Assessment of Water Quality Condition within Barnegat Bay, NJ Using the Data Collected between 2008 and 2013

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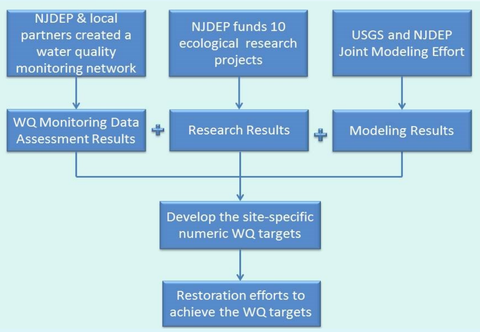
Background

As part of Governor Christie's Comprehensive Plan to address the ecological health of Barnegat Bay NJ, a targeted water monitoring project was conducted within the Barnegat Bay Watershed. The New Jersey Department of Environmental Protection and 7 Monitoring Network Partners collected over 5,000 water samples over a two-year period. The robust dataset produced as part of this project, together with other available data during the time frame of 1/1/2008 and 06/30/2013, provided the foundation for the Department to complete a comprehensive assessment of the water quality condition of Barnegat Bay and its tributaries. With the better understanding of the water quality condition, the numeric water quality targets specific for the Bay are expected to be developed based on the findings from 10 ecological research projects and the construction/simulation of the dynamic modeling tool.

Methods

The water quality assessment included two parts: Part 1 compared the observed water quality data to the existing applicable numeric New Jersey Surface Water Quality Standards, as part of the Department's biennial 2014 Integrated Report and following the method specified in the Methods Document (http://www.state.nj.us/dep/wms/bearsdocs/2014_final_methods_document_and_response_to_comments.pdf). Part 2 was a comparison between Barnegat Bay data and the targets used by other estuaries in the Northeast United States relative to the narrative nutrient criteria. Part 2 assessment was conducted by only using the data being collected by the Department between June 2011 and June 2013, given the robustness of this sub-dataset.

How this Monitoring Project and Data Assessment Links to the Governor's Plan



Overall Results

Part 1:

Observed Water Quality Data Compared to Existing Surface Water Quality Standards

Figure 1. Overall Summary Assessment Outcomes by Designated Use for the Bay

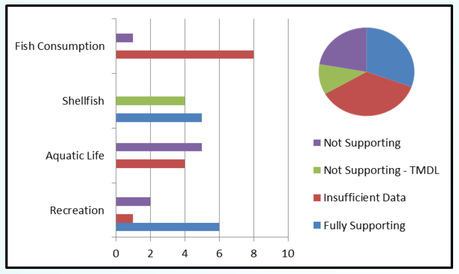
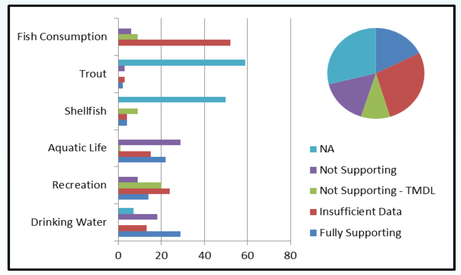


Figure 2. Overall Summary Assessment Outcomes by Designated Use for the Tributaries



Selected Parameters of Interest Associated with Aquatic Life Use Support:

Figure 3. Dissolved Oxygen

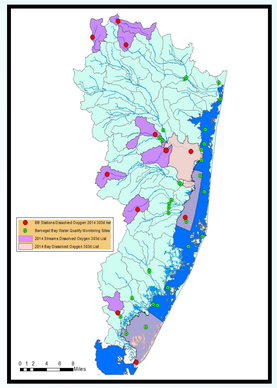


Figure 4. Total Phosphorus

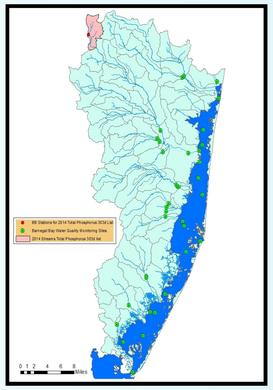
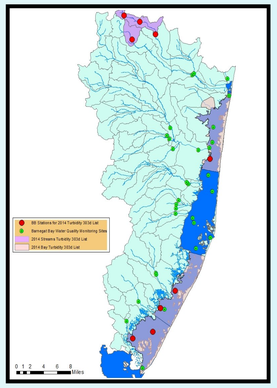


Figure 5. Turbidity



Part 2:

Comparison to Water Quality Targets Used by Other Northeastern Estuaries

Barnegat Bay water quality conditions were compared to the numeric water quality criteria that have been identified for other estuaries in the northeast. The ranges of these values, given in Table 1 are considered adequate to support healthy ecosystems for the specific estuaries . These values might not be protective of ecological health in Barnegat Bay. The maps shown in Figures 6, 7, 8 and 9 show the existing Barnegat Bay conditions relative to the selected thresholds used in other estuaries.

Figure 6. Mean Chl-a

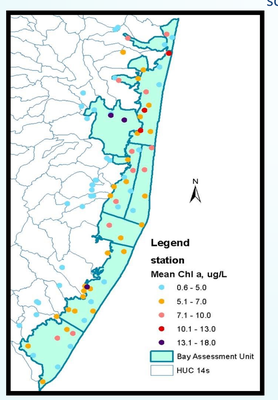


Figure 7. Chl-a, 90th Percentile

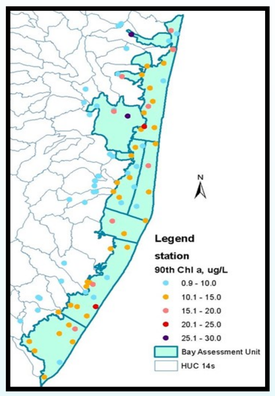


Figure 8. DO Sat, Daily Mean <75%

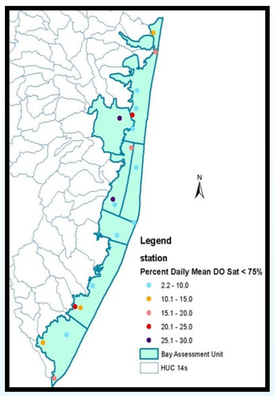


Figure 9. TSS, 75th percentile growing season

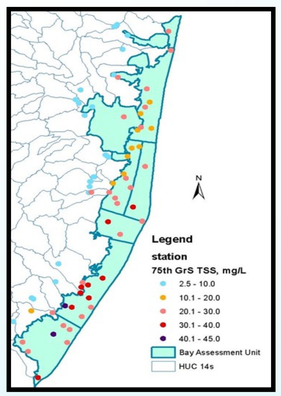


Table 1. Targets developed after scientific studies to quantify water quality criteria for other estuaries in the northeast.

Parameter	Target Used by Others (Compare with Figures 6, 7, 8, 9)
Chlorophyll-a	Mean < 5 ug/L (Massachusetts Back Bays) 90th percentile < 10 ug/L (Great Bay) 90th percentile < 20 ug/L (Delaware Inland Bays)
Dissolved Oxygen	Daily Mean > 75% Saturation (Great Bay)
TSS	75th Percentile in Growing Season < 20 mg/L (Delaware Inland Bays)

Where is Barnegat Bay?

Thank you to all of our Partners

Previous National Water Monitoring Conference Presentations on Barnegat Bay:

- http://acwi.gov/monitoring/conference/
  - "Collaborative Water Quality Monitoring Program to Support Modeling and Restoration of Barnegat Bay," presented by Helen Pang (see 2014 Session L4)
  - "Modeling of Water-Quality Dynamics and Responses to Nutrient and Other Stresses in Barnegat Bay-Little Egg Harbor, New Jersey," presented by Fred Spitz (see 2014 Session L4)
  - "Developing a Water Monitoring Consortium to Support NJ's Barnegat Bay Action Plan," presented by Leslie McGeorge (see 2012 Session O1)

For more information on Barnegat Bay, see:

- http://www.nj.gov/dep/barnegatbay/
  - Action Item 7: "Adopt More Rigorous Water Quality Standards"