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

NOAA ORRAP Meeting
February 18, 2009

Eric Vowinkel
USGS New Jersey Water Science Center
USGS Acting Executive Secretary of the National Monitoring Network of the National Water Quality Monitoring Council
vowinkel@aol.com

Outline of Presentation

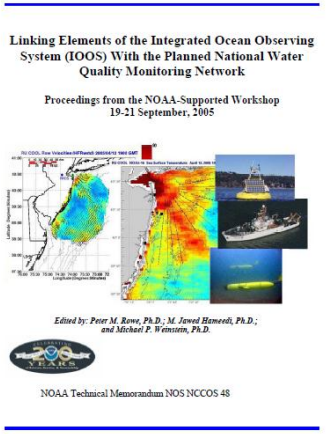
- Interactions with MACOORA
- National Monitoring Network Pilot Inventory and Demonstration Phase in Delaware Basin (success stories)
- Proposed Data Management and additional continuous real-time monitoring for the Delaware River Basin (DEWOOS)
- Methods Board Sensors Work Group
- Where are we going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

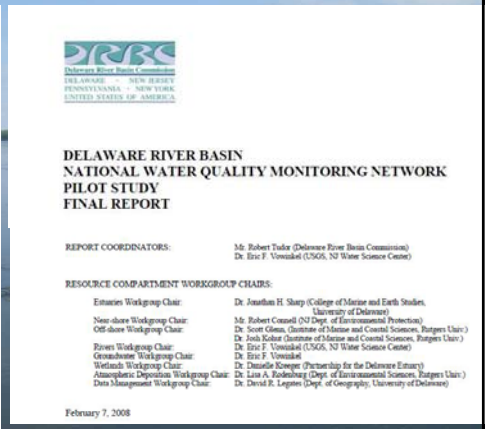


Linking Elements of the Integrated Ocean Observing System (IOOS) With the Planned National Water Quality Monitoring Network

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

Edited by: Peter M. Rowe, Ph.D.; M. Jawed Hameedi, Ph.D.; and Michael P. Weinstein, Ph.D.

NOAA Technical Memorandum NOS NCCOS 48



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

REPORT COORDINATORS: Mr. Robert Tudor (Delaware River Basin Commission); Dr. Eric F. Vowinkel (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:	Mr. Robert Connell (NJ Dept. of Environmental Protection)
Off-shore Workgroup Chair:	Dr. Scott Glenn, (Institute of Marine and Coastal Sciences, Rutgers Univ.)
	Dr. Josh Kohut (Institute of Marine and Coastal Sciences, Rutgers Univ.)
Rivers Workgroup Chair:	Dr. Eric F. Vowinkel (USGS, NJ Water Science Center)
Groundwater Workgroup Chair:	Dr. Eric F. Vowinkel
Wetlands Workgroup Chair:	Dr. Danielle Kreeger (Partnership for the Delaware Estuary)
Atmospheric Deposition Workgroup Chair:	Dr. Lisa A. Rodenburg (Dept. of Environmental Sciences, Rutgers Univ.)
Data Management Workgroup Chair:	Dr. David R. Legates (Dept. of Geography, University of Delaware)

February 7, 2008

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

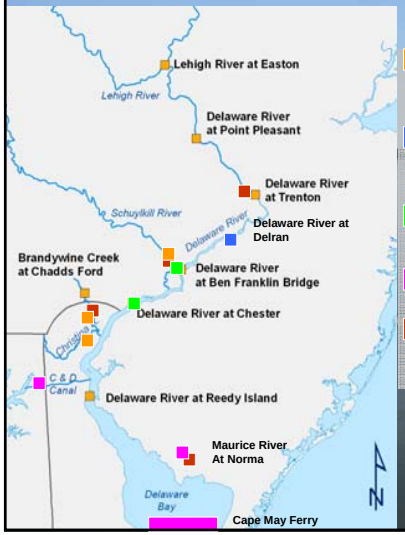
http://www.ccma.nos.noaa.gov/publications/IOOSTechMemo.pdf

Delaware River Basin
recent report and conference highlights

http://www.delawareestuary.org/

http://www.state.nj.us/drbc/SOTB/index.htm

NWQMN Delaware River Basin Demonstration Area Sensor and Discrete Monitoring Network

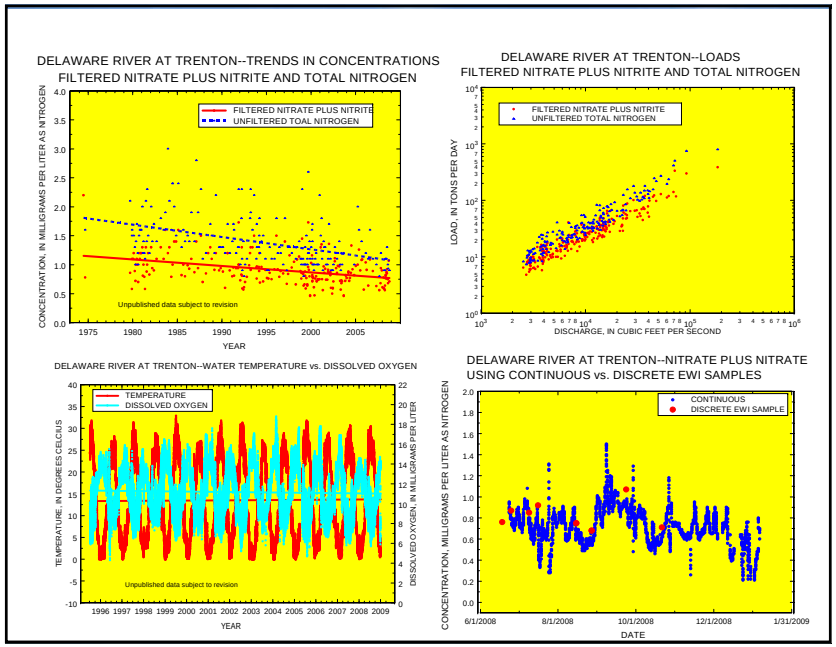


- Existing 4 or 5 parameter real-time sensors
- New 5 parameter real-time sensor
- Upgraded to 5-parameter real-time sensor with turbidity
- Possible real-time sensors
- DEL-NMN discrete monitoring sites for nutrients and carbon

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

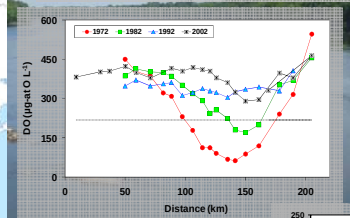
Objectives FY08-09

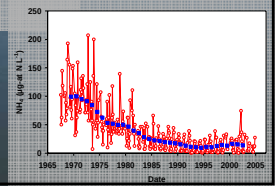
- **Improve real-time monitoring along river and estuary**
  - **New site at Delran T, SC, pH, DO and turbidity**
  - **upgrade other stations to include turbidity**
- **Improve nutrient and carbon analyses as per Nutrient Work Group recommendations**
  - **Major head of tide stations in the basin (Delaware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



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) 883-9500
(609) 883-9522 (FAX)
robert.tudor@drbc.state.nj.us

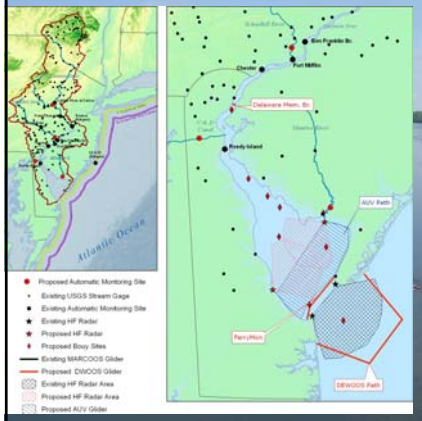
Financial Rep: Richard Gore

Delaware River Basin Commission

Duration of Project: 2 years plus 1 optional

Funding type: Grant

DEWOOS NOAA Grant
Proposed Real-Time Monitoring

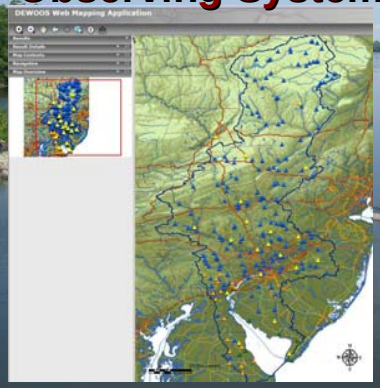


- Upgrades to USGS water-quality sites
- Delaware Memorial Bridge (UDel)
- Buoys for oyster beds (NJDEP)
- Cape May Ferry (UDel)
- AUV for shallow estuary (UDel)
- Moorings lower estuary (UDel)
- AUV for offshore (RU/UDel)
- CODAR for Delaware Estuary (UDel/RU) to complete RCOOS
- Atmospheric (RU)
-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

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

DEWOOS

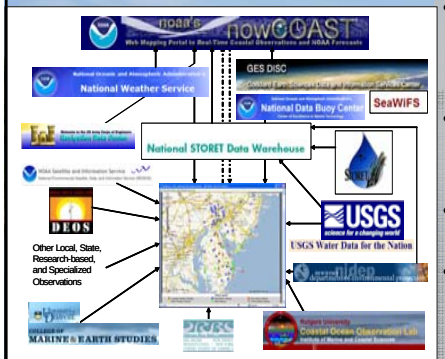
Delaware Estuary-to-Watershed-to-Ocean Observing System



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

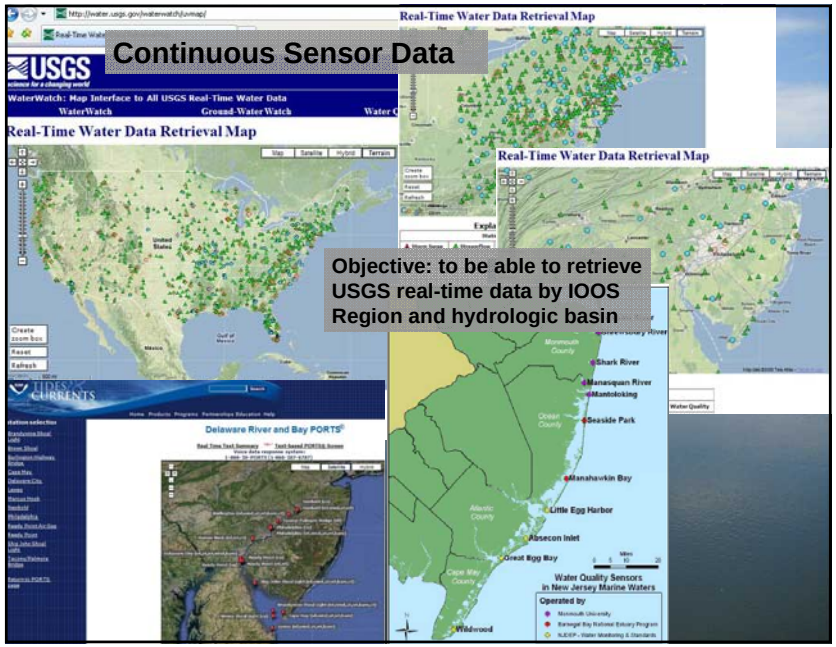
- Proposed **integrated watershed and coastal environmental data-management system** that can be applied to a variety of watersheds across the nation—"**use the data we already have**".
- Initially based on DEOS concept
- MACOORA provided seed money to start project to David Legates at UDEL
- Demonstrate 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



management systems.

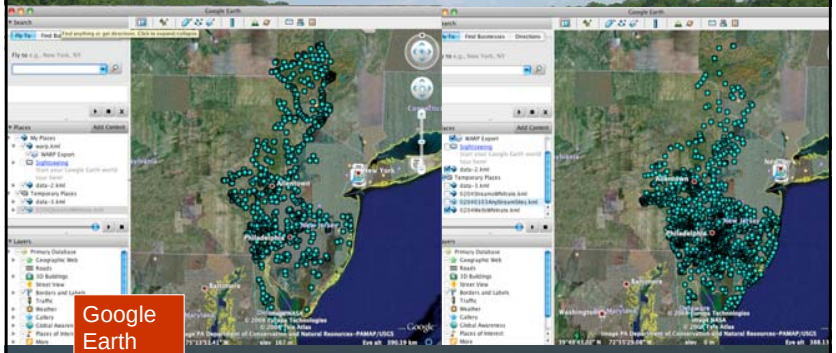
- **Standard 'station-based'** data where an observing platform remains in a fixed position and records data on a regular basis.
- **Research-specific measurements** taken for a short time period.
- **Lagrangian observations** from observing platforms that move
- **Gridded data** acquired by remote sensing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

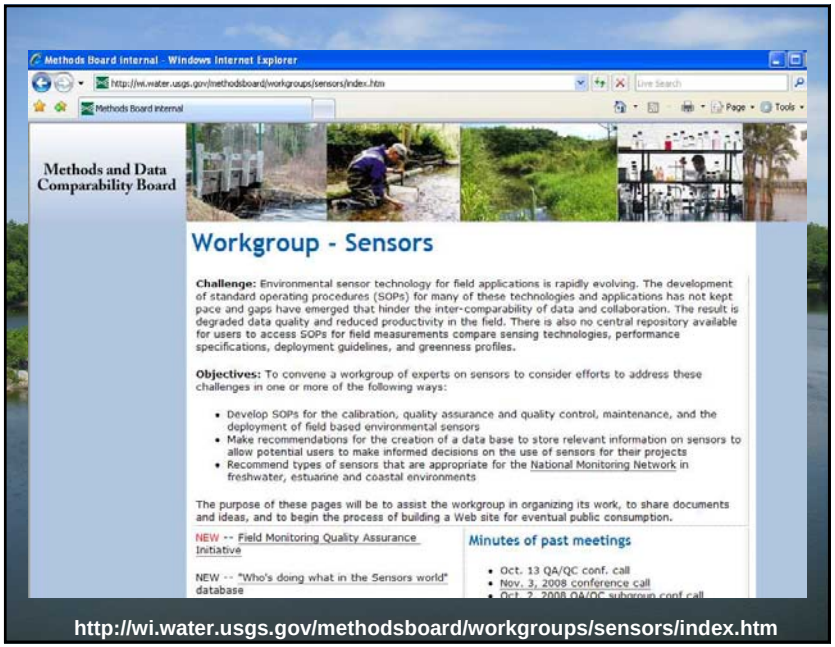


USGS/EPA Data Exchange

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





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?