**NERACOOS Integrated Nutrient Observatory**
**Great Bay Stakeholder Workshop Report**

## Introduction

In the Fall of 2014, NERACOOS initiated a 3-year project, funded by the IOOS Ocean Technology Transition (OTT) Program, to integrate automated nutrient sensors into its network of buoys throughout the Northeast. A key component of this project is to engage with key stakeholders, such as water quality managers, consultants and researchers, who will use the nutrient data in their research and decision making processes. The overall goals of the outreach component are to:

- Inform stakeholders about the sensor deployment and availability of nutrient data in the region,
- Share lessons learned from operating and integrating the nutrient sensors into buoy systems,
- Improve our understanding of how stakeholders use nutrient data,
- Understand stakeholders' needs for nutrient data access and visualization; and
- Better understand stakeholders' nutrient data QA/QC requirements.

On May 26, 2015 NERACOOS hosted a workshop in Greenland, New Hampshire for local stakeholders (see Appendix A: Workshop Participants). The goal of the workshop was to inform stakeholders about the NERACOOS Integrated Nutrient Observatory project and specifically the deployment of nutrient sensors in Great Bay, as well as to discuss their potential use of the data (see Appendix B: Workshop Agenda). The first part of the workshop included presentations on Great Bay water quality management, Great Bay circulation and nutrient cycling, and an overview of the automated nutrient sensors to be deployed in Great Bay. These presentations are available on the Nutrient Observatory website at www.neracoos.org/nutrientobservatory.
The second part of the workshop included facilitated breakout groups where the stakeholders discussed several key questions. The key questions focused on:

- How do you use dissolved nutrient data?
- Do you have any QA/QC requirements to be able to use nutrient data?
- Are there additional data types that you would like to see collected?
- Will you use the data directly or prefer a synthesis of the data?
- What type of data visualizations do you use and what would be helpful?
- Do you need any training on data access?

## Nutrient Data Use

In the breakout sessions, meeting participants first described and discussed how they and/or their organization uses dissolved nutrient data collected in Great Bay or other coastal areas. Stakeholders indicated that they use dissolved nutrient data in the following ways:

- To inform regulatory decisions.
- To help with the protection of the Bay.

- As a water quality management tool.
- To help interpret what is happening in Bay.
- To ground truth and improve model of Bay.
- To support aquaculture decision making.
- To support research, including: relationship of phytoplankton to nutrient concentrations; modeling nutrient flux and processes; understanding temporal and biomass responses of primary producers.

The breakout groups then discussed the other questions, as listed above. Below is a categorized list of recommendations and/or requests that came from the breakout discussions.

**Breakout Discussion Results:**

**Data analysis and interpretation**

- There should be a data analysis plan that provides an interpretation of the nutrient data and puts the data into context using associated environmental data and historical data.
- Water quality managers requested the measurement of total nitrogen. While the sensors do not measure total nitrogen it was suggested that the data from the sensors could be used with other data to model total nitrogen.

**Data QA/QC**

- Provide access to metadata that includes a description of QA/QC process and contact information for a person who can answer questions about the process.
- The Quality Assurance (QA) toolbox from Georgia Coastal Ecosystem Long Term Environmental Research Network (https://gce-lter.marsci.uga.edu/public/im/tools/data_toolbox.htm) might be a useful QA tool for data mangers to use with these data.
- Identify water quality management community data QA/QC requirements.

**Data access and display**

- Provide access to near real-time nutrient data along with description of limits and potential issues with the real-time data.
- Provide access to a post real-time QA/QC'd data file of the nutrient data. The QA/QC'd data file should be available at least annually and more frequently if possible.
- Provide access to the nutrient data in various common file formats e.g. CSV, ASCII, etc.
- Develop a webinar and/or video tutorial demonstrating how to access and download the nutrient data.
- Can NERACOOS provide a tool that supports the development of a State of the Estuaries report?

- Provide daily readings and tidal averages of nutrient data.
- Provide a tool that can display nutrient data along with other parameters to help illustrate relationships.

**Communications and sustainability**

- Develop a plan to sustain sensors after project and communicate status of sensors especially to stakeholders that rely on the data.
- Consider partnering with Great Bay Monitoring Initiative.
- Great Bay Estuaries Program could help get feedback on use and value of the nutrient data and data tools.
- Communicate outcomes of Long Island Sound and Narragansett Bay Stakeholder workshops with this group so that they can learn about similar and different needs and approaches.
- Coordinate with Will Willheim who has nutrient sensors in tributaries and coordinate with other related EPSCOR efforts in the region.

NERACOOS and our project partners will consider these requests/recommendations and integrate them into the work plan if feasible. NERACOOS will also be holding similar workshops in the Long Island Sound and Narragansett Bay regions in 2016. Stakeholder requests and recommendations will be reviewed from all workshops and common requests will be addressed throughout the region if feasible.

Appendix A: Stakeholder Workshop Participants

| Attendee Name | Organization |
|---|---|
| Bill Arcieri | VHB, Inc |
| Jackie Ball | NERACOOS |
| Jeff Barnum | Great Bay-Piscataqua Waterkeeper |
| Jean Brochi | US EPA Region 1 |
| Todd Callaghan | MA CZM |
| Linda Coe | Great Bay Community College |
| Steven Couture | NH DES |
| Jaclyn Covino | Great Bay Community College |
| Brian Gennaco | Virgin Oyster Company |
| Tom Gregory | University of New Hampshire |
| Steve Jones | University of New Hampshire |
| Joel Jordan | Great Bay Community College |
| Corey Koch | WET Labs |
| Richard Langan | University of New Hampshire |
| Matthew Liebman | US EPA Region 1 |
| Steve Miller | Great Bay NERRS |
| Ru Morrison | NERACOOS |
| Dean Peschel | City of Dover/ Peschel Consulting |
| Jody Potter | University of New Hampshire |
| Cory Riley | Great Bay NERRS |
| Joe Salisbury | University of New Hampshire |
| Tom Shyka | NERACOOS |
| Cassie Stymiest | NERACOOS |
| Prassede Vella | MassBays National Estuary Program & MA CZM |

# Great Bay Nutrient Observatory Workshop
# May 26, 2015

Great Bay NERRS | 89 Depot Rd. | Greenland, NH (directions)

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|---|---|
| 9:15 | Coffee |
| 9:30 | Welcome, Introductions and Meeting Goals: Tom Shyka, NERACOOS |
| 9:50 | NERACOOS Overview: Ru Morrison, NERACOOS |
| | Integrated Nutrient Observatory: Cassie Stymiest, NERACOOS |
| 10:05 | Great Bay Oceanography and Nutrient Dynamics: Joe Salisbury, University of New Hampshire |
| 10:25 | Automated Nutrient Sensors: Corey Koch, WET Labs |
| 10:45 | Break |
| 11:00 | Great Bay Water Quality Management: Steve Couture, N.H. DES |
| 11:30 | Breakout Session 1: Use of data and associated data requirements |
| 12:00 | Lunch |
| 12:45 | Breakout Session 2: Data access, tools and training needs |
| 1:30 | Next Steps and Conclude |