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## 2008 Great Bay Water Quality (Datasonde) Monitoring Program

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# 2008 Great Bay Water Quality (DataSonde) Monitoring Program

A Final Report to

The Piscataqua Region Estuaries Partnership

Submitted by

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## Introduction

*In situ* water quality assessment has become an important source of data for monitoring, research and management activities in estuaries nationwide. As part of the National Estuarine Research Reserve System, the Great Bay System-Wide Monitoring Program (SWMP) produces *in situ* water quality data for four sites in and around Great Bay. This project extends the SWMP program to include year-round *in situ* data for a station at the University of New Hampshire Coastal Marine Lab pier at the mouth of the Piscataqua River and summer data for a station in the Salmon Falls (SF) River. This suite of stations provides a comprehensive *in situ* sampling array that monitors the major rivers and open estuary locations within the Great Bay estuarine system.

## Project Goals and Objectives

UNH completed this project under contract to the Piscataqua Region Estuaries Partnership (Project ID #06-M-1). The project goals and objectives per the contract were to:

- (1) support *in situ* water quality monitoring for the April – December sampling season at the Lamprey River (LR), Squamscott River (SQ), Oyster River (OR), Great Bay (GB) and Coastal Marine Lab (CML) sites; and
- (2) fund the deployment of *in situ* water quality monitoring at the Salmon Falls (SF) for July, August and September.

The final work product was agreed to be a series of Excel data files containing monthly data records for each of these sites along with appropriate meta-data for these data (these have been provided).

## Methods

The methods for this project followed the procedures prescribed by the National Estuarine Research Reserve Central Data Management Office (CDMO) and detailed in Small et al. (2003).

Briefly, YSI 6600 DataSondes are programmed to obtain measurements of specific conductivity, salinity, dissolved oxygen, percent saturation, pH, temperature, water level, and turbidity every half-hour. The instruments are deployed continuously during ice-free seasons, except for brief periods when they are removed for cleaning, maintenance and recalibration. Pre and post-deployment calibrations are performed using the diagnostics menu of the YSI Ecowatch program and QA/QC

procedures developed by NERR Research Coordinators and YSI engineers. VWR conductivity and pH standards are used for calibration. YSI formazin is used to calibrate turbidity probes.

DataSondes are deployed approximately one meter from the bottom and recovered for data download every 2-4 weeks depending upon the time of year. Files are first examined and graphed using Ecowatch software. Missing and/or anomalous data are noted. Files are then transferred to a Macintosh computer and opened in Excel software and edited. Missing data due to routine YSI maintenance and probe failure or communication errors noted. Files are verified by means of CDMO Excel macros.

The CDMO `cdmamac3.xls` macro allows the user to automatically format column widths to the correct number decimal places based on the YSI sensor specifications. It also allows the user to QA/QC each data logger generated file for missing data points, and find all data points that fall outside the range of what the datalogger is designed to measure (outliers). The CDMO `import.xls` macro will allow PC users with 30-minute data to automatically create a monthly Excel file from a two-week deployment. In addition, in November 1999 a graphing capability was added to this macro allowing users to produce single parameter and missing point graphs on a monthly basis. All files are graphed in Excel and examined in order that anomalous data points can be identified and removed.

## Results and Discussion

Data for the DataSondes deployed as part of the NERRS SWMP program have been submitted and accepted by the NERRS CDMO. So as not to create potentially different data sets (CDMO potentially modifies the data that are submitted to them), the data and all associated meta-data for the GB, LR, SQ and OR sites are available at <http://cdmo.baruch.sc.edu/home.html> and by following the links to: (a) NERR Data; (b) NERR Data and Associated Metadata; (c) NERR SWMP Water Quality Data; and (d) Great Bay (GRB).

For the CML site, DataSondes were successfully deployed as follows:

Site/Sonde	deploy date	time	retrieve date	time
CML	12/12/07	1500	1/29/08	1500
CML	1/29/08	1500	3/25/08	830
CML	3/25/08	900	5/19/08	1300
CML	5/19/08	1400	6/27/08	730
CML	6/27/08	800	7/29/08	800
CML	7/29/08	900	9/3/08	1000
CML	9/3/08	1030	10/8/08	1400
CML	10/8/08	1430	11/21/08	1100
CML	11/21/08	1030	1/14/09	1300

For the SF site, DataSondes were successfully deployed as follows:

Site	deploy date	time	retrieve date	time
SF	7/14/08	1200	8/20/08	1330
SF	8/20/08	1400	9/21/08	1200

The data provided with this report includes the following information for the CML and SF DataSonde deployments: (a) raw data files; (b) edited data files (these are the files that should be used and distributed); and (c) meta-data, calibration and deployment files.

### Conclusions and Recommendations

The *in situ* water quality monitoring program provides important data on basic water quality parameters in the Great Bay estuary. The CML site at the mouth of the Piscataqua River provides particularly critical information on the marine 'end-member' for the Great Bay system necessary for modeling and other integrative studies. The SF site provides important information on water quality during the critical summer period when dissolved oxygen levels may potentially decrease. When combined with the NERRS SWMP DataSonde program, these instruments provide comprehensive coverage of the Great Bay estuary.

### References

Tamara D. Small, Ashly D. Norman, Danna D. Swain, Jesse Friedmann and Dwayne E. Porter. (2003) CDMO NERR SWMP DATA MANAGEMENT MANUAL Version 5.0 (December 2003). NOAA National Estuarine Research Reserve, Centralized Data Management Office, Georgetown, SC.