



National Monitoring Network for Coastal Waters and Their Tributaries: the Delaware River Basin Demonstration Project

NOAA ORRAP Meeting
February 18, 2009

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of the National Water Quality Monitoring Council
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Outline of Presentation

- Interactions with MACOORA
- National Monitoring Network Pilot Inventory and Demonstration Phase in Delaware Basin (success stories)
- Proposed Data Management and additional continuous real-time monitoring for the Delaware River Basin (DEWOOS)
- Methods Board Sensors Work Group
- Where are we going from here?

Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA)

<http://www.macoora.org/>

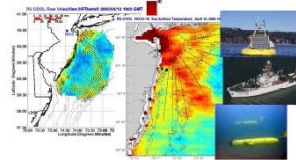


- Formed to integrate observations from Cape Hatteras to Cape Cod
- Four Themes from Annual Meeting October 22-23, 2008
 - Coastal Inundation
 - Maritime Safety
 - Water Quality
 - Ecosystem Based Management—Fisheries
- Water-quality workshop in March 11-12, 2008 in Philadelphia, PA

Data Inventory and Pilot Study Reports with gap analyses

Linking Elements of the Integrated Ocean Observing System (IOOS) With the Planned National Water Quality Monitoring Network

Proceedings from the NOAA-Supported Workshop
19-21 September, 2005



Edited by: *Peer-M. Rowe, Ph.D.; M. Jewel Hemeneth, Ph.D.; and Michael P. Wenzon, Ph.D.*



NOAA Technical Memorandum NOS NCCOS 48



DELAWARE RIVER BASIN NATIONAL WATER QUALITY MONITORING NETWORK PILOT STUDY FINAL REPORT

REPORT COORDINATORS:
Dr. Robert Tucker (Delaware River Basin Commission)
Dr. Eric F. Vossahol (USGS, NJ Water Science Center)

RESOURCE COMPARTMENT WORKGROUP CHAIRS:

Estuaries Workgroup Chair:	Dr. Jonathan H. Sharp (College of Marine and Earth Studies, University of Delaware)
Near-shore Workgroup Chair:	Dr. Robert Connel (NJ Dept. of Environmental Protection)
Off-shore Workgroup Chair:	Dr. Scott Glenn (Institute of Marine and Coastal Sciences, Rutgers Univ.)
Rivers Workgroup Chair:	Dr. Josh Kolar (Institute of Marine and Coastal Sciences, Rutgers Univ.)
Groundwater Workgroup Chair:	Dr. Eric F. Vossahol (USGS, NJ Water Science Center)
Wetlands Workgroup Chair:	Dr. Eric F. Vossahol
Atmospheric Deposition Workgroup Chair:	Dr. Denade Kowar (Partnership for the Delaware Estuary)
Data Management Workgroup Chair:	Dr. Lisa A. Rodenburg (Dept. of Environmental Sciences, Rutgers Univ.) Dr. David R. Leggett (Dept. of Geography, University of Delaware)

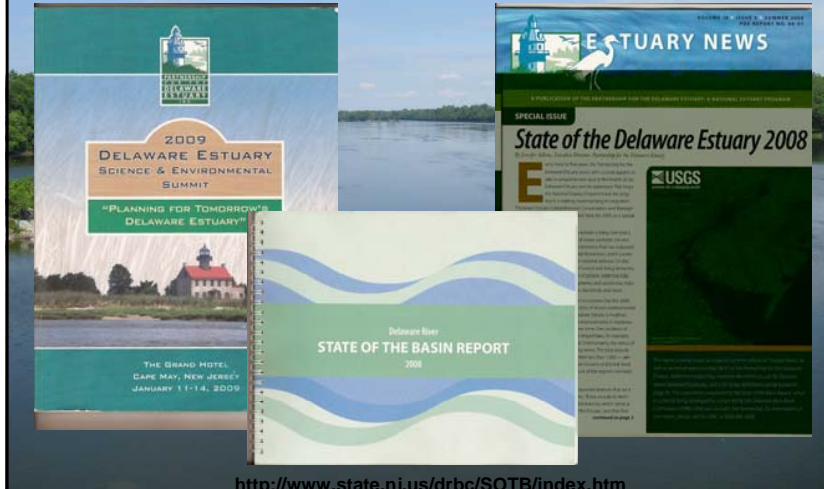
February 7, 2008

<http://acwi.gov/monitoring/network/>

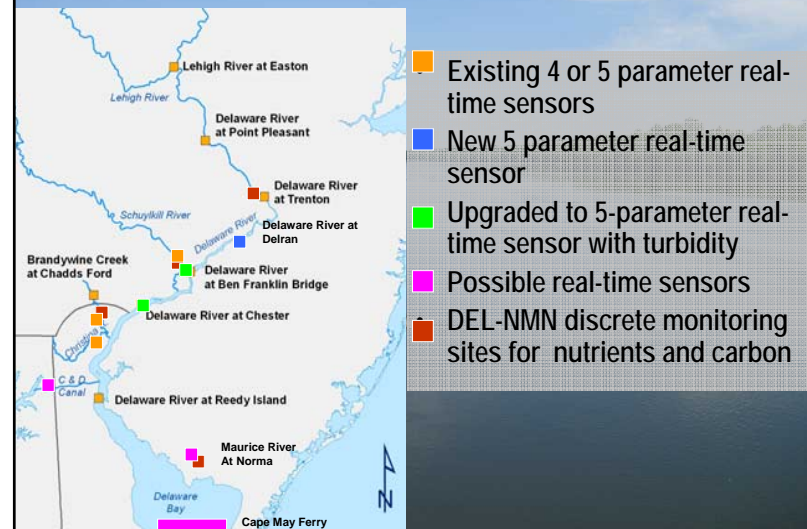
<http://www.cma.nos.noaa.gov/publications/IOOSTechMemo.pdf>

Delaware River Basin recent report and conference highlights

<http://www.delawareestuary.org/>



NWQMN Delaware River Basin Demonstration Area Sensor and Discrete Monitoring Network

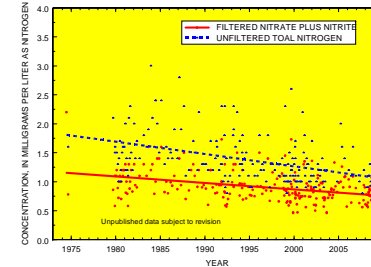


USGS Improvements to Monitoring in the Delaware River Basin to Meet the Needs of the National Monitoring Network for U.S. Coastal Waters and Their Tributaries

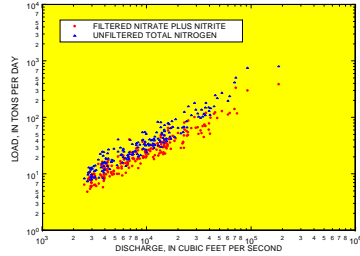
Objectives FY08-09

- **Improve real-time monitoring along river and estuary**
 - New site at Delran T, SC, pH, DO and turbidity
 - upgrade other stations to include turbidity
- **Improve nutrient and carbon analyses as per Nutrient Work Group recommendations**
 - Major head of tide stations in the basin (Delaware River at Trenton, Schuylkill, Maurice, Christina/Brandywine)
 - Estuary Boat Run sites
- **Delaware River at Trenton upgraded to a “temporary” USGS NASQAN site**

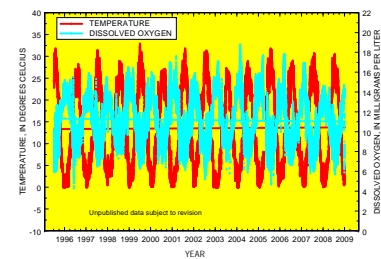
DELAWARE RIVER AT TRENTON--TRENDS IN CONCENTRATIONS
FILTERED NITRATE PLUS NITRITE AND TOTAL NITROGEN



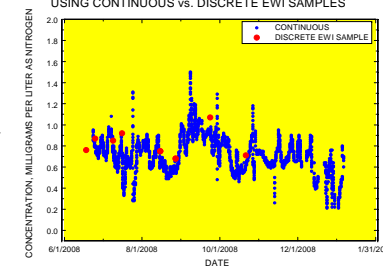
DELAWARE RIVER AT TRENTON--LOADS
FILTERED NITRATE PLUS NITRITE AND TOTAL NITROGEN



DELAWARE RIVER AT TRENTON--WATER TEMPERATURE vs. DISSOLVED OXYGEN

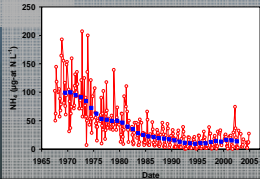
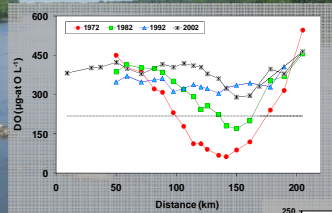


DELAWARE RIVER AT TRENTON--NITRATE PLUS NITRITE
USING CONTINUOUS vs. DISCRETE EWI SAMPLES



Boat Run Network

- Data collected since early 1970's
- 22 sites along estuary spine sampled 16 times per year on same day
 - Nutrients Carbon Other
 - Bacteria VOCs



NOAA Grant Proposal related to real-time monitoring and data management in the Delaware Basin

PROPOSAL COVER SHEET

Development of a Delaware Basin Watershed to Ocean Water-Quality-Data Exchange Portal and Upgrades to Real-Time Observation Systems as Part of the National Monitoring Network for Coastal Waters and Their Tributaries

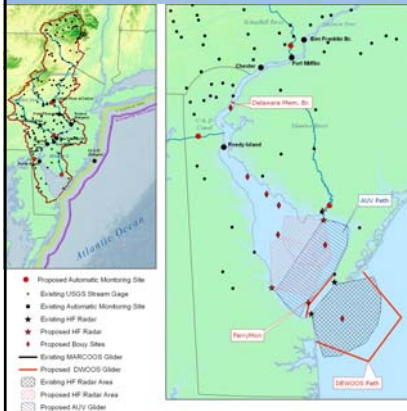
December 3, 2007

Principal Investigator: Robert Tudor
 Deputy Executive Director
 Delaware River Basin Commission
 25 State Police Drive
 P.O. Box 7360
 West Trenton, NJ 08628-0360
 (609) 883-0500
 (609) 883-9522 (FAX)
robert.tudor@drbc.state.nj.us

Financial Rep: Richard Gore
 Delaware River Basin Commission
 Duration of Project: 2 years plus 1 optional
 Funding type: Grant



DEWOOS NOAA Grant Proposed Real-Time Monitoring

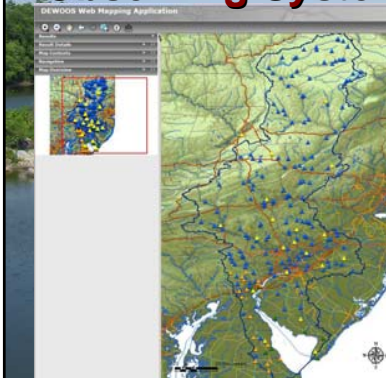


- Upgrades to USGS water-quality sites
- Delaware Memorial Bridge (UDel)
- Buoys for oyster beds (NJDEP)
- Cape May Ferry (UDel)
- AUV for shallow estuary (UDel)
- Moorings lower estuary (UDel)
- AUV for offshore (RU/UDel)
- CODAR for Delaware Estuary (UDel/RU) to complete RCOOS
- Atmospheric (RU)
- Wetlands (PDE)
- DEWOOS Data Management

Additional sensors such as nitrate, chlorophyll, and PARS planned at selected sites

DEWOOS

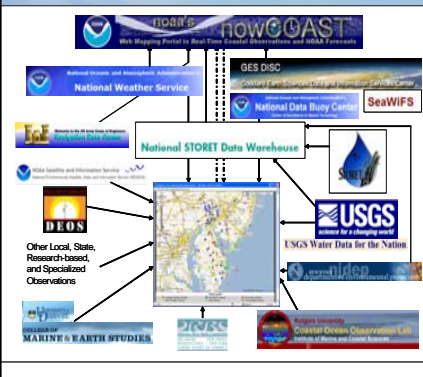
Delaware Estuary-to-Watershed-to-Ocean Observing System



<http://www.dewoos.udel.edu/>

- Proposed **integrated watershed and coastal environmental data-management system** that can be applied to a variety of watersheds across the nation—**"use the data we already have"**.
- Initially based on DEOS concept
- MACOORA provided seed money to start project to David Legates at UDEL
- Demonstrate how a cooperative regional monitoring system can be linked to and enhance the National Water Quality Monitoring Network
- One-stop shopping web site for data in the DRB

DEWOOS Data Sources and Type Platforms



- **Standard 'station-based'** data where an observing platform remains in a fixed position and records data on a regular basis.
- **Research-specific measurements** taken for a short time period.
- **Lagrangian observations** from observing platforms that move
- **Gridded data** acquired by remote sensing technology and spatial interpolation methodologies.

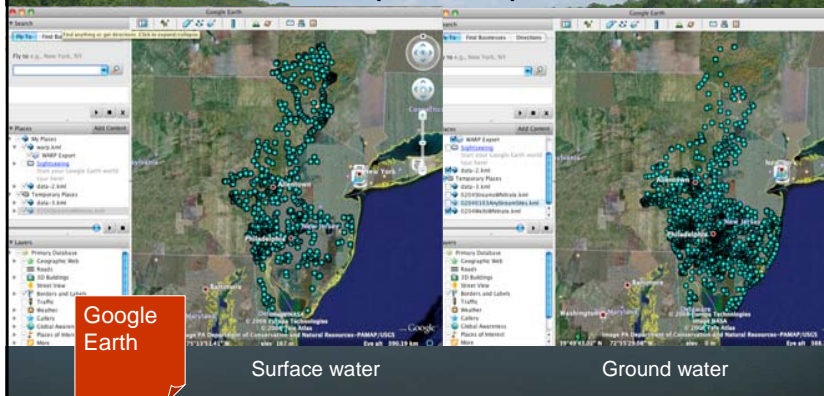
This block contains three screenshots of USGS web-based maps. The top map, titled 'Continuous Sensor Data', shows a grid of green dots representing sensor locations across the United States. The middle map is a 'Real-Time Water Data Retrieval Map' showing the entire US with various data points. The bottom map is a detailed view of 'Water Quality Sensors in New Jersey Marine Waters', showing specific locations like Shark River, Mantoloking, Little Egg Harbor, and Little Egg Bay. A legend indicates that the sensors are operated by the National Oceanic and Atmospheric Administration (NOAA), the New Jersey Department of Environmental Protection (NJDEP), and the USGS.

Objective: to be able to retrieve USGS real-time data by IOOS Region and hydrologic basin

USGS/EPA Data Exchange

USGS: Jon Scott, Nate Booth, Dorrie Gellenbeck, I-Lin Kuo
USEPA: Dwane Young

Example: Discrete water-quality sites with nitrate data in the Delaware River Basin (HUC0204) from USGS/NWIS



Methods and Data Comparability Board

Workgroup - Sensors

Challenge: Environmental sensor technology for field applications is rapidly evolving. The development of standard operating procedures (SOPs) for many of these technologies and applications has not kept pace and gaps have emerged that hinder the inter-comparability of data and collaboration. The result is degraded data quality and reduced productivity in the field. There is also no central repository available for users to access SOPs for field measurements compare sensing technologies, performance specifications, deployment guidelines, and greenness profiles.

Objectives: To convene a workgroup of experts on sensors to consider efforts to address these challenges in one or more of the following ways:

- Develop SOPs for the calibration, quality assurance and quality control, maintenance, and the deployment of field based environmental sensors
- Make recommendations for the creation of a data base to store relevant information on sensors to allow potential users to make informed decisions on the use of sensors for their projects
- Recommend types of sensors that are appropriate for the National Monitoring Network in freshwater, estuarine and coastal environments

The purpose of these pages will be to assist the workgroup in organizing its work, to share documents and ideas, and to begin the process of building a Web site for eventual public consumption.

NEW -- Field Monitoring Quality Assurance Initiative

Minutes of past meetings

- Oct. 13 QA/QC conf. call
- Nov. 3, 2008 conference call
- Oct. 3, 2008 QA/QC subcommittee call

NEW -- "Who's doing what in the Sensors world" database

<http://wi.water.usgs.gov/methodsboard/workgroups/sensors/index.htm>

Where do we go from here?

- **Communicate, cooperate, collaborate**
- **Continued development of DEWOOS**
- **Develop methods to integrate**
 - analysis of discrete point, continuous, probabilistic, satellite, water-quality data
 - atmospheric, river, ground water, wetlands, estuary, near coastal, and ocean observations to tell the story of water quality in the Delaware River Basin
- **Water-quality website** on MACOORA homepage
- **Sensors Work Group**—manufacturer independent field QA/QC and field applications to improve data comparability by National Conference in April 2010
- **Contaminants**—do we include “contaminants of emerging concern” in National Network?