

Barnegat Bay Water Quality and Quantity Monitoring Program



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Water Monitoring and Standards
NJDEP

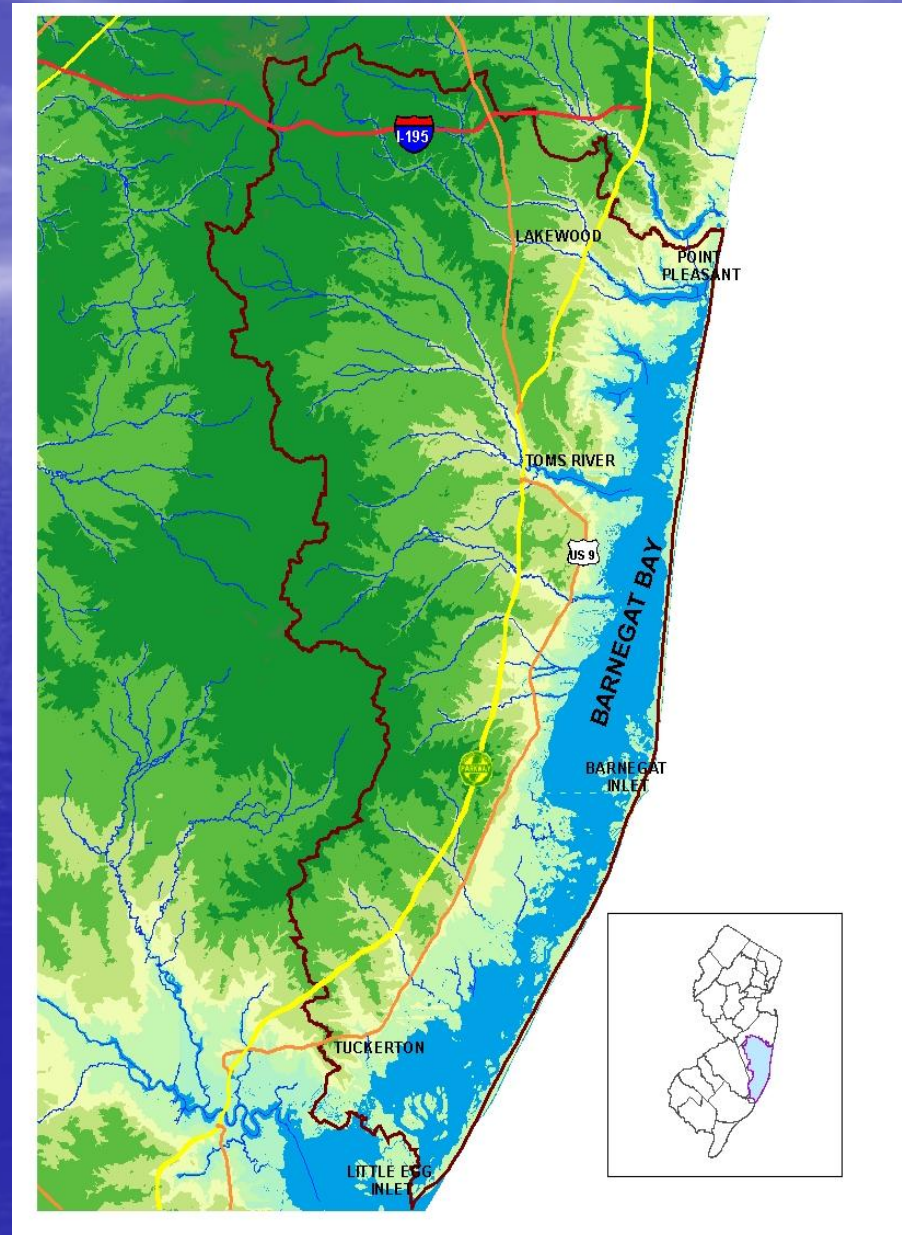
2013 Delaware Estuary
Science & Environmental Summit

January 29, 2013



Outline

- Background
- Monitoring Objectives & Components
- Selected Monitoring Results



Barnegat Bay Stressors and Ecological Concerns

Ecological concerns include:

- Degrading water quality
- Loss of SAV
- Occurrences of macroalgae & brown tide
- Declining hard clams
- Increasing stinging nettle populations

Stressors include:

- Rapid population increase, LU/LC Changes, intensive boating uses, nuclear facility cooling water discharge, nutrient & other pollutant loadings



Governor's Action Plan for Barnegat Bay December 9, 2010

(to address ecological health of bay)

1. Close Oyster Creek Nuclear Facility Early
2. Fund Stormwater Mitigation Projects
3. Reduce Nutrient Pollution from Fertilizers
4. Require Post-Construction Soil Restoration
5. Acquire Land in the Watershed
6. Est. Special Area Management Plan
7. Adopt More Rigorous Water Quality Standards

Monitoring Consortium & Model Development

8. Educate the Public
9. Fill Research Gaps – 10 projects developed
10. Reduce Water Craft Impacts



Objectives of Barnegat Bay Water Monitoring Program

- Determine the locations and extent of water quality impairments
- Calibrate and validate modeling tools
 - Identify numeric criteria or loading targets for nutrients
 - Simulate the effect of potential future conditions
 - Direct water quality restoration and/or TMDL development for the bay



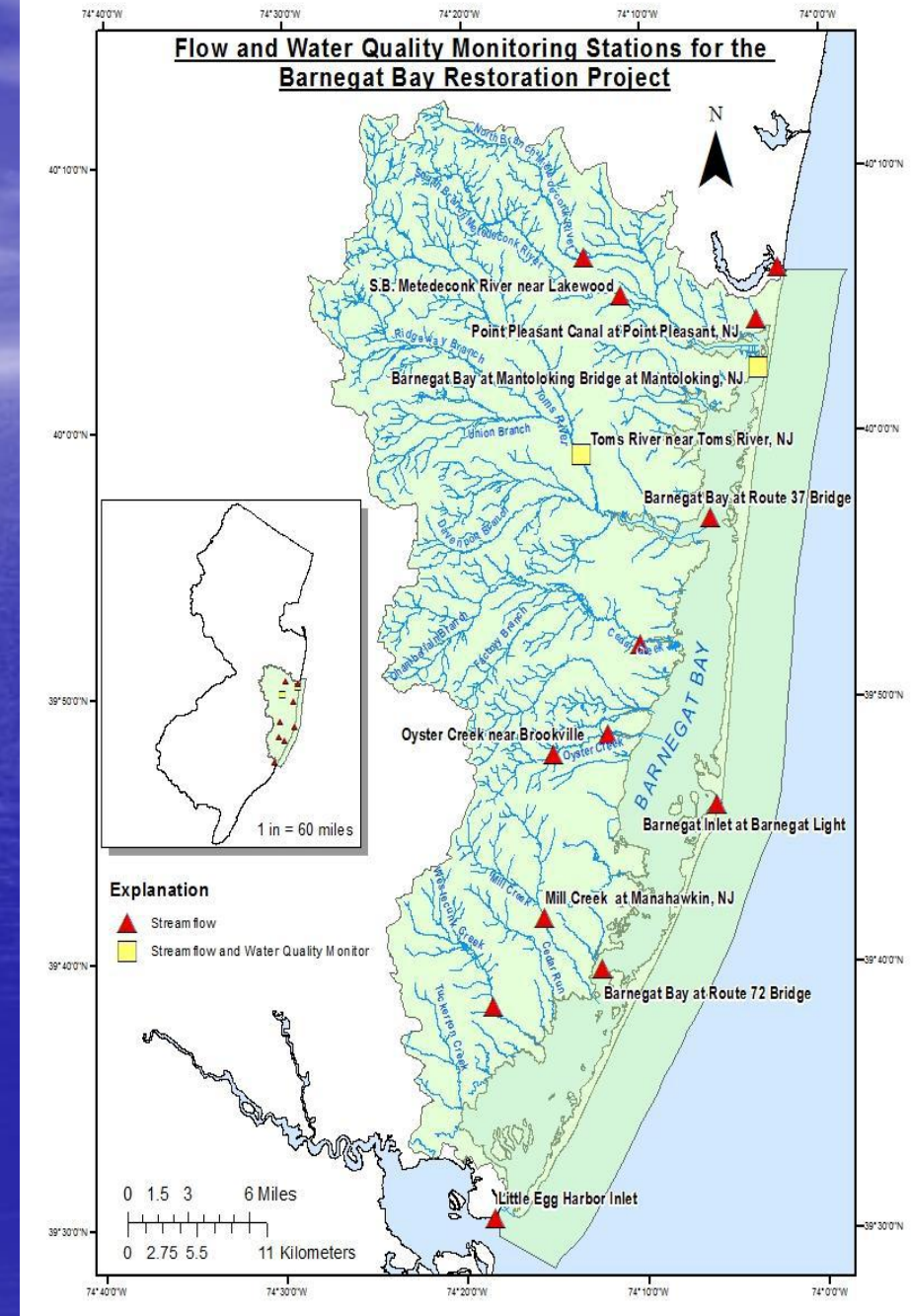
Monitoring Program

- Flow Monitoring – DEP & USGS
 - Tributaries: Manual measurement and gaging stations
 - Bay: gaging stations and tide gage
- Water Quality Sampling – DEP & Many Partners
 - Discrete Water Quality Samples – tributary and bay stations
 - Continuous Monitoring – fixed and buoy
 - Intensive sample events summer 2012



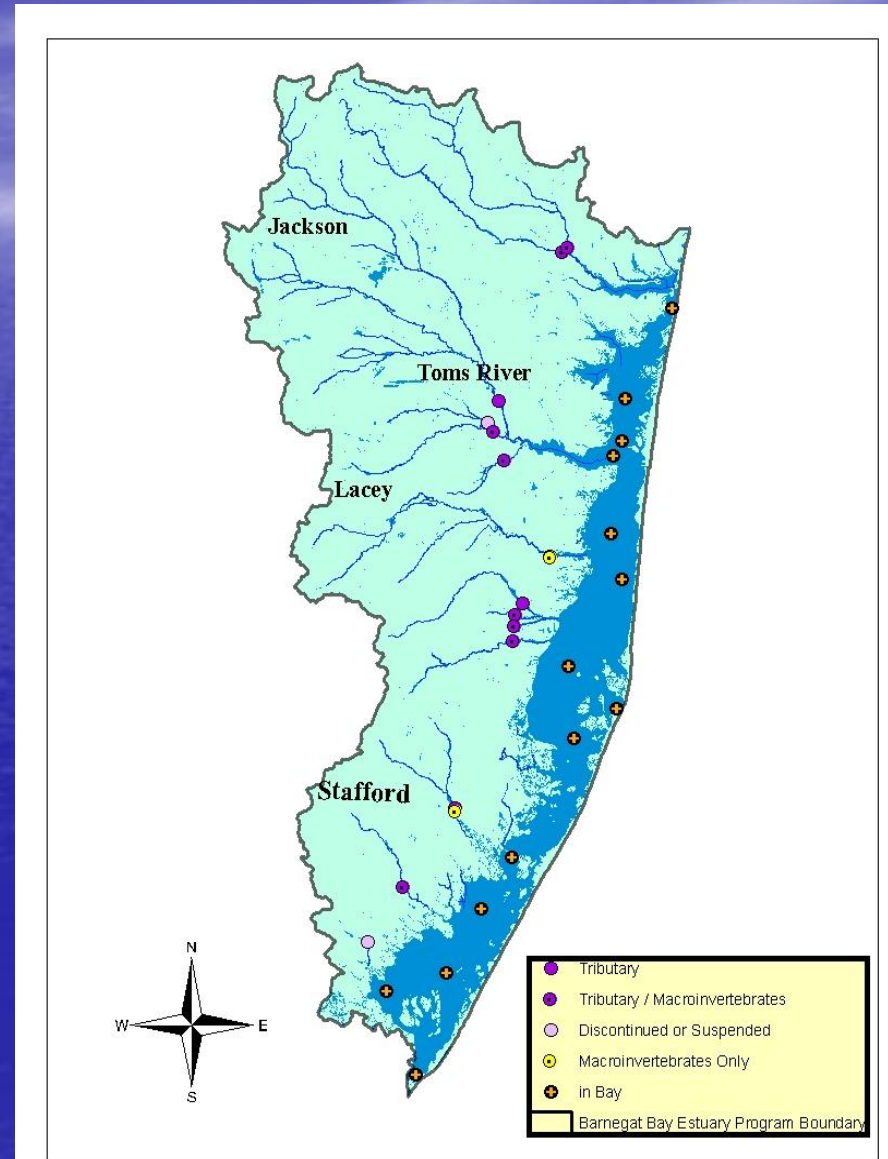
Flow Monitoring

- Gaging stations
 - 7 along the tributaries
 - 3 on bay inlets
 - 3 on the bay
- Manual measurements
 - At the tributary stations where there is no gaging stations



Water Quality Monitoring Stations

- Tributaries Stations (BT)
 - Above the head of tide
 - 13 (12) major tributaries for grab samples
 - One fixed continuous monitoring station
- In-bay station (BB)
 - 15 grab sample stations
 - 1 fixed continuous WQ station
 - 4 buoys



Discrete Sample Collection

- **Phase 1** (6/11-3/12)
 - 13 Trib stations & 14 Bay stations
 - ~ biweekly sampling frequency
 - A total of 18 sampling events completed
- **Phase 2** (4/12- 12/12)
 - 12 Trib stations & 15 Bay stations
 - March to Sept.:4 times / month; Oct- Dec.: 2 times / month
 - A total of 27 sampling events
 - Surface and bottom samples
- **Phase 3** (01/13 – 06/13)
 - 7 Trib stations & 15 bay stations
 - Jan and Feb 2 times/month , March- June 4 times/month
 - Less bottom samples



Parameters

- Field Parameters
 - Temp, DO, DO Sat, pH, Specific Conductance, Turbidity
- Laboratory Parameters
 - TSS, BOD5, CBOD5, CBOD20, Dissolved and Total Nutrients, Alkalinity, Silica, TOC, DOC, Chlorophyll a
- Bay Only
 - Surface and bottom samples, Salinity, Secchi Depth



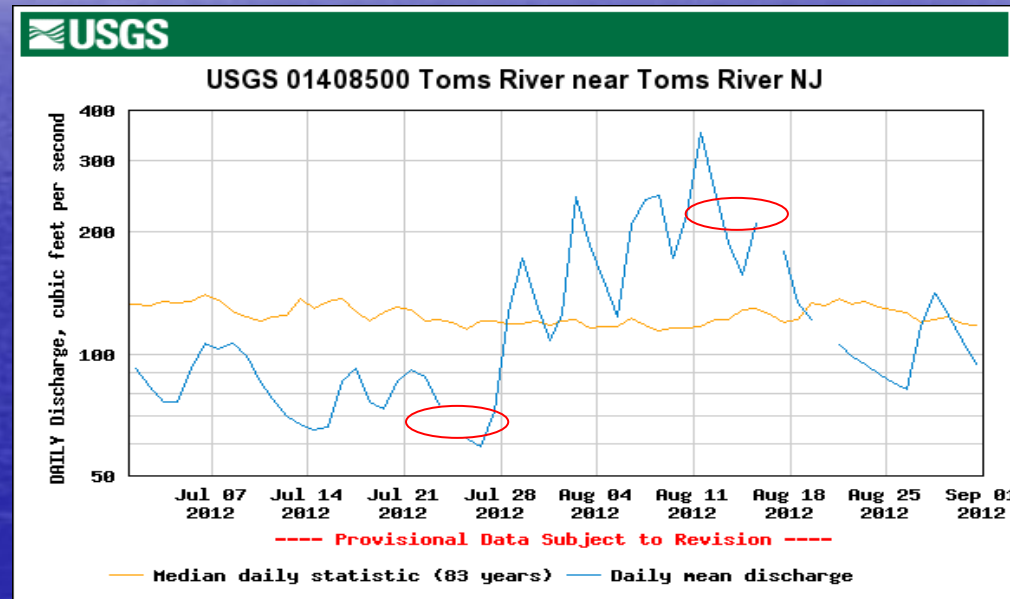
Intensive Sampling Summer 2012

- Two 4-days events
 - July 23rd-26th
 - August 13th-16th

- Bay
 - 6 grab samples/day

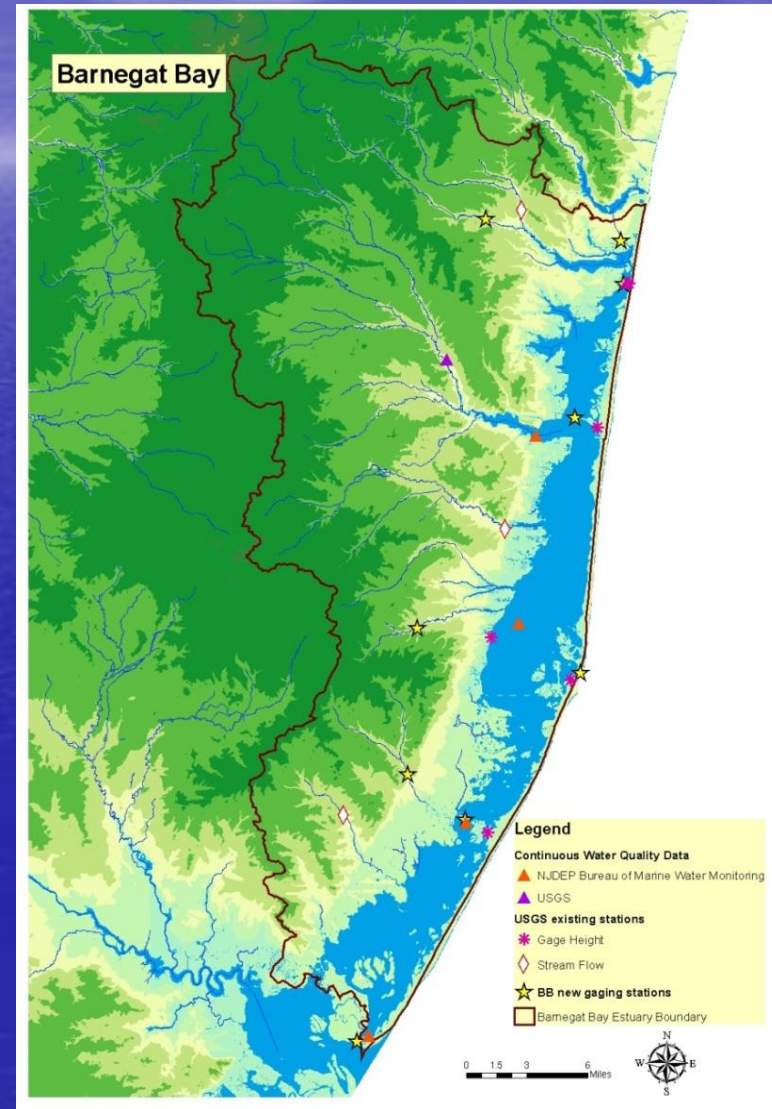
- Tributaries

- 2 grab/day on day 1&4
- Sondes deployed for duration of both events
 - DO, DO Saturation, pH, Temp, Conductivity

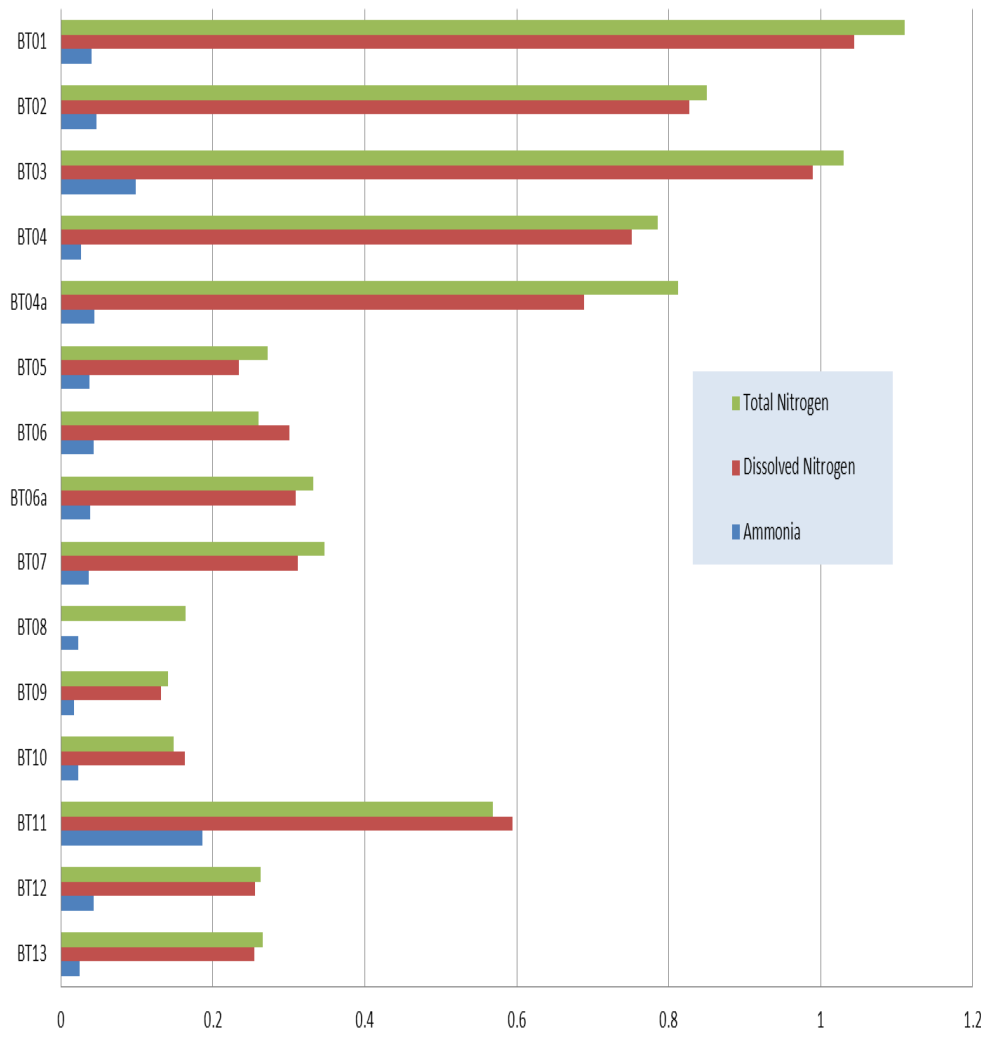


Continuous Data

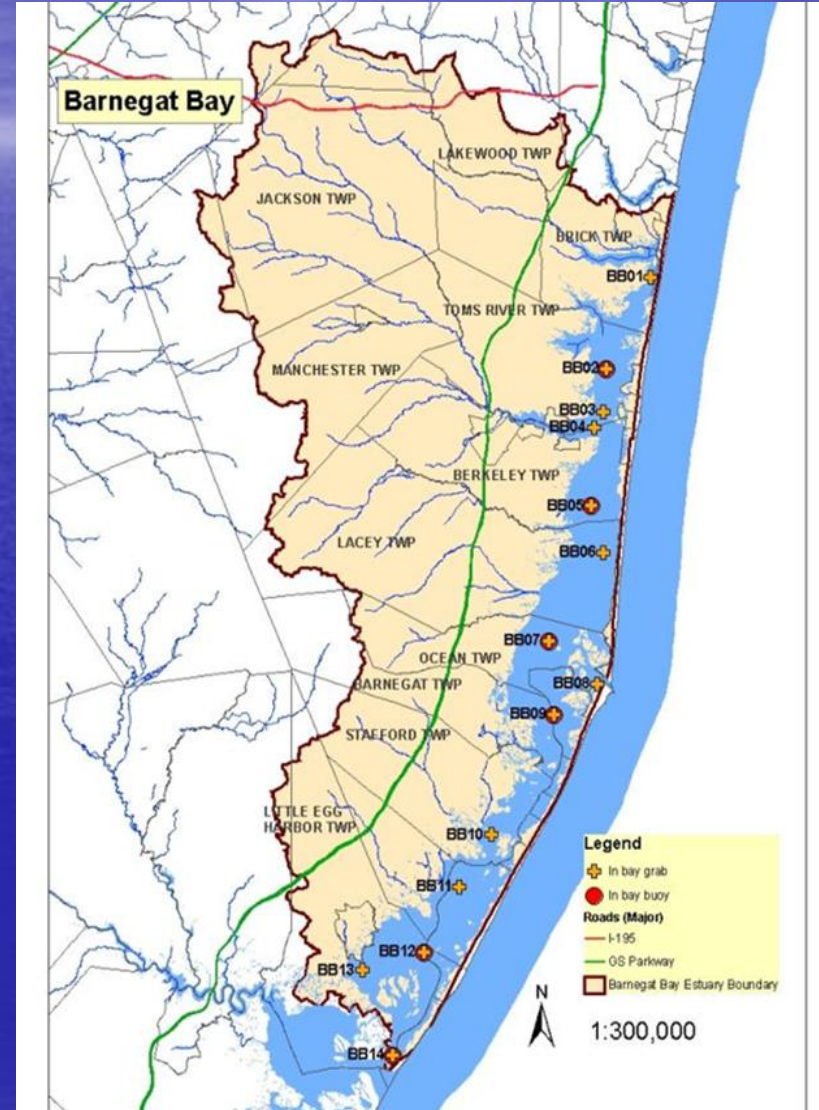
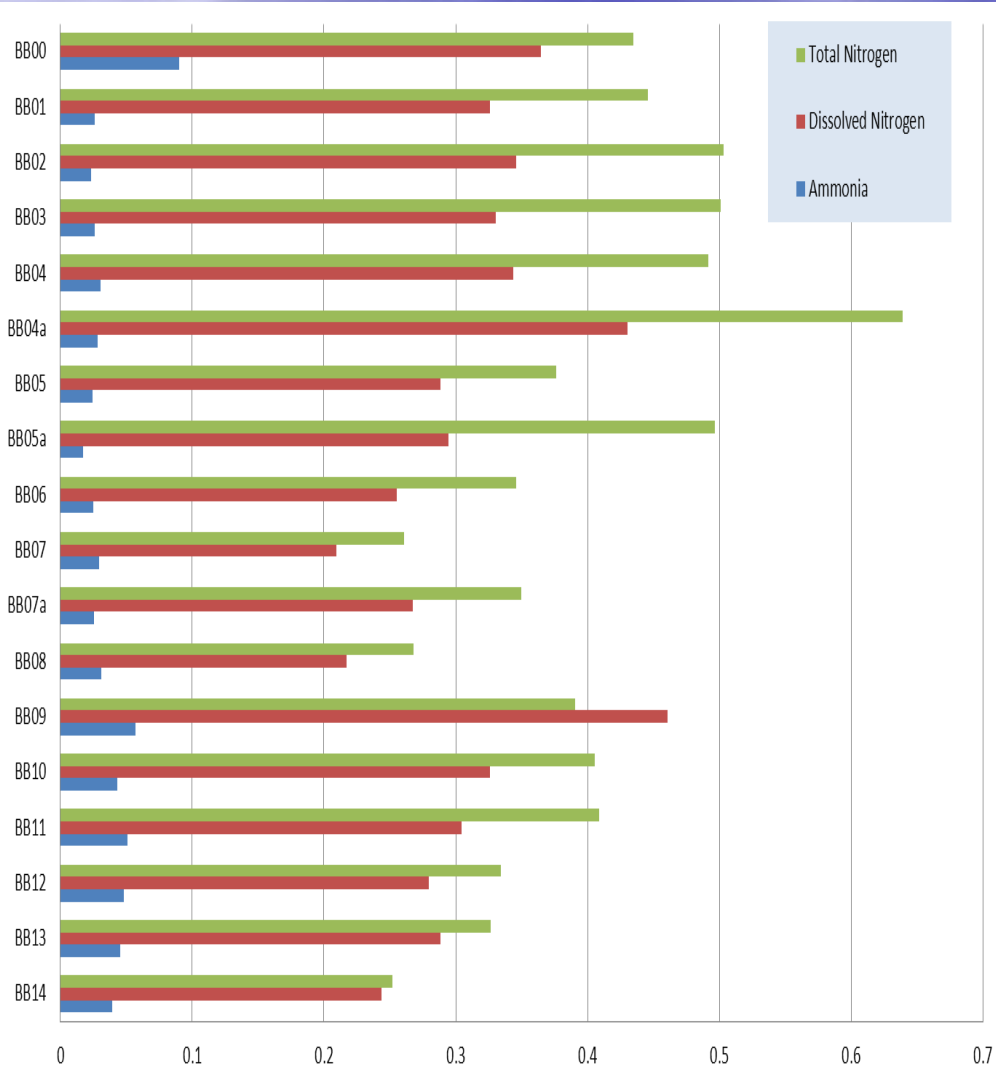
- Two fixed stations
 - Salinity, Temp, DO, DO%, SC, pH, Turbidity
 - Nitrate at Toms River
 - Chl a at Mantoloking
 - NWIS
- 4 buoys
 - Salinity, Temp, DO, DO%, SC, pH, Chl a, Turbidity
 - BB04, BB7A, BB10, BB14
 - Interactive Map



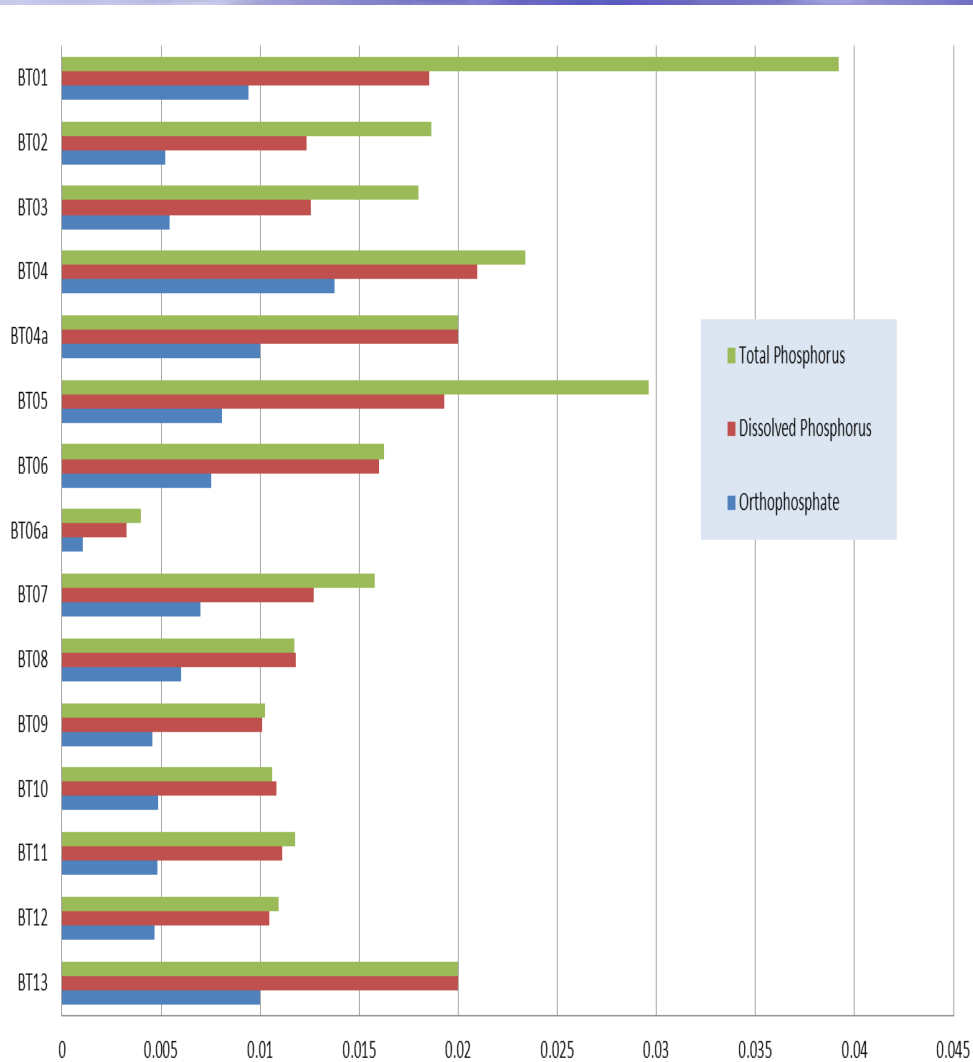
Avg Nitrogen Concentration at Tributary Stations (discrete sample 6/11 to 8/12)



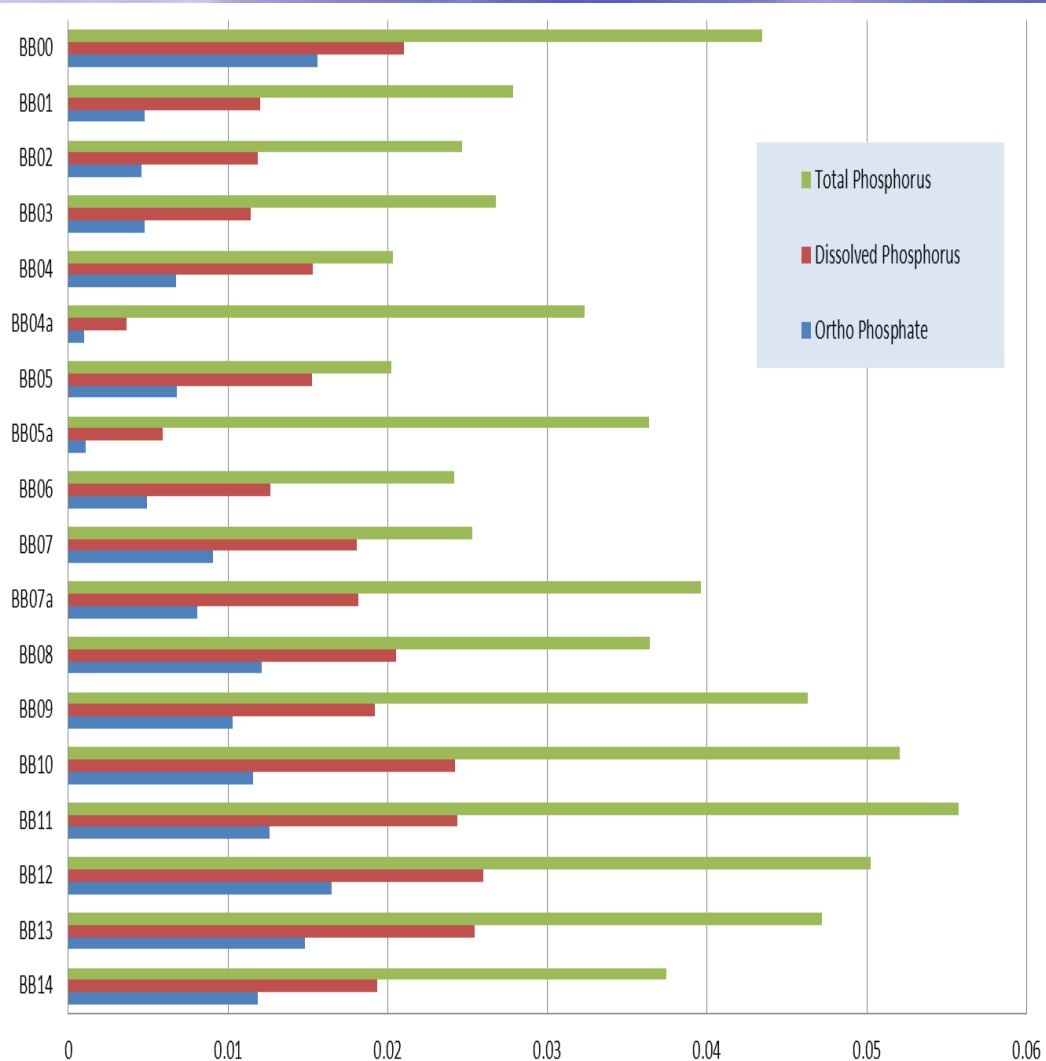
Avg Nitrogen Concentration at Bay Stations (discrete sample 6/11 to 8/12)



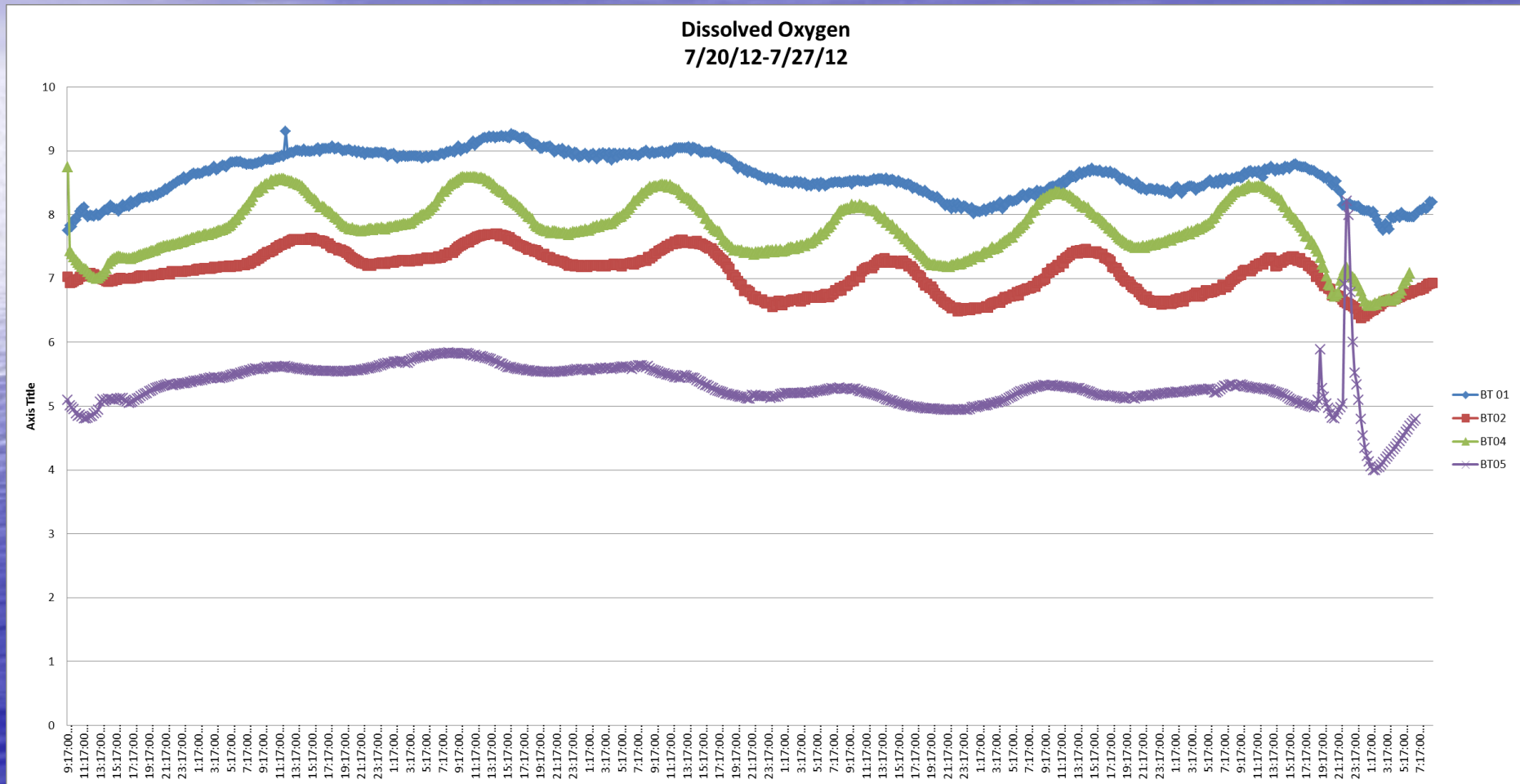
Avg Phosphorus Concentration at Tributary Stations (discrete sample 6/11 to 8/12)



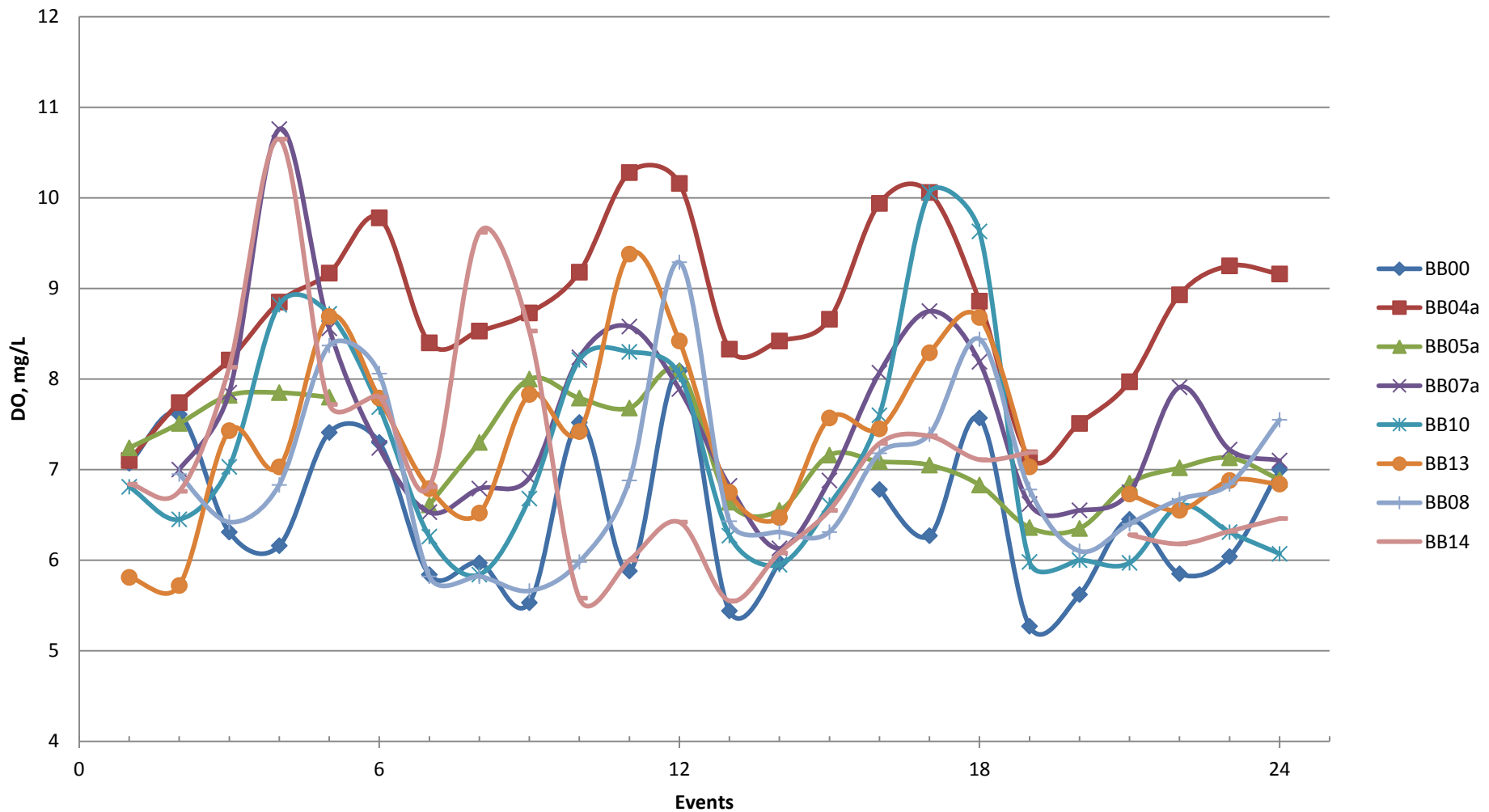
Avg Phosphorus Concentration at Bay Stations (discrete sample 6/11 to 8/12)



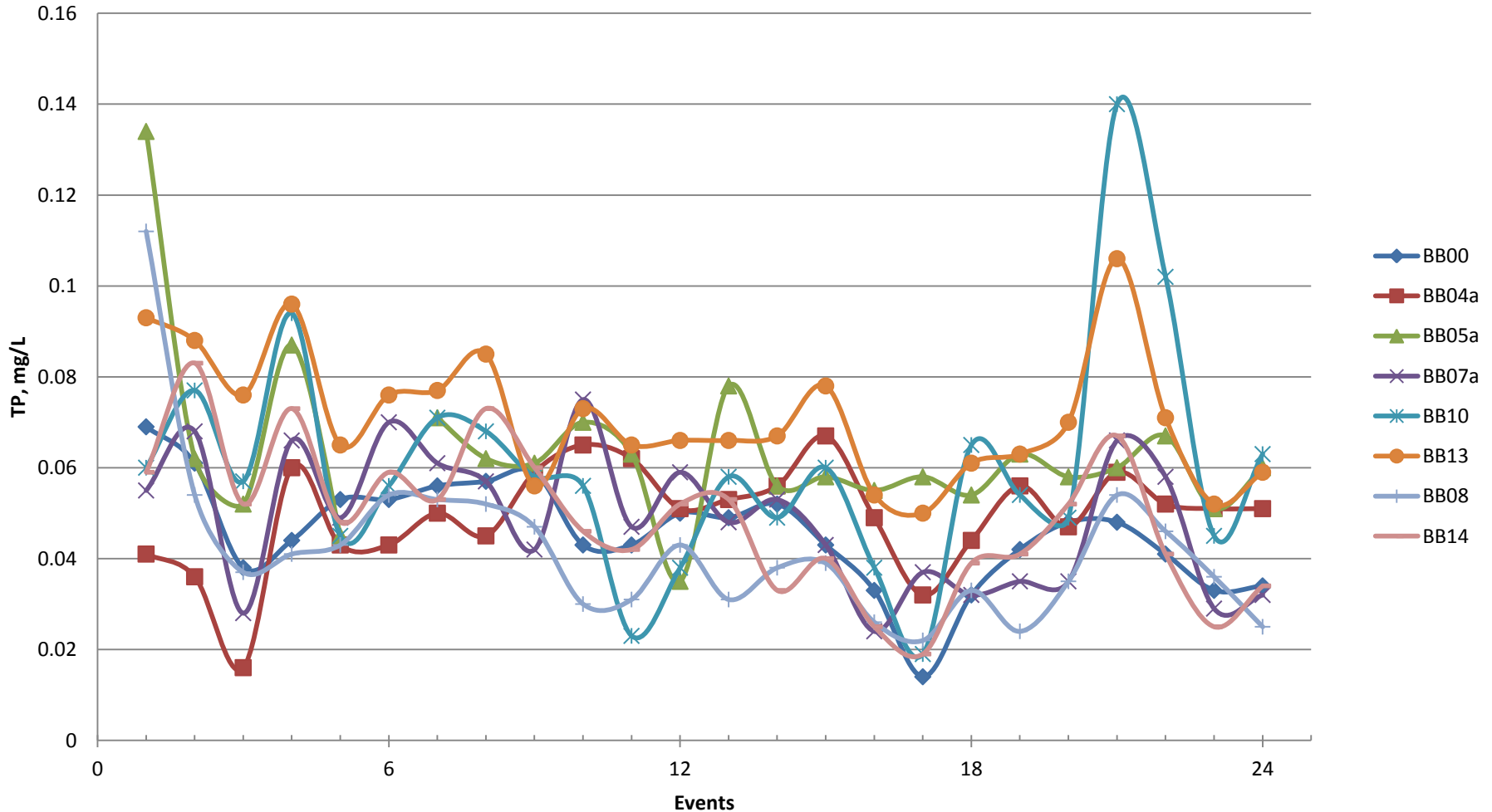
July Intensive – DO in Tributaries



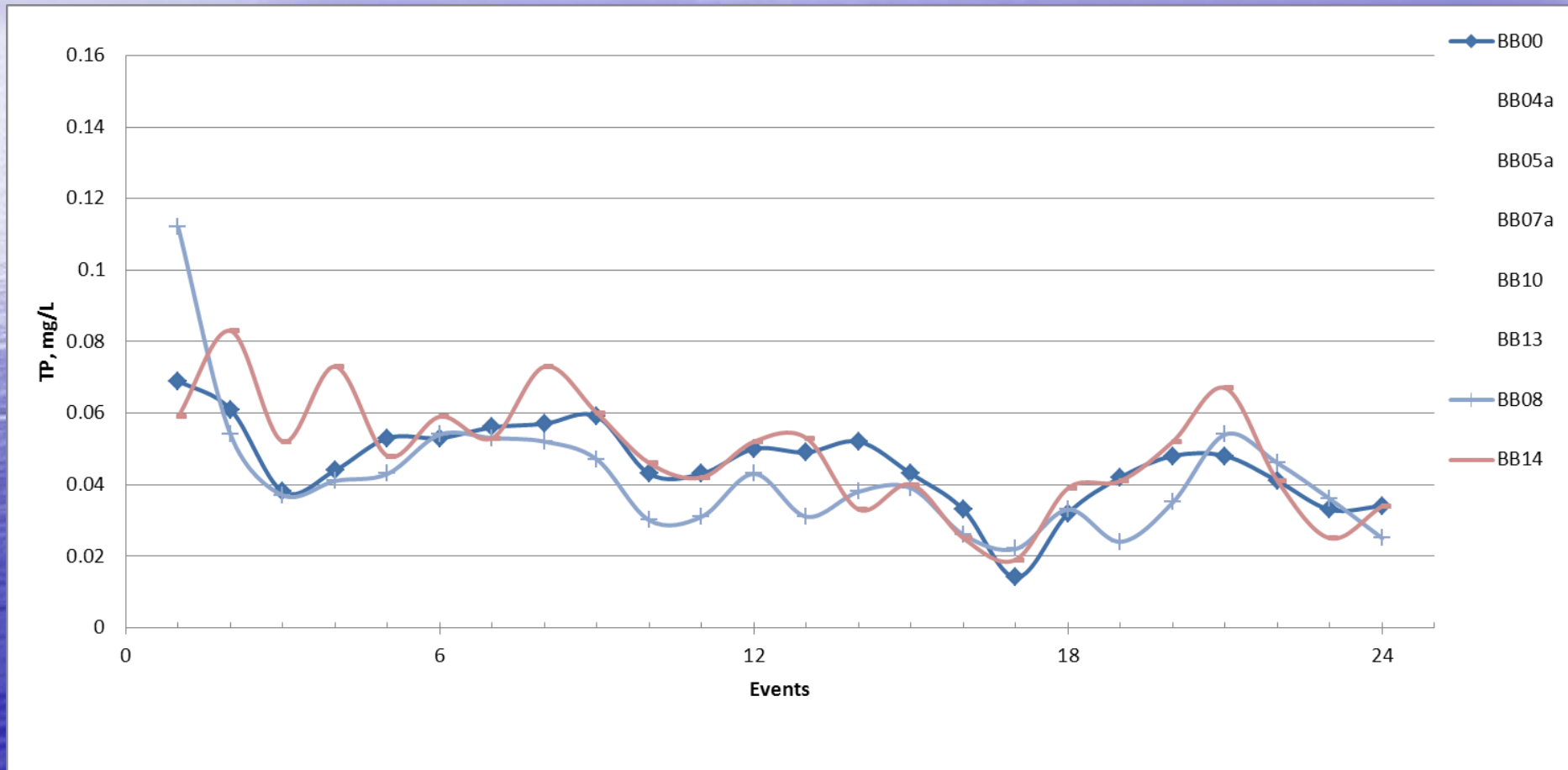
July Intensive – DO in Bay



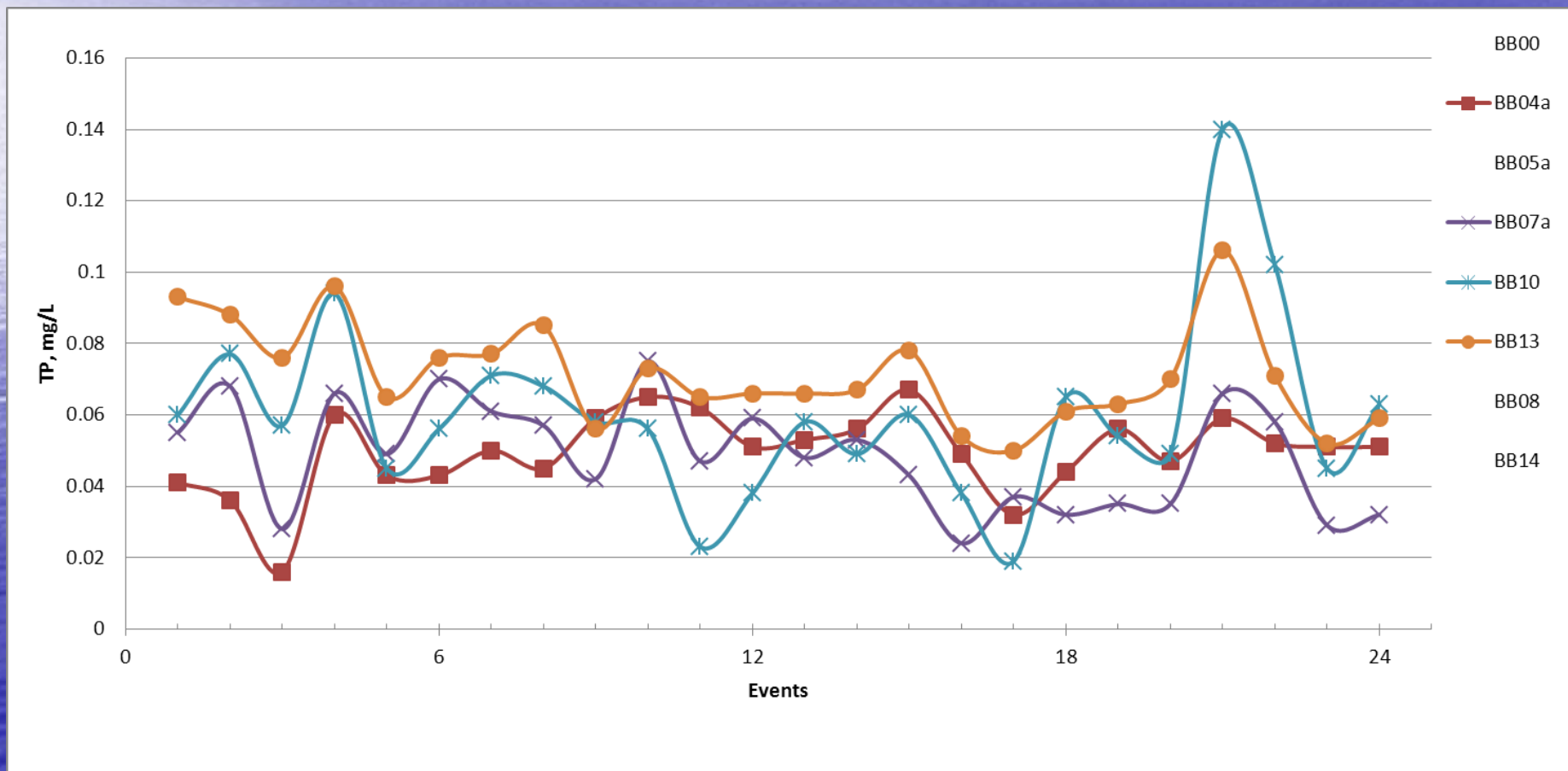
July Intensive – TP in Bay



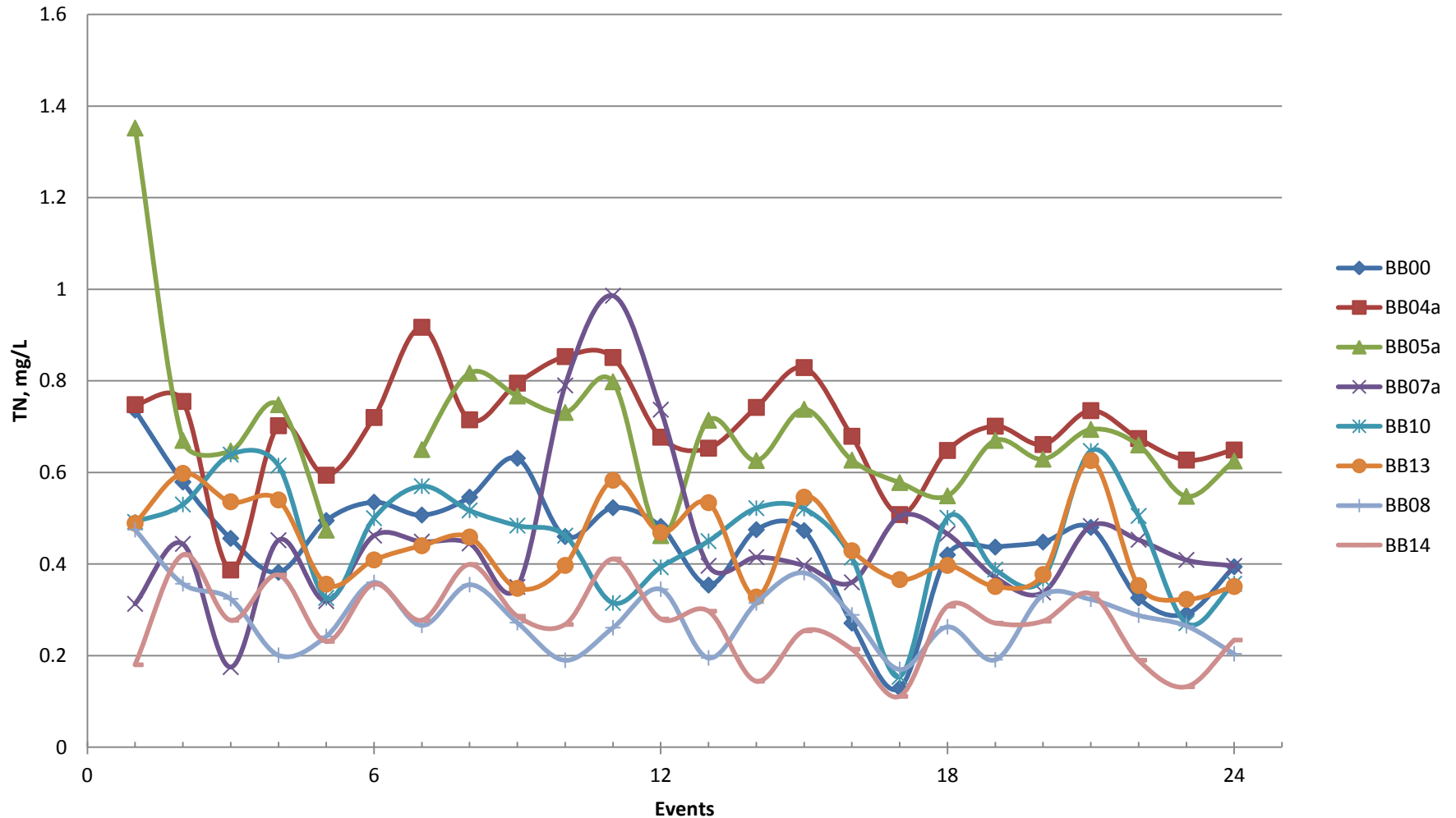
July Intensive – TP in Bay (cont.)



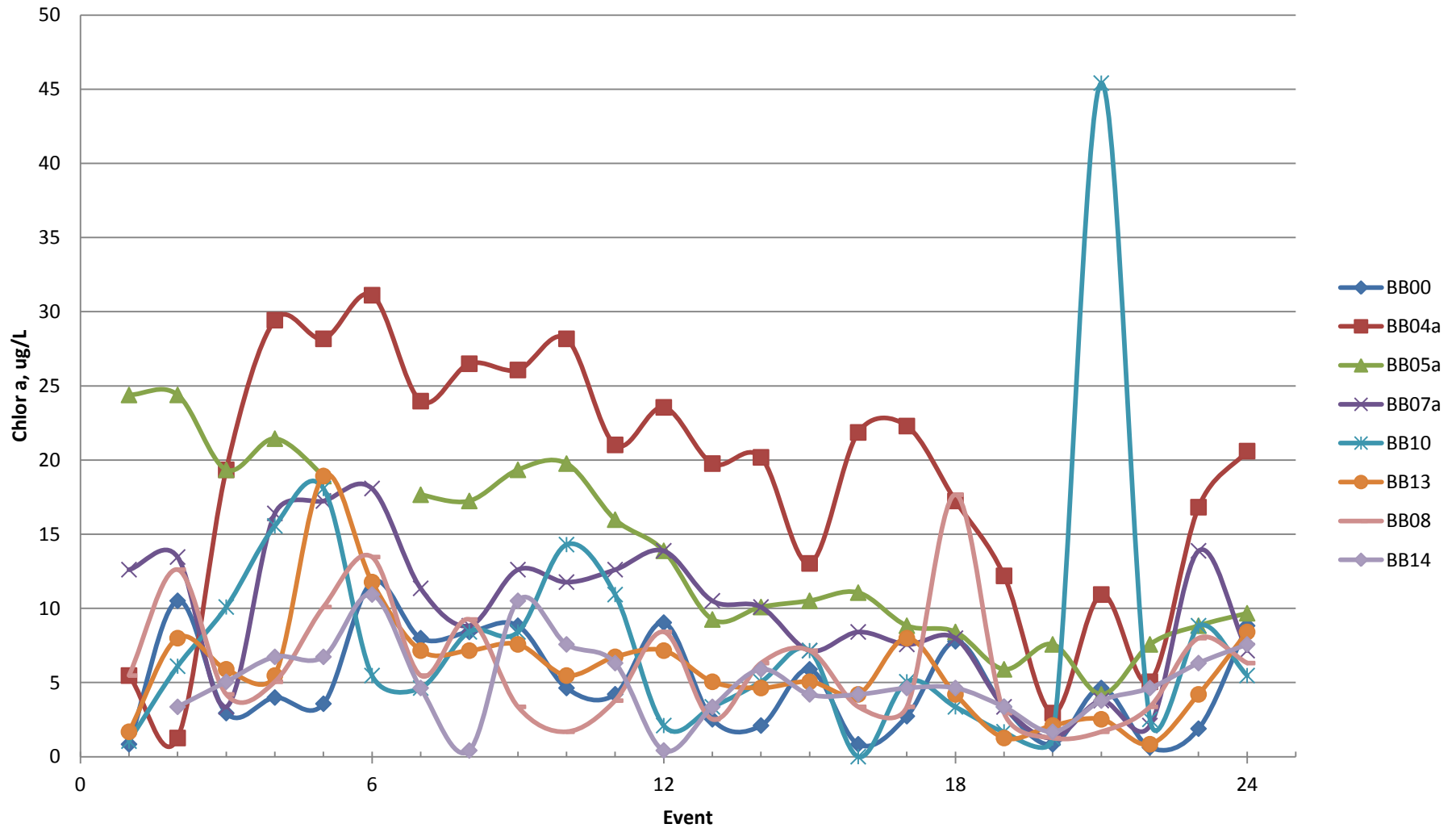
July Intensive – TP in Bay (cont.)



July Intensive – TN in Bay



July Intensive – Chl a in Bay



Data Use



- Adjustment of the future sampling
- Spatial distribution informs the segmentation of the bay model
- Populate, calibrate and validate the model
- Barnegat Bay-specific assessment



Internet Explorer browser window showing the URL: <http://www.state.nj.us/dep/barnegatbay/plan-wqstandards.htm>

Navigation menu: Home | About DEP | Index by Topic | Programs/Units | DEP Online

Section Header: **Comprehensive Plan of Action Item #7 Adopt More Rigorous Water Quality Standards**

Text: After adopting the Comprehensive Plan of Action for coastal waters on December 21, 2010, the DEP and its partners launched a new comprehensive ambient water quality monitoring network in the Barnegat Bay watershed on June 6, 2011. This network will provide water quality data that will establish the baseline conditions of the bay and assess these conditions against water quality standards. This information will then direct actions, including the possible establishment of a TMDL (Total Maximum Daily Load), needed to restore the bay.

Image: A map of the Barnegat Bay watershed with a red box around it and the text "Click to launch interactive map".

Text: The network is lead by DEP, with 9 partners. Within the network, water quality monitoring is currently taking place at 12 locations on tributaries to the bay and 14 locations within the bay itself. In addition, stream flow is being monitored at the 12 tributary locations. The map above displays each of these 26 active monitoring locations, as well as several stations which are currently either suspended or have been discontinued/relocated. By clicking on each monitoring location, users can see the name and location of the monitoring site, which partner is doing the water quality and/or stream flow monitoring, link to partner websites, view photos of the site as well as access the monitoring data that has been collected at each station.

Text: There are 2,157 stream miles within the Barnegat Bay watershed. 75% of the stream miles are protected as Outstanding National Resource Waters (ONRW) which includes streams classified as Freshwater 1 (FW1) and Pinelands Waters (PL) or Category One waters (C1). These waters are protected from water quality degradation because of their unique

Internet Explorer browser window showing the URL: <http://www.state.nj.us/dep/barnegatbay/bbmapviewer.htm>

Section Header: **STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION BARNEGAT BAY**

Text: Data accessible: by station or all available
Trib stations – surface data only
Bay stations – surface & bottom data
Continuous data – bay & tributaries

Map: Interactive map of the Barnegat Bay watershed showing monitoring stations and water quality data. A pop-up window for station BT05 (Tributary / Macroinvertebrates) is visible, showing location details and download options.

Legend: Continuous Monitoring Sites (Green triangle for Bay, Red triangle for Tributary), Water Quality Monitoring Sites (Purple circle for Tributary, Yellow circle for Discontinued or Suspended, Green circle for Macroinvertebrates Only, Black circle for in Bay), Roads (Yellow for Interstate, Orange for US Highway, Green for State Highway, Blue for Toll Road, Red for Local Road), Streams (Blue line), Municipalities (Blue outline), Counties (Black outline), Mid-Atlantic States (Grey outline), 2007 Imagery.

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<http://www.nj.gov/dep/barnegatbay/bbmapviewer.htm>



Partners



QUESTIONS ?

