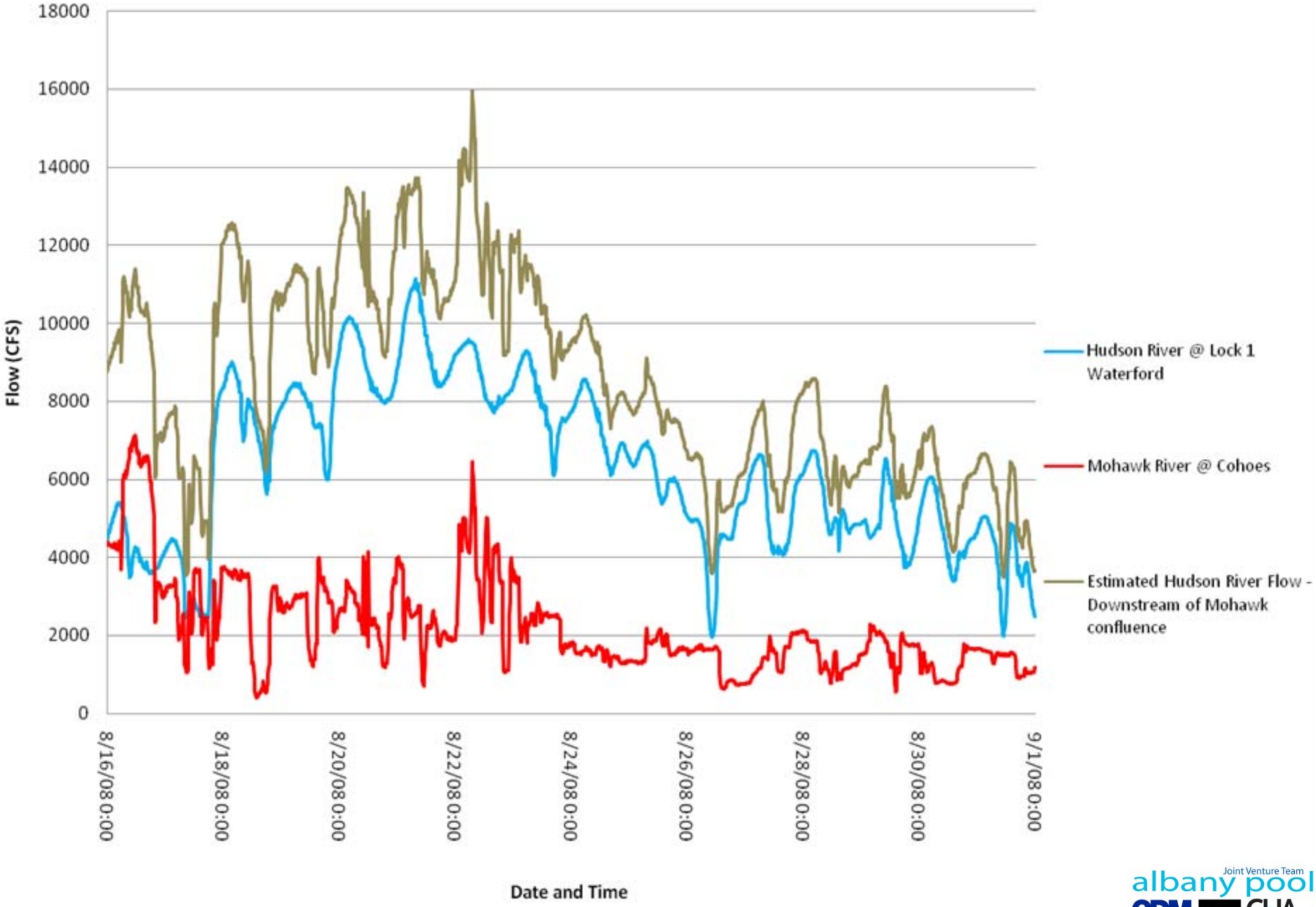
Dry Weather Flow 8/16-8/31



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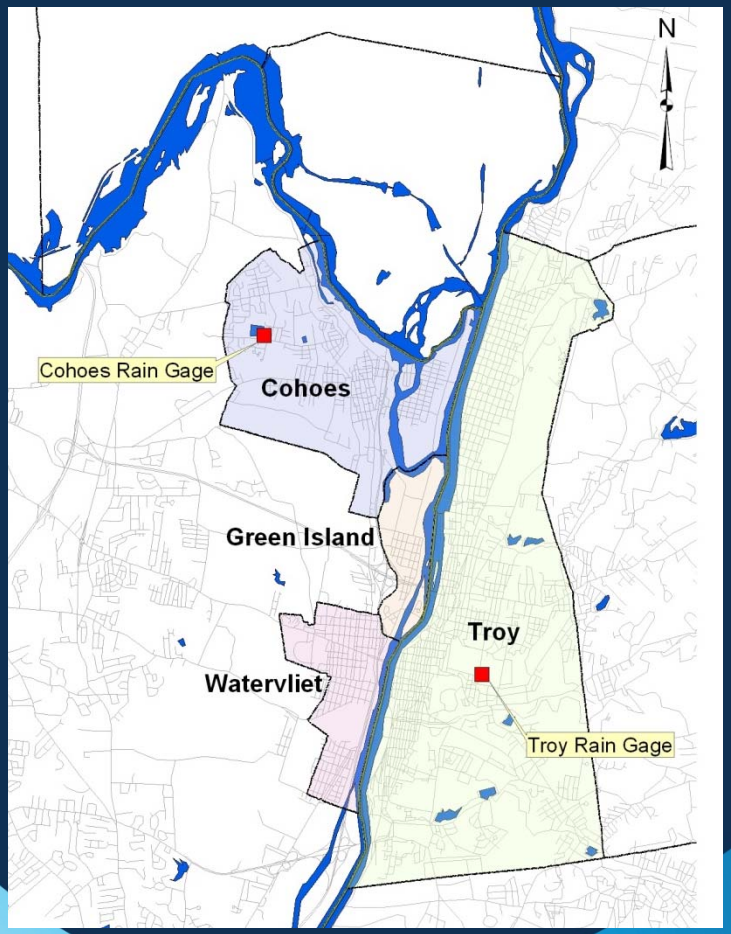
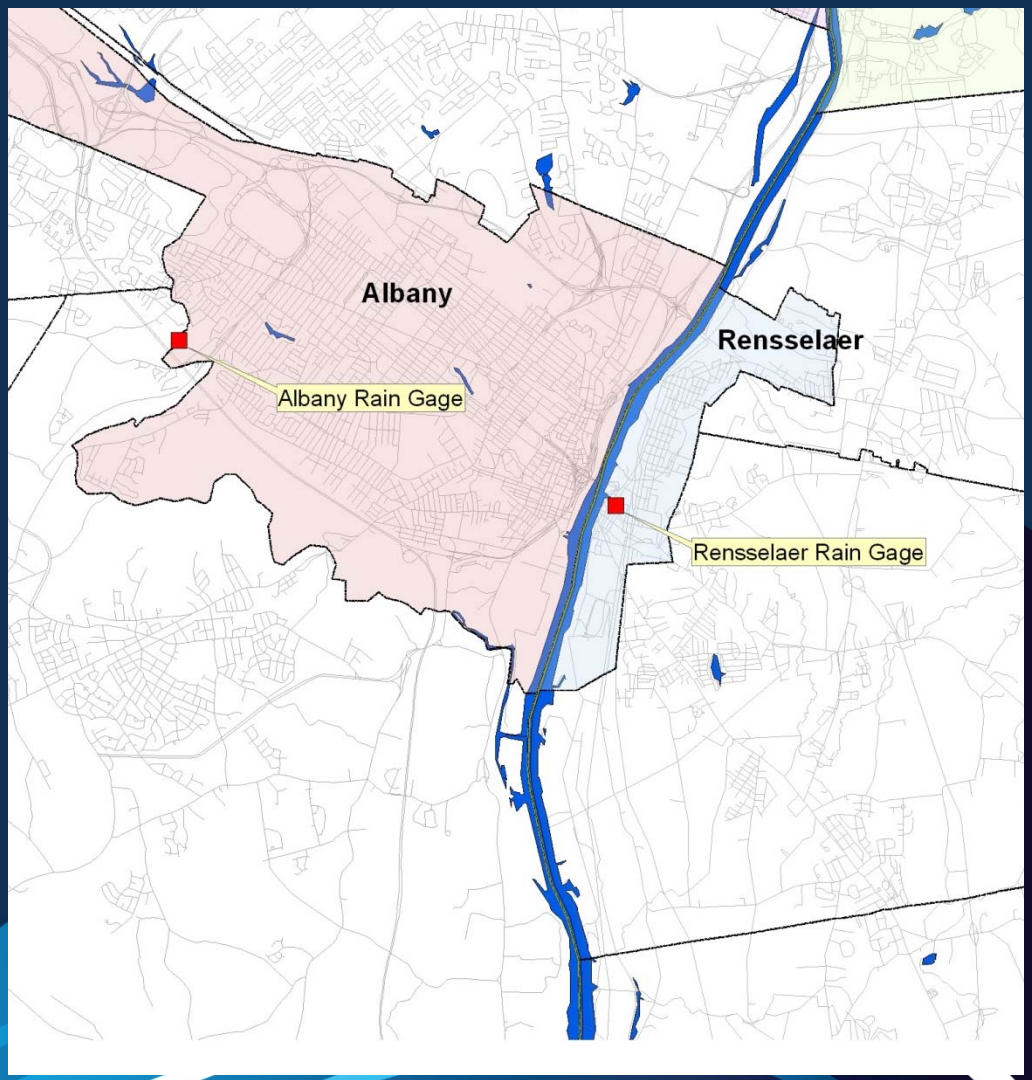
Rain Gages





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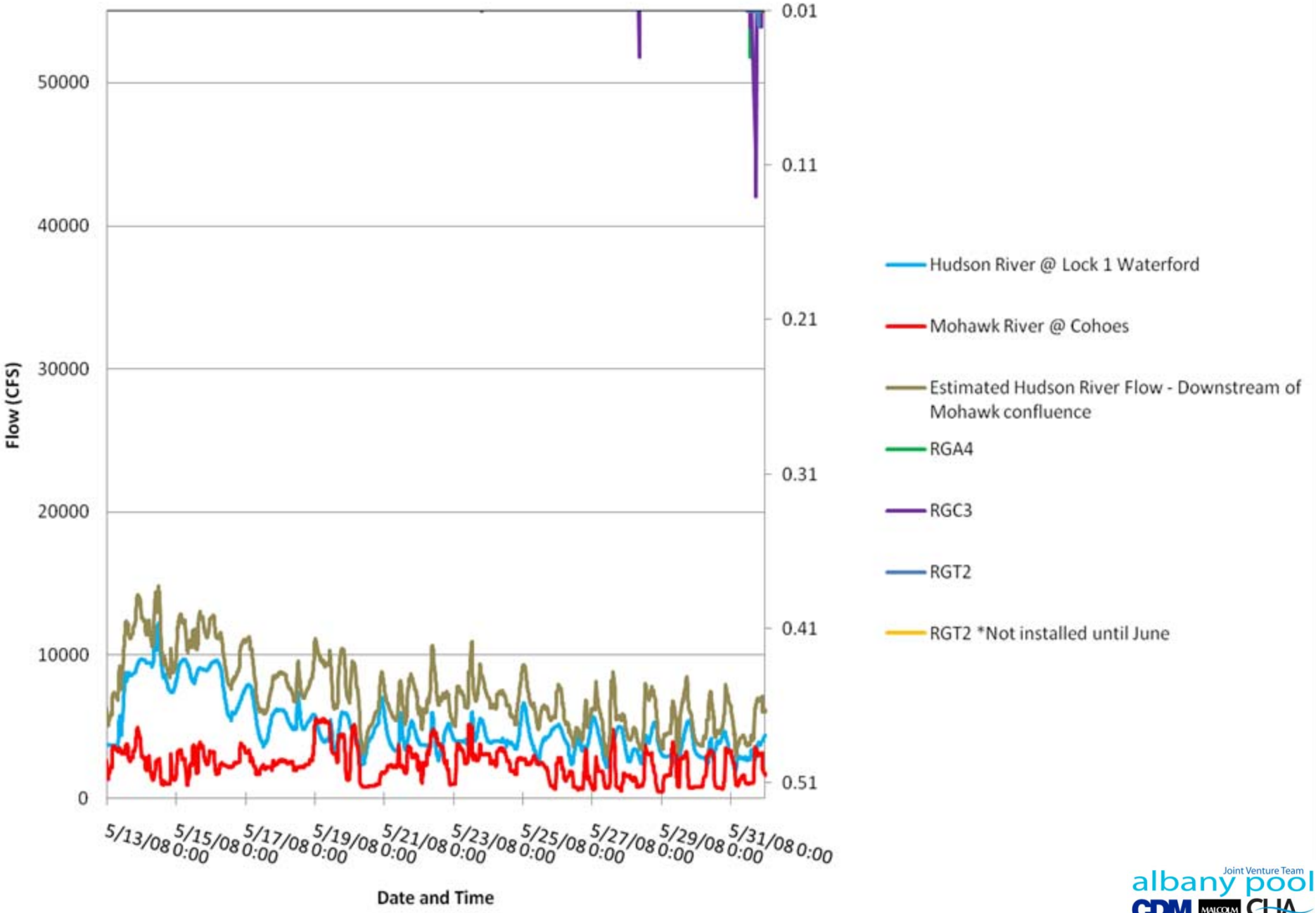
May - Hudson and Mohawk River



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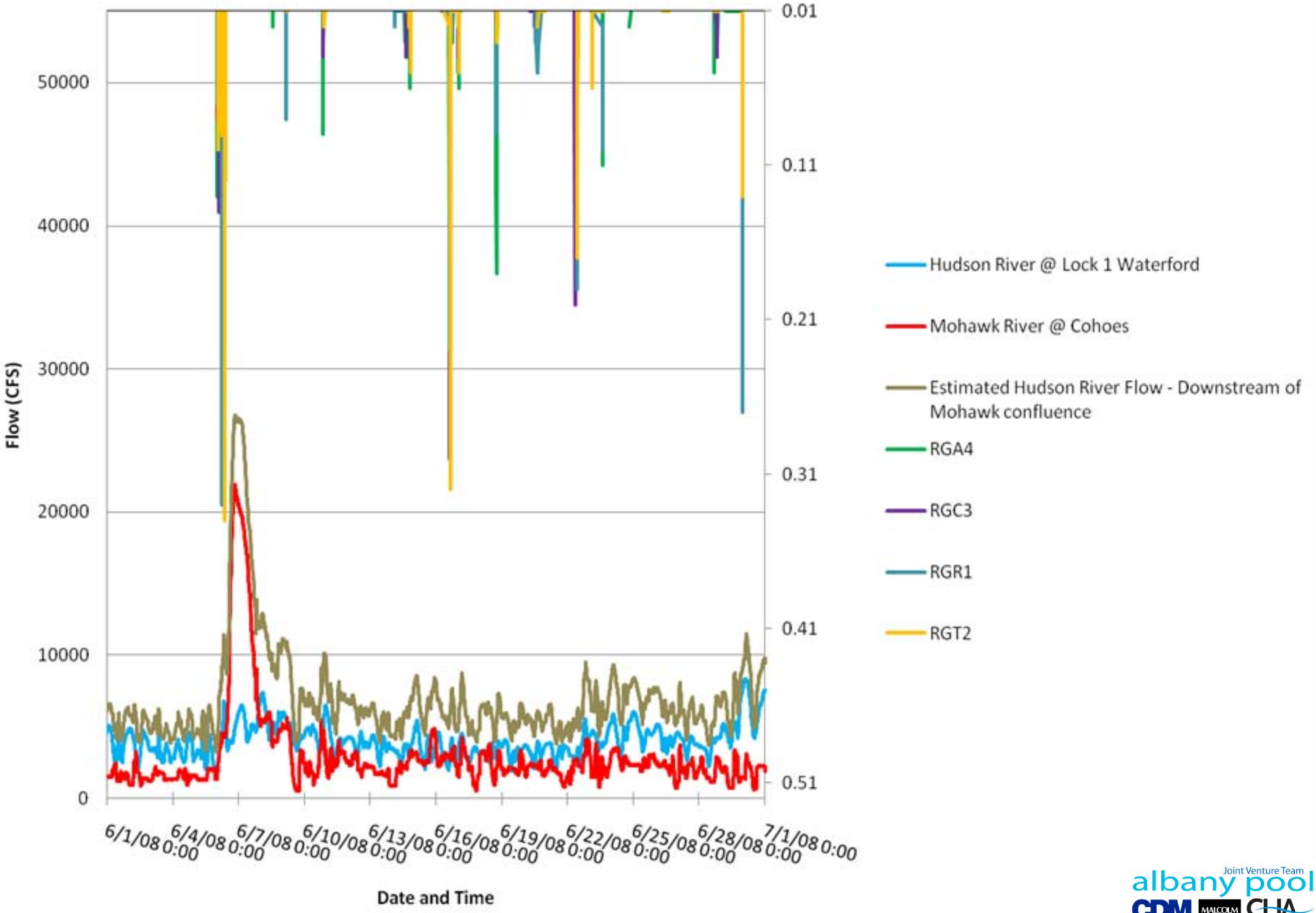
June - Hudson and Mohawk River



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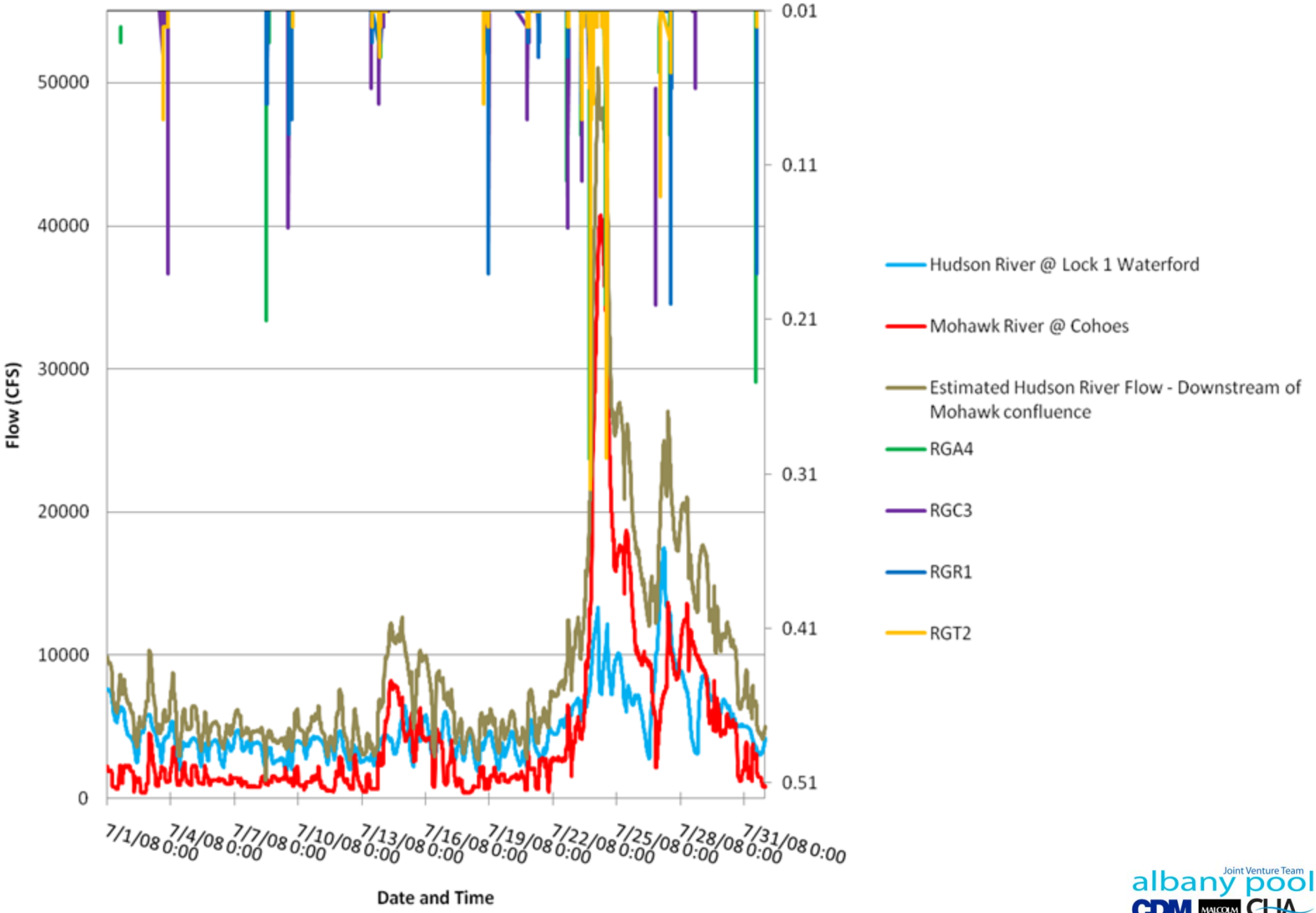
July - Hudson and Mohawk River



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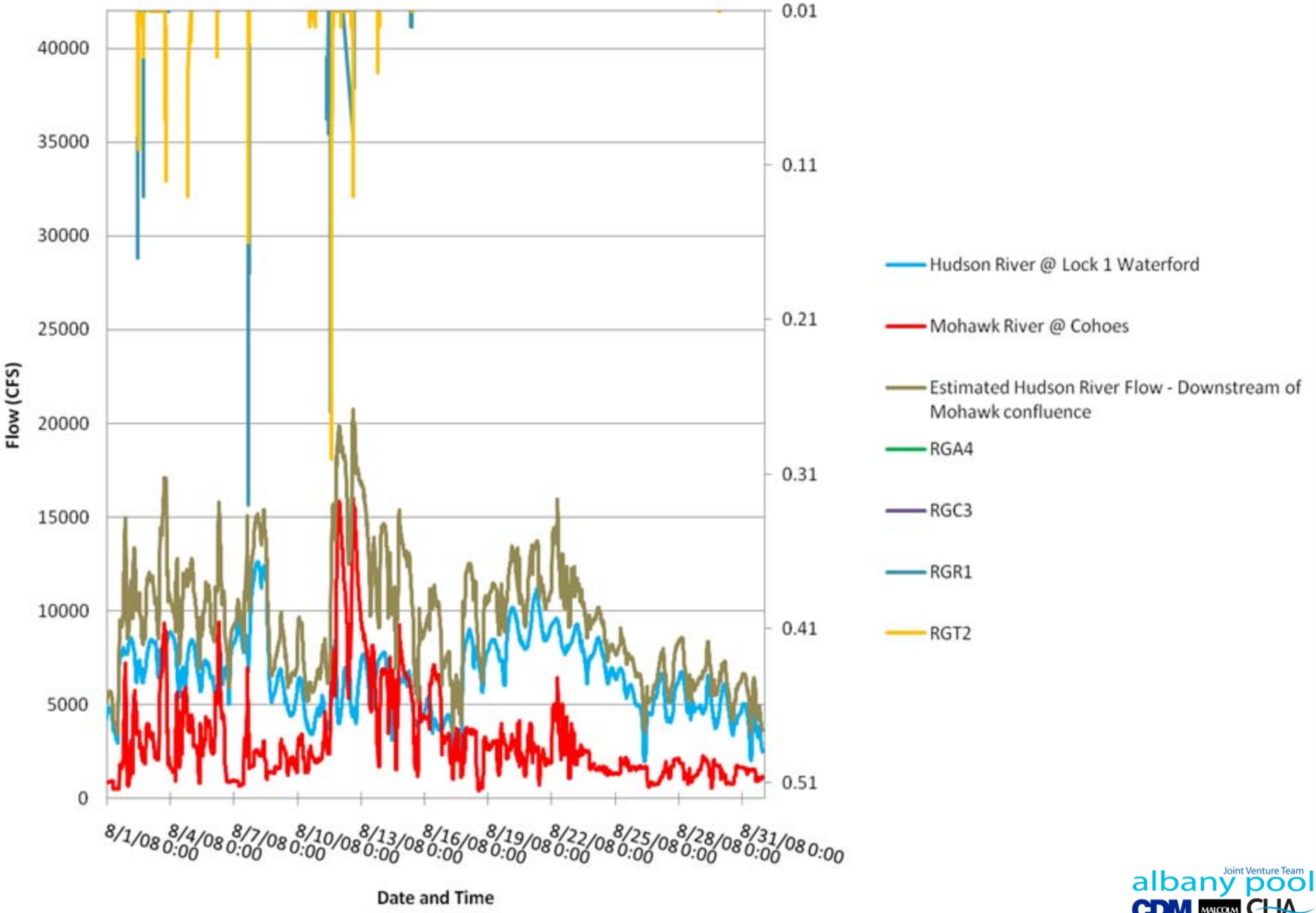
August - Hudson and Mohawk River



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Dry Weather Sampling Events

Dry Event No.	Date	Time	Hudson River @ Lock 1 Waterford (cfs)	Mohawk River @ Cohoes (cfs)	Hudson River @ Federal Dam (1) (cfs)	Hudson River Tide @ Albany Port (feet)	Tide
1	5/13/08	08:00	3869	3395	7264	2.38	Flow
2	5/14/08	08:00	9345	1244	10589	0.47	Low
3	5/15/08	08:00	9345	909	10254	0.00	Low
4	5/16/08	08:00	8502	2419	10921	-0.27	Low
5	5/27/08	10:00	2169	739	2909	3.54	High
6	5/28/08	10:00	2474	924	3397	2.10	High
7	5/29/08	08:00	2796	3899	6695	1.82	Flow
8	5/31/08	00:00	3136	3300	6436	4.53	High
9	6/04/08	12:00	2632	1429	4061	-1.55	Low
10	6/26/08	15:00	4182	1684	5866	-0.73	Low
11	6/27/08	12:00	3385	2404	5789	2.73	Ebb
12	6/28/08	12:00	2930	1202	4132	3.67	High
13	7/07/08	11:00	3494	1148	4642	1.13	Ebb
14	7/17/08	08:00	3385	2662	6047	0.81	Ebb
15	7/18/08	08:00	2600	833	3433	1.10	Ebb

(1) Estimated based on the sum of Hudson river and Mohawk River Flows

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Bacteria Standards

- NYS Standard for Class A, B and C Waters for Fecal Coliform
  - Geometric Mean of 5 samples < 200 cfu/100ml
- USEPA Proposed Standard for E. Coli
  - Geometric Mean of 5 samples < 126 cfu/100ml
  - Single Sample Maximum < 235 cfu/100ml 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 are well mixed laterally
- Hudson and Mohawk Rivers are 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
- June 4 anomaly
- Beaches are in compliance with fecal coliform standards

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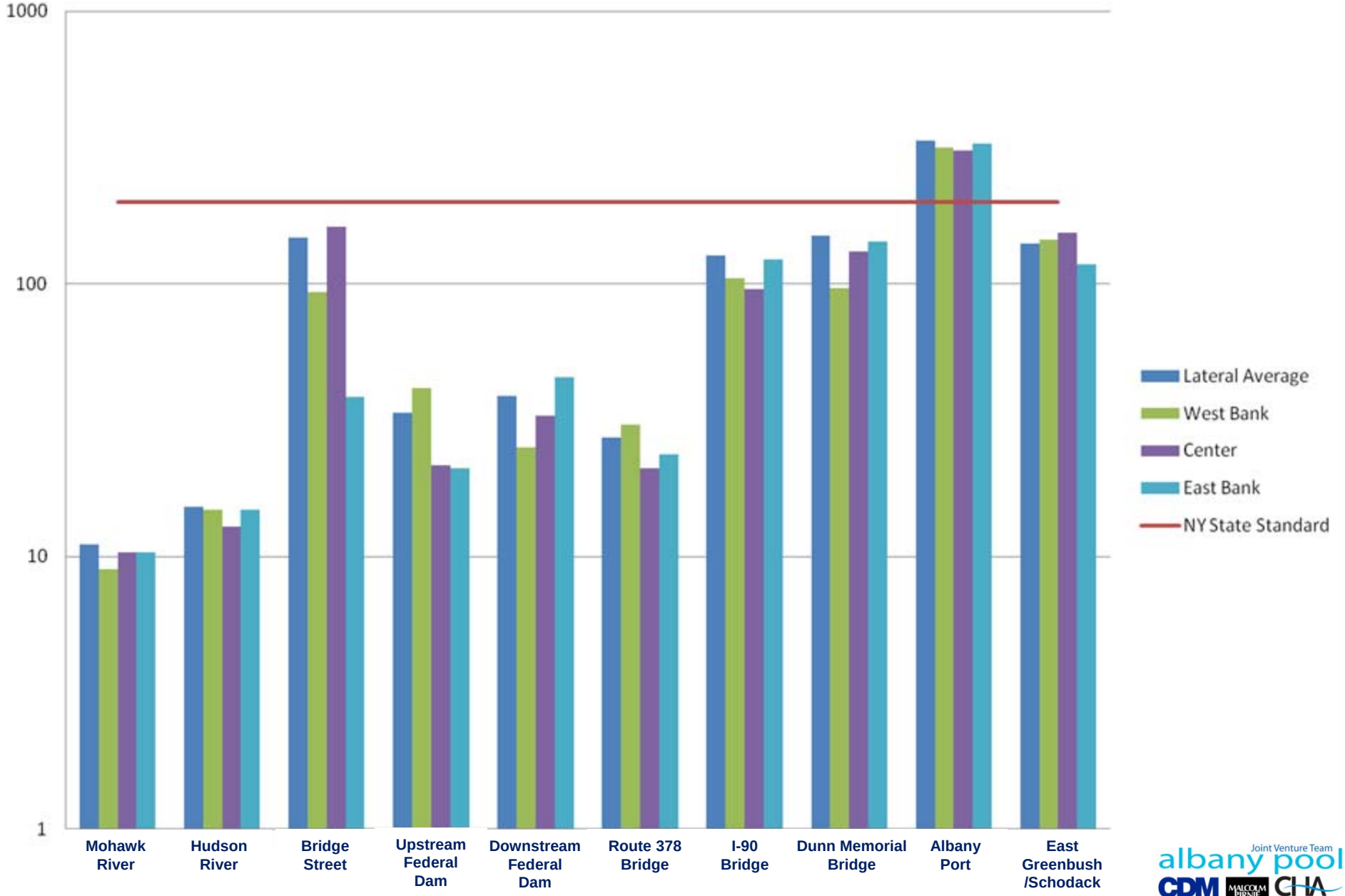
River Transects - Fecal Coliform

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



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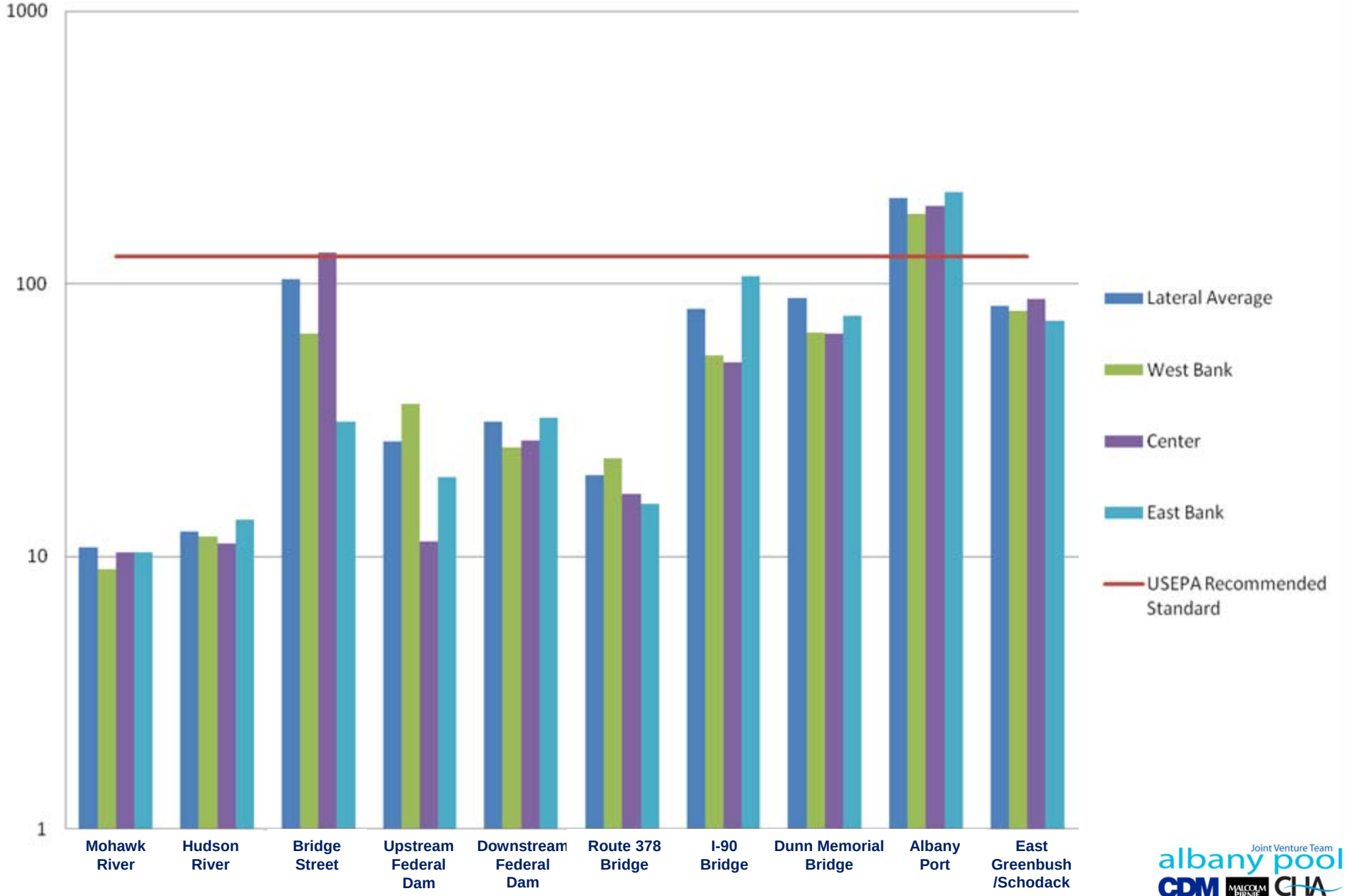
River Transects - E.Coli

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



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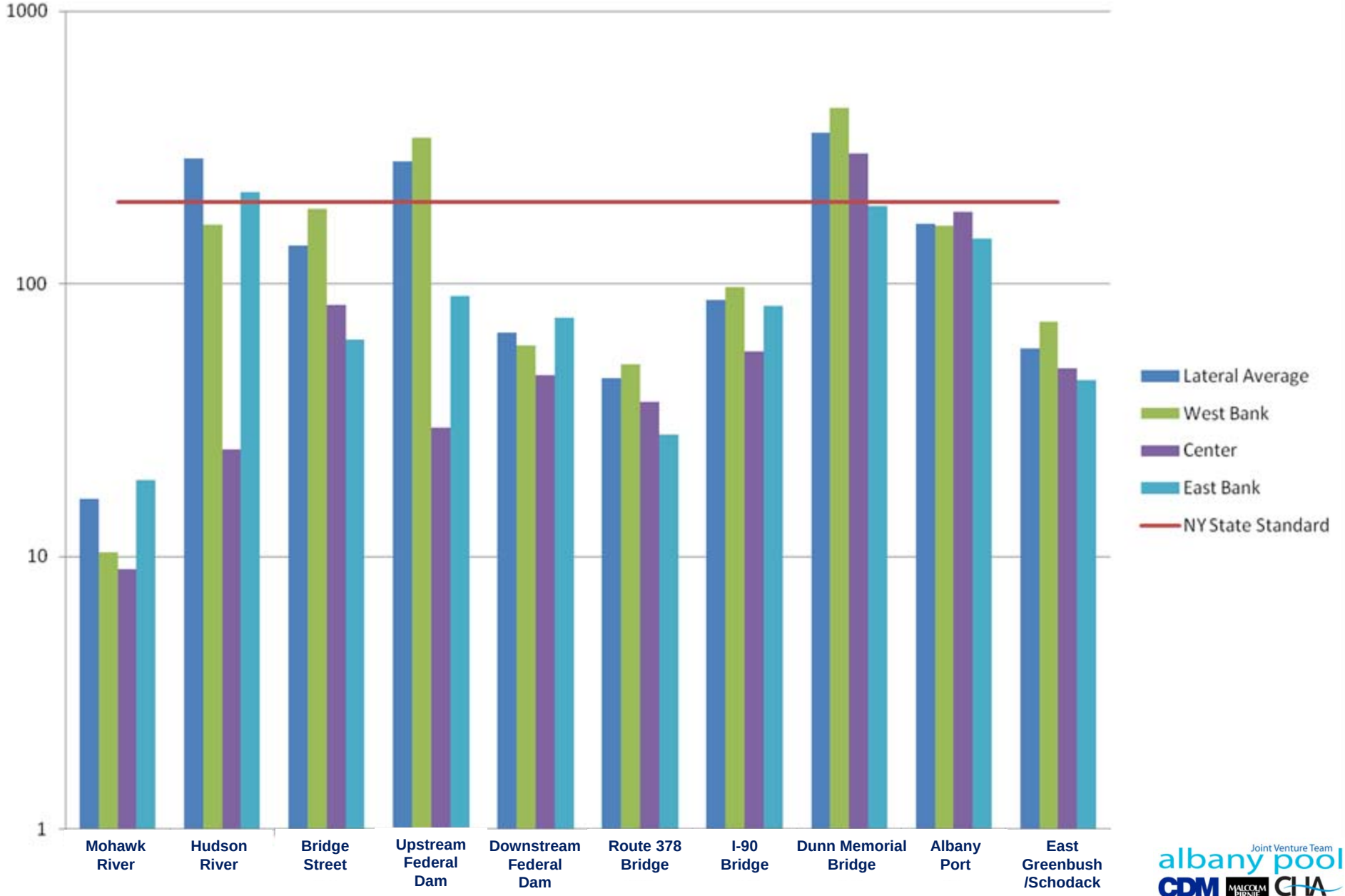
River Transects - Fecal Coliform

Second 30 day Period (5/28/2008 - 6/26/2008)



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Dry Weather Fecal Coliform Data
River Transects

	5/13	5/14	5/15	5/16	5/27	5/28	5/29	5/31	6/4	6/26	6/27	6/28	7/7	7/17	7/18
A-RT1	12	11	14	9	9	47	9	11	18	14	16	14	9	18	11
B-RT3	15	12	9	33	15	126	9	9	554860	343	132	48	33	45	30
A-RT2	54	33	69	24	23308	2382	103	60	63	54	72	90	54	3516	815
B-RT4	34	18	23	32	101	34	90	38	61768	240	140	68	134	50	43
C-RT5	27	39	56	27	54	52	42	30	122	158	146	48	141	86	25
C-RT6	21	20	45	24	33	24	27	32	60	154	96	75	177	93	27
C-RT7	477	132	72	102	72	75	60	60	126	146	39	52	105	206	42
C-RT8	264	145	114	284	63	179	375	413	664	323	129	333	99	764	51
C-RT9	260	413	240	520	313	154	273	105	247	117	129	144	78	120	87
C-R10	99	213	156	137	123	51	48	36	84	87	57	27	57	102	45

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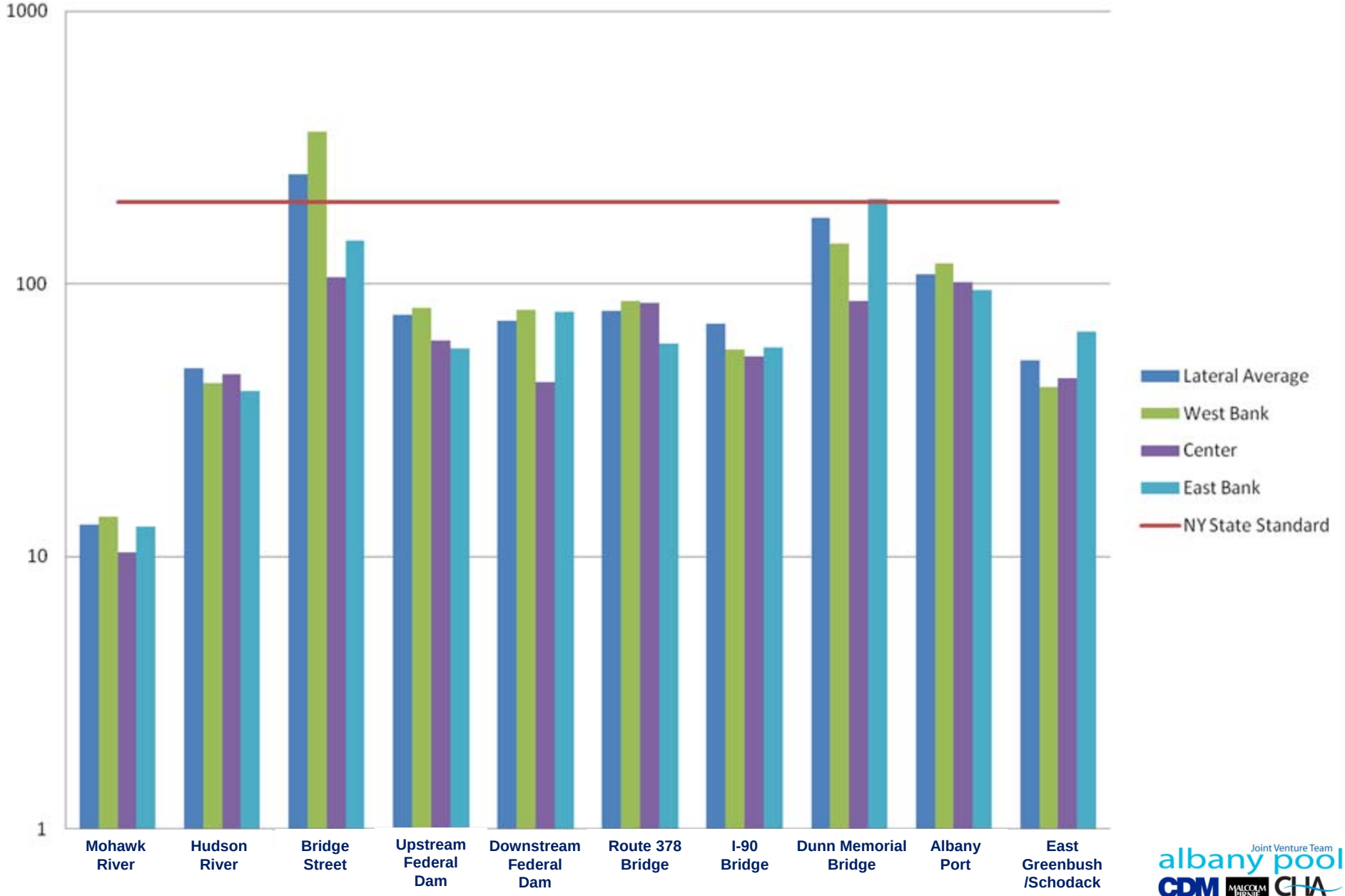
River Transects - Fecal Coliform

Third 30 day Period (6/27/2008 - 7/18/2008)



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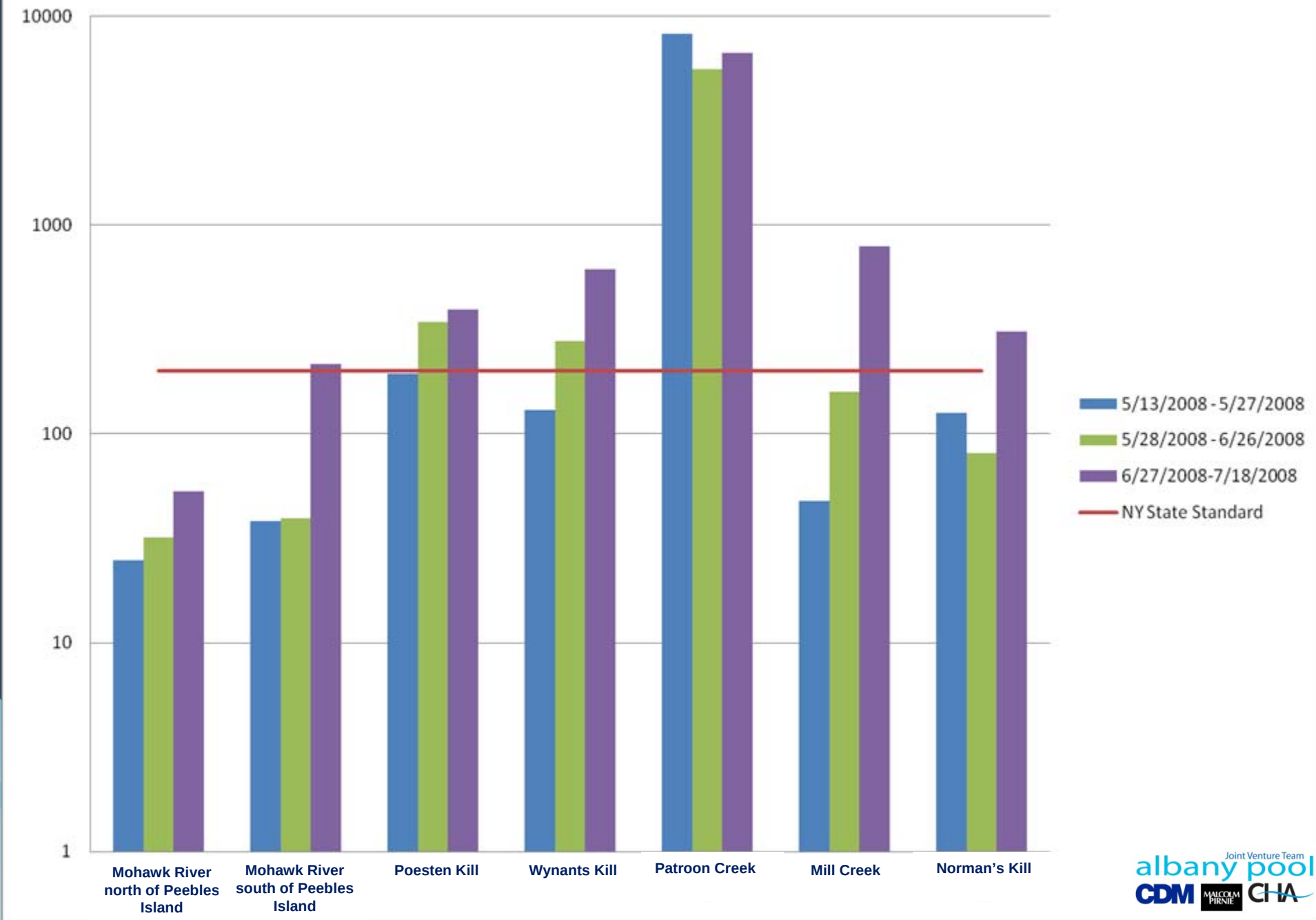
Tributaries-Fecal Coliform



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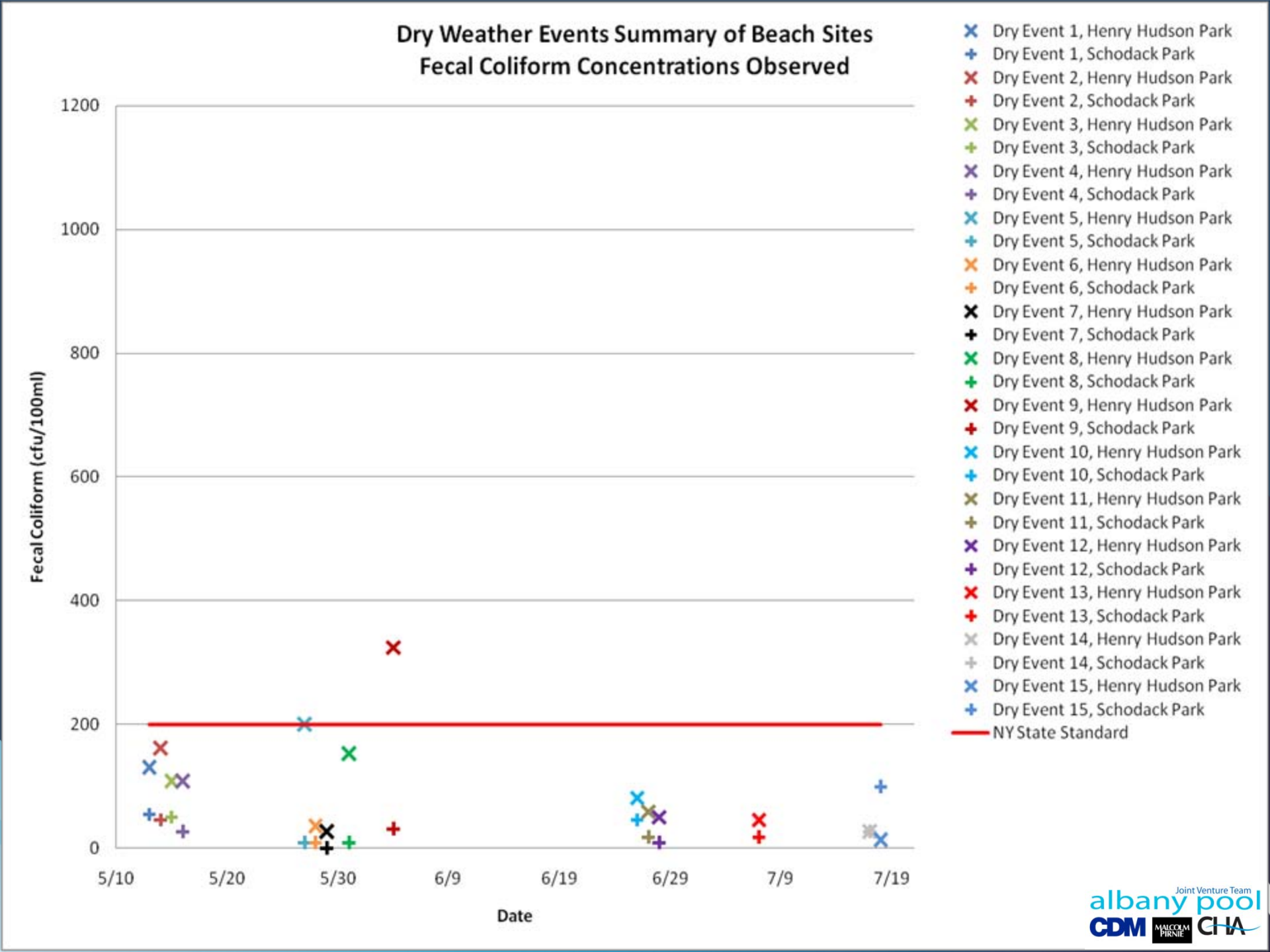

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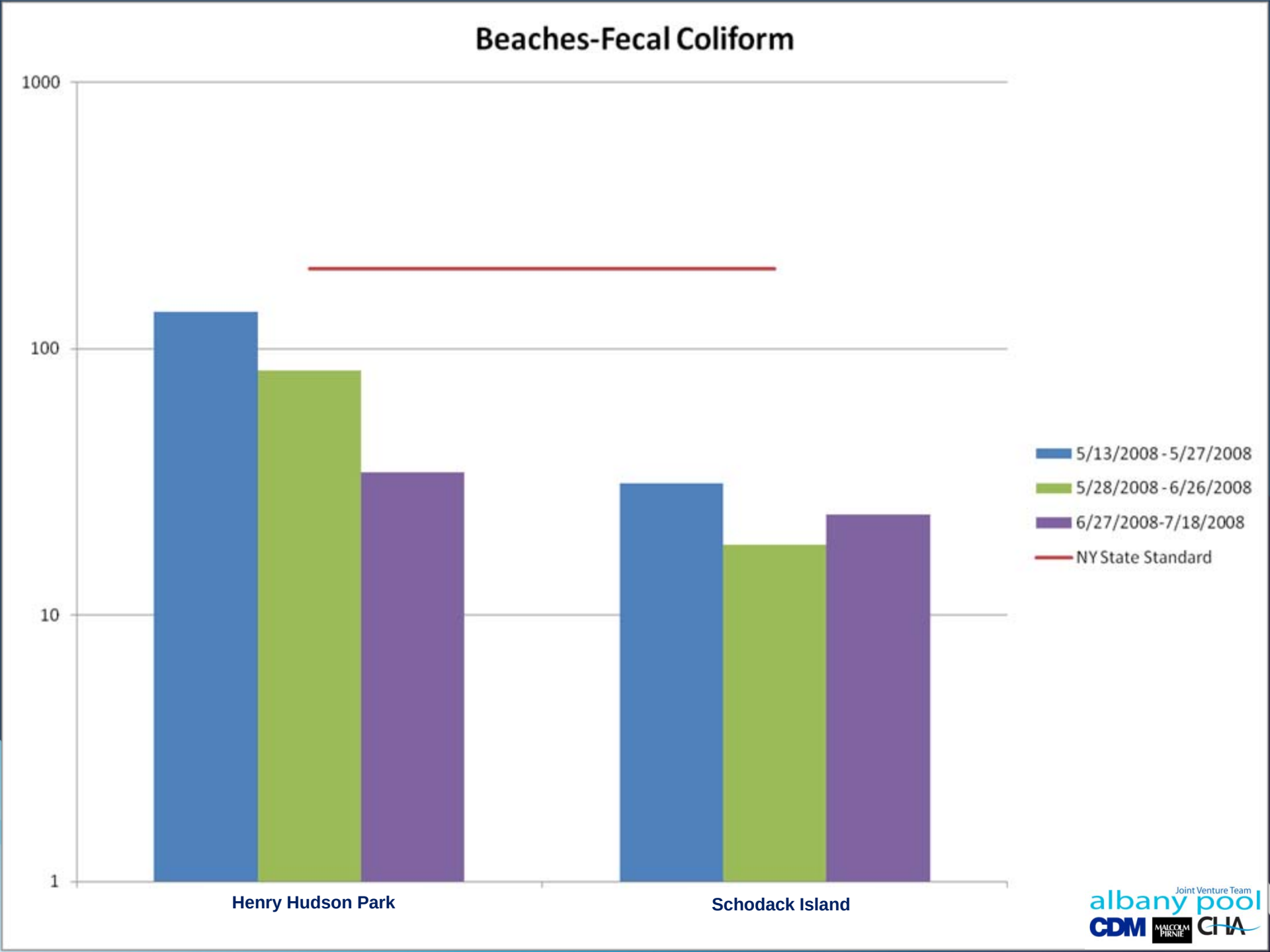
Beaches-Fecal Coliform



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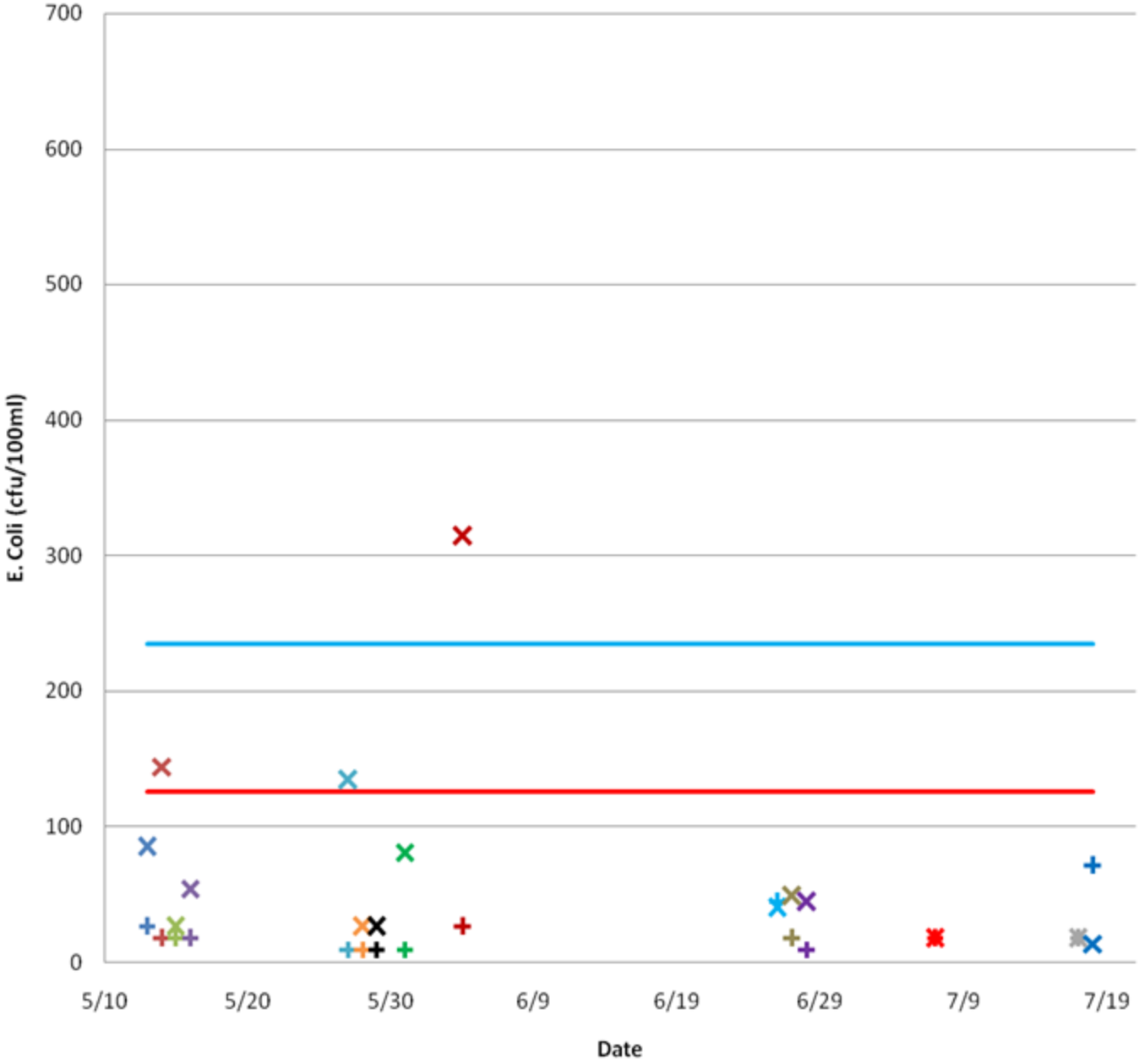
Dry Weather Events Summary of Beach Sites
E. Coli Concentrations Observed



- 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
- USEPA Geometric Mean
- USEPA SSM for Beaches

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WWTPs - Bacteria

Table 4-9
Dry Weather Fecal coliform concentration (cfu/100ml) in Wastewater samples

WWTP	5/13	5/14	5/15	5/16	5/27	5/28	5/29	5/31	6/4	6/26	6/27	6/28	7/7	7/17	7/18
Waterford	838964	5300	6757	4400	24000	3400	2,800	7748	4600	9730	27000	9910	66364	41000	990000
Rensselaer	58000	60000	44000	48000	10000	24000	2,900	1818	23000	4600	3600	1305	1026	10631	3800
Albany North	135454	24000	9730	8829	11818	28000	9,459	8468	80909	16396	9369	7748	56000	200000	9820
Albany South	3000	2000	3100	5000	43000	31000	6,757	32000	70909	20000	10631	7297	33000	9099	5700
East Greenbush	52000	51000	83636	71727	35000	5600	864	91818	61818	100909	380000	590000	32000	100000	40815

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Dry-Weather Implications on LTCP Program

- River is Well Mixed
  - 1-D model for fecal coliform loading can be utilized to assess control alternatives
    - WWTP disinfection
    - Patroon Creek , Wynants Kill and Poesten Kill impact
- Beaches are in compliance with fecal coliform standards

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Wet Weather Sampling Events

Wet Event No.	Sample Start Time	Cumulative Precipitation @ Albany Airport (inches)	Hudson River @ Lock 1 Waterford[1] (cfs)	Mohawk River @ Cohoes[1] (cfs)	Hudson River @ Federal Dam [1] [2] (cfs)	Patroon Creek @ Northern Blvd[1] (cfs)	Sampling Duration (hours)
1	5/31/08 15:00	0.18	⟷ 7886	2511	10398	20	48
2	6/28/08 16:00	0.19	5417	1856	7273	27	48
3	7/08/08 11:00	0.32	3107	1295	4402	22	48
4	7/13/08 12:00	1.13	⟷ 3988	4719	8707	39	48

(1) Flows are time averaged over duration of the sampling event
(2) Estimated based on the sum of Hudson river and Mohawk River Flows

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Wet Weather Summary

- Fecal Coliform and E. Coli exhibit similar trends
- River is well mixed laterally
- Hudson and Mohawk Rivers are generally in compliance with fecal coliform standards at upstream limits of study
- Larger storms result in greater fecal counts

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Wet Weather Summary, Continued

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

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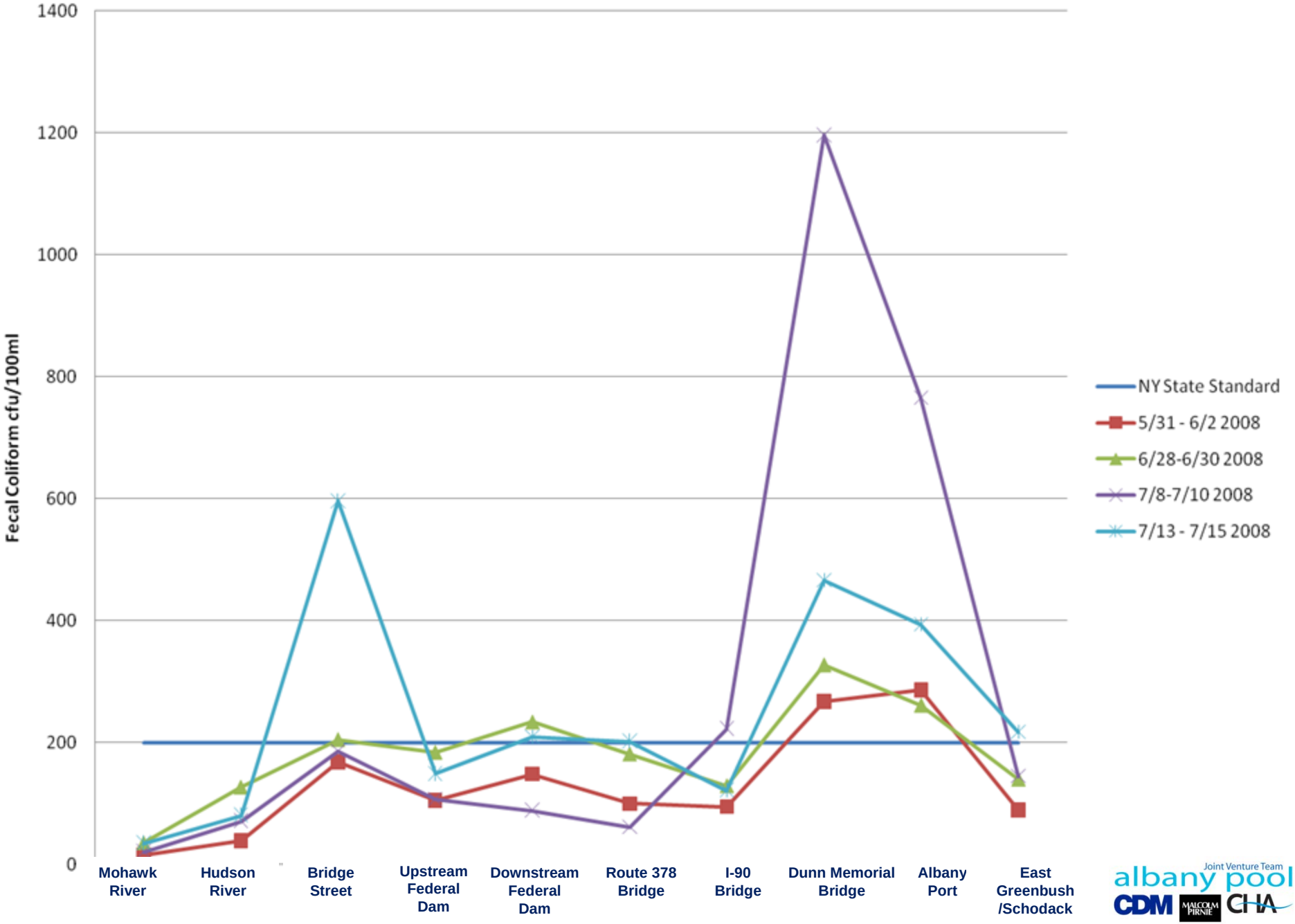
Fecal Coliform Geometric Mean of Wet Weather Events



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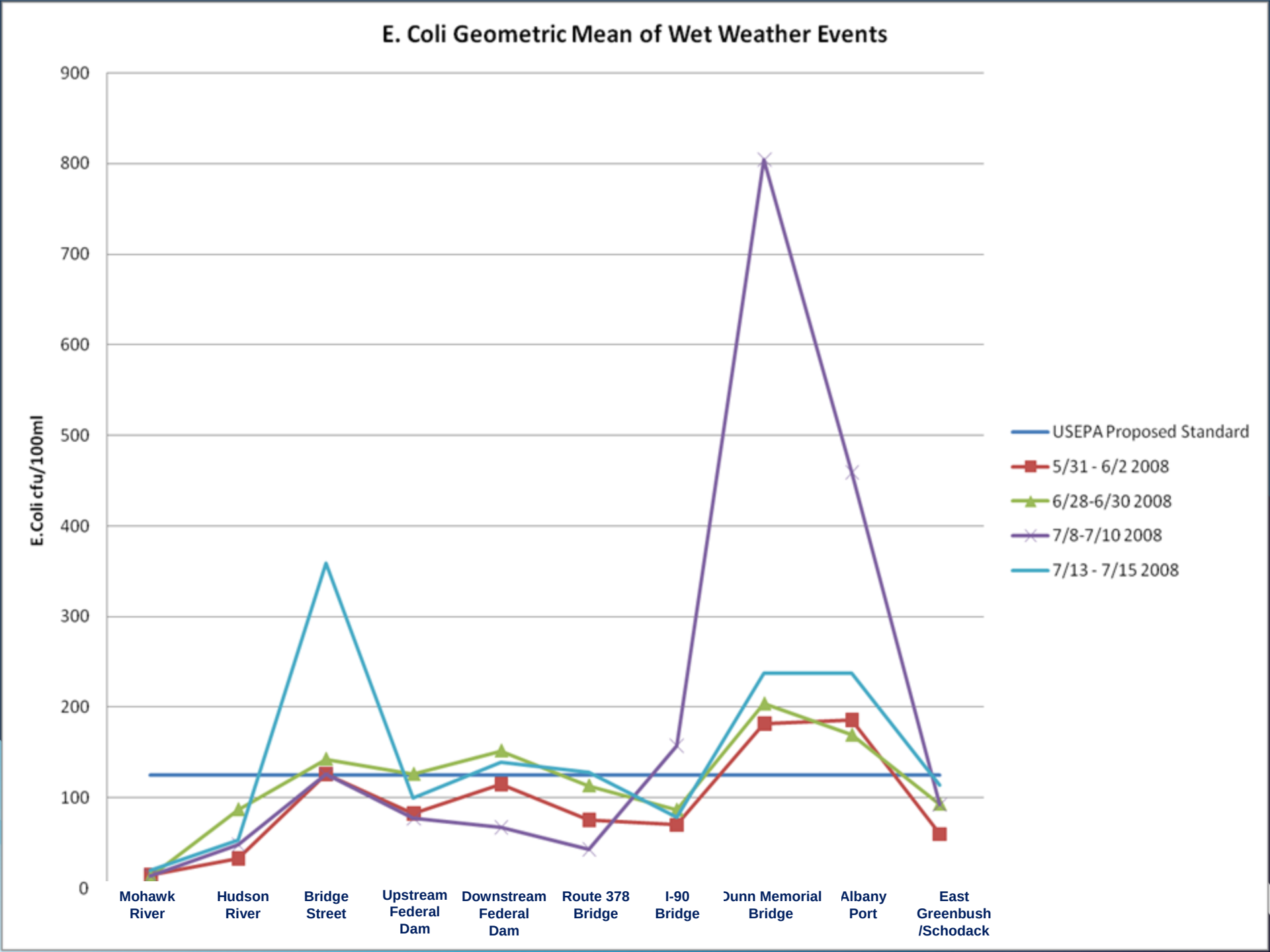
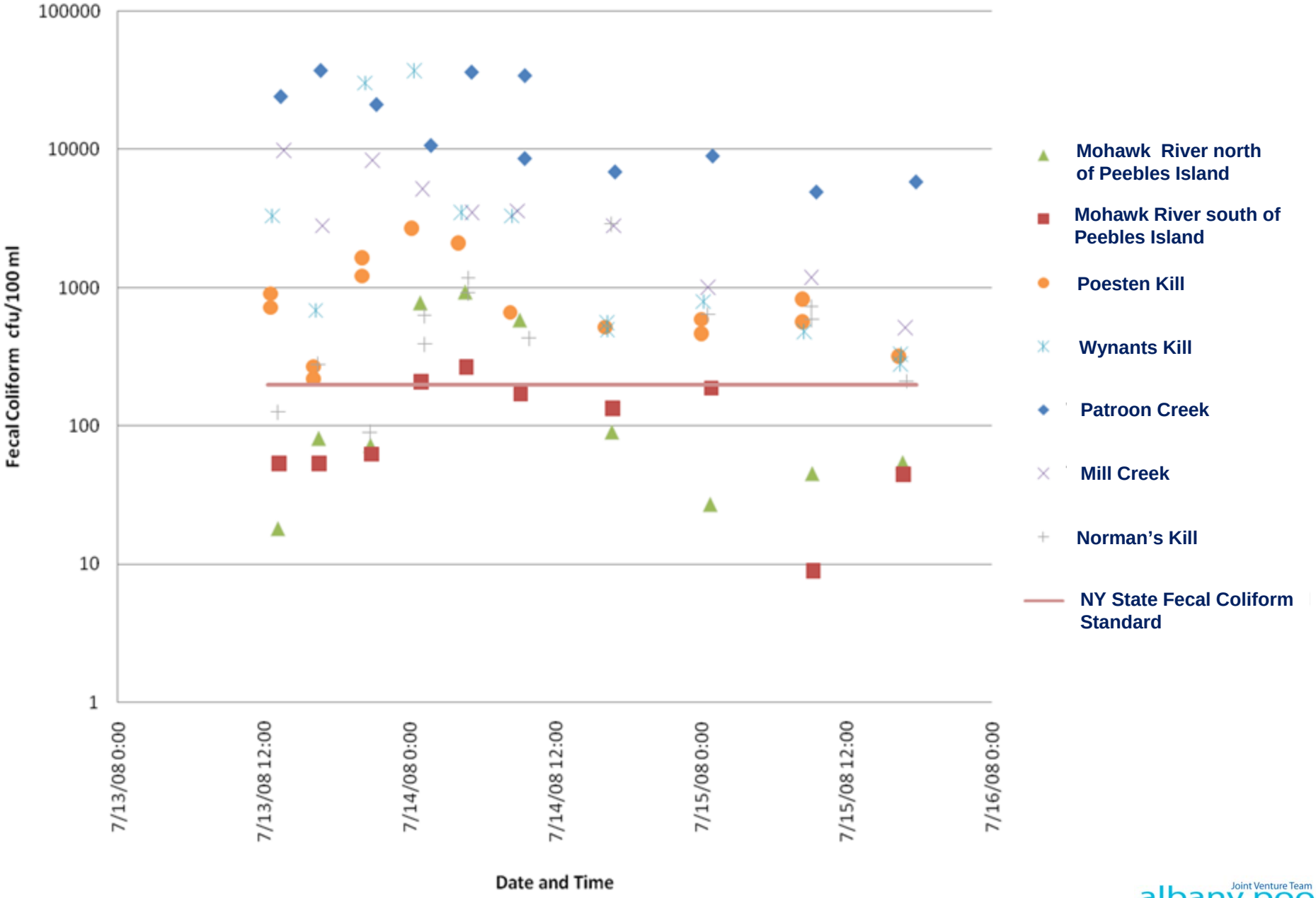

E. Coli Geometric Mean of Wet Weather Events
E.Coli cfu/100ml
900
800
700
600
500
400
300
200
100
0
Mohawk River
Hudson River
Bridge Street
Upstream Federal Dam
Downstream Federal Dam
Route 378 Bridge
I-90 Bridge
Dunn Memorial Bridge
Albany Port
East Greenbush /Schodack
USEPA Proposed Standard
5/31 - 6/2 2008
6/28-6/30 2008
7/8-7/10 2008
7/13 - 7/15 2008

Event 4 Summary of Fecal Coliform in Tributary samples



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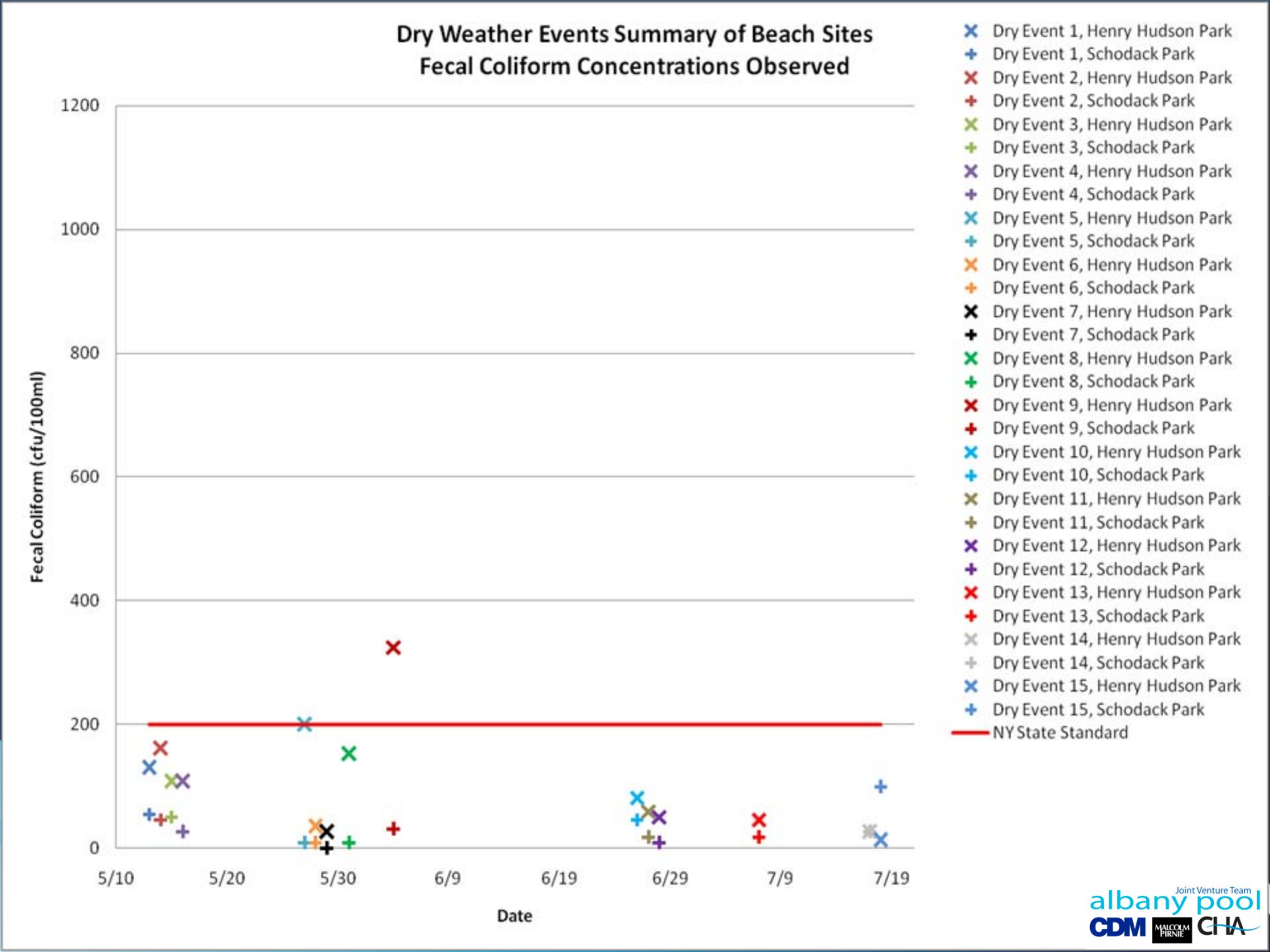

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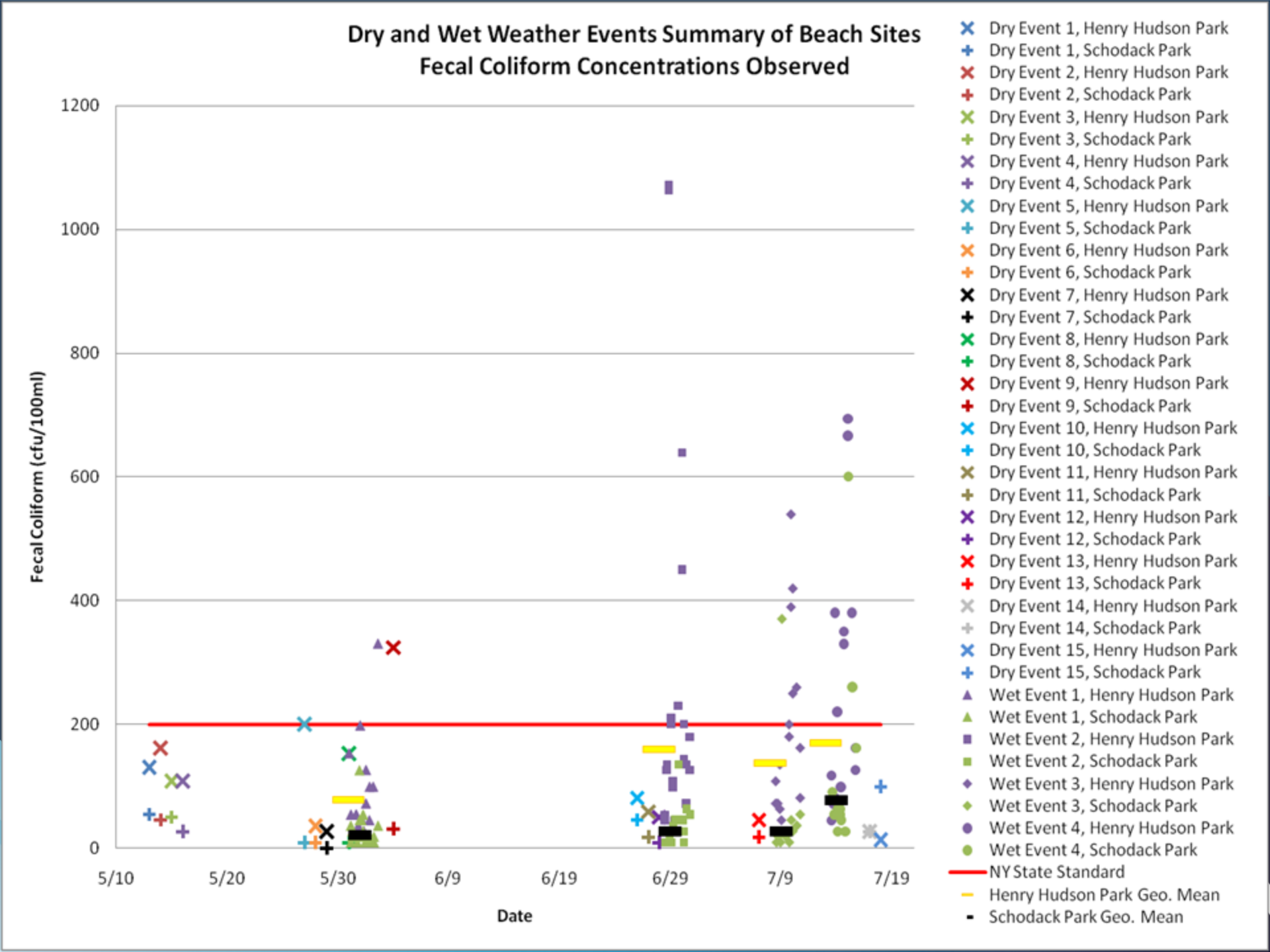
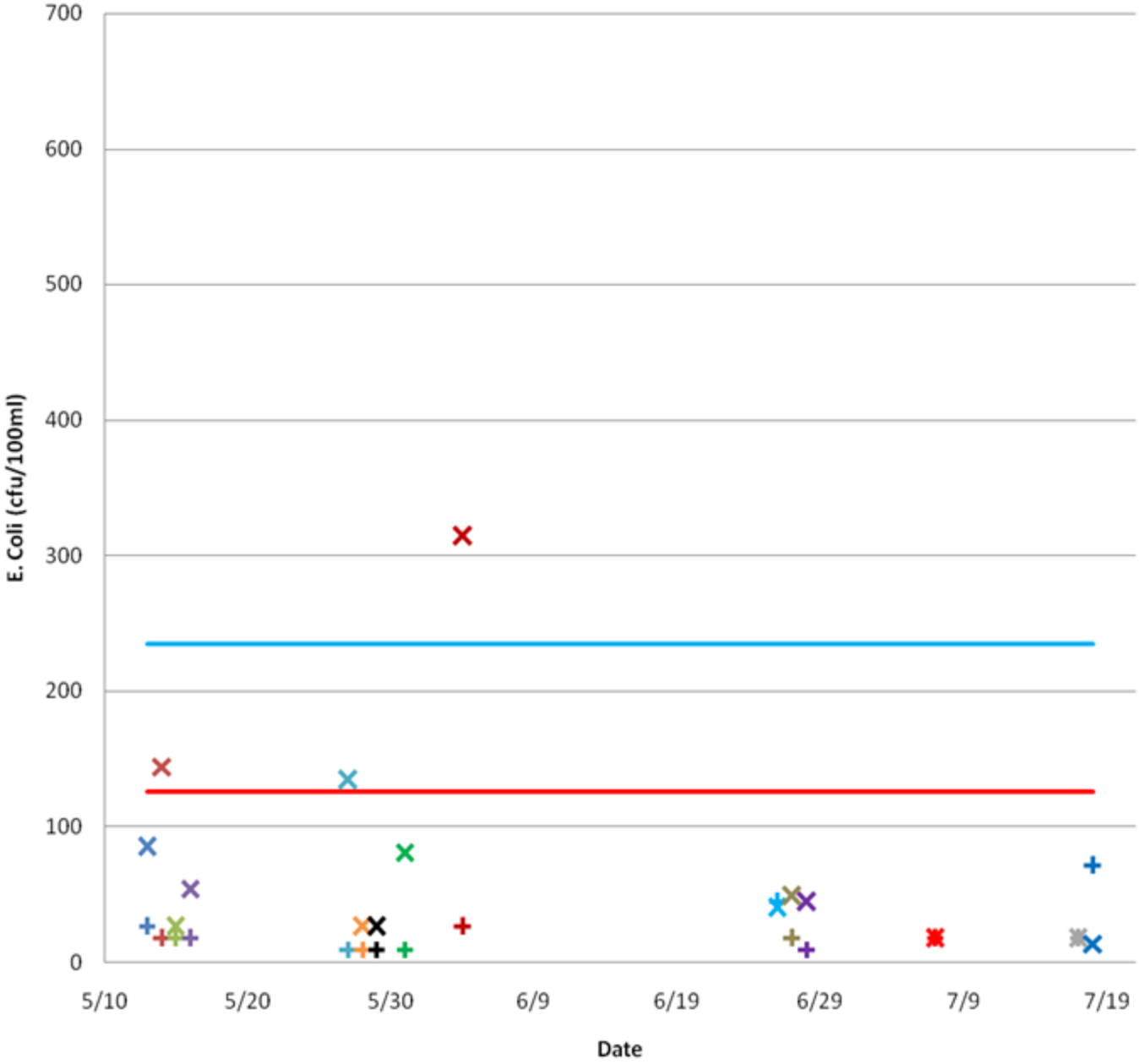

Dry and Wet Weather Events Summary of Beach Sites
Fecal Coliform Concentrations Observed
Fecal Coliform (cfu/100ml)
1200
1000
800
600
400
200
0
5/10
5/20
5/30
6/9
6/19
6/29
7/9
7/19
Date
Dry Event 1, Henry Hudson Park
Dry Event 1, Schodack Park
Dry Event 2, Henry Hudson Park
Dry Event 2, Schodack Park
Dry Event 3, Henry Hudson Park
Dry Event 3, Schodack Park
Dry Event 4, Henry Hudson Park
Dry Event 4, Schodack Park
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
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

Dry Weather Events Summary of Beach Sites
E. Coli Concentrations Observed



- 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
- USEPA Geometric Mean
- USEPA SSM for Beaches

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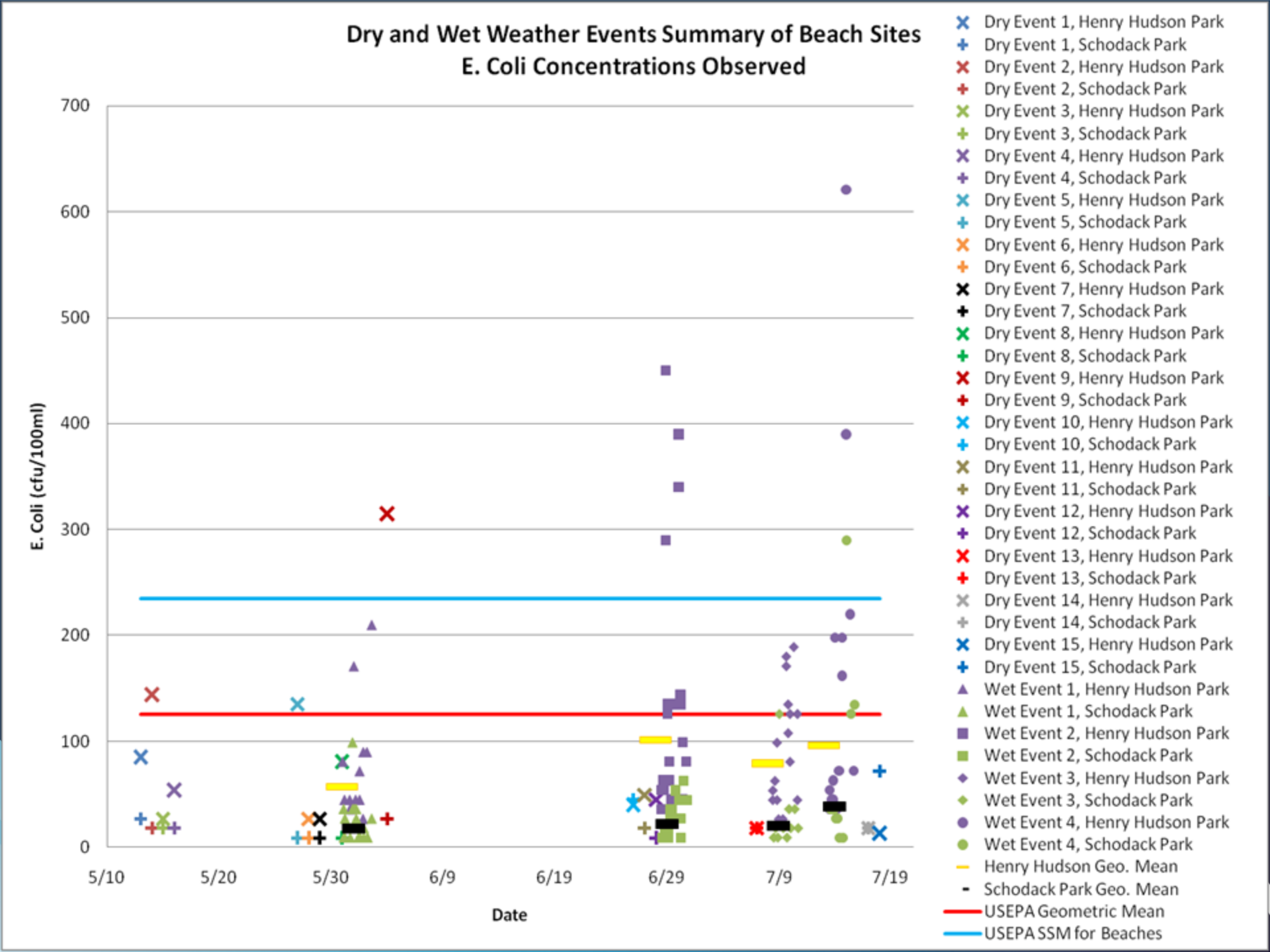
Dry and Wet Weather Events Summary of Beach Sites
E. Coli Concentrations Observed
E. Coli (cfu/100ml)
700
600
500
400
300
200
100
0
5/10
5/20
5/30
6/9
6/19
6/29
7/9
7/19
Date
Dry Event 1, Henry Hudson Park
Dry Event 1, Schodack Park
Dry Event 2, Henry Hudson Park
Dry Event 2, Schodack Park
Dry Event 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
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
Henry Hudson Geo. Mean
Schodack Park Geo. Mean
USEPA Geometric Mean
USEPA SSM for Beaches

Field Measured Parameters

- Hand held probe used to capture:
  - Temperature
  - pH
  - Conductivity
  - Dissolved Oxygen

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Other Conclusions

- Temperature, Conductivity, pH all in typical ranges
- Unseasonably low Hudson River spring DO
  - No apparent DO demand through sampling area
  - No apparent impact on DO in study area

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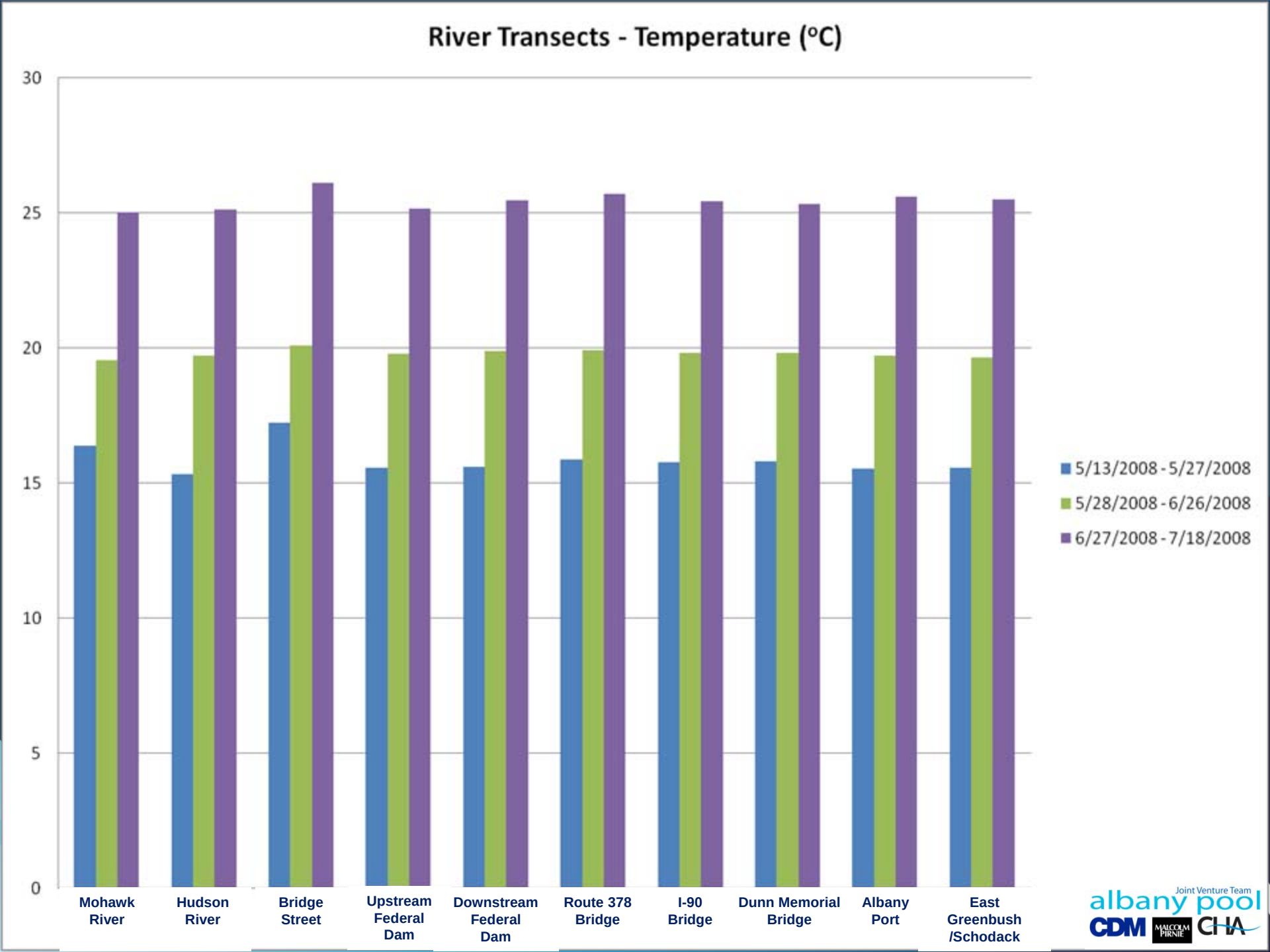
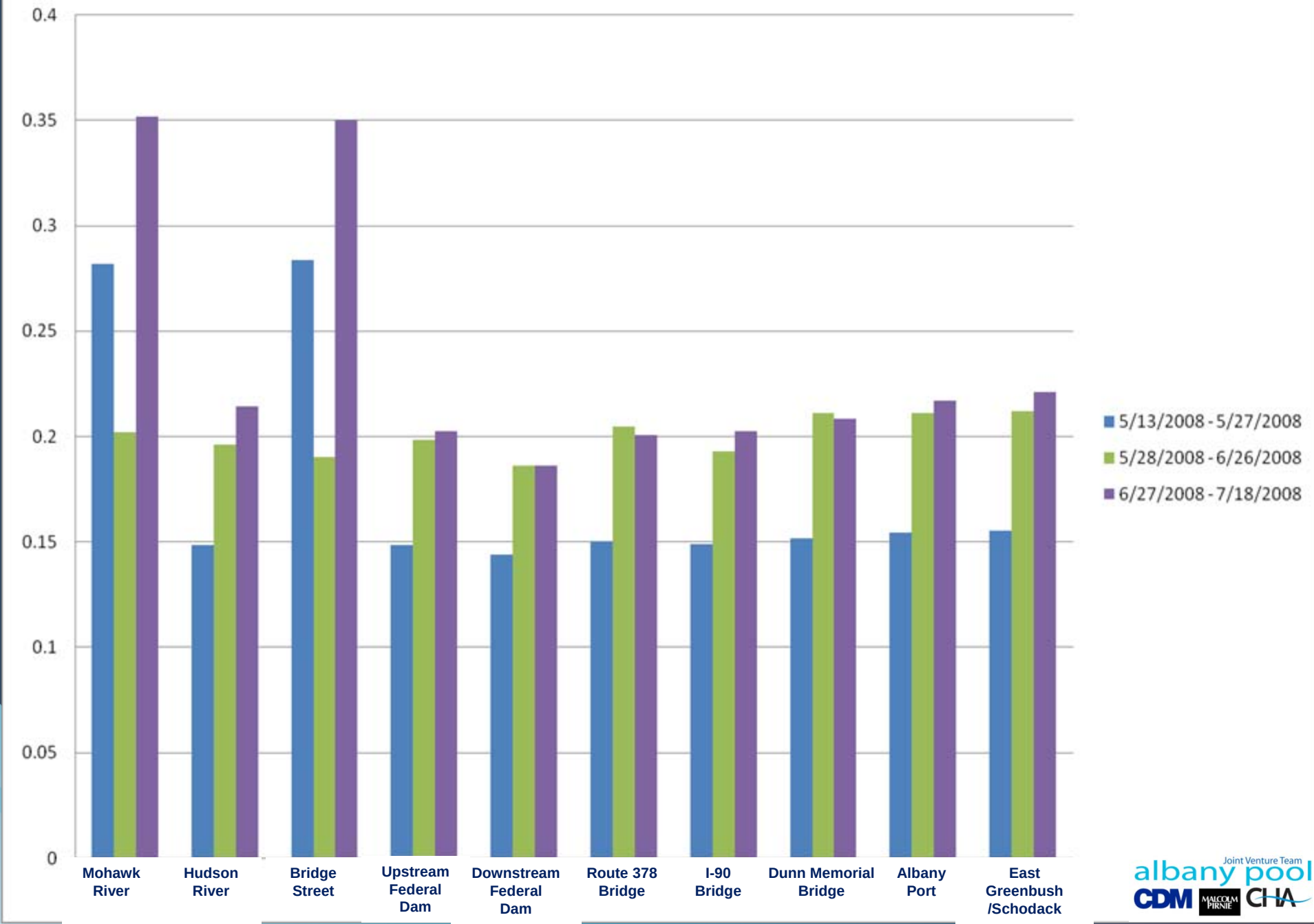


River Transects - Conductivity (mS/cm)



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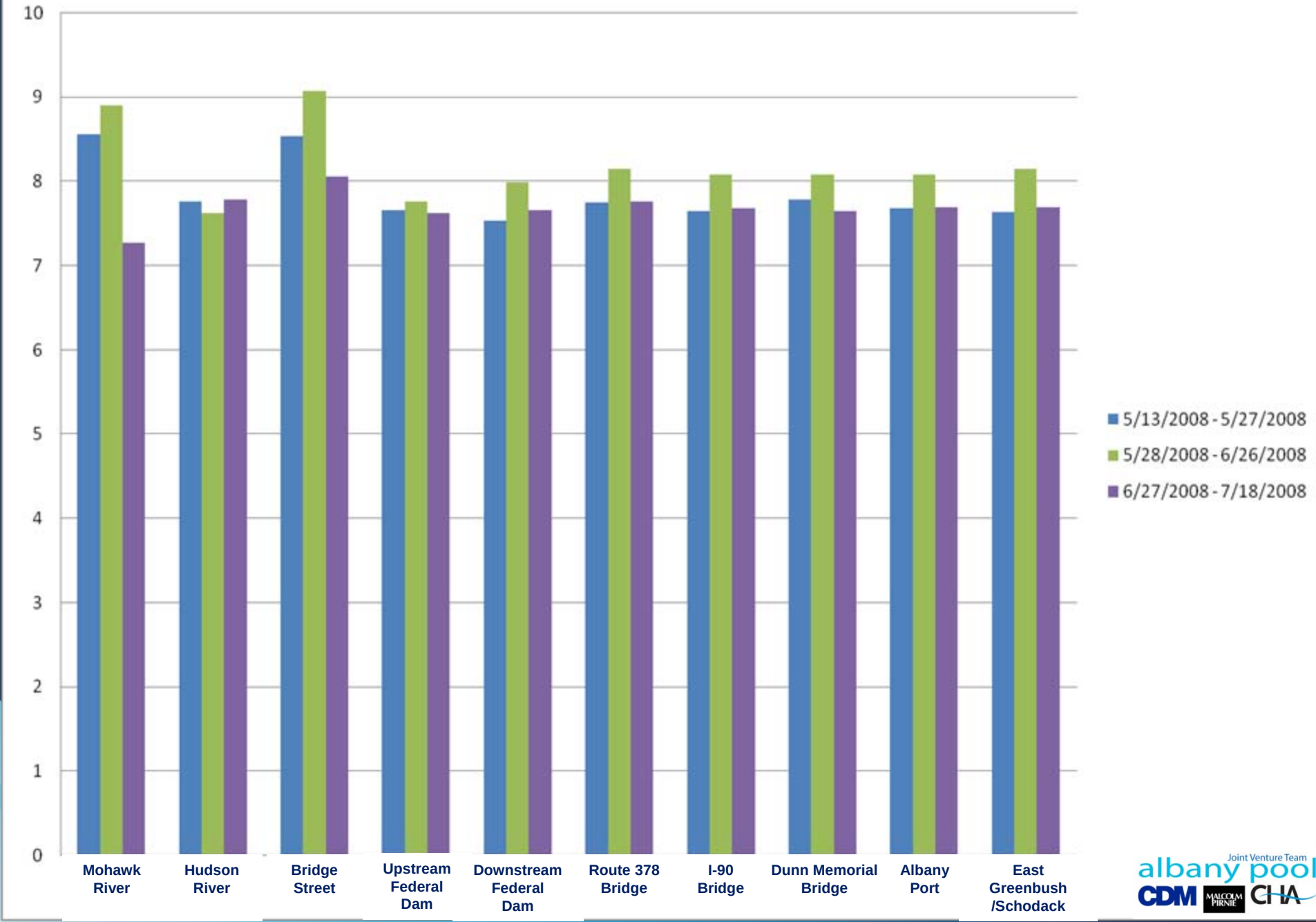
River Transects - pH



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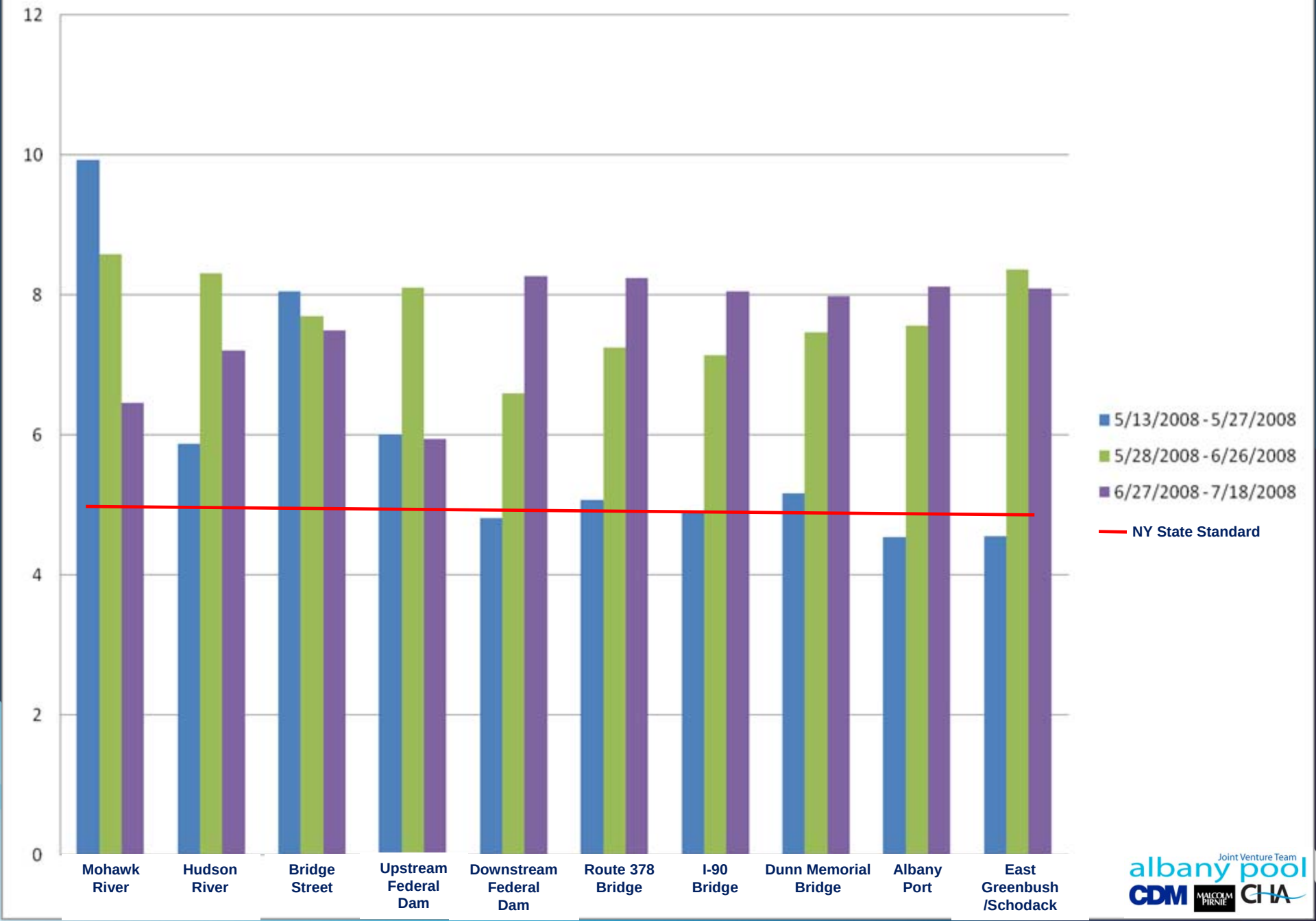
Dry Weather River Transects – Dissolved Oxygen (mg/l)



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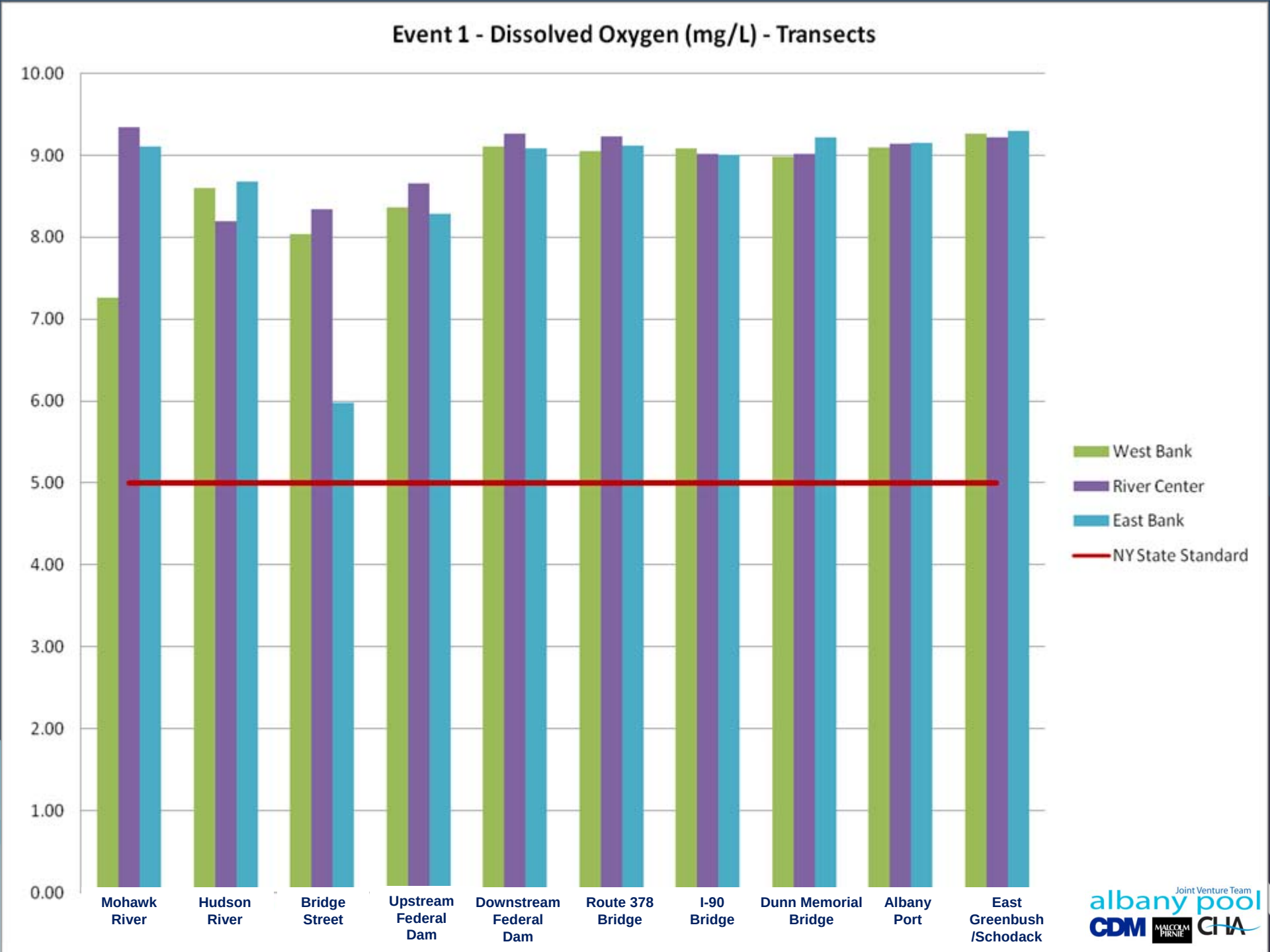
Event 1 - Dissolved Oxygen (mg/L) - Transects
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
West Bank
River Center
East Bank
NY State Standard
Mohawk River
Hudson River
Bridge Street
Upstream Federal Dam
Downstream Federal Dam
Route 378 Bridge
I-90 Bridge
Dunn Memorial Bridge
Albany Port
East Greenbush /Schodack
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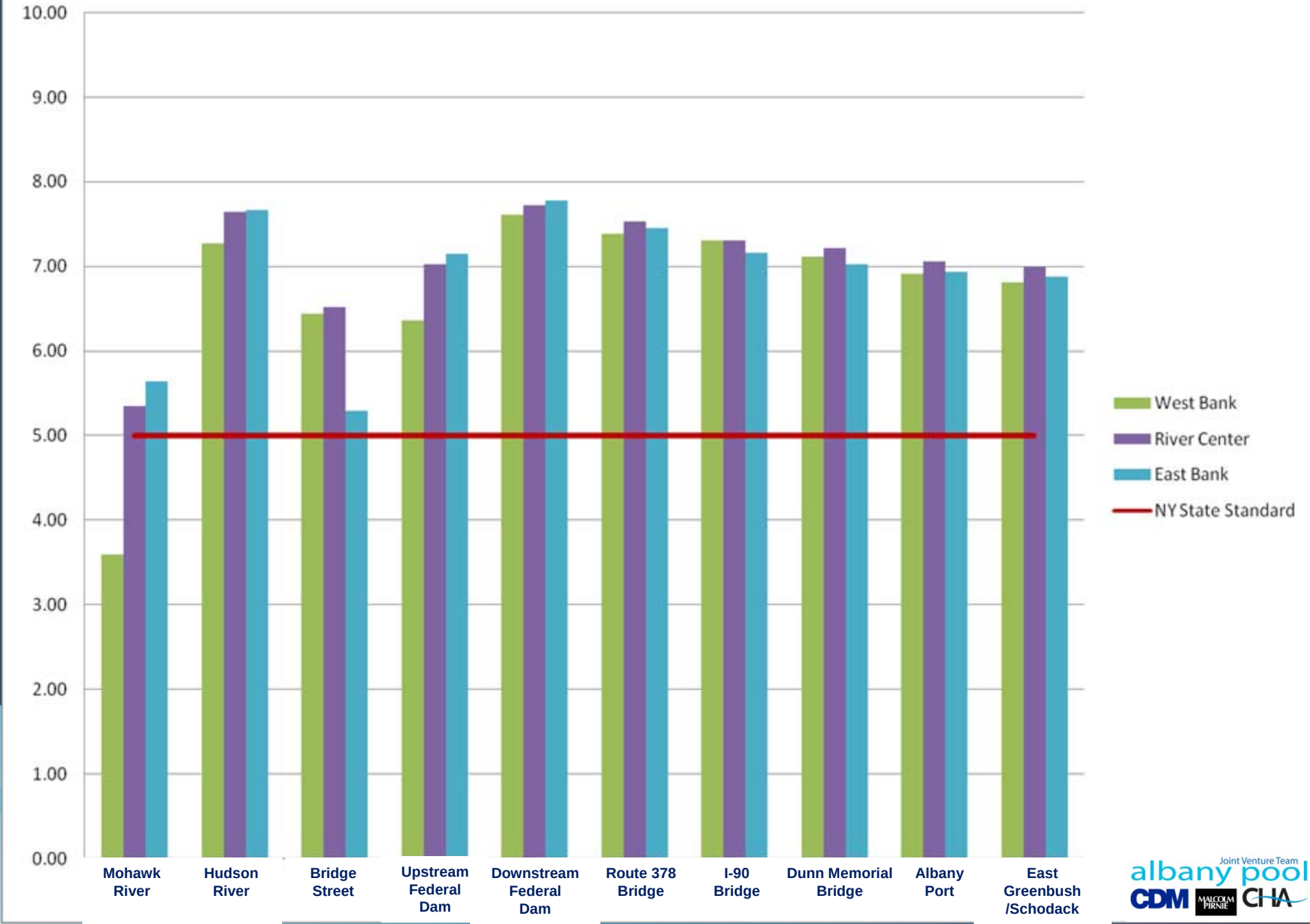
CDM
MALCOLM PIRNIE
CHA

Event 2 - Dissolved Oxygen (mg/L) - Transects



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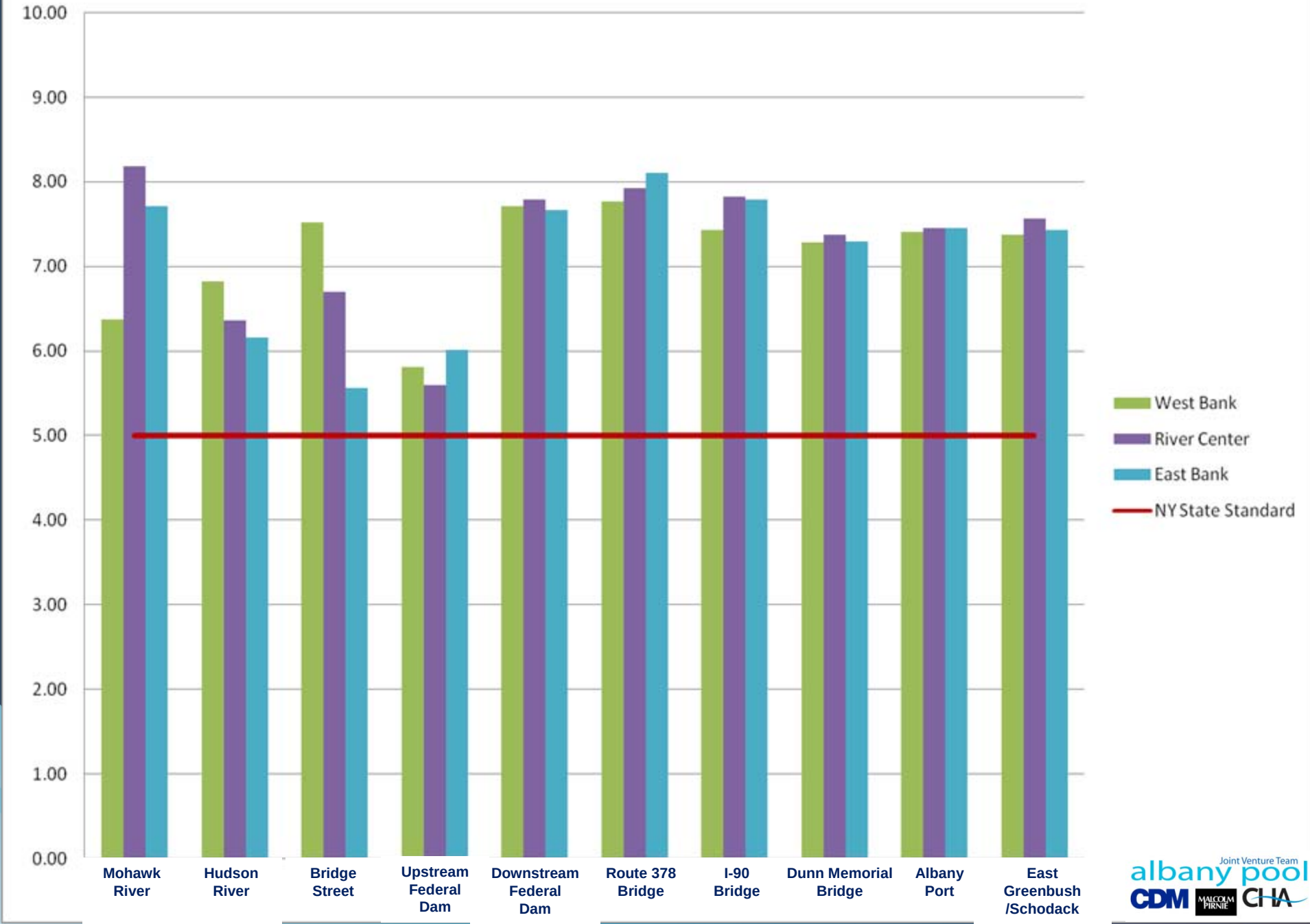
Event 3 - Dissolved Oxygen (mg/L) - Transects



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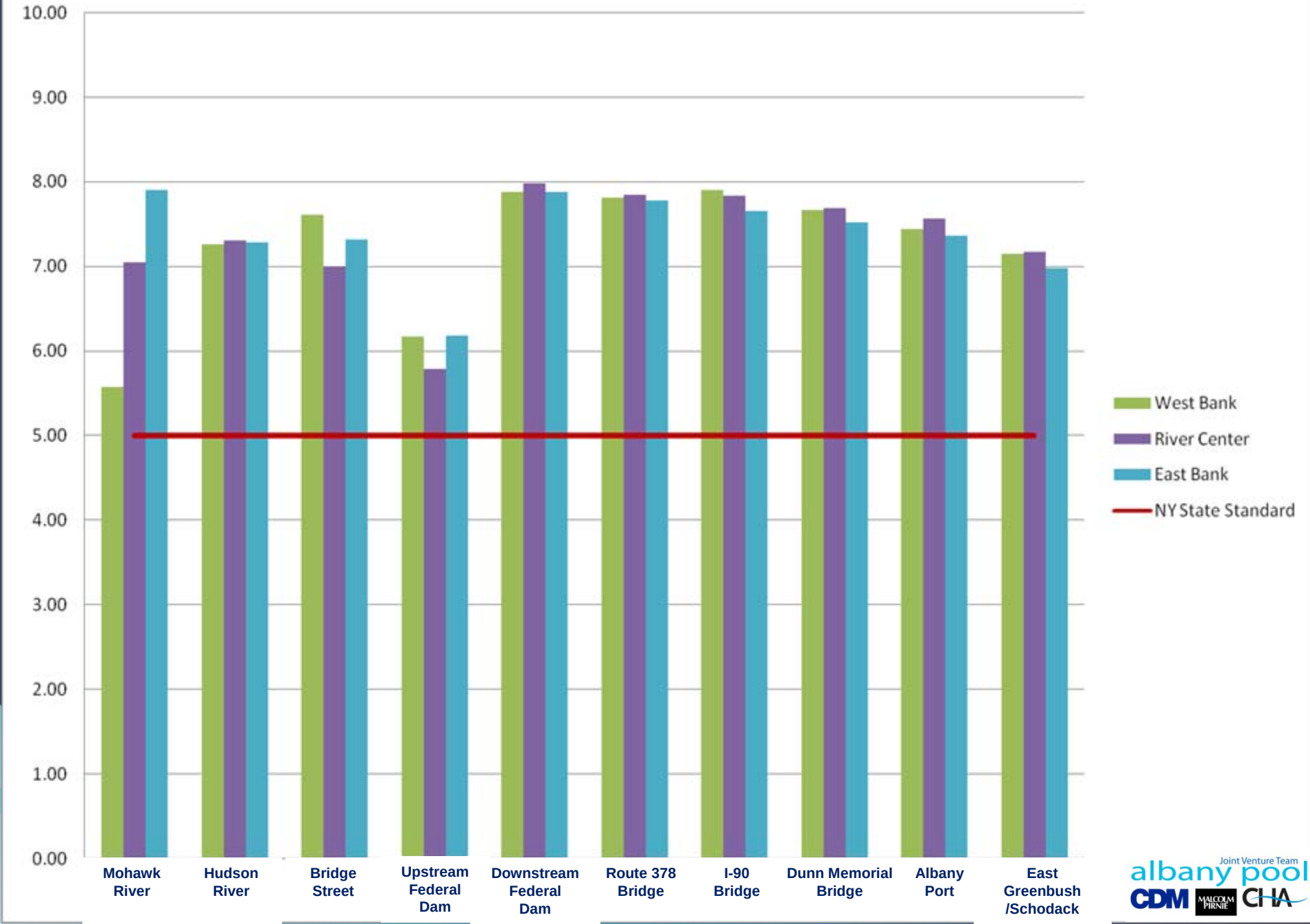
Event 4 - Dissolved Oxygen (mg/L) - Transects



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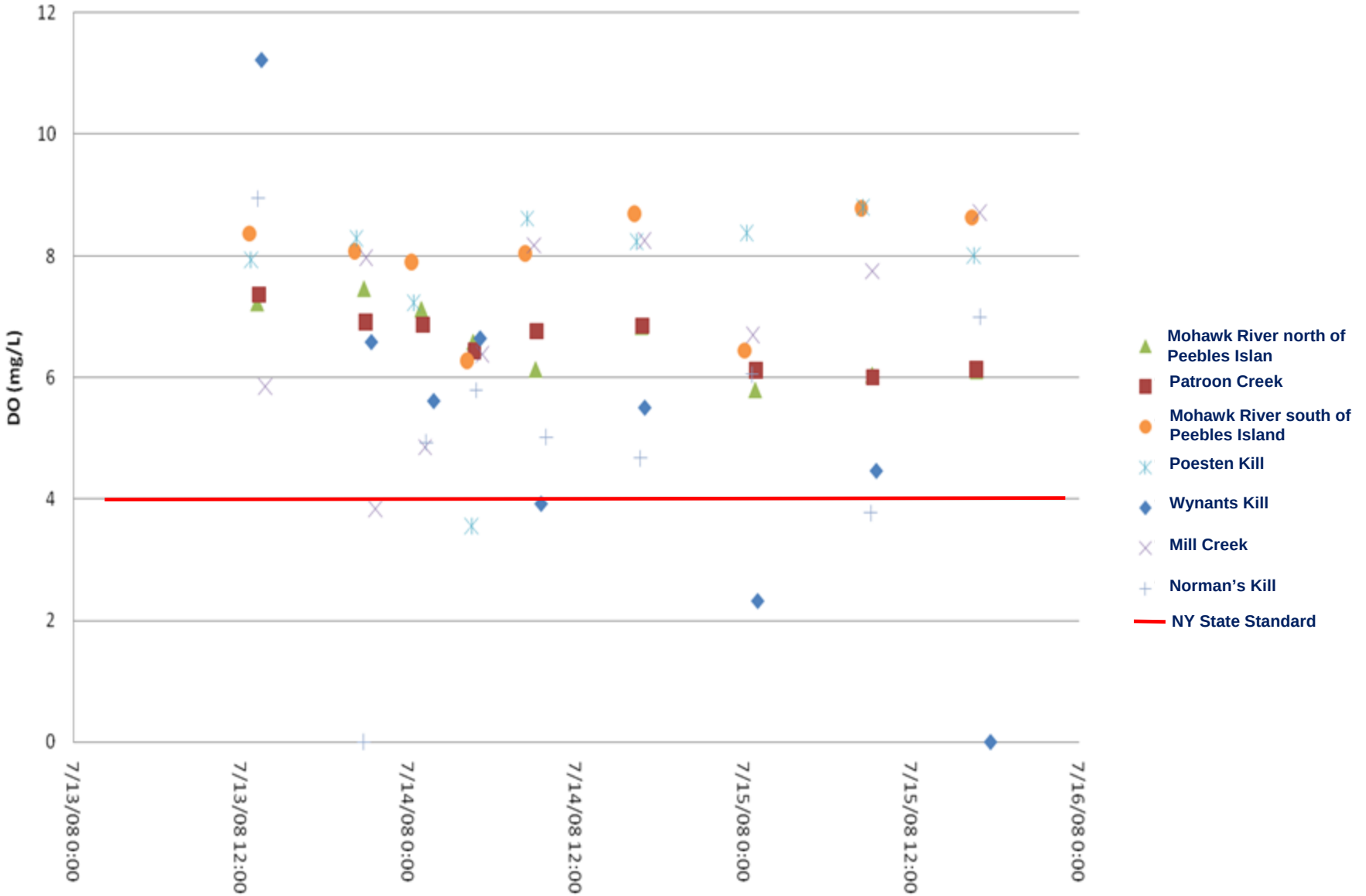
Tributary Wet Weather DO Event 4



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CSO Characterizations

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

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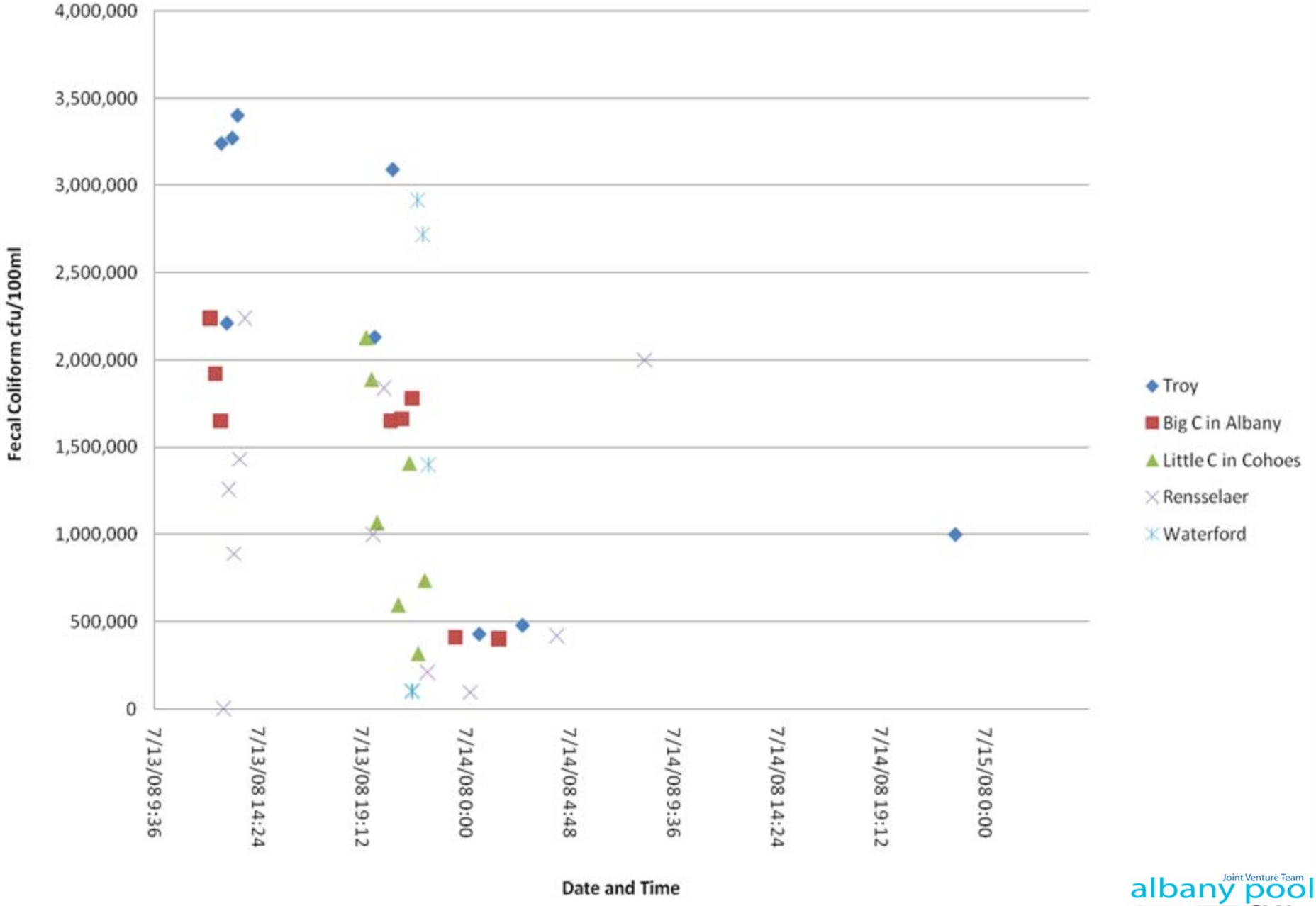
Event 4 Summary of Fecal Coliform in CSO



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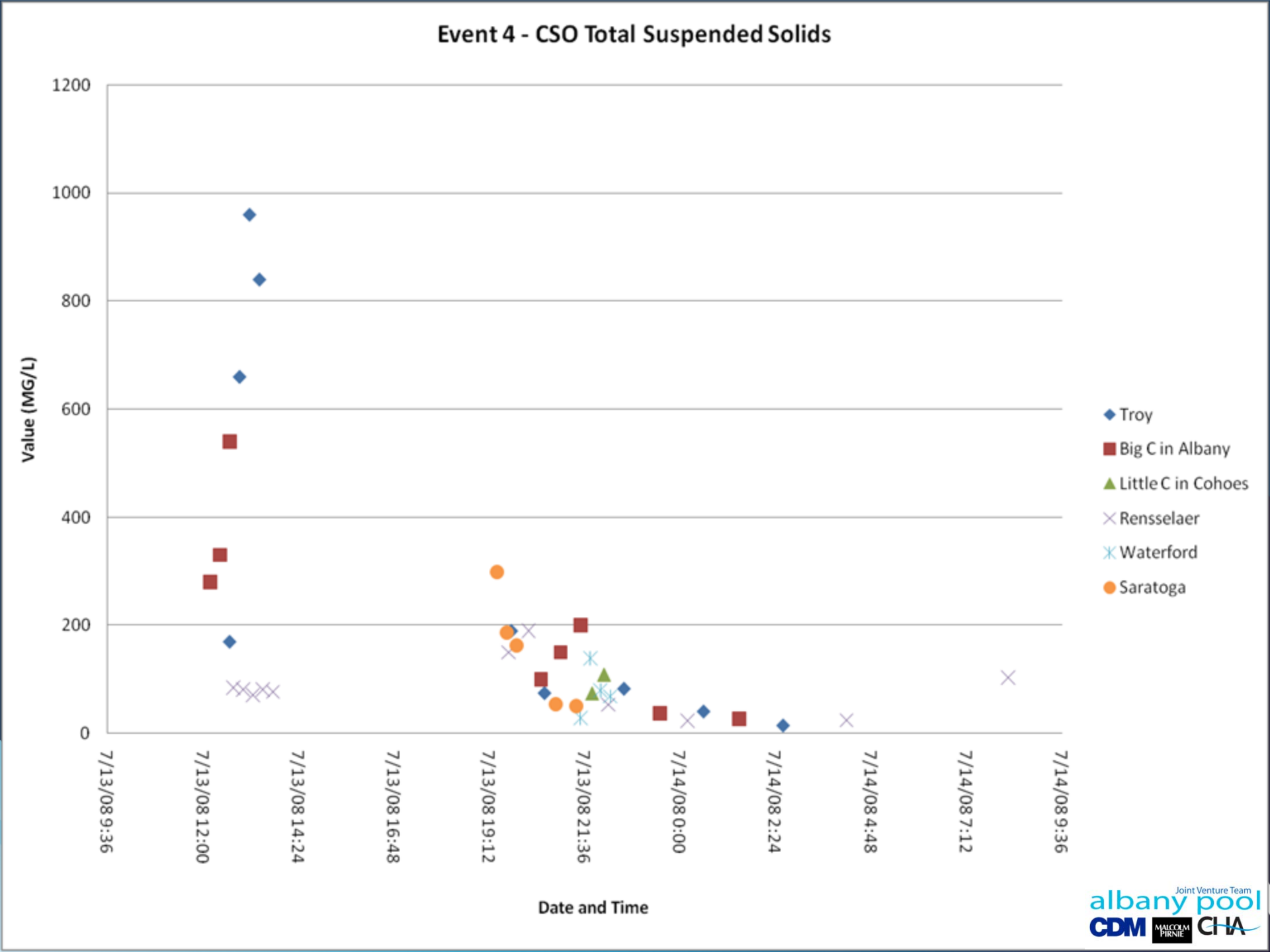
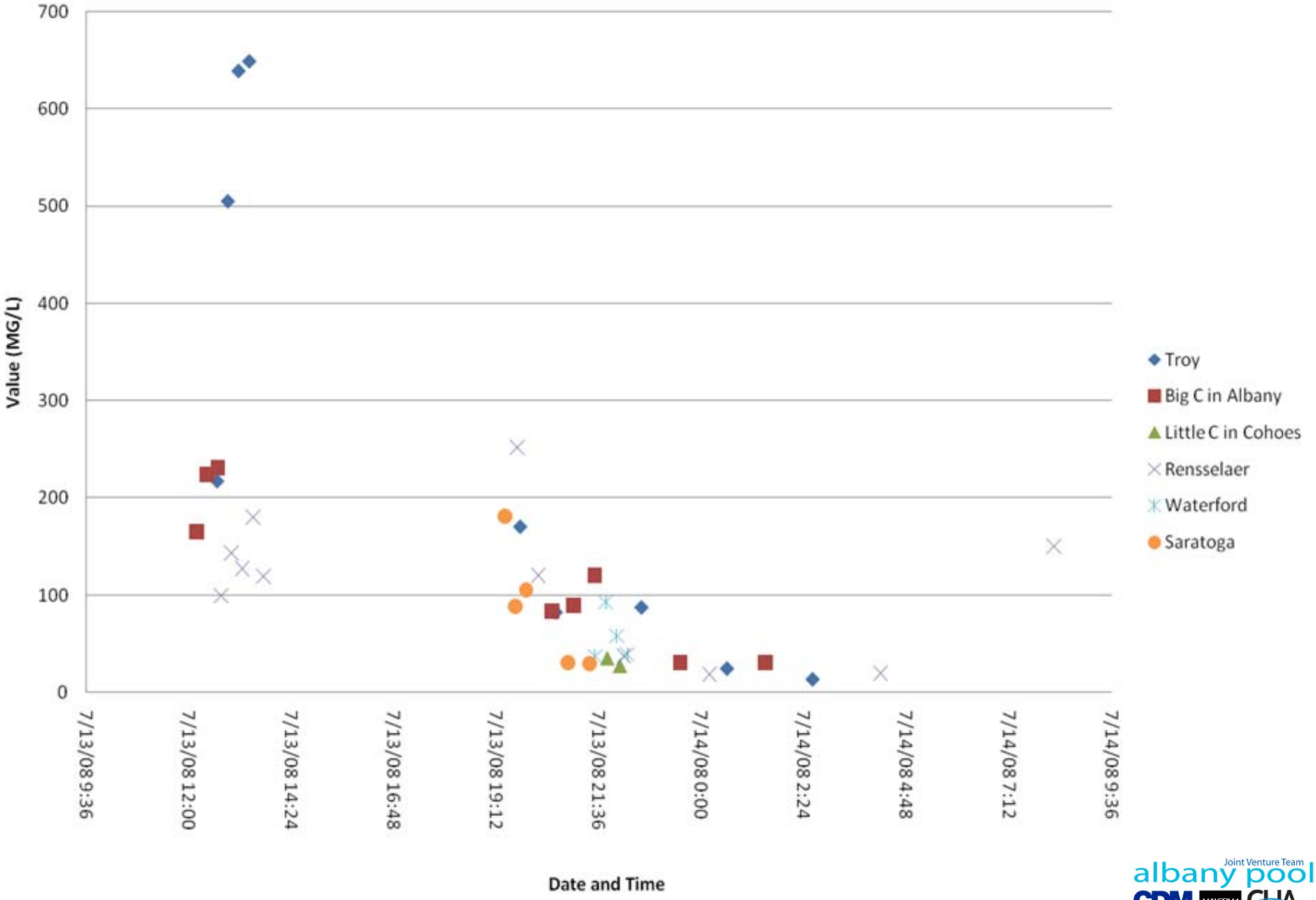

Event 4 - CSO Total Suspended Solids
Value (MG/L)
1200
1000
800
600
400
200
0
7/13/08 9:36
7/13/08 12:00
7/13/08 14:24
7/13/08 16:48
7/13/08 19:12
7/13/08 21:36
7/14/08 0:00
7/14/08 2:24
7/14/08 4:48
7/14/08 7:12
7/14/08 9:36
Date and Time
Troy
Big C in Albany
Little C in Cohoes
Rensselaer
Waterford
Saratoga

Event 4 - CSO Biological Oxygen Demand



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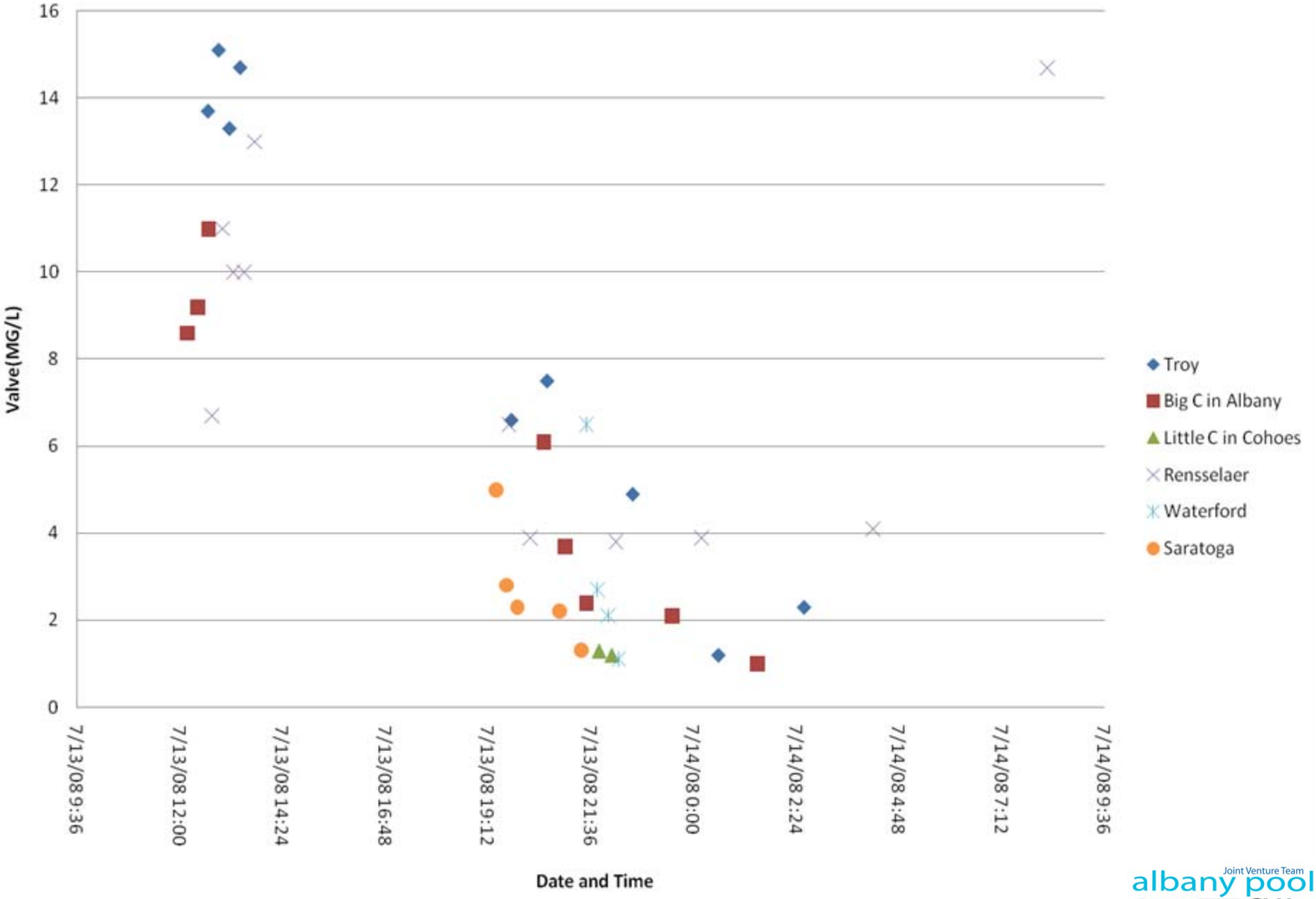
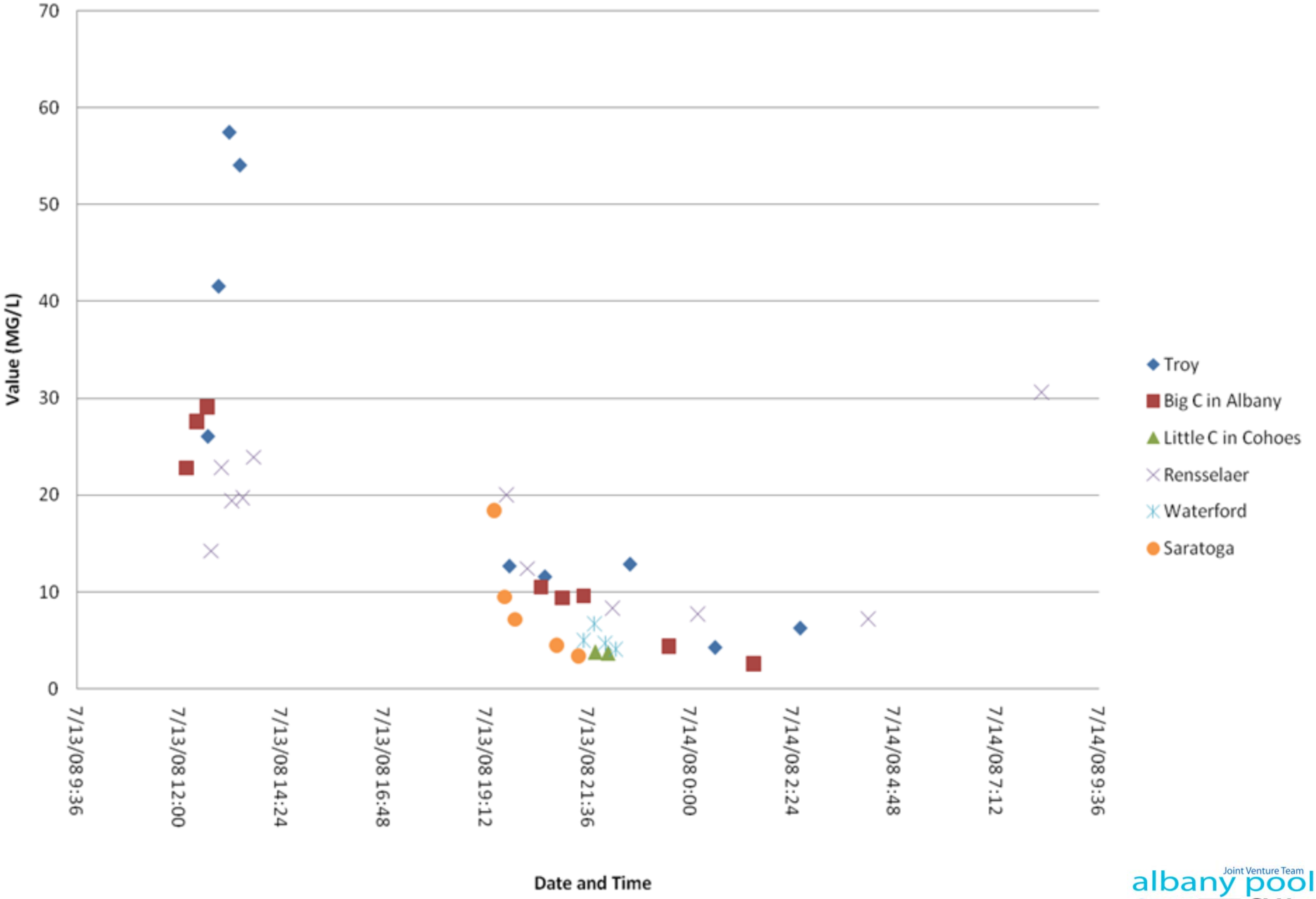
Event 4 - CSO Ammonia Nitrogen



Event 4 - CSO Total Kjeldahl Nitrogen



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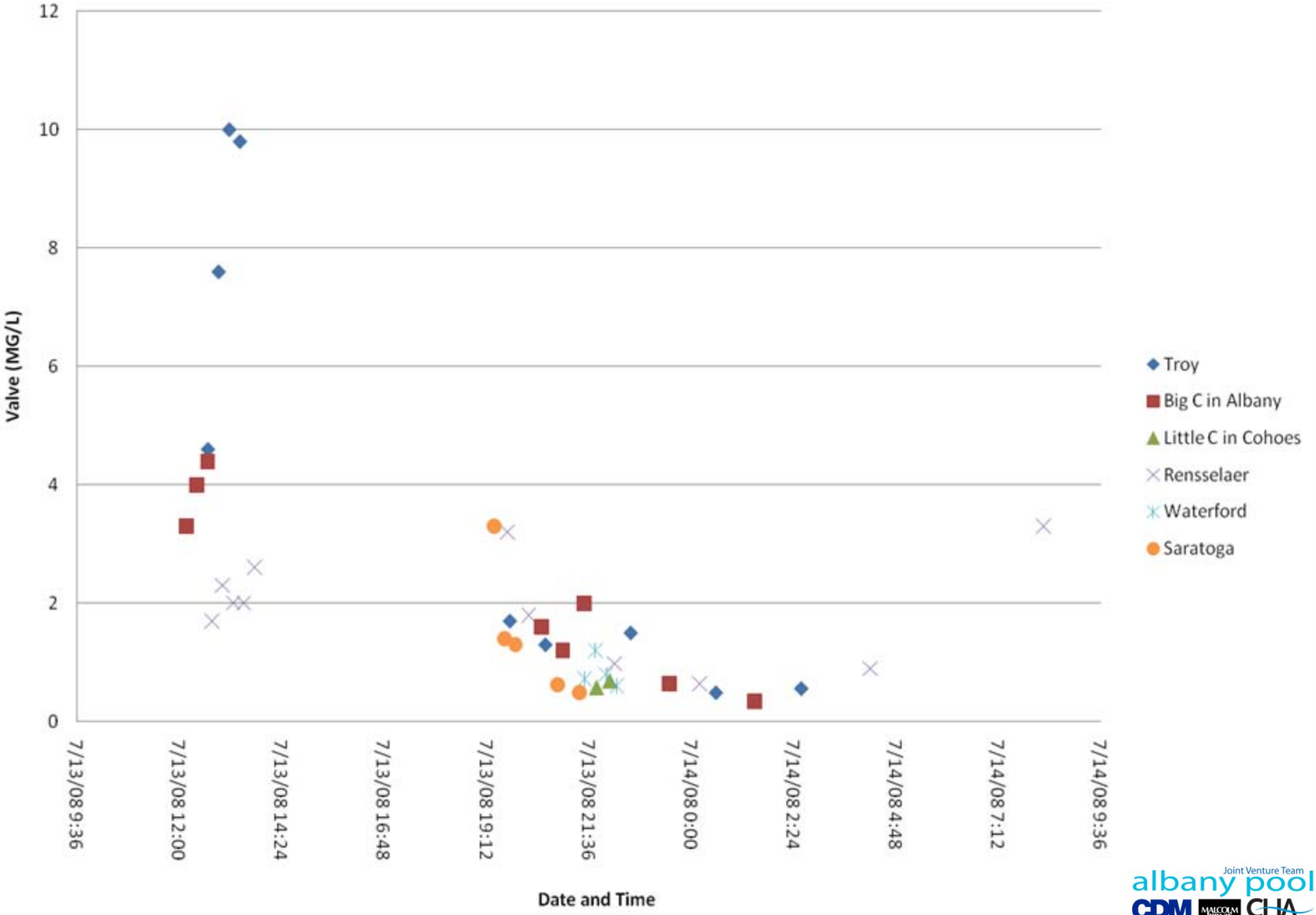
Event 4 - CSO Total Phosphorus



Wet-Weather Implications on LTCP Program

- River is Well Mixed
  - 1-D model for fecal coliform loading can be utilized to assess control alternatives
    - WWTP disinfection
    - Patroon Creek , Wynants Kill and Poesten Kill impact
- Despite significant dry and wet weather loading, the areas where standards are consistently exceeded are spatially small
- Beaches are in compliance with geometric mean fecal coliform standard
- Dry weather improvements could reduce CSO control requirements

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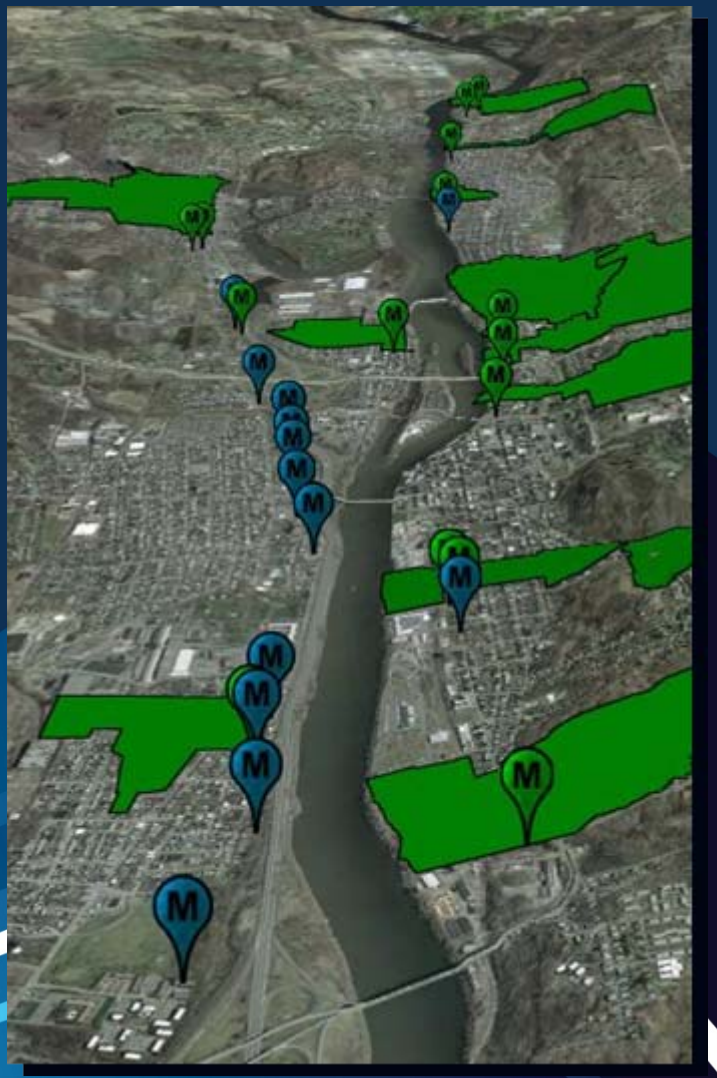
Combined Sewer System Monitoring

- DEC Approved Plan
  - 25 flow meters and 4 rain gauges
  - May 1 – August meters
  - Deliverable planned for September 2009
- Implemented Plan
  - 45 flow meters and 4 rain gauges
  - Additional $176,000 committed
  - June 4 – September 6, 2009
  - ADS Deliverable 11/3/2009



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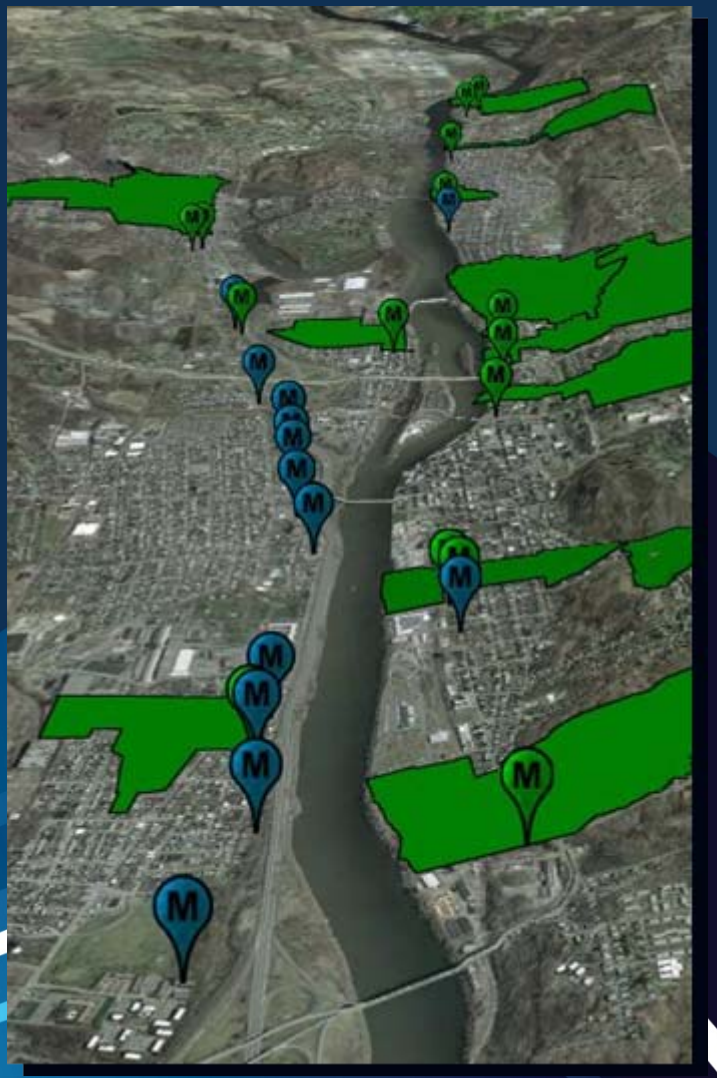
Combined Sewer System Monitoring - Results

- ADS deliverable received 11/3/09
- Precipitation data for 4 rain gauges
- Flow data for 45 flow monitoring sites
  - Site installation/maintenance reports
  - Hydrographs
  - Scattergraphs
- Preliminary review is promising for CSS calibration



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Next Steps

- Ongoing Activities
  - Finalize Receiving Water Quality Assessment
  - Flow monitoring data review and summary
  - CSS Model calibration and simulations
  - WWTP Evaluations
  - CSO Control Screening
- Future Activities
  - 1D Bacteria Model of Hudson River
  - Meet with DEC in April/May to discuss CSS Model calibration, baseload
- Public Participation
  - CAC/Public meetings

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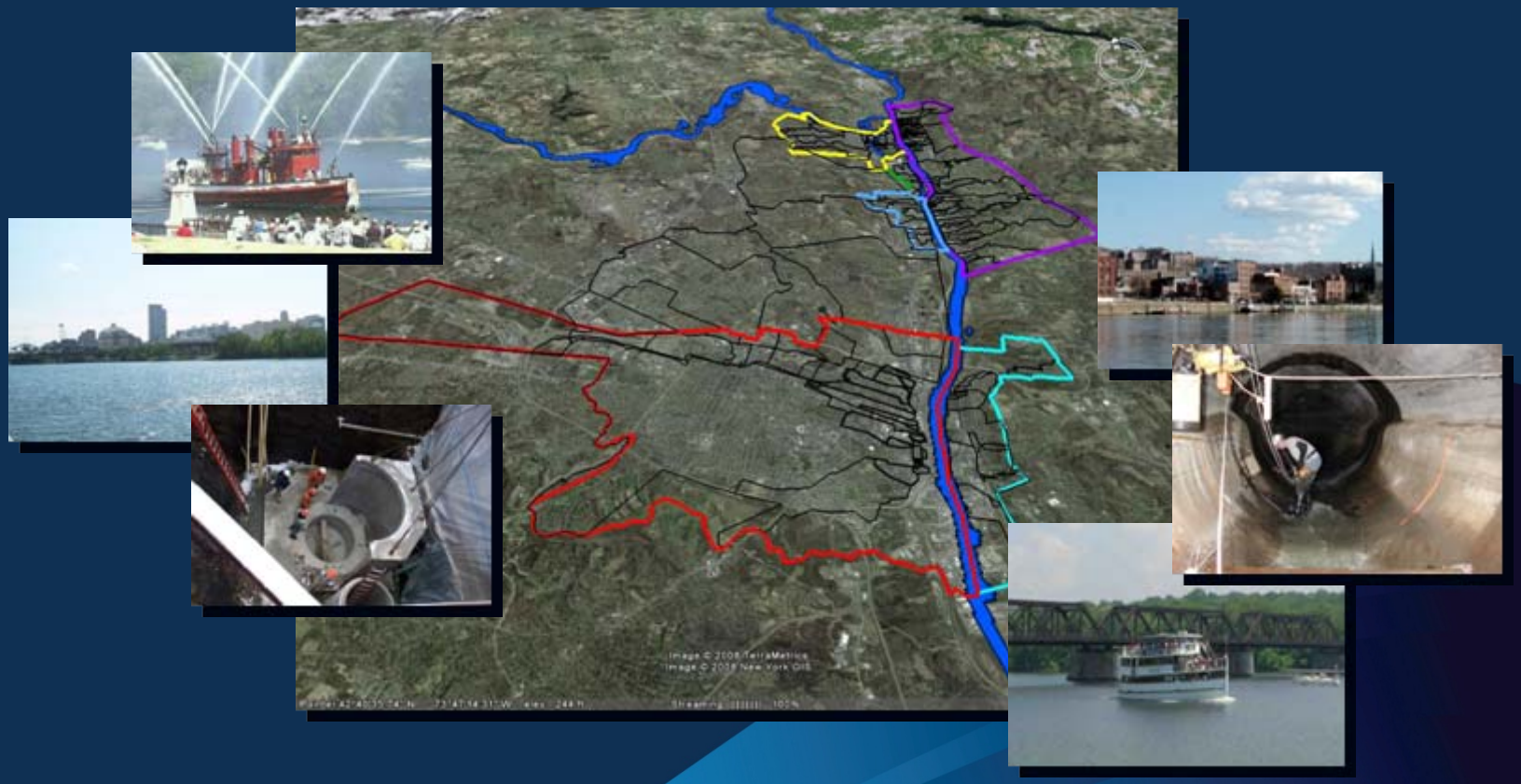
Albany Pool Combined Sewer System
Long-Term Control Plan Development



Questions or Comments

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2003 Water Quality Study

- 15 Events
- Predetermined Dates
  - 7/28/2003 – 10/16/2003
- 1 Set of Samples per Event
- No Dry/Wet Weather protocol

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Comparison of 2003 Data with 2008 Data

- The conditions during 6 Sampling Events in 2003 corresponded to a 2008 Dry Weather Condition
- The conditions during 9 Sampling Events in 2003 corresponded to a point in time during a 2008 Wet Weather Condition

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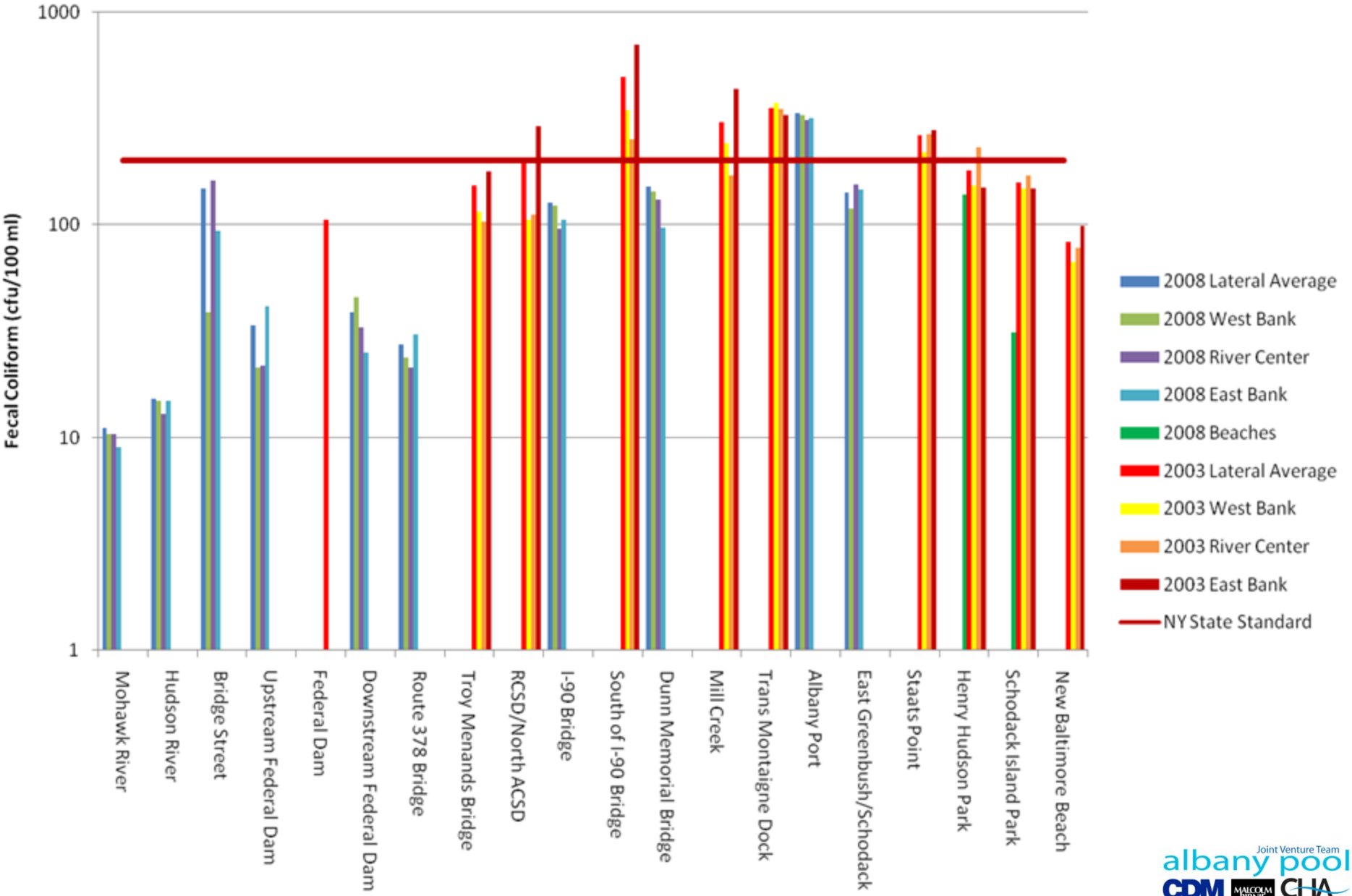
2003 (7/27 - 10/17) and 2008 (Period 1: 5/13 - 5/27)
Dry Weather River Transect Bacteria Samples



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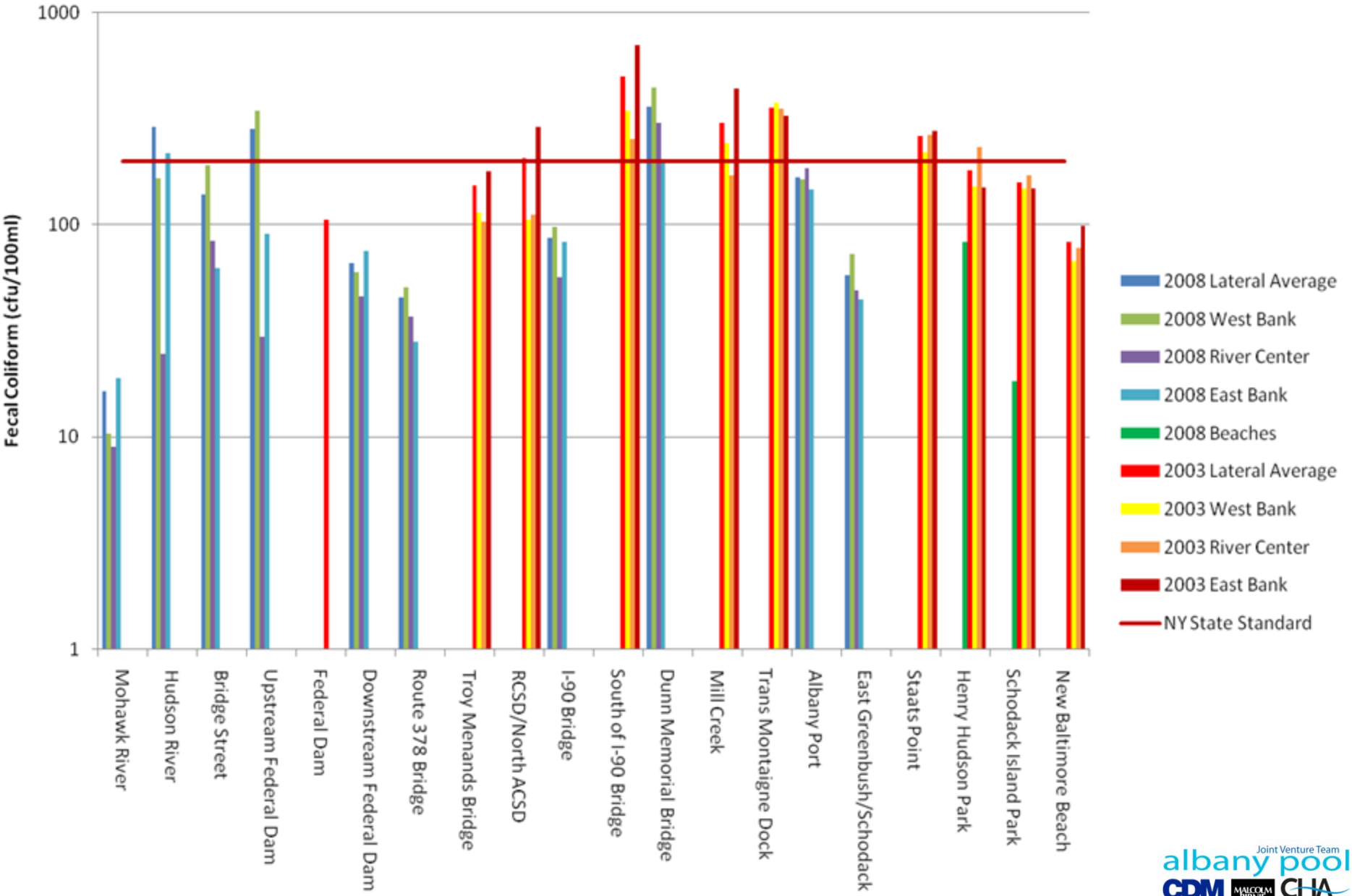
2003 (7/27 - 10/17) and 2008 (Period 2: 5/28 - 6/26)
Dry Weather River Transect Bacteria Samples



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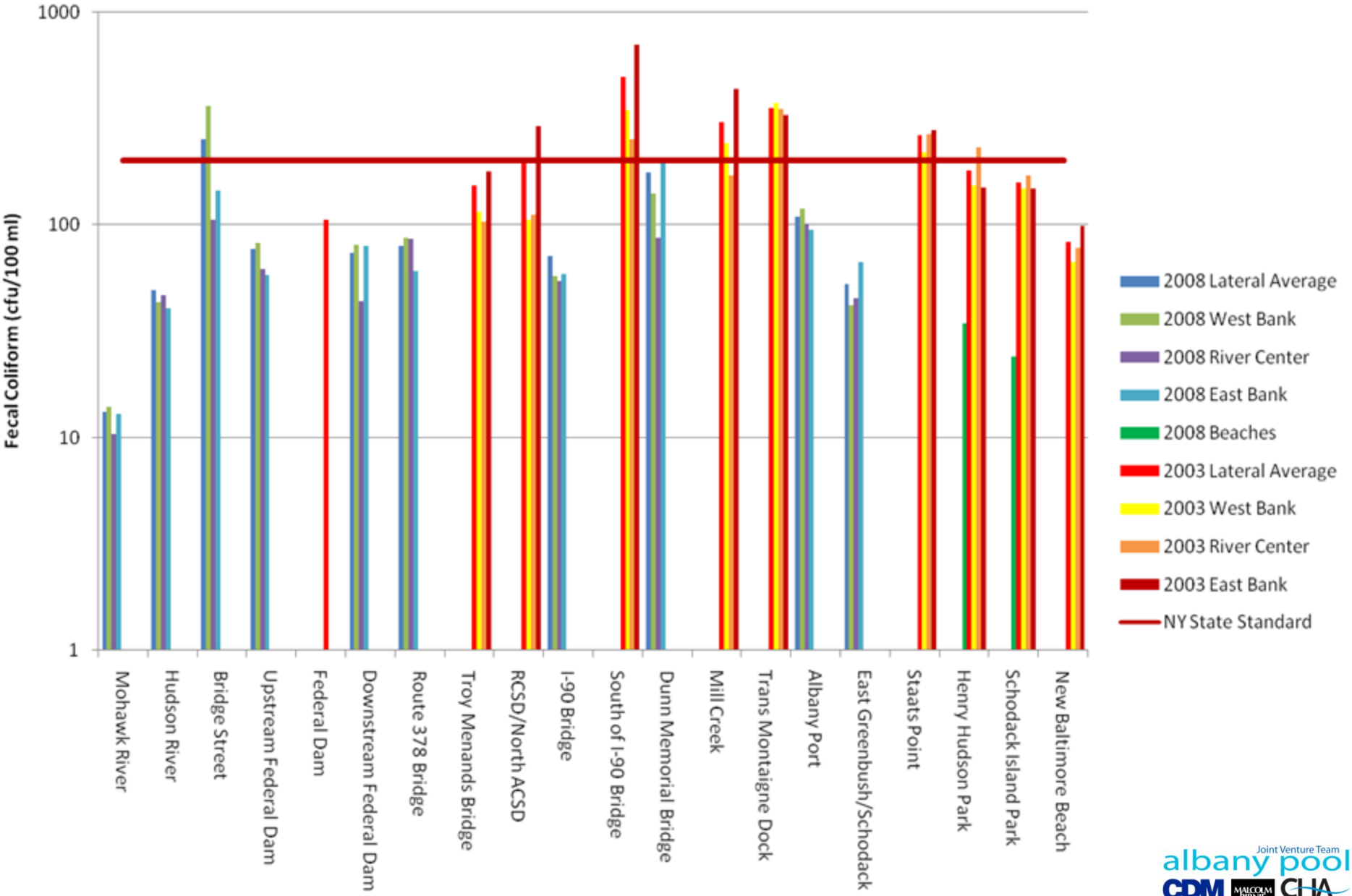
2003 (7/27 - 10/17) and 2008 (Period 3: 6/27 - 7/18)
Dry Weather River Transect Bacteria Samples



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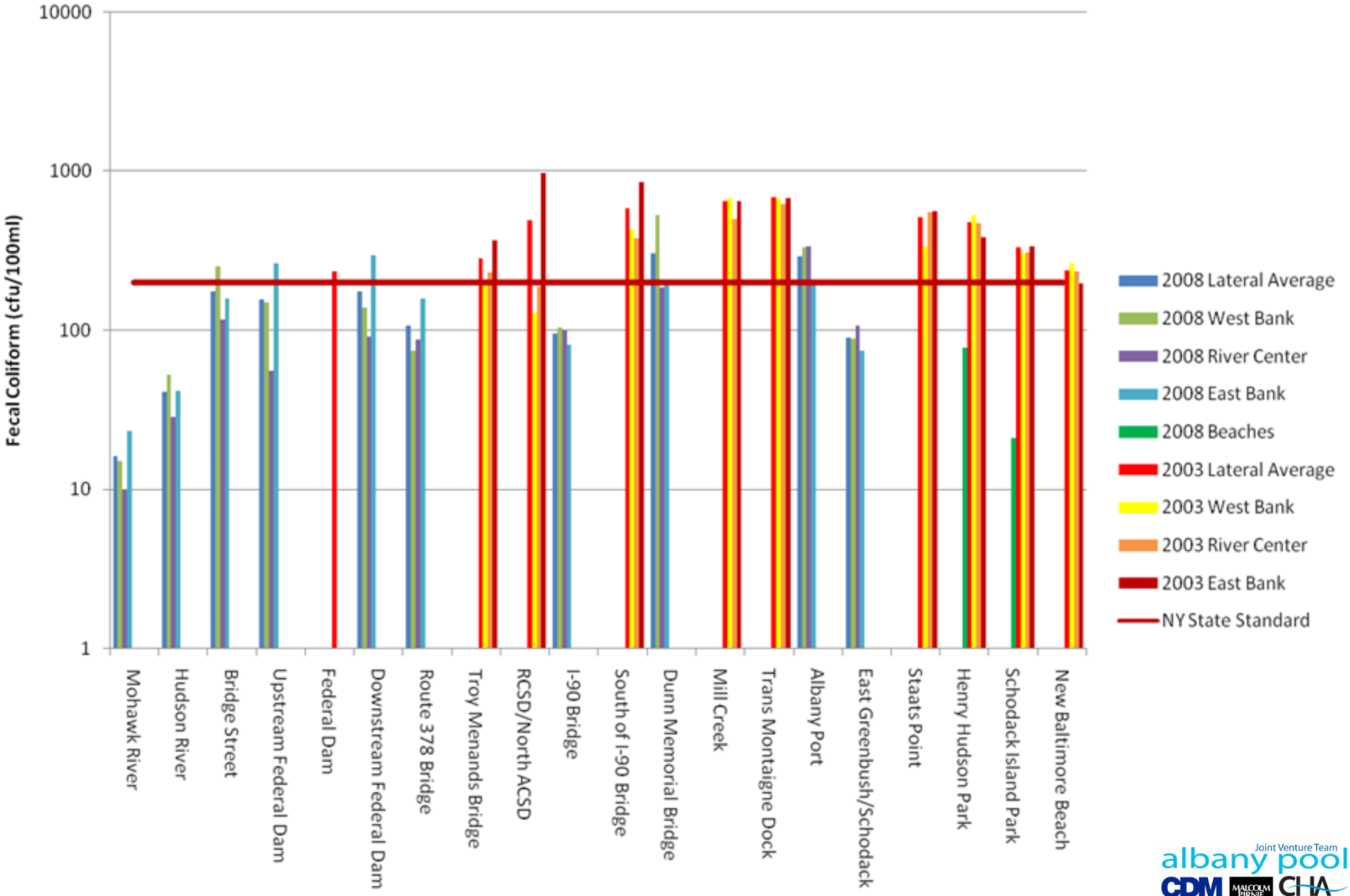
2003 (7/27 - 10/17) and 2008 (Event 1: 5/31)
Wet Weather River Transect Bacteria Samples



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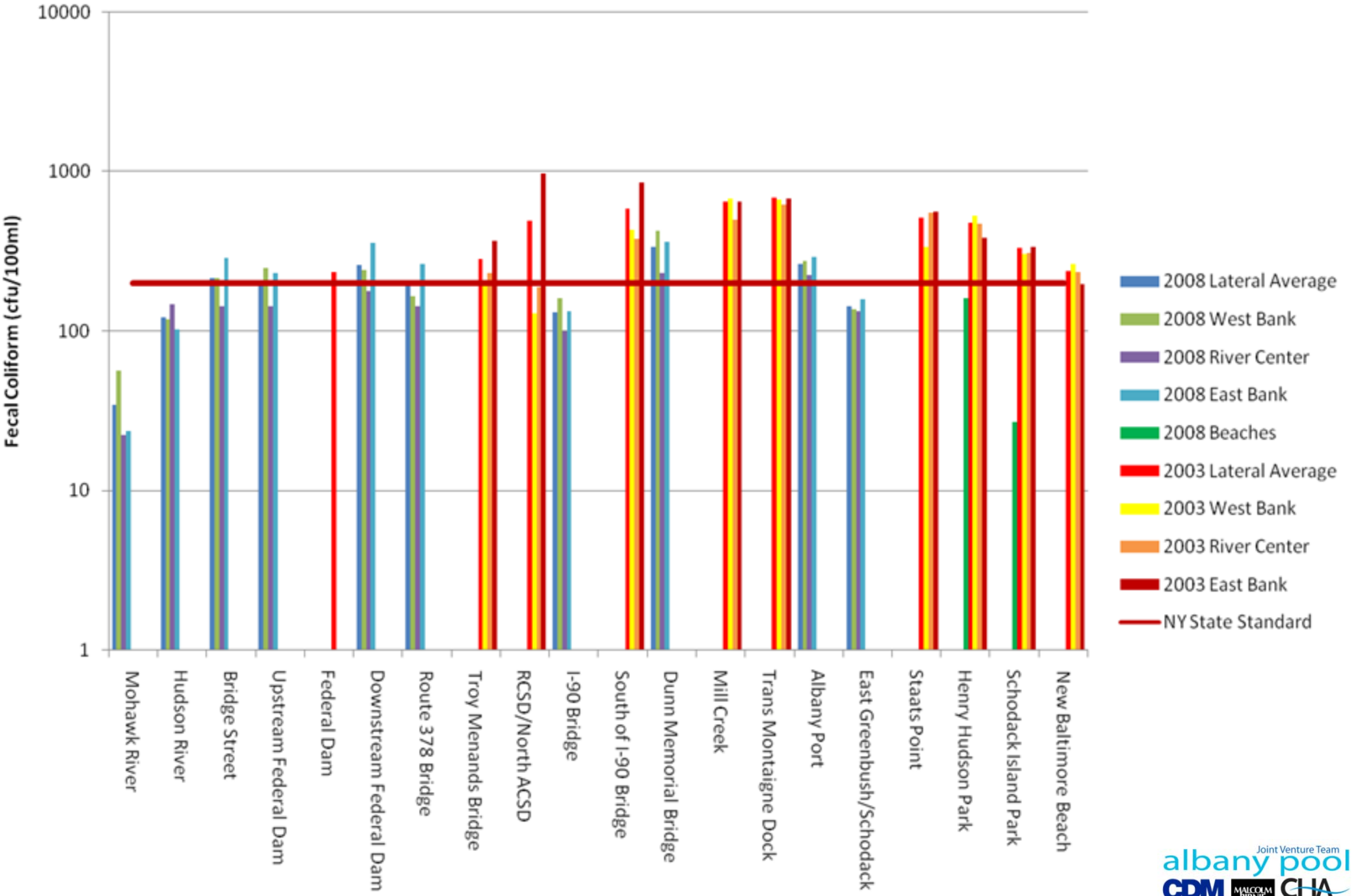
2003 (7/27 - 10/17) and 2008 (Event 2: 6/28)
Wet Weather River Transect Bacteria Samples



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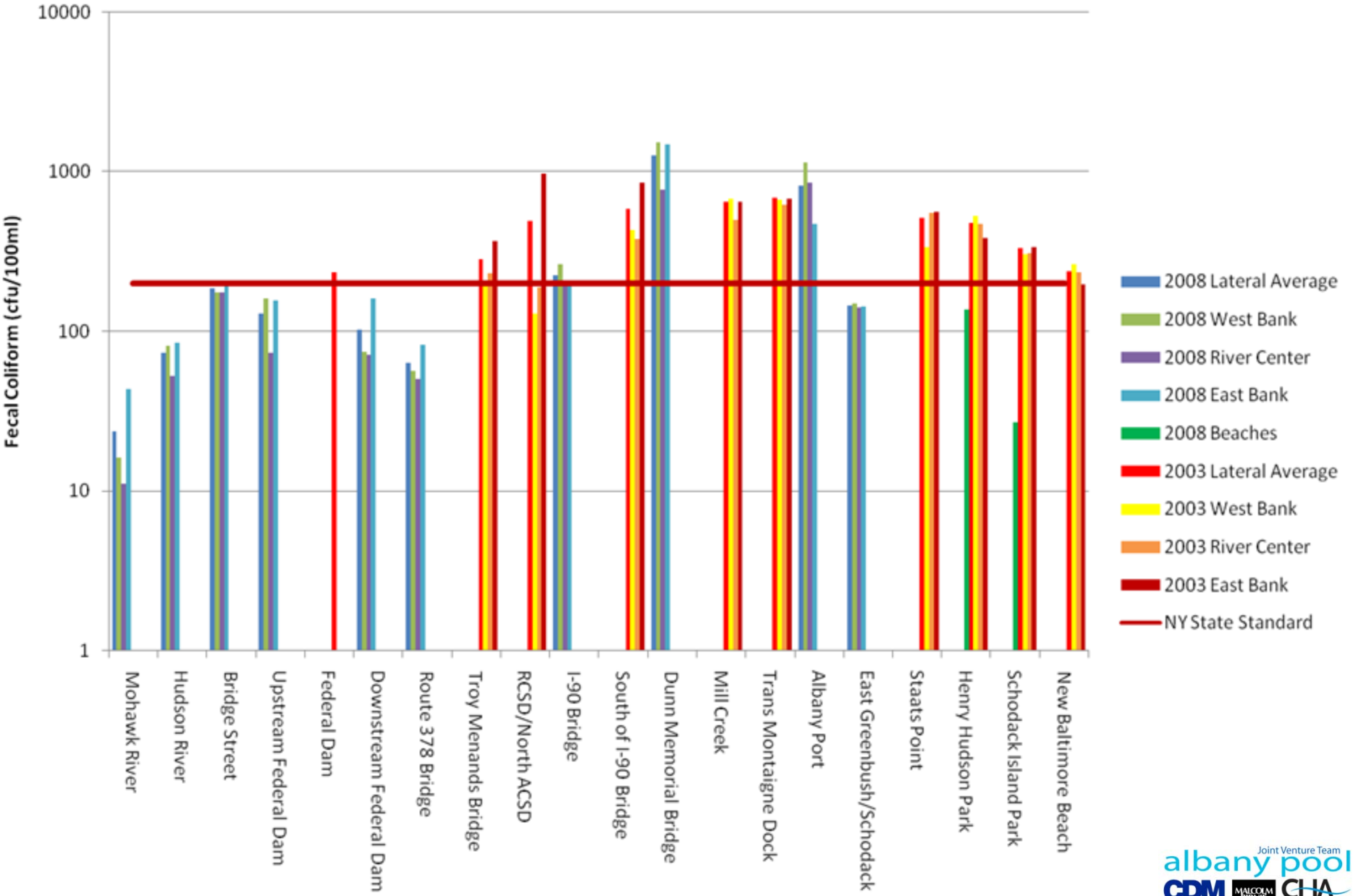
2003 (7/27 - 10/17) and 2008 (Event 3: 7/8)
Wet Weather River Transect Bacteria Samples



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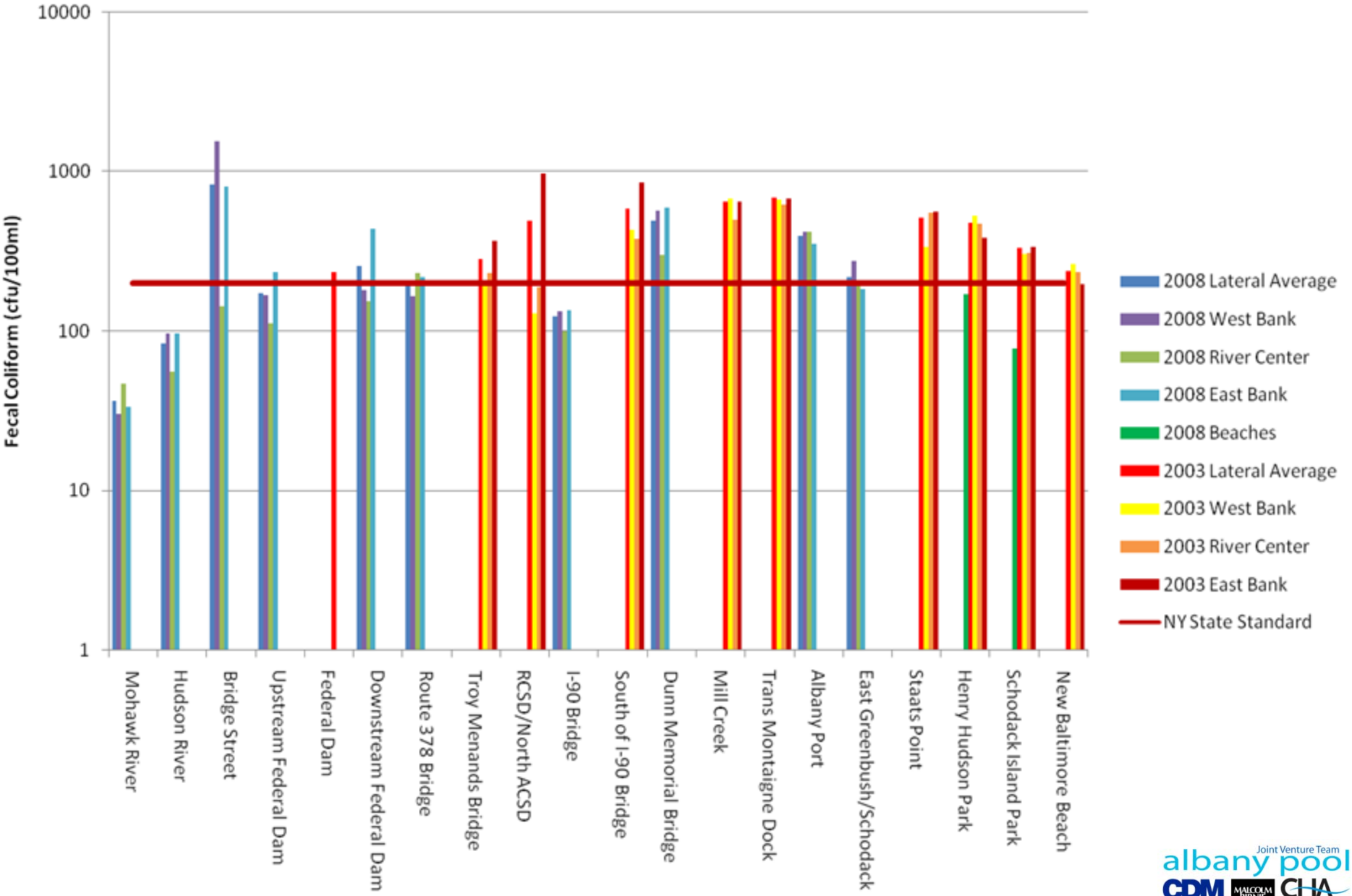
2003 (7/27 - 10/17) and 2008 (Event 4: 7/13)
Wet Weather River Transect Bacteria Samples



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