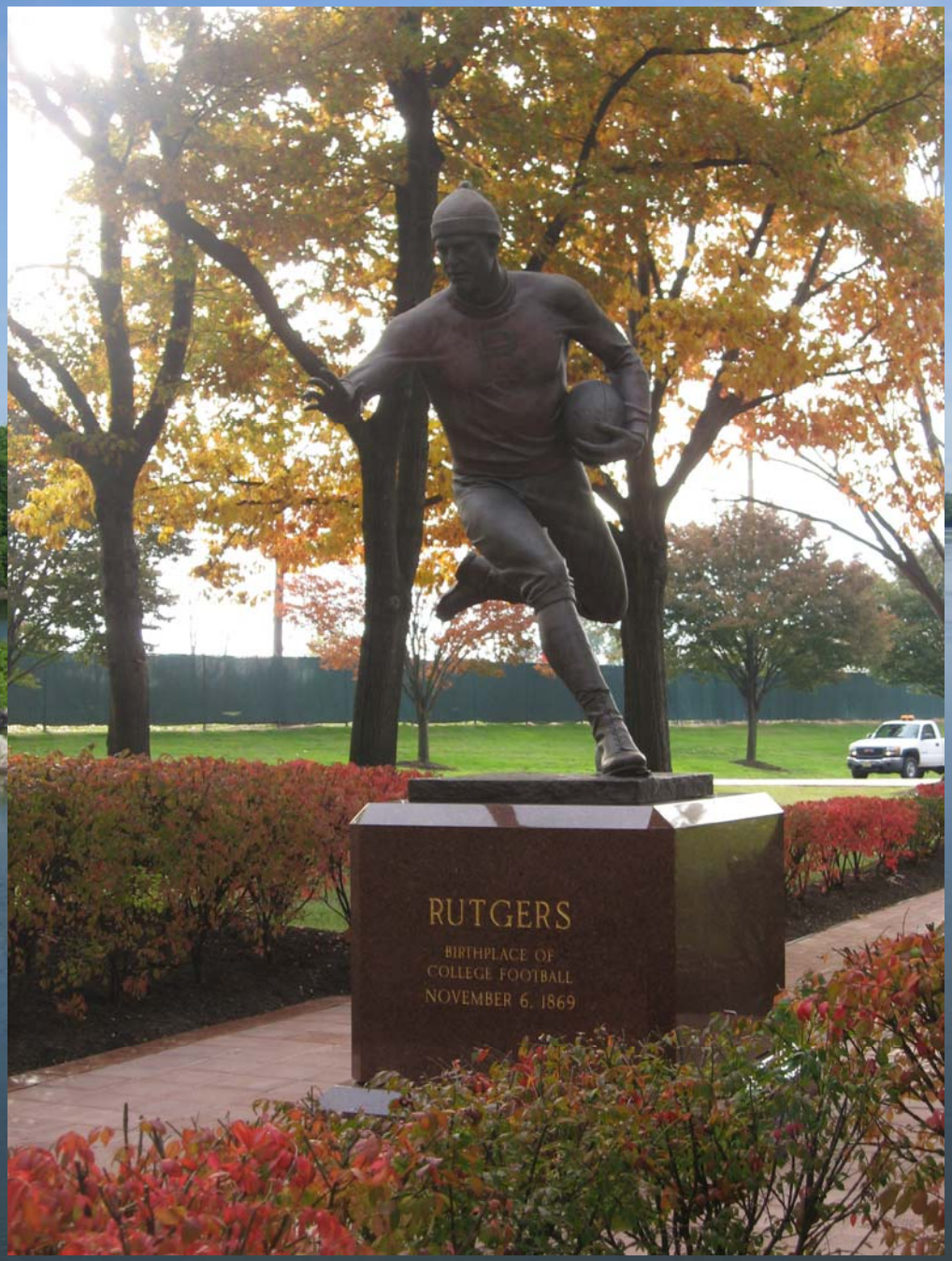
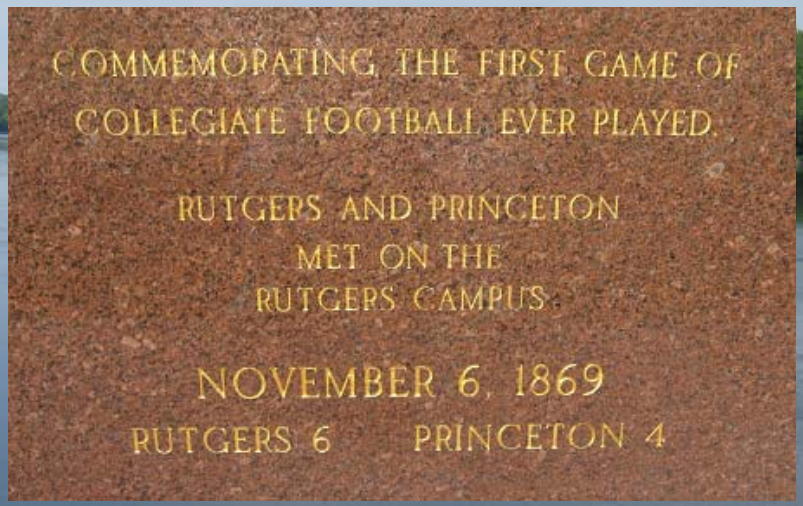
The National Network for U.S. Coastal Waters and Their Tributaries

Progress report on
Network Demonstration Area projects and other related monitoring and data management activities
NWQMC Meeting Ft Collins, CO
July 22, 2008

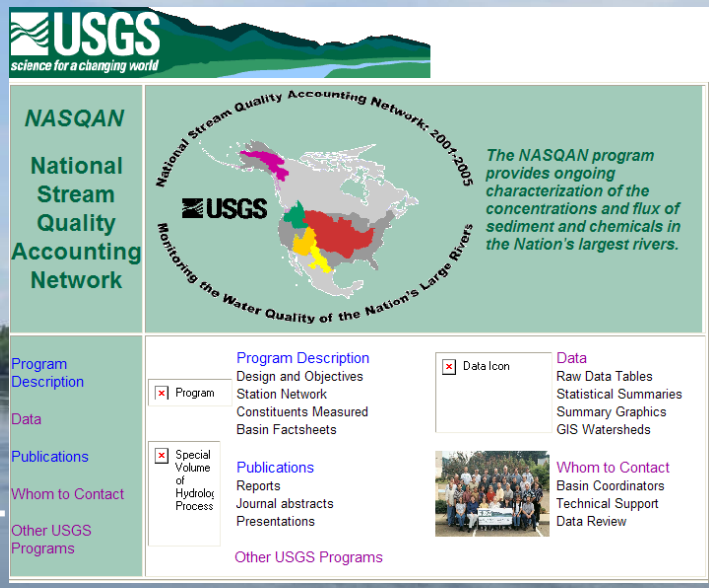
Outline of Presentation

- **USGS Network Activities ($1M for FY08 and FY09)**
  - **USGS NASQAN expansion—5 new sites**
  - **Demonstration Areas**
    - **Lake Michigan**
    - **San Francisco Bay**
    - **Delaware River Basin**
  - **USGS/USEPA Data Exchange**
- **Other Delaware Basin Efforts**
  - **Delaware Estuary Benthic Survey—USEPA ORD + others**
  - **DEWOOS data management system—UDel and others**
  - **MARCOOS—Rutgers and UDel**
- **Provide feedback to projects**


RUTGERS
BIRTHPLACE OF
COLLEGE FOOTBALL
NOVEMBER 6, 1869

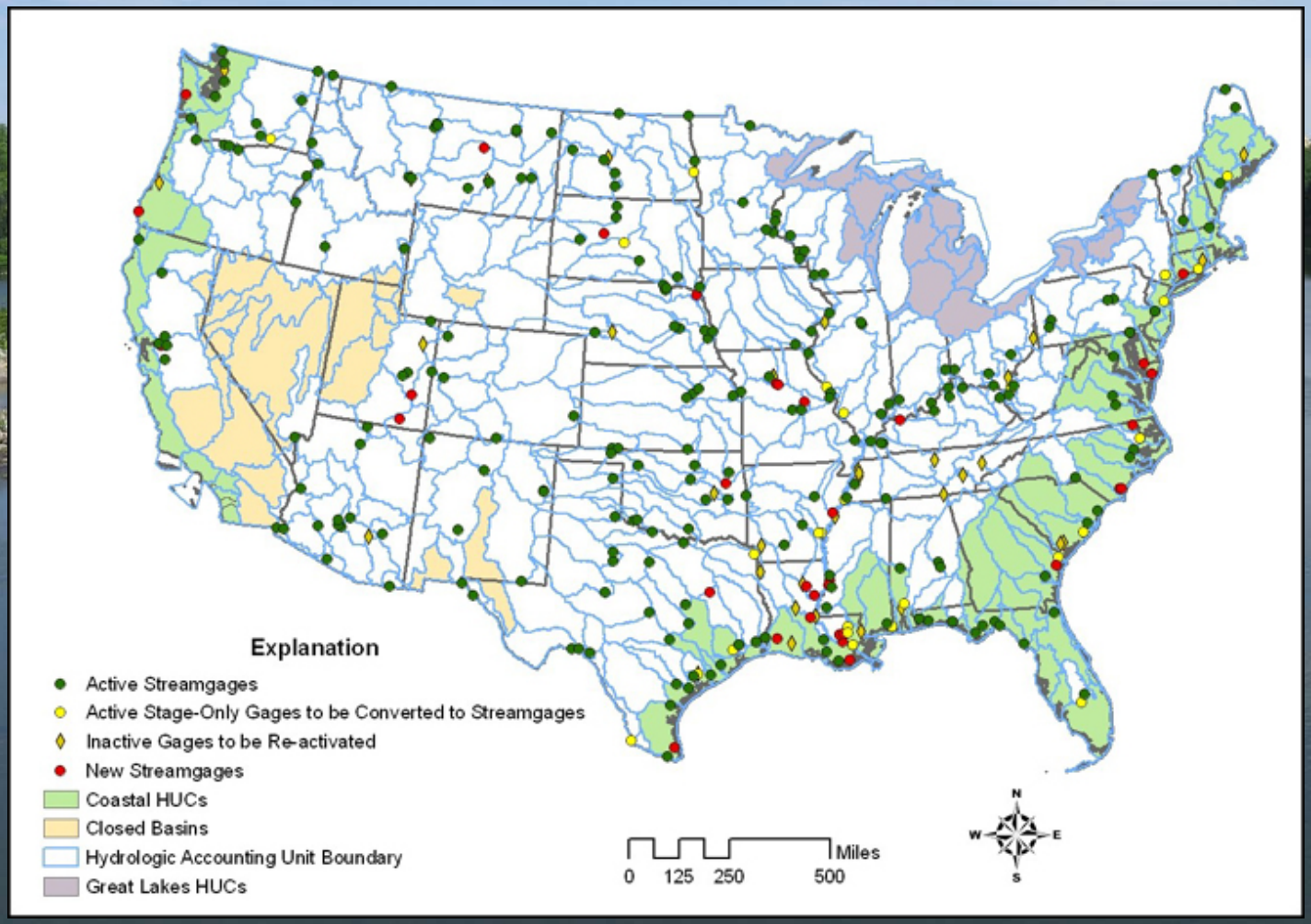

COMMEMORATING THE FIRST GAME OF
COLLEGIATE FOOTBALL EVER PLAYED.
RUTGERS AND PRINCETON
MET ON THE
RUTGERS CAMPUS.
NOVEMBER 6, 1869
RUTGERS 6 PRINCETON 4

USGS NASQAN Expansion

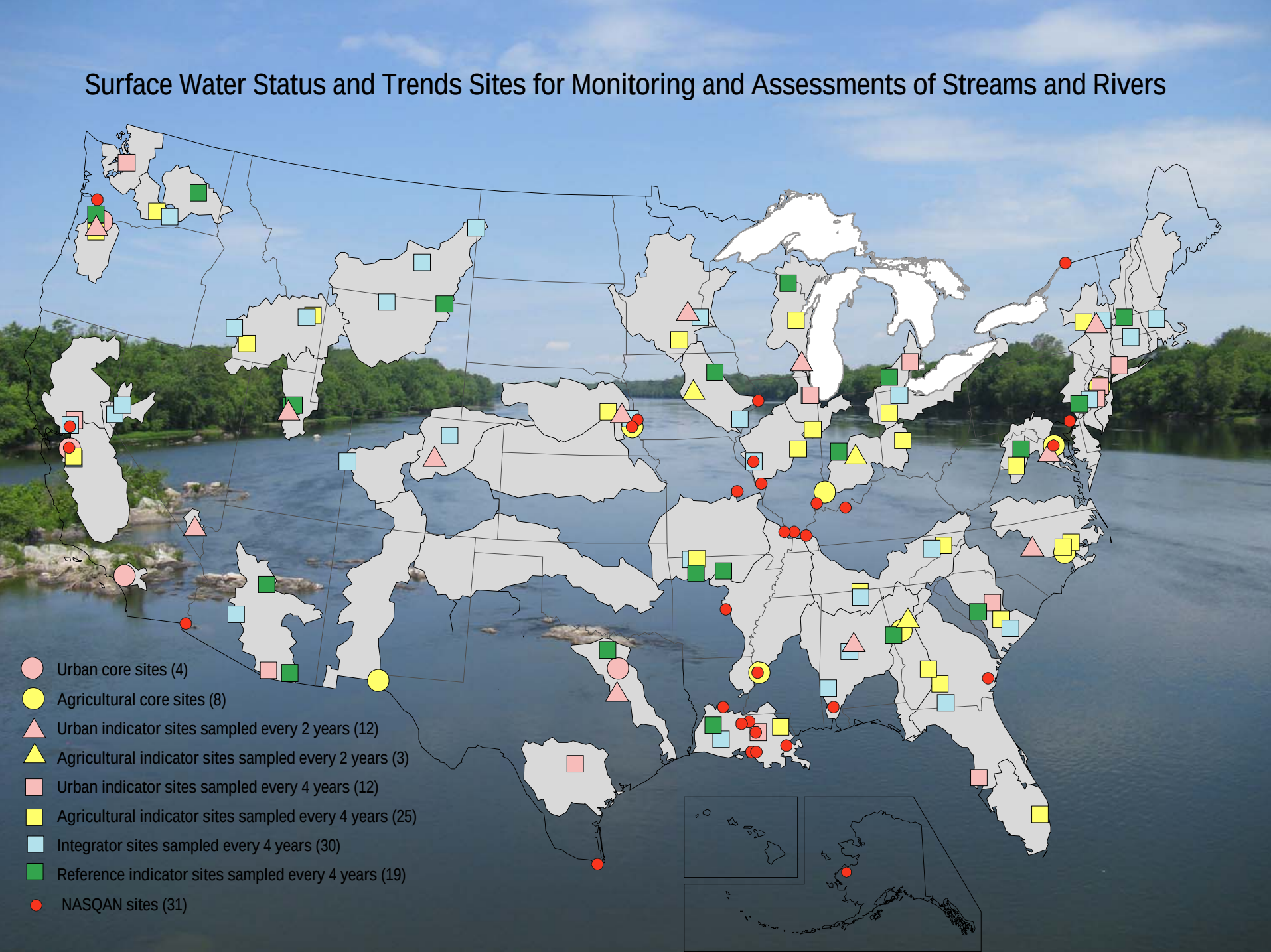


- **5 new sites**
  - **Delaware River at Trenton**
  - **Hudson River at Poughkepsie,**
  - **Mississippi River at Vicksburg, MS**
  - **Appalachicola River near Sumatra, FL**
  - **Brazos River, Texas**
- **Monitored for constituents below 12 times per year**
  - **Major ions**
  - **Nutrients**
  - **Carbon**
  - **Suspended sediments**
  - **Pesticides (NAWQA pesticides plus degradation products)**
  - **Metals**

Figure 3-7. Map of the conterminous United States, showing Hydrologic Accounting Unit boundaries, closed basins, coastal basins, Great Lakes basins, and streamgages required to meet the design criteria for inland rivers.



Surface Water Status and Trends Sites for Monitoring and Assessments of Streams and Rivers



Data from April-June 2008 already online

Nutrient Flux for the Mississippi River Basin and Subbasins - Windows Internet Explorer

http://toxics.usgs.gov/hypoxia/mississippi/nutrient_flux_yield_est.html

USGS Toxics

Nutrient Flux for the Mississippi River Basin and Subba...

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Hypoxia in the Gulf of Mexico

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Nutrient Flux for the Mississippi River Basin and Subbasins

USGS has monitored streamflow and water quality in the Mississippi River Basin (MRB) for decades. Increasingly, management concerns have focused on delivery of streamflow and nutrients to the Gulf of Mexico because of their influence on the formation and extent of a zone of hypoxic waters in the northern Gulf (What is Hypoxia? U.S. Environmental Protection Agency). Flux and yield estimates for subbasins are important because they provide a means to identify the primary source areas and the relative contributions of both streamflow and nutrients from different parts of the Basin. USGS has made estimates of the delivery of streamflow and nutrients both to the Gulf and for selected subbasins and provided that information for use by managers including the Mississippi River/Gulf of Mexico Watershed Nutrient Task Force. Current flux estimates, along with selected previous estimates, are provided below. As the statistical methods to estimate flux improve, fluxes are recalculated for the period of record to provide a consistent and comparable record of flux through time. Current flux estimates, along with selected previous estimates, are provided below, along with a description of the current monitoring network which will provide improved information in the future.

Current Nutrient Flux and Yield Estimates and Streamflow Data

- **Streamflow and Nutrient Delivery to the Gulf of Mexico for October 2007 to June 2008 (Preliminary)**
- **Streamflow and Nutrient Flux of the Mississippi-Atchafalaya River Basin and Subbasins Through Water Year 2006** Note: Estimates of the total delivery to the Gulf of Mexico have been updated with 2007 data.
- **Streamflow and Nutrient Fluxes of the Mississippi-Atchafalaya River Basin and Subbasins for the Period of Record Through 2005**: U.S. Geological Survey Open-File Report 2007-1080.

Previous Nutrient Flux and Yield Estimates

- **Total MRB Nutrient Flux to the Gulf of Mexico (period of record to 2005, June to July Years)**
- **MRB Nutrient Flux Estimates for the Period 1996-2000 (published in Kelly and others, 2001)**

Internet 100%

Demonstration Areas

- All 3 areas have decided to enhance nutrient monitoring at different levels
- Suspended sediments and phycotoxins in the San Francisco Bay area
- Toxicity indicator in Lake Michigan area
- Real time monitoring, carbon, and sediment enhancements in the Delaware Basin area

Nutrient Work Group Recommendations

Analyte	Range	Detection limit
Dissolved ammonium	0.007–0.50 mg N L^{-1}	0.007 mg N L^{-1}
Dissolved nitrate plus nitrite	0.007–10.0 mg N L^{-1}	0.007 mg N L^{-1}
Dissolved ortho phosphate	0.001–5.0 mg P L^{-1}	0.001 mg P L^{-1}
Dissolved silica	0.003–4.0 mg Si L^{-1}	0.003 mg Si L^{-1}
Particulate nitrogen	0.01–100 %	0.01%
Particulate phosphorus	0.005–5.0 mg P L^{-1}	0.005 mg P L^{-1}
Total dissolved nitrogen	0.001–10.0 mg N L^{-1}	0.001 mg N L^{-1}
Total nitrogen	0.03–15.0 mg N L^{-1}	0.03 mg N L^{-1}
Total dissolved phosphorus	0.01–5.0 mg P L^{-1}	0.01 mg P L^{-1}
Total phosphorus	0.01–10.0 mg P L^{-1}	0.01 mg P L^{-1}
Chlorophyll *a*	0.01–150 µg L^{-1}	0.01 µg L^{-1}
Dissolved oxygen	0–15 mg L^{-1}	0.1 mg L^{-1}
Total suspended sediments	1–20,000 mg L^{-1}	10 mg L^{-1}
Conductivity/salinity	0–1,000 mS cm^{-1}	1 -100 µS cm^{-1}
Dissolved organic carbon	0.22–50 mg C L^{-1}	0.22 mg C L^{-1}
Dissolved inorganic carbon	3–24 mg C L^{-1}	3 mg C L^{-1}
pH	1–12 pH	0.01 pH
Particulate carbon	0.01–100 %	0.01%
Photosynthetically active radiation (400 -700 nm)	0.01–10,000 µmol m^{-2} s^{-1}	0.01 µmol m^{-2} s^{-1}

Tier 1--required

Tier 2—recommended

Response variable

Ancillary analysis

Dissolved inorganic nitrogen (DIN)
Dissolved organic nitrogen (DON)
Total nitrogen (TN)
Total dissolved nitrogen (TDN)
Particulate nitrogen (PN)
DIN = NO3NO2 + NH4
TDN = DIN + DON
TN = TDN + PN
DON = TDN - DIN

Total Phosphorus (TP)
Dissolved inorganic phosphate (DIP)
Ortho phosphate (oPO4)
Particulate phosphate (PP)
Total dissolved phosphorus (TDP)
DIP = oPO4
TP = TDP + PP
TDP = DOP + oP04
TP = oPO4 + DOP + PP

San Francisco Bay

- **Two projects**
  - **Real-time suspended-sediment flux monitoring (Dave Schoellhamer)**
  - **Nutrient and phycotoxin monitoring in the SF Bay and South SF Bay salt ponds (Jim Cloern)**

SF Bay Sediment Project

Key USGS players:

Project Chief: David Schoellhamer, CAWSC

CAWSC personnel: Paul Buchanan, Greg Shellenbarger, Jessica Wood, Scott Wright

USGS collaborators: Bruce Jaffe (GD), Jessica Lacy (GD), John Takekawa (BRD)

Overall objective:

Measure flow and suspended-sediment flux between different subembayments of San Francisco Bay to support TMDL studies and wetland restoration projects

FY2008 objective:

Install a continuous flow and suspended sediment flux monitoring station on the Dumbarton Bridge

San Francisco Bay Sediment Monitoring Sites

http://sfbay.wr.usgs.gov/sediment/cont_monitoring/

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Continuous Monitoring in the San Francisco Bay and Delta

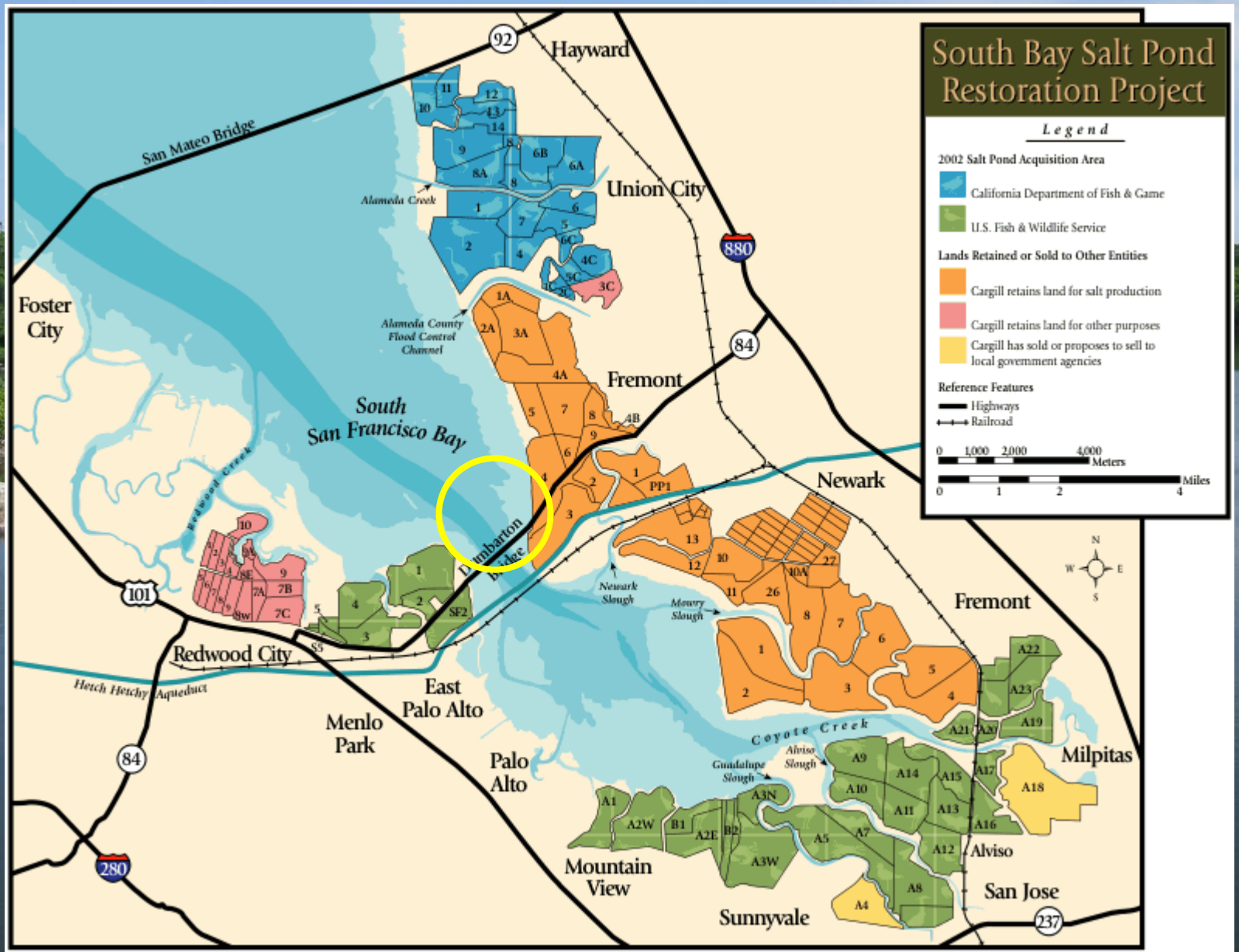
D.Schoellhamer and P.Buchanan

The USGS has continuously monitored suspended-solids concentrations, temperature, salinity, and water level at many sites throughout the San Francisco Bay and Delta since 1989.

Data availability varies among the sites and is limited to time series between 1989 and 2005. As additional data becomes available and the database is further developed, this webpage will be updated.

Internet 75%

Dumbarton Bridge Study Site



Nutrient and Phycotoxin Project

The $50K NWQ Network funds are being used for 2 projects:

I. Enhancement of San Francisco Bay water quality research and monitoring

II. Pilot sampling of the South SF Bay salt ponds.

Key Players :Jim Cloern and project members Tara Schraga, Sarah Foster, and Cate Phillips are conducting field sampling, sample processing, analyses, data compilation, presentation, and interpretation of the nutrient and phytoplankton data. We have created 3 contracts for the following analyses:

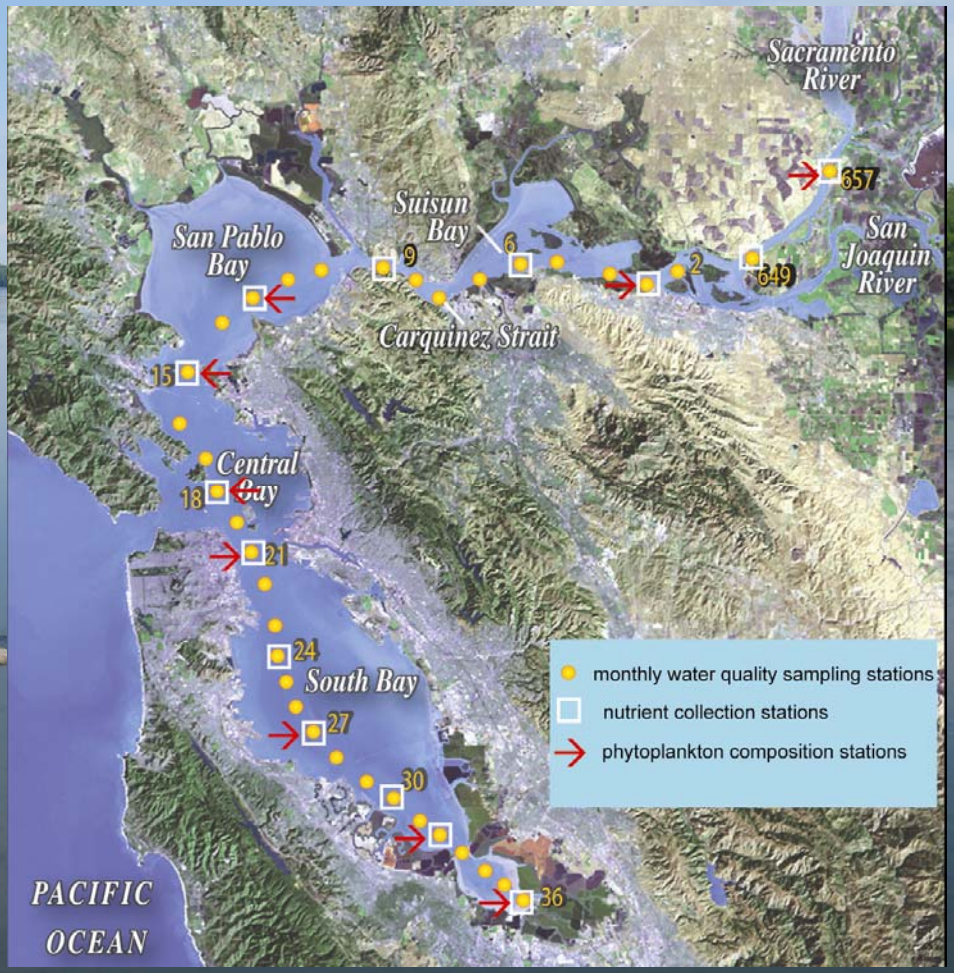
- phytoplankton identification by a contractor taxonomist Richard Dufford
- phycotoxin analysis by Raphael Kudela (University of California, Santa Cruz)
- nutrient autoanalysis by the Dugdale-Wilkerson Lab at San Francisco State University via NWQMC-funded contracts

I.SF Bay nutrient and phycotoxin monitoring: Objectives and sampling locations

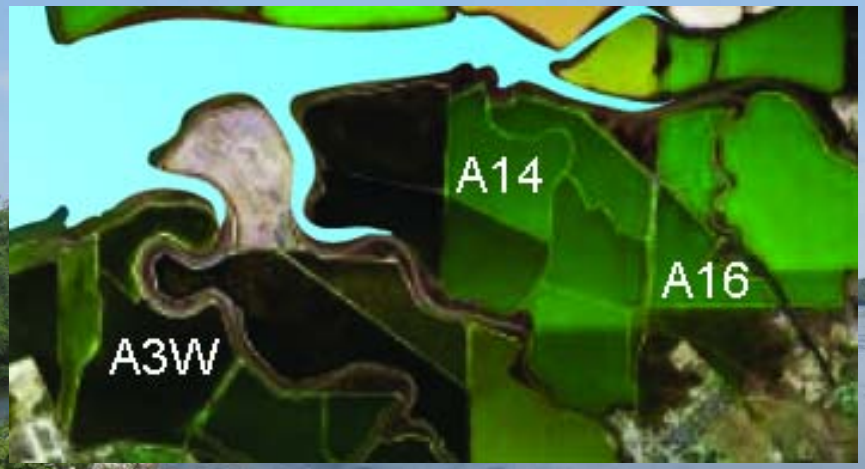
Since 1968 the USGS has sustained a monitoring and research program in San Francisco Bay.

Funded nutrient monitoring in SFB was identified as a critical gap. We are applying NWQMC funds to fill this gap by characterizing dissolved inorganic nutrients (NO3+2, NH4, PO4, SiO) The nutrient data are posted semi-annually to our public website database http://sfbay.wr.usgs.gov/access/wqdata/query/

Phytoplankton community identification, another identified monitoring gap, is also being supported by the NWQMC funds.



II. South San Francisco Bay Salt Ponds: NWQMC USGS San Francisco Pilot sampling in 3 former salt ponds



Salt ponds ring South San Francisco Bay, their bright colors are due to phytoplankton. Two thirds of the commercial ponds were decommissioned in 2003-4 and connected to the Bay as part of the South San Francisco Bay Salt Pond Restoration Program. With connectivity, these ponds represent an emerging threat to SFB water quality as they contain high concentrations of toxic phytoplankton that were not historically in the Bay and are now present.

Ponds A3W, A14, + A16 are being retained as open water flow-through systems. Our pilot sampling of these 3 former salt ponds are first brush at understanding the capacity of the ponds to grow and retain toxic algae and assessing the effect of ponds on water quality of San Francisco Bay. No one else is conducting water quality monitoring in these pond which are already significantly impacting on San Francisco Bay water quality and will continue to do so for decades to come.

Lake Michigan

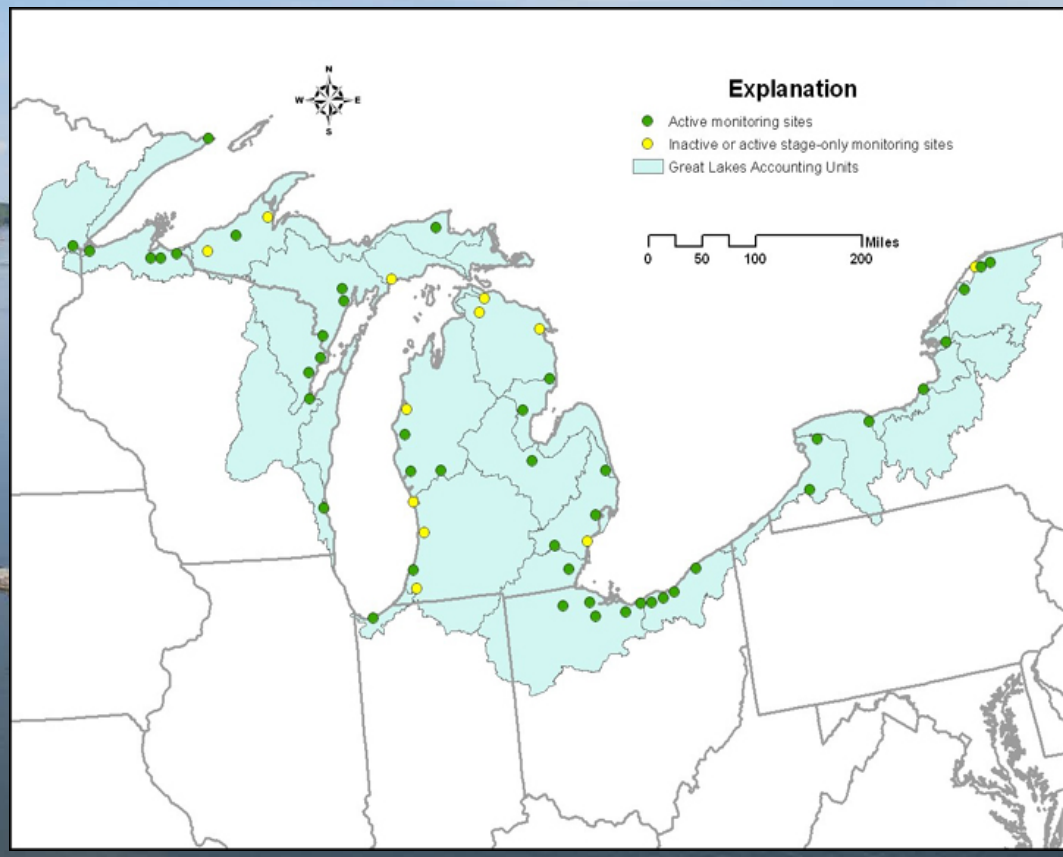
Objectives

- **Improve nutrient monitoring at 17 sites as suggested by Network Design and Nutrient Work Groups**
- **Added three new sites to increase percent of basin flow covered = 20 total sites**
- **Add toxicity testing (SPMD) to selected stations**
- **List of constituents**
  - **Nutrients**
  - **Toxicity**

Proposed Lake Michigan Rivers Network

- NMN proposed 17 sites. Lake Michigan group added 3 additional sites that already conduct flow and quality monitoring.
- NMN Design – 90% of inflow sampling outlets of HUC 6 watersheds. In Lake Michigan the proposed design would sample only 67% mostly at HUC 8 sites. The 3 additional sites increases the inflow sampled to 72% and adds important geographic areas and long term data sets.
- Primary river monitoring entities in the Lake Michigan Basin - USGS, States of Michigan, Wisconsin, and Indiana. Secondary entities – Universities, Tribes, Sewerage Districts

Original Network Design



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Demonstration River Sites

Delaware River Basin

Objectives FY08-09

- **Improve nutrient and carbon analyses as per Nutrient Work Group recommendations**
  - **Head of tide stations in the basin**
  - **Estuary Boat Run sites**
- **Improve real-time monitoring along river and estuary**
  - **New site at Delran T, SC, pH, DO and turbidty**
  - **upgrade stations to include turbidity**
- **Delaware River at Trenton upgraded to a USGS NASQAN site—supplement existing NAWQA site**
- **Water Quality Data Exchange**
  - **DEWOOS**
  - **EPA and USGS WQX**

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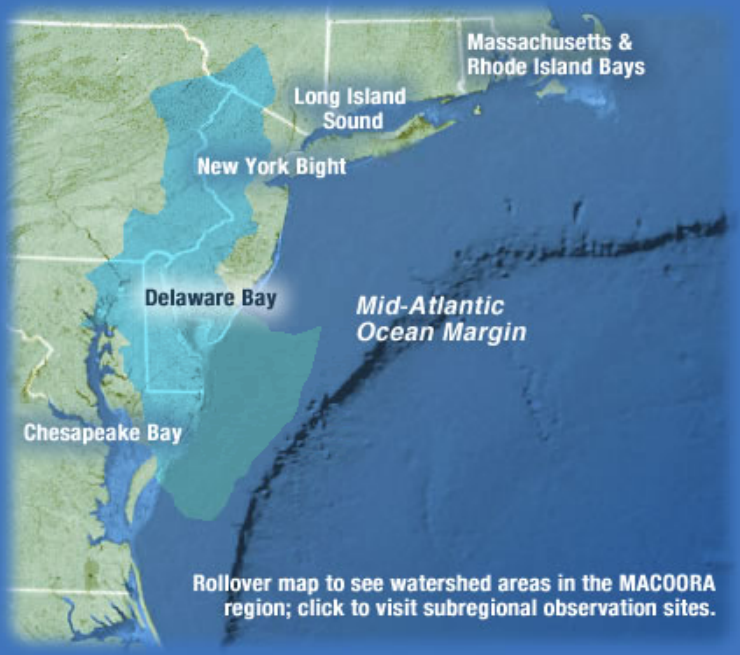
Learn more about National Ocean Observing efforts.



About MACOORA

MACOORA coordinates and facilitates observations of the ocean and estuaries between Cape Hatteras and Cape Cod as part of a national effort to improve scientific observations of our coastal oceans...more

About MARCOOS

(MARCOOS) is the regional observing system of MACOORA...more

.macoora.org/de_bay_sub.html Internet

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Mid-Atlantic Coastal Ocean Observing Regional Association

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- Organization Chart
- MARCOOS
- MARCOOS Conceptual Design

2008

2008 National Water Quality Monitoring Conference: Key to Understanding Our Waters
May 18–22, 2008
Atlantic City Convention Center
Atlantic City, New Jersey

Harmful Algal Blooms in the Mid-Atlantic Forum
April 28, 2008
University of Delaware
Hugh R. Sharp Campus
Virden Conference Center
Lewes, Delaware

Water Quality Monitoring: Managers' Needs Assessment Workshop for Estuarine, Coastal, & Ocean Observations
March 11–12, 2008
Ramada Inn — Philadelphia International Airport
Philadelphia, Pennsylvania

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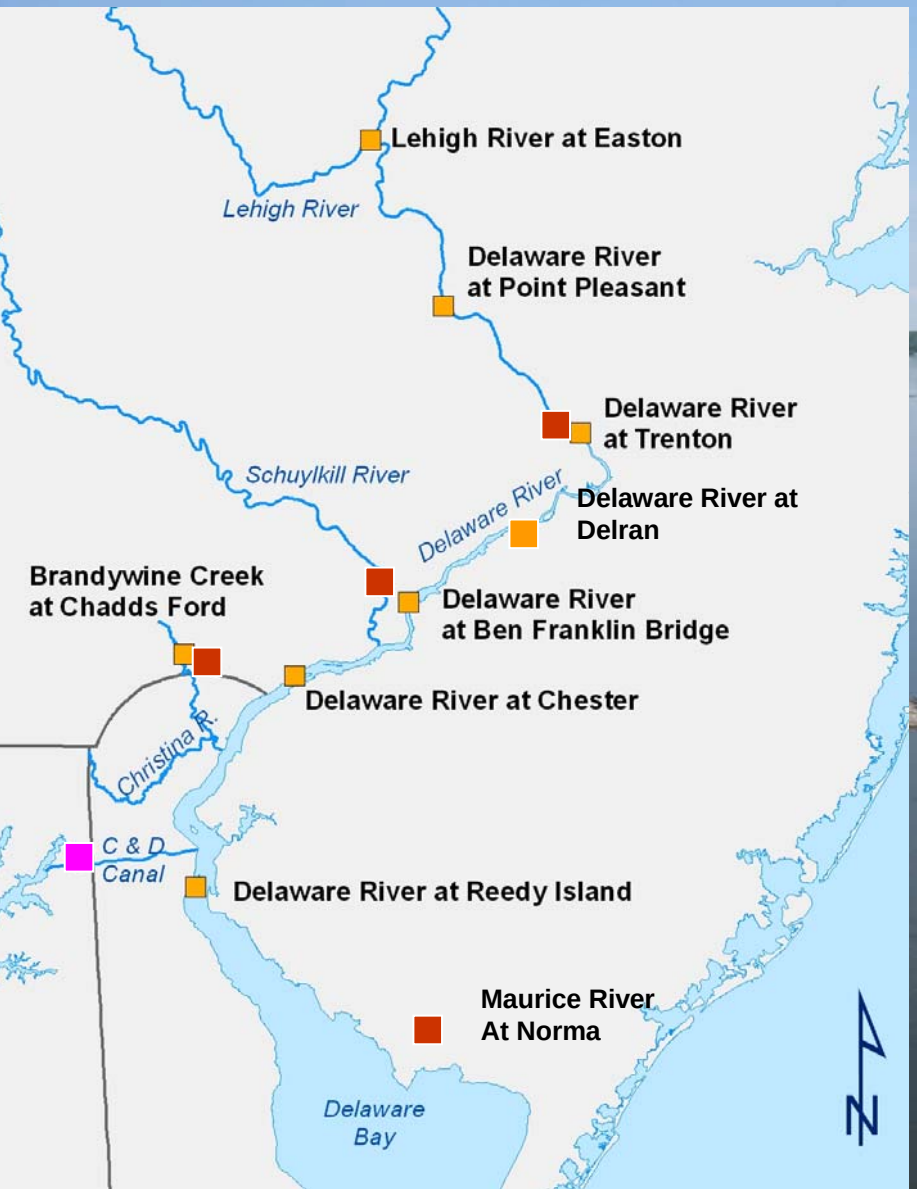
Delaware Basin Monitoring Sites

- Nutrient and carbon sites
  - Delaware River at Trenton
  - Schuylkill River
  - Brandywine River
  - Maurice River
- Real-time sites on Delaware River and tribs
  - Delaware River at Trenton
  - Delran
  - Ben Franklin Bridge
  - Chester, PA
  - Reedy Island

Delaware River Basin USGS Sampling Network

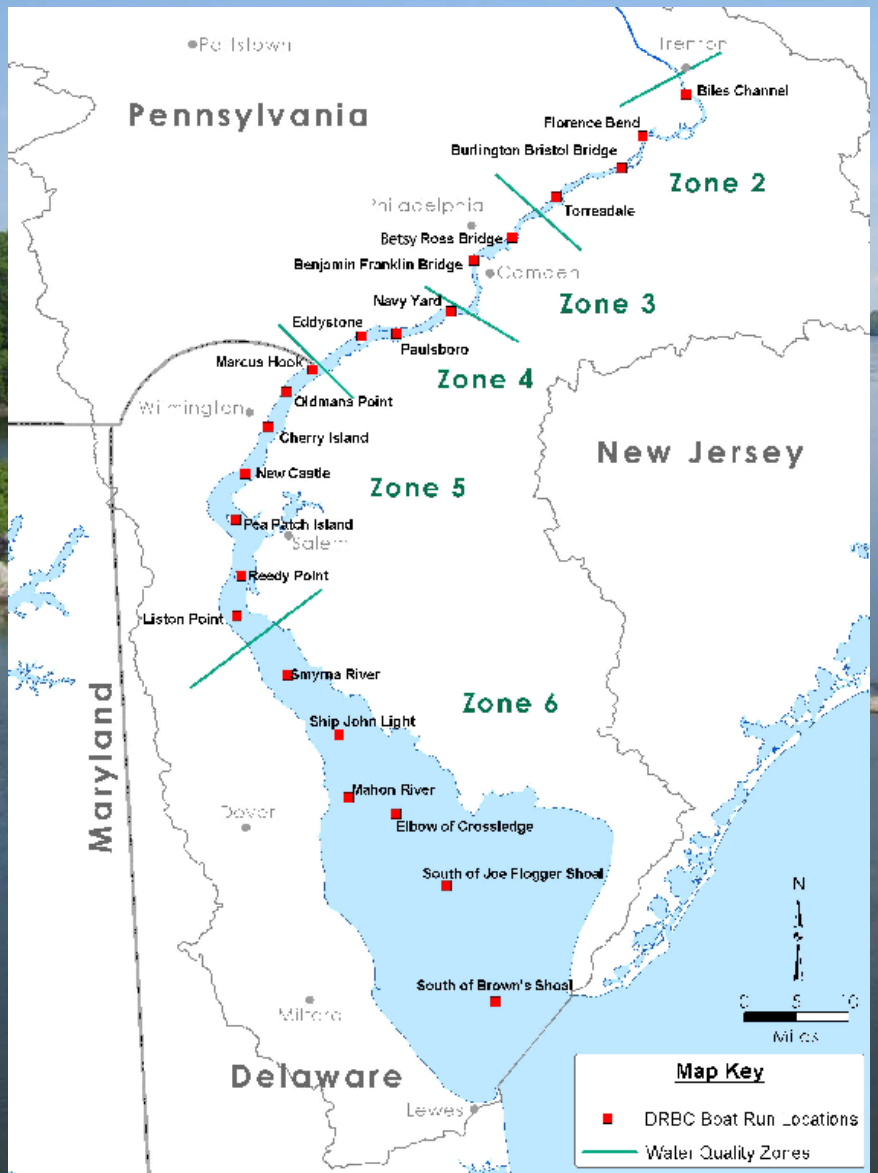
An Automated Water Quality e-mail Notification System



- DRBC developed an automated application that performs the following *daily* tasks:
  - Retrieves real time water quality observations from 7 USGS monitoring stations (VBA program);
  - Compares observations to WQ criteria;
  - Generates and sends e-mail to a list server if observations are outside criteria;
- Operational since August 2006

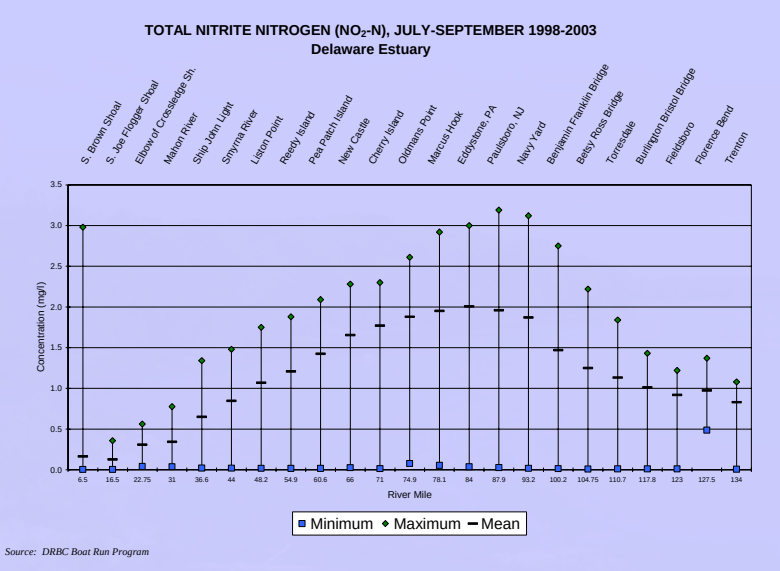
Delaware River Basin Commission
DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
UNITED STATES OF AMERICA

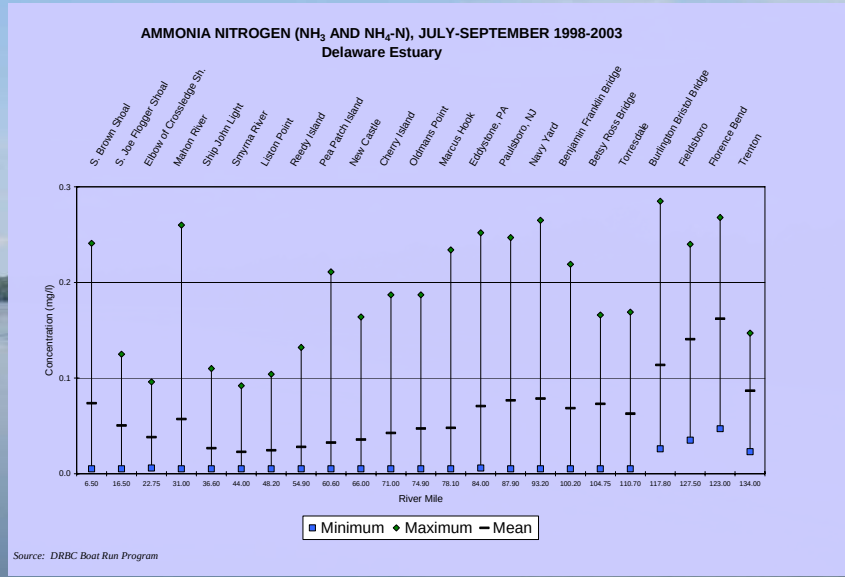
Delaware Estuary Boat Run Sites



- Data collected since early 1970's
- 22 sites along estuary spine sampled 16 times per year on same day
  - Nutrients
  - Carbon
  - Bacteria
  - VOCs
  - Other
- Compliments previous and planned National Coastal Assessment monitoring

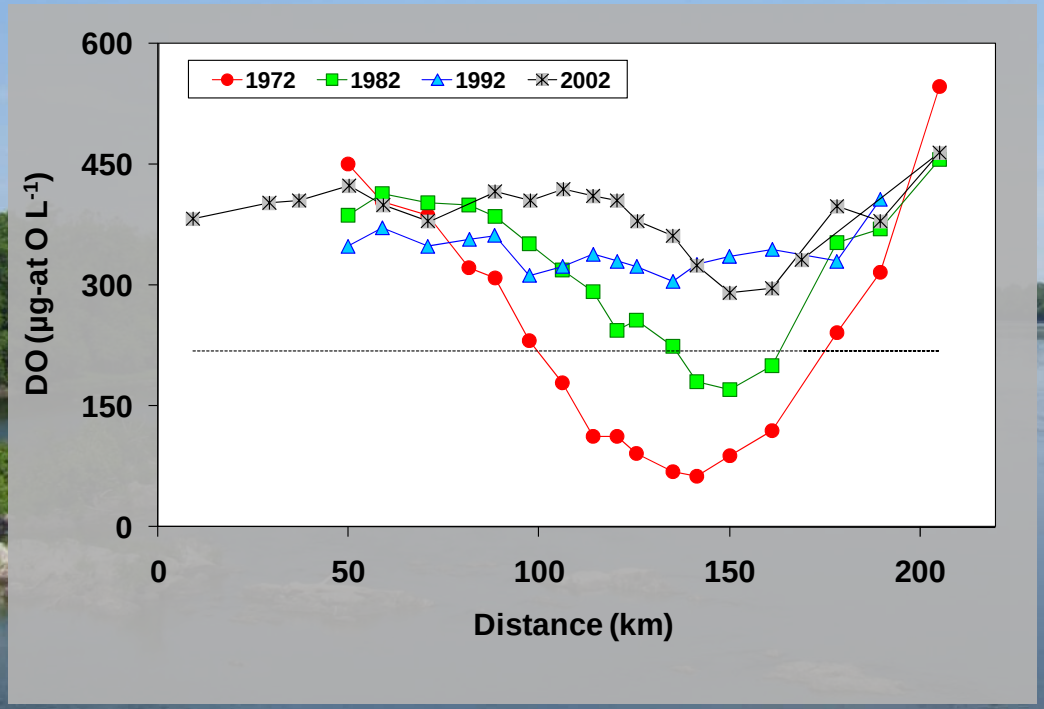
Boat Run Nutrient Results 1999-2003

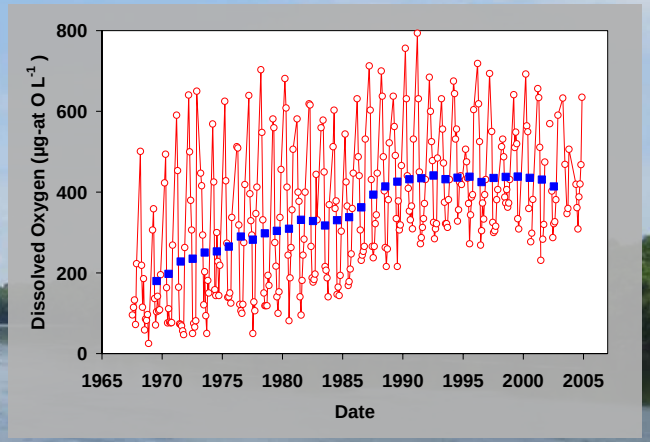


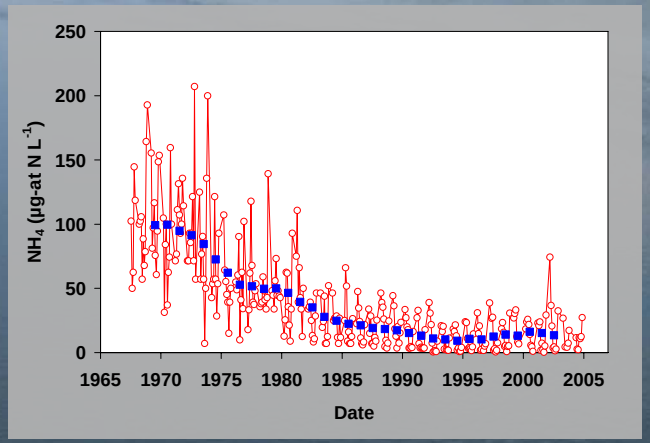


- Want to determine if existing nutrient constituent concentrations met the recommended minimum reporting levels of the Nutrient Work Group
- Graphs show a reasonable detection level in the estuary along the basin gradient

Historical Boat run Data







- WQ data back to the early 1970's
- DO sag below Philadelphia decreasing as wastewater treatment plant improvements
- Need to improve data storage and retrieval

More Precise Assessment of Benthic Conditions in Delaware Bay Using Probability Survey Data, Targeted Sampling and Acoustic Habitat Maps.

Henry A. Walker[1], Jeff Hollister[1], Bart Wilson[2], Robert Scarborough[2], David Carter [2], Danielle Kreeger[3], Krista Laudenbauch-Nelson[3], Amie Howell[4], and Charles Strobel[1,]

[1] U.S. Environmental Protection Agency (USEPA), ORD, National Health and Environmental Effects Research Laboratory, Atlantic Ecology Division, Narragansett, RI 02882

[2] Delaware Department of Natural Resources and Environmental Control, DSWC, Delaware Coastal Programs,
89 Kings Highway, Dover, DE 19901

[3]Partnership for the Delaware Estuary, One Riverwalk Plaza. 110 South Poplar Street, Suite 202, Wilmington, DE 19801

[4] U.S. EPA Region III, Office of State and Watershed Partnerships, 1650 Arch St. (3WP10). Philadelphia, PA 19103

More Precise Assessment of Benthic Conditions in Delaware Bay

DCMP
DELAWARE COASTAL MANAGEMENT PROGRAM

PARTNERSHIP FOR THE DELAWARE ESTUARY INC.

Coastal Management Program

DNREC Online

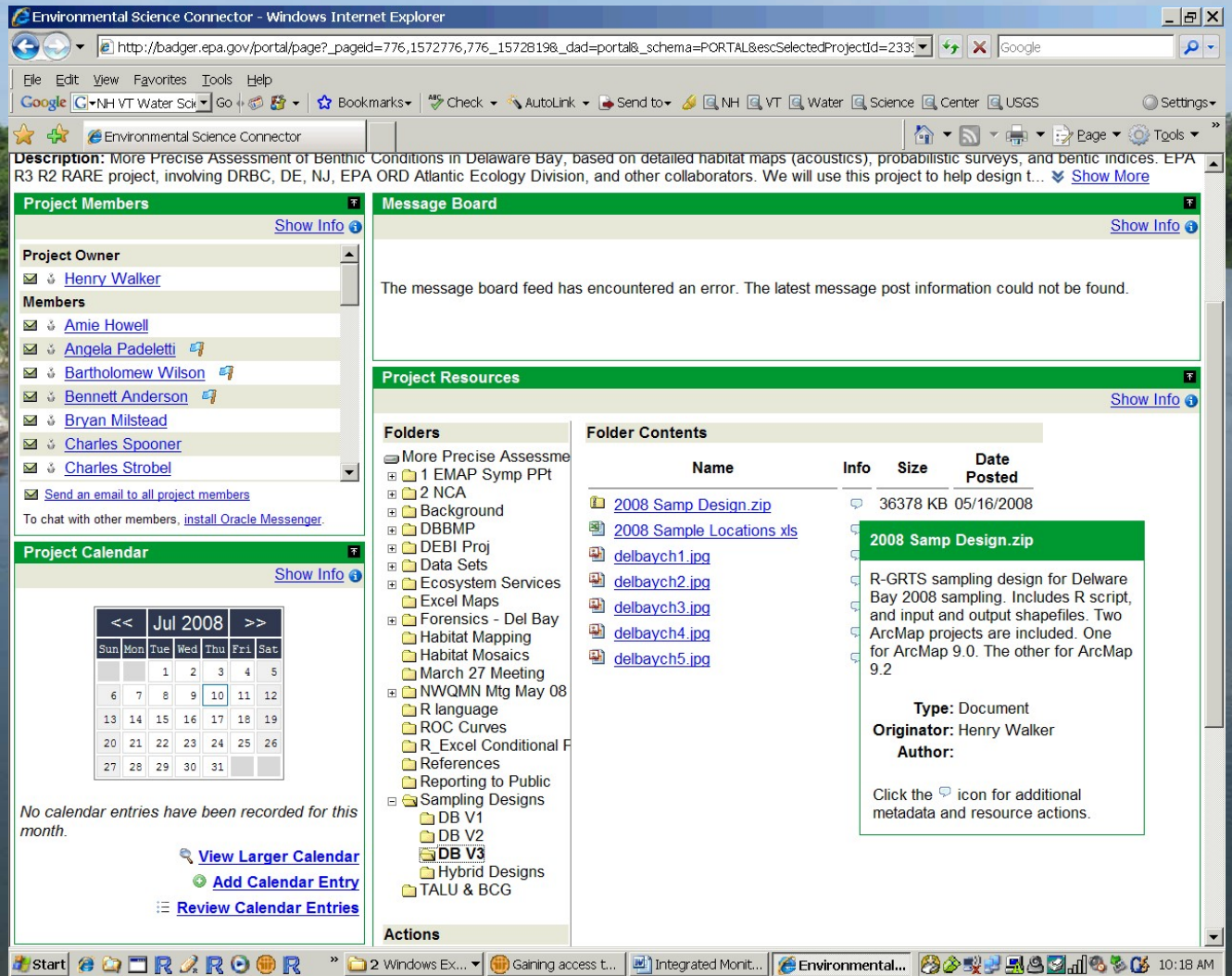
Delaware River Basin Commission

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

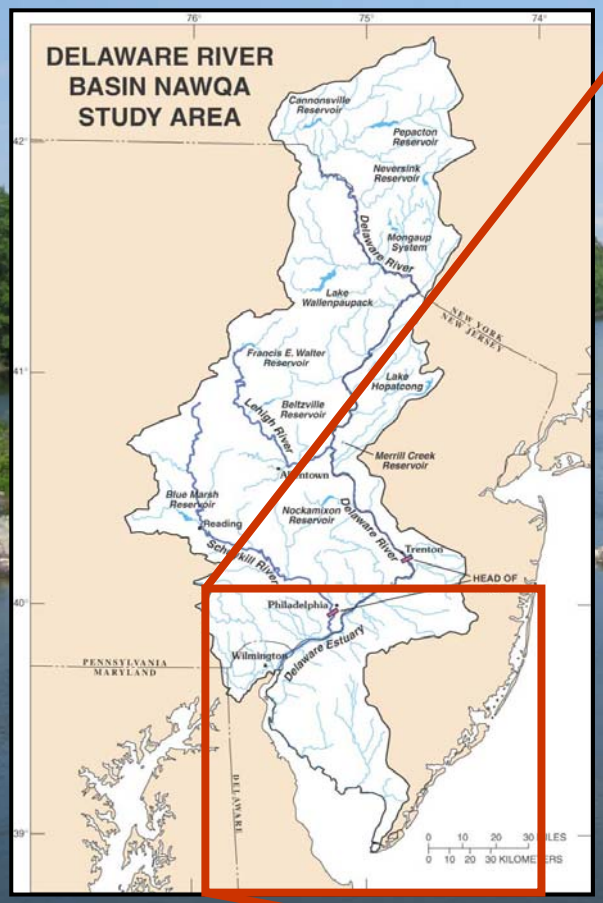
UNIVERSITY OF DELAWARE

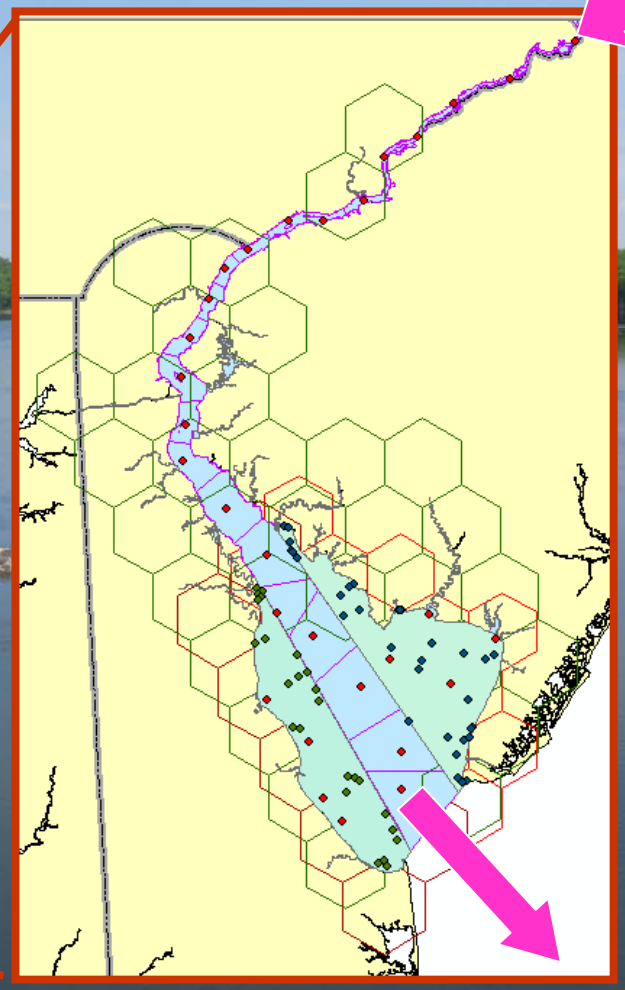
new jersey department of environmental protection nidep

Delaware Bay Benthic Study
EPA Web Portal
need web site here!!!



Some of the basics related to the probability survey design.





Boat Run Stations

Sampling design for 2000-2001 includes:

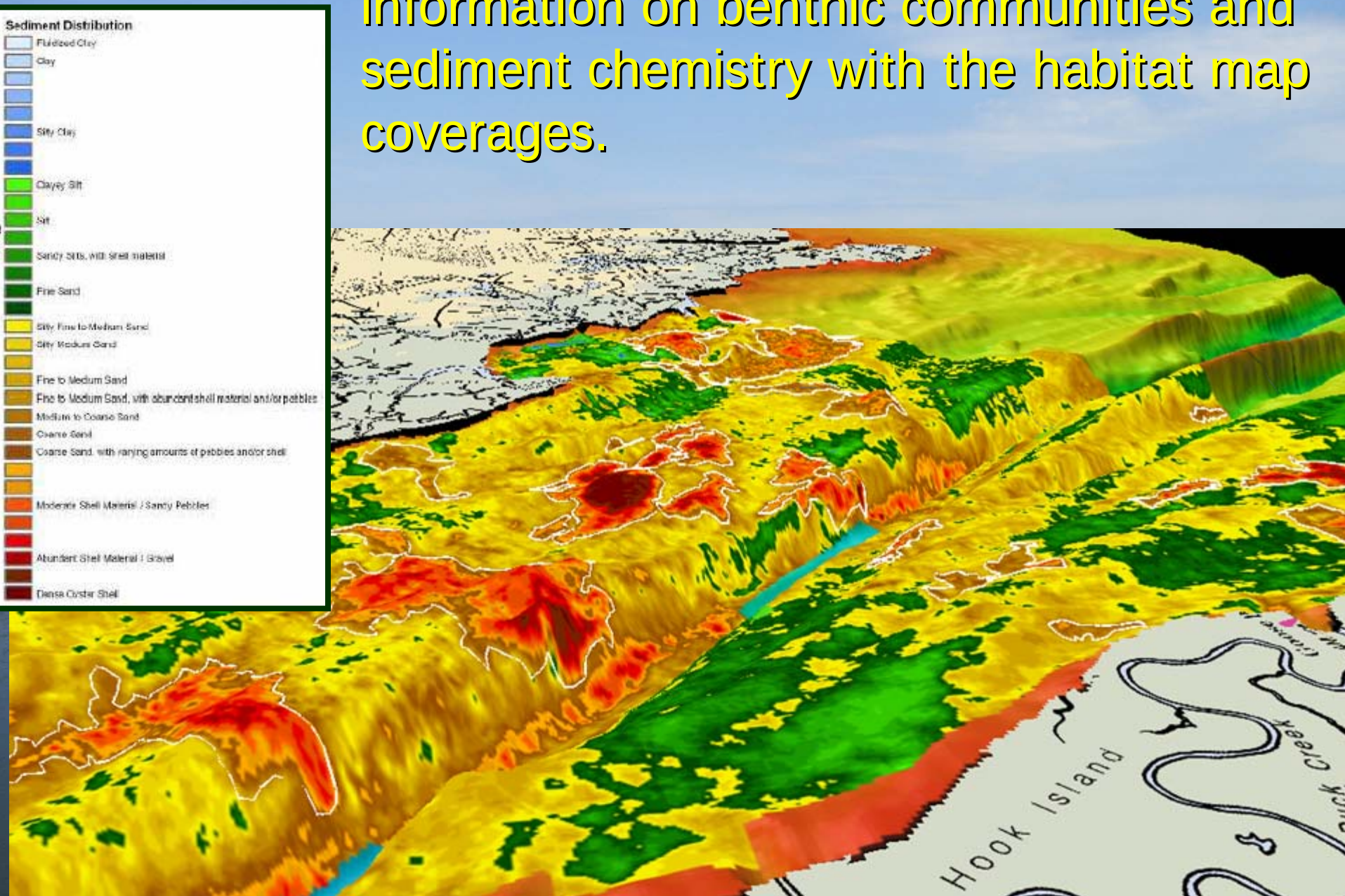
(1) Boat Run stations,

(2) Delaware Bay, and

(3) Minor tributaries

Additional Info from earlier EMAP Virginia Province, MAIA, and subsequent NCA surveys thru 2006.

In the year ahead, we will be combining information on benthic communities and sediment chemistry with the habitat map coverages.



USGS/EPA Data Exchange

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

USEPA: Dwane Young

Example: Stream sites with Nitrate in the Delaware River Basin (HUC0204)

Excel

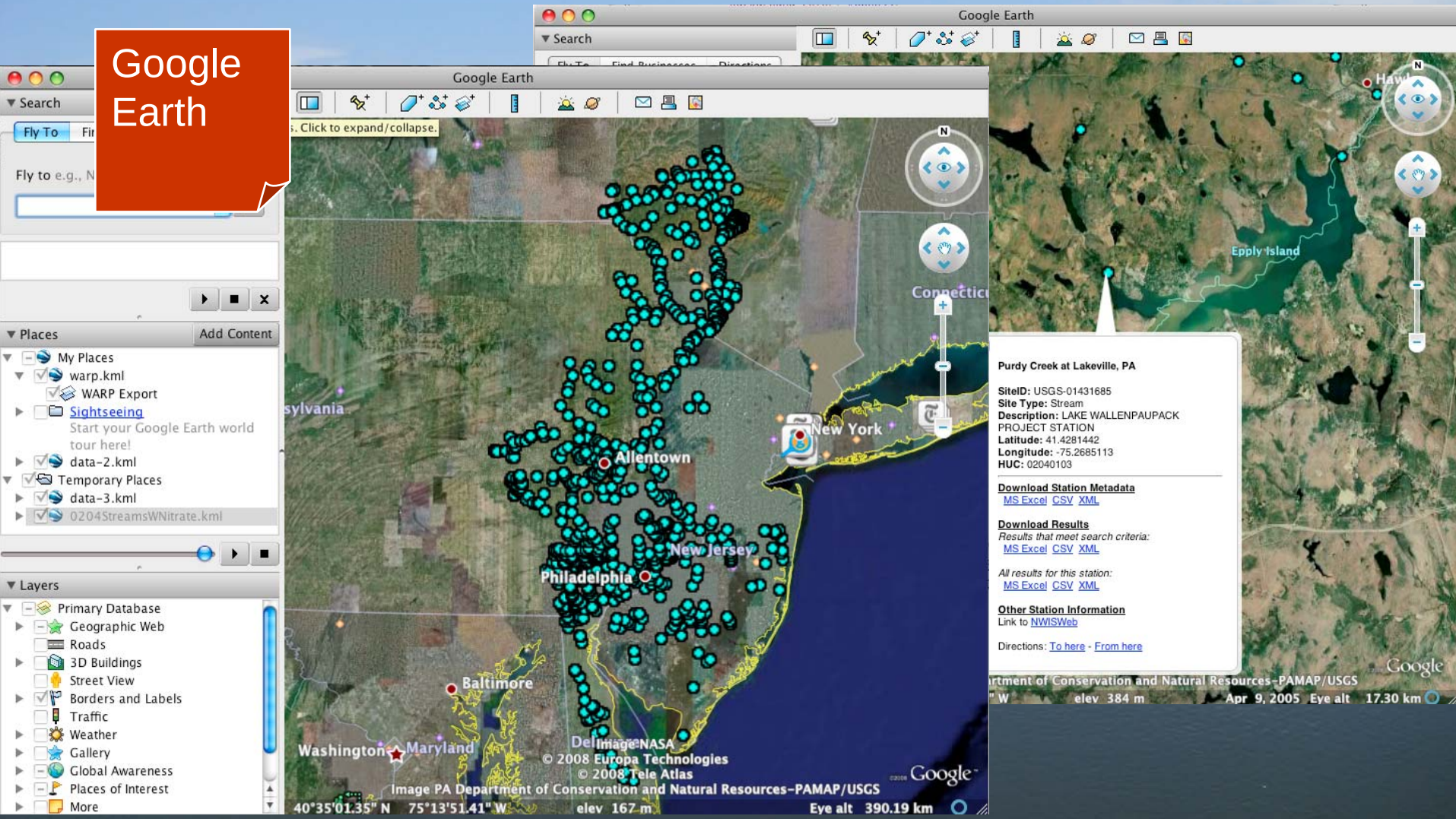
data-1.xls.xlt

New Open ... rmat Undo Redo AutoSum Sort A-Z Sort Z-A Gallery Toolbox 100% Zoom Help

Sheets Charts SmartArt Graphics WordArt

	A		F	G	H	I	J	K	L	M	N	O	P	Q
1	Organiz		ActivityMediaS	ActivityStartDa	ActivityStartTir	ActivityStartTir	ResultDetectio	CharacteristicName	ResultSampleF	ResultMeasure	ResultMeasure	ResultStatusId	StatisticalBase	ResultValueTyp
2	USGS-P	ience Center	Surface Water	1992-04-15	16:30:00	EDT		Ammonia and ammonium	Dissolved	0.03	mg/l NH4	Historical		Calculated
3	USGS-P	Science Center	Surface Water	1992-04-15	16:30:00	EDT		Nitrogen, Kjeldahl	Total	0.20	mg/l as N	Historical		Actual
4	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Ammonia and ammonium	Total	0.03	mg/l NH4	Historical		Calculated
5	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Ammonia and ammonium	Total	0.02	mg/l as N	Historical		Actual
6	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Nitrate-nitrite	Dissolved	0.210	mg/l as N	Historical		Actual
7	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Nitrate-nitrite	Total	0.21	mg/l as N	Historical		Actual
8	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT	Not Detected	Nitrite	Dissolved			Historical		Actual
9	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT	Not Detected	Nitrite	Total			Historical		Actual
10	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Nitrogen compounds, organic	Total	0.18	mg/l	Historical		Calculated
11	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Nitrogen, mixed forms (NH3), (NH4), o	Total	0.41	mg/l	Historical		Calculated
12	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Nitrogen, mixed forms (NH3), (NH4), o	Total	1.8	mg/l NO3	Historical		Calculated
13	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Phosphate	Dissolved	0.031	mg/l	Historical		Calculated
14	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Phosphate	Dissolved	0.010	mg/l as P	Historical		Actual
15	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Phosphate	Total	0.01	mg/l as P	Historical		Actual
16	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Phosphate-phosphorus	Total	0.031	mg/l	Historical		Calculated
17	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Phosphorus	Total	0.01	mg/l	Historical		Actual
18	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Hydrogen ion	Total	0.00014	mg/l	Historical		Calculated
19	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Stream flow, instantaneous		12	cfs	Historical		Actual
20	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		pH	Total	6.9	std units	Historical		Actual
21	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Specific conductance	Total	75	uS/cm @25C	Historical		Actual
22	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Temperature, water		10.5	deg C	Historical		Actual
23	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-04-15	16:30:00	EDT		Ammonia and ammonium	Dissolved	0.020	mg/l as N	Historical		Actual
24	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	10:45:00	EDT		Sediment	Suspended	2	mg/l	Historical		Actual
25	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Stream flow, instantaneous		9.0	cfs	Historical		Actual
26	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		pH	Total	6.9	std units	Historical		Actual
27	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Specific conductance	Total	75	uS/cm @25C	Historical		Actual
28	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Temperature, water		17.5	deg C	Historical		Actual
29	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT	Not Detected	Nitrogen, Kjeldahl	Total			Historical		Actual
30	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Ammonia and ammonium	Dissolved	0.04	mg/l NH4	Historical		Calculated
31	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Ammonia and ammonium	Dissolved	0.030	mg/l as N	Historical		Actual
32	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Ammonia and ammonium	Total	0.04	mg/l NH4	Historical		Calculated
33	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Ammonia and ammonium	Total	0.03	mg/l as N	Historical		Actual
34	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Nitrate-nitrite	Dissolved	0.097	mg/l as N	Historical		Actual
35	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Nitrate-nitrite	Total	0.10	mg/l as N	Historical		Actual
36	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT	Not Detected	Nitrite	Dissolved			Historical		Actual
37	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT	Not Detected	Nitrite	Total			Historical		Actual
38	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Phosphate	Dissolved	0.031	mg/l	Historical		Calculated
39	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Phosphate	Dissolved	0.010	mg/l as P	Historical		Actual
40	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Phosphate	Total	0.01	mg/l as P	Historical		Actual
41	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Phosphate-phosphorus	Total	0.031	mg/l	Historical		Calculated
42	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT	Not Detected	Phosphorus	Total			Historical		Actual
43	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Hydrogen ion	Total	0.00012	mg/l	Historical		Calculated
44	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Gage height		0.360	m	Historical		Calculated
45	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-13	11:00:00	EDT		Height, gage		1.18	ft	Historical		Actual
46	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Nitrite	Dissolved	0.010	mg/l as N	Historical		Actual
47	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Nitrite	Total	0.01	mg/l as N	Historical		Actual
48	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Nitrogen compounds, organic	Total	0.35	mg/l	Historical		Calculated
49	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Nitrogen, mixed forms (NH3), (NH4), o	Total	0.70	mg/l	Historical		Calculated
50	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Nitrogen, mixed forms (NH3), (NH4), o	Total	3.1	mg/l NO3	Historical		Calculated
51	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Phosphate	Dissolved	0.092	mg/l	Historical		Calculated
52	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Phosphate	Dissolved	0.030	mg/l as P	Historical		Actual
53	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Phosphate	Total	0.03	mg/l as P	Historical		Actual
54	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Phosphate-phosphorus	Total	0.092	mg/l	Historical		Calculated
55	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Phosphorus	Total	0.06	mg/l	Historical		Actual
56	USGS-PA	USGS Pennsylvania Water Science Center	Surface Water	1992-05-31	09:00:00	EDT		Stream flow, instantaneous		20	cfs	Historical		Actual

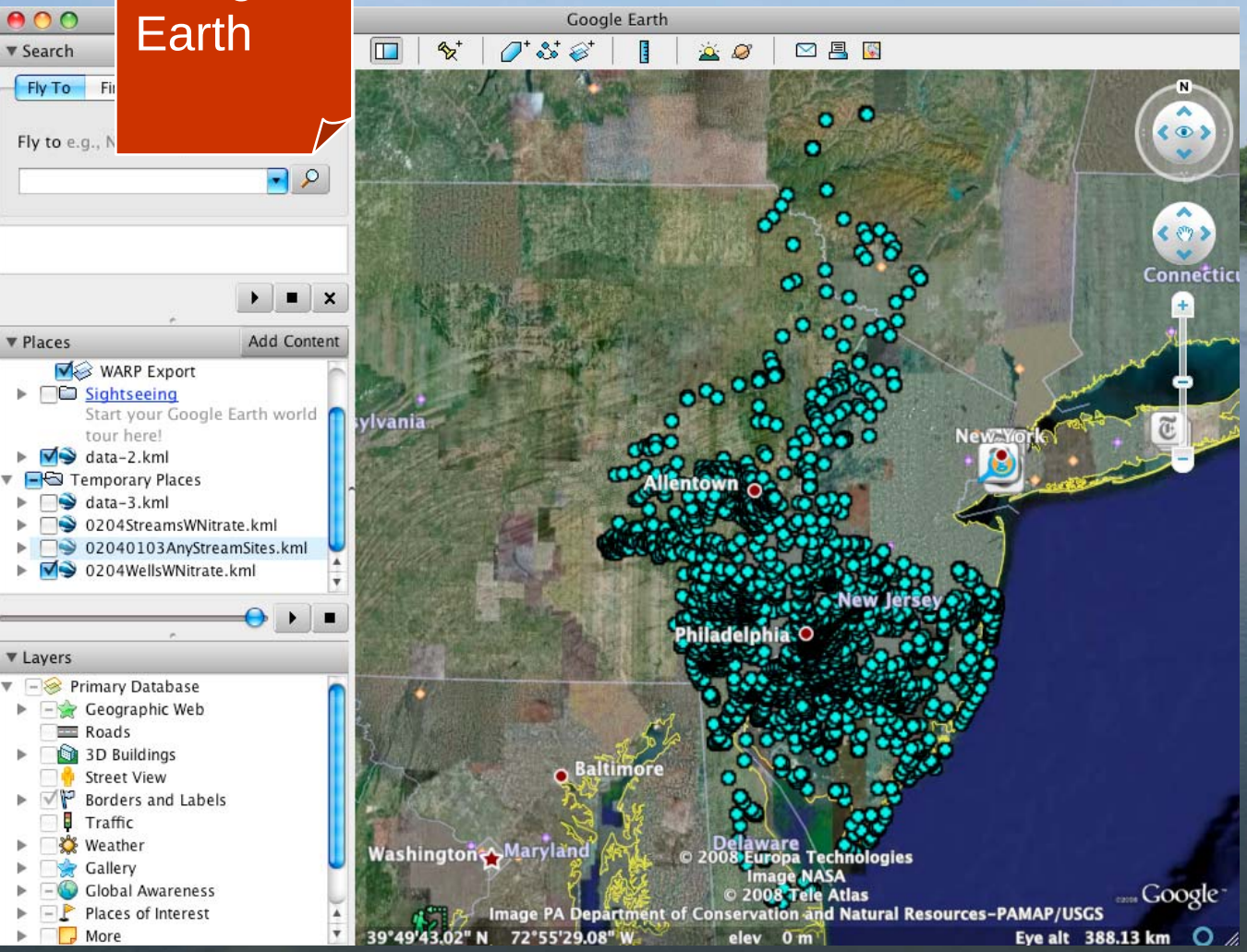
Example: Stream sites with Nitrate in the Delaware River Basin (HUC0204)

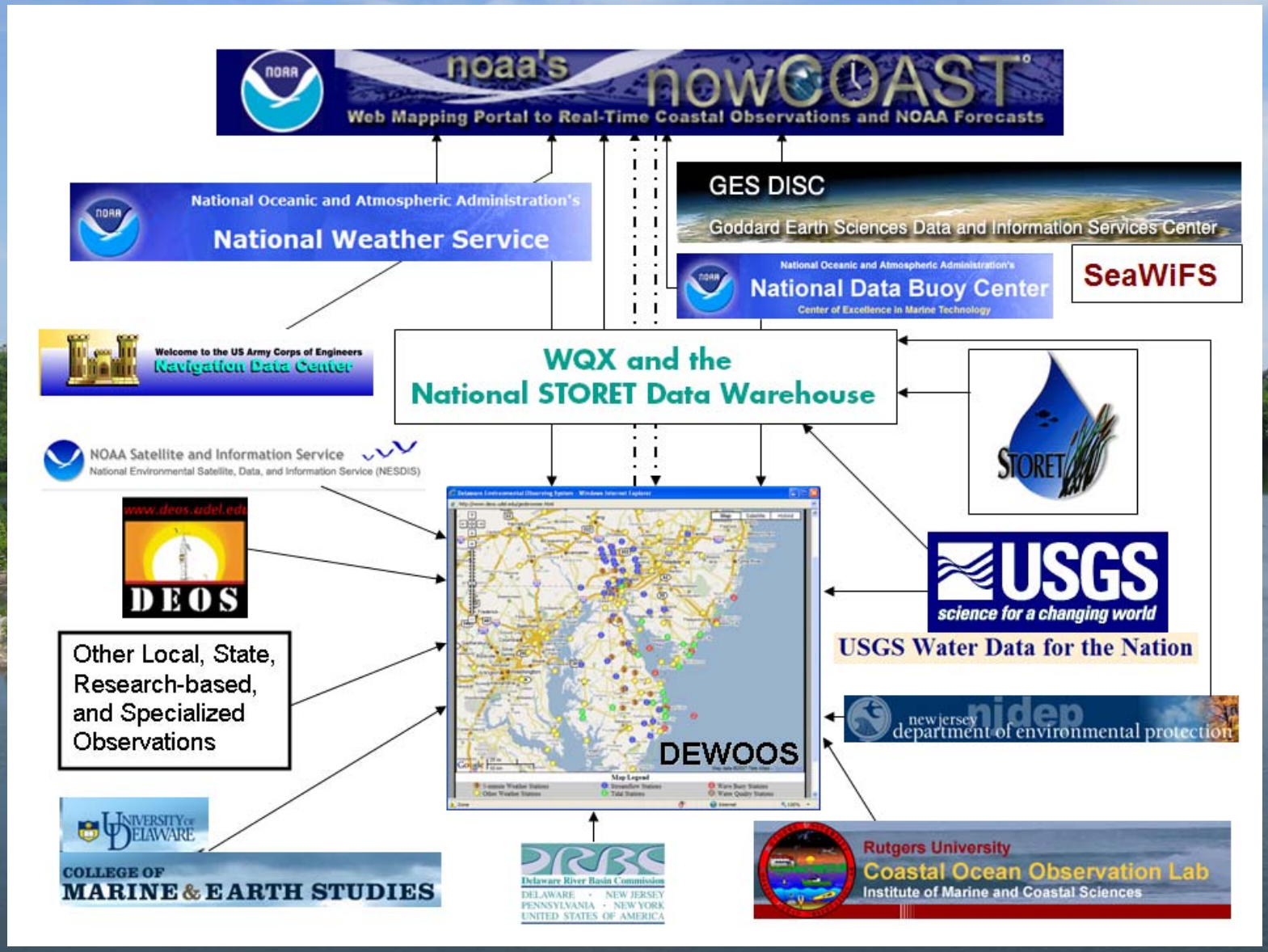


Google Earth

Example: Wells with Nitrate in the Delaware River Basin (HUC0204)

Google Earth





4.1 Delaware River Basin Data Management Schema (DEWOOS)

DEWOOS: The Delaware Estuary Watershed-to-Ocean Observing System - Windows Internet Explorer

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

File Edit View Favorites Tools Help

DEWOOS: The Delaware Estuary Watershed-to-Ocea...

The Delaware Estuary "Watershed-to-Ocean" Observing System (DEWOOS)

DEOS | DRBC | MACOORA

DEWOOS

The Delaware Estuary "Watershed-to-Ocean" Observing System (DEWOOS) is a prototype developed by the Delaware Environmental Observing System (DEOS) to demonstrate the potential for a regional data management and visualization system for the Delaware River Basin. To this end, DEWOOS provides a web-based GIS interface to real-time environmental data throughout the basin. Initially, data will include US Geological Survey streamflow and water quality data, National Weather Service meteorlogical data, and DEOS meteorological data.

The Delaware River Basin

The Delaware is the longest un-dammed river east of the Mississippi, extending 330 miles from the confluence of its East and West branches at Hancock, N.Y. to the mouth of the Delaware Bay where it meets the Atlantic Ocean. The river is fed by 216 tributaries, the largest being the Schuylkill and Lehigh Rivers in Pennsylvania. In all, the basin contains 13,539 square miles, draining parts of Pennsylvania, New Jersey, New York, and Delaware. Included in the total area number is the 782 square-mile Delaware Bay, which lies roughly half in New Jersey and half in Delaware.

- Home
- Partners
- Weather
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- Air Quality

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Contact: David R. Legates | Phone: 302.831.4920

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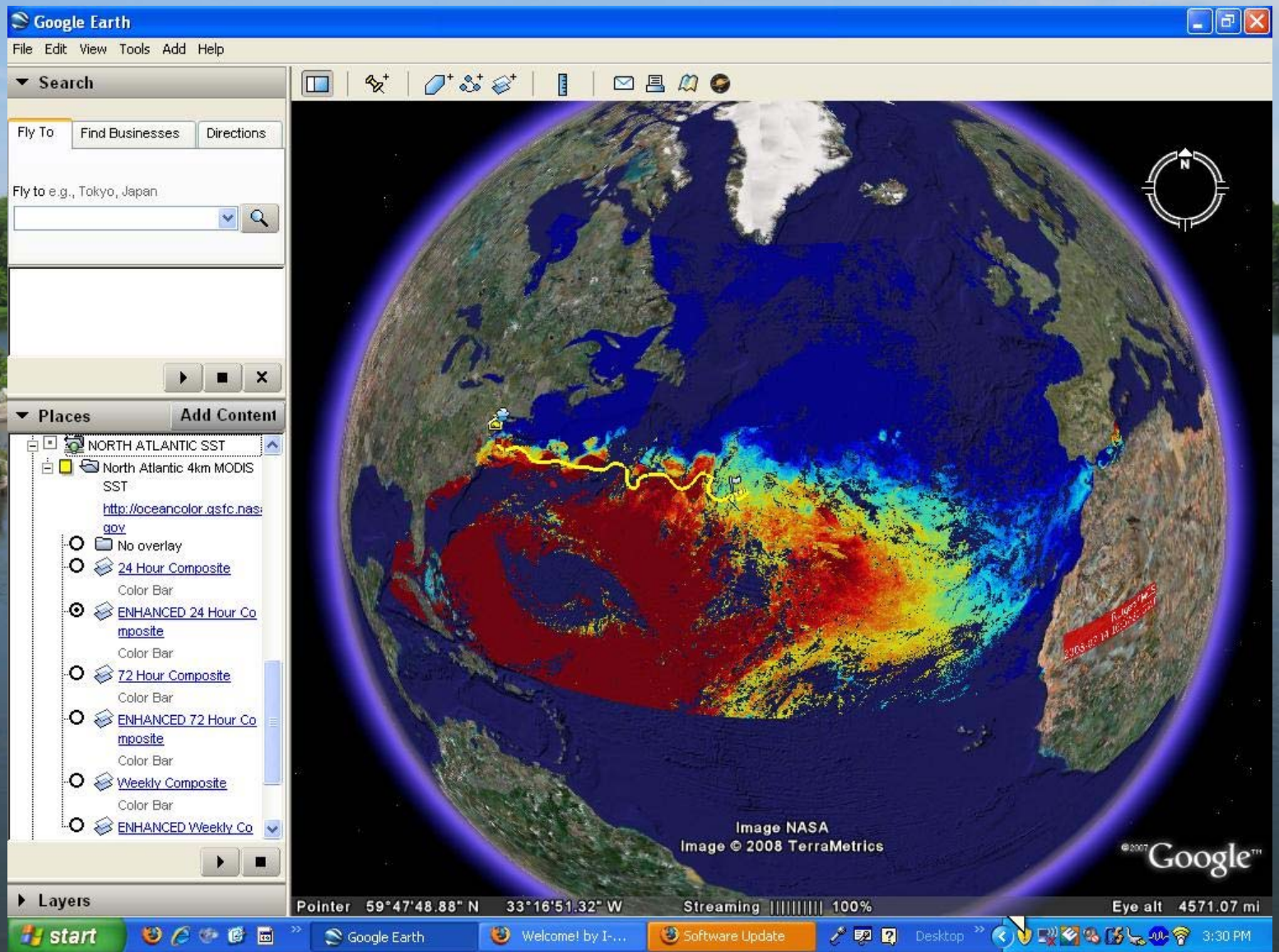
Google Earth
File Edit View Tools Add Help
Search
Fly To
Find Businesses
Directions
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Places
Add Content
NORTH ATLANTIC SST
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http://oceancolor.gsfc.nasa.gov
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Image NASA
Image © 2008 TerraMetrics
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Streaming 100%
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start
Google Earth
Welcome! by I-...
Software Update
Desktop
3:30 PM

Agricultural + Urban + golf courses + mammals + birds = algal blooms

Funds for DEWOOS Data Management

- Seed money from MACOORA to get started--$10K
- Another $10K from MACOORA to keep going until potential NOAA funding
- Proposal to NOAA requesting $200K per year for 3 years
- Proposal to NWQMC for Pilot study

MARCOOS

Mid-Atlantic Regional Coastal Ocean Observing System

MACOORA
Mid-Atlantic Coastal Ocean Observing Regional Association

WELCOME!

This website is the evolving home of the Mid-Atlantic Regional Coastal Ocean Observing System (MARCOOS). The primary goal for this site is to facilitate management of MARCOOS and interactions between MARCOOS PIs, MACOORA membership, and the MACOORA board.

MARCOOS is a joint effort with 30 Principal Investigators from 20 academic, governmental and private institutions across the region. MARCOOS is deploying and operating the Regional Coastal Ocean Observing System designed to fulfill user needs defined within the Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA). MACOORA is one of 11 Regional Associations in the US Integrated Ocean Observing System (IOOS).

The proposal, submitted to the National Ocean and Atmospheric Administration Coastal Services Center (NOAA-CSC) can be accessed below.

- Executive Summary (28.7 MB)
- Full Proposal (14.3 MB)
- Body and Main Budget Only (0.7 MB)

MARCOOS meeting in Westport, MA on March 13 - 14, 2008

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University of Maryland
Horn Point Laboratory
P.O. Box 775, Cambridge, MD 21613

WEMAS: Watershed Environmental Monitoring and Analysis System - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.deos.udel.edu/wemas/

Getting Started Latest Headlines

Watershed Environmental Monitoring and Analysis System (WEMAS)

DEOS | DRBC | MACOORA

WEMAS - Watershed Environmental Monitoring and Analysis System

WEMAS is a prototype developed by the Delaware Environmental Observing System (DEOS) to demonstrate the potential for a regional data management and visualization system for the Delaware River Basin. To this end, WEMAS provides a web-based GIS interface to real-time environmental data throughout the basin. Initially, data will include US Geological Survey streamflow and water quality data, National Weather Service meteorlogical data, and DEOS meteorological data.

The Delaware River Basin

The Delaware is the longest un-dammed river east of the Mississippi, extending 330 miles from the confluence of its East and West branches at Hancock, N.Y. to the mouth of the Delaware Bay where it meets the Atlantic Ocean. The river is fed by 216 tributaries, the largest being the Schuylkill and Lehigh Rivers in Pennsylvania. In all, the basin contains 13,539 square miles, draining parts of Pennsylvania, New Jersey, New York, and Delaware. Included in the total area number is the 782 square-mile Delaware Bay, which lies roughly half in New Jersey and half in Delaware.

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Done

Water-Quality Web Services Initial Tasks

- Design a common data format based on USEPA WQX (based on ESAR and NWQMC data elements)
- Map USGS data to this new format
  - Parameter Codes to EPA's Substance Registry System
  - Translate other data elements: Site Type, Media and Chemical Groups
- Develop common services for serving Sites, Samples and Results

Future

- Station and Result web services planned for release this FY
- Define a common spatial framework vis-à-vis SRS for chemical nomenclature: NHDPlus
- Software libraries for other applications to leverage the web services
- Portal and analytical applications

http://QWWebServices.usgs.gov

Rapid e-mail Notification of Real-Time Water Quality Monitoring Results for the Delaware River Basin

Delaware River Basin Commission

DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
UNITED STATES OF AMERICA

6th National Monitoring Conference
Atlantic City, NJ
May 22, 2008

John R. Yagecic, P.E.
Delaware River Basin Commission

This Presentation

- **Background and Motivation for this project**
- **How the system works**
- **Operational status and statistics**
- **Other related applications**
- **Anticipated future development**

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UNITED STATES OF AMERICA

Background - Parallel Needs

- WQ Standards
- 2004 Integrated Assessment process realized that WQ standards were sometimes being violated;
- Violations were not identified until well after the event was over;
- Lost opportunities for more refined monitoring.

- Drinking water concerns
- November 2004 Athos 1 spilled 473,000 gallons of crude oil into Delaware Estuary;
- Ash basin leak at PPL's Martin's Creek power plant August 23rd-27th, 2005 released ~100 million gallons of ash and water into the Delaware River.

An Automated Water Quality e-mail Notification System

- DRBC developed an automated application that performs the following *daily* tasks:
  - Retrieves real time water quality observations from 7 USGS monitoring stations (VBA program);
  - Compares observations to WQ criteria;
  - Generates and sends e-mail to a list server if observations are outside criteria;
- Operational since August 2006

Automated Water Quality Watch Notification

Station	DO Instantaneous	DO 24-hr average	Temperature	pH (min and max)	Turbidity	Salinity
Delaware River at Trenton, NJ 01463500	✓	✓	✓	✓	✓	
Delaware River at Pt. Pleasant, PA 01460200	✓	✓	✓	✓	✓	
Delaware River at Ben Franklin Bridge 01467200		✓	✓	✓	✓	
Delaware River at Chester, PA 01477050		✓	✓	✓	✓	
Delaware River at Reedy Island Jetty 01482800		✓	✓	✓	✓	
Lehigh River at Easton, PA 01454720						
Brandywine at Chadds Ford, PA 01481000	✓	✓		✓	✓	

- DRBC developed an automated application that performs the following *daily* tasks:
  - Retrieves real time water quality observations from 7 USGS monitoring stations;
  - Compares observations to WQ criteria;
  - Generates and sends e-mail to a list server if observations are outside criteria;

Sample e-mail

Delaware River Basin Commission
DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
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Subject: [DRBC_WQ_Watch] pH Water Qual. Notice, Delaware River at Trenton, NJ , 5/5/2008 5:00:10 AM
From: John Yagecic <John.Yagecic@drbc.state.nj.us>
Sender: DRBC_WQ_Watch@yahoogroups.com
Reply-To: DRBC_WQ_Watch@yahoogroups.com
Date: 5/5/2008 5:00 AM
To: DRBC_WQ_Watch@yahoogroups.com

Visit Your Group

5/5/2008 5:00:10 AM Delaware River
This is a report generated from an automated daily scan of
real time USGS water quality monitors.

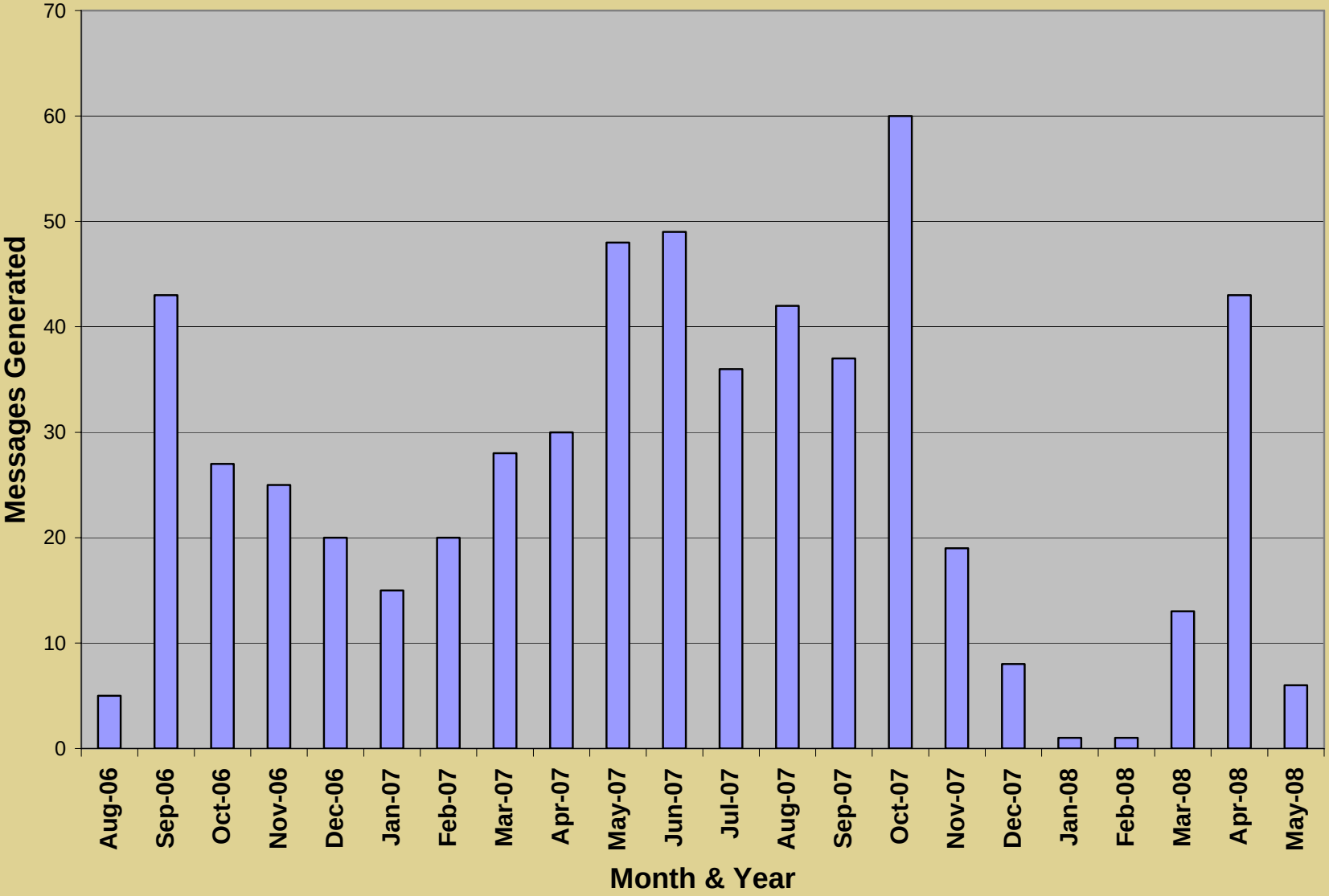
PROVISIONAL Observations indicate that the Delaware River at Trenton, NJ

was outside DRBC's criteria for pH not higher than 8.5
including the following dates, and times:

Gage	Date and Time	Measurement
Trenton	05/04/08 04:00 PM	8.6
Trenton	05/04/08 06:00 PM	8.7
Trenton	05/04/08 07:00 PM	8.7
Trenton	05/04/08 08:00 PM	8.7
Trenton	05/04/08 09:00 PM	8.6

For more information, visit the USGS web page at
http://waterdata.usgs.gov/nwis/current/?type=quality
WARNING: This message is based on PROVISIONAL unconfirmed
observations.
Values outside criteria do not necessarily indicate a violation of water
quality standards.
This service is subject to periodic outages and interruptions beyond DRBC
control.
Please do not rely solely on this e-mail alert for water quality information.
Please do not respond to this e-mail. For questions about the e-mail Contact
John.Yagecic@drbc.state.nj.us or
DRBC, 609-883-9500, or visit the DRBC web site at www.drbc.net

Messages Generated by Month (as of May 14, 2008)



To Subscribe…

Go to:

http://tech.groups.yahoo.com/group/DRBC_WQ_Watch/

- No Charge;
- Targeted toward organizations with a water quality mission, but open to anyone;
- Prospective subscribers must e-mail back a brief statement acknowledging system limitations.

DRBC WQ Watch

DRBC_WQ_Watch : DRBC Water Quality Watch - Windows Internet Explorer

http://tech.groups.yahoo.com/group/DRBC_WQ_Watch/

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Info Settings

Group Information

Members: 15

Category: Earth Sciences

Founded: Aug 23, 2006

Language: English

Already a member?
Sign in to Yahoo!

Stay up to speed on the latest Groups news and updates, visit the Groups blog today!

Home

Join This Group!

Activity within 7 days: 17 New Messages - New Questions

Description

Welcome to DRBC Water Quality Watch.

This list server provides results of automated daily scans of the U.S. Geological Survey's real time water quality monitors on the mainstem Delaware River and select tributaries. Monitoring results are compared to location specific DRBC water quality criteria. Messages will only be generated and sent when observed water quality values appear to be outside the applicable DRBC criteria. Monitoring platforms generate values for:

- Dissolved Oxygen;
- pH;
- Temperature;
- Turbidity; and
- Specific Conductivity.

Not all parameters are monitored at all stations. Not all stations have applicable DRBC criteria for all monitored parameters. A more detailed writeup describing this service is under development and will be posted to this site shortly.

All postings to this list server are generated by the Delaware River Basin Commission.

Please do not post any messages to this group list. Comments, questions, or other information should instead be sent to John.Yagecic@drbc.state.nj.us

Internet 100%

Benefits of this system

- Fast notification of apparent WQ standard violations;
- Faster recognition & repair of monitor malfunctions;
- Seeing in real time the linkages in parameters (i.e. pH violations upstream one week – DO violations downstream the following week);
- Fewer surprises at Integrated Assessment time;
- Increase visibility and value of continuous monitors to management and funders;
- Better communication among states and other agencies in interstate waters.

Other Related Applications

- Real time scanning and e-mail notification of forecasted flood stages;
- Real time estuary flow and transport model;
  - Both developed by DRBC using VBA Excel;
  - Shared code with many other organizations;

- Delaware Valley Early Warning System

Expectations for Continued Development

- Additional continuous monitors;
  - Additional site just below head of tide (2009);
  - Additional non-tidal sites in upper basin (2010);
- Screening of some intra-state monitoring sites using applicable state criteria – State of Delaware;
- Addition of NOAA PORTS monitors;
- Development of other screening criteria, such as salinity targets;
- Joining measurements to derive more sophisticated warning tools;
  - Temperature and pH to indicate for unionized ammonia

Rapid e-mail Notification of Real-Time Water Quality Monitoring Results for the Delaware River Basin

Questions?

John.Yagecic@drbc.state.nj.us
www.drbc.net

Delaware River Basin Commission

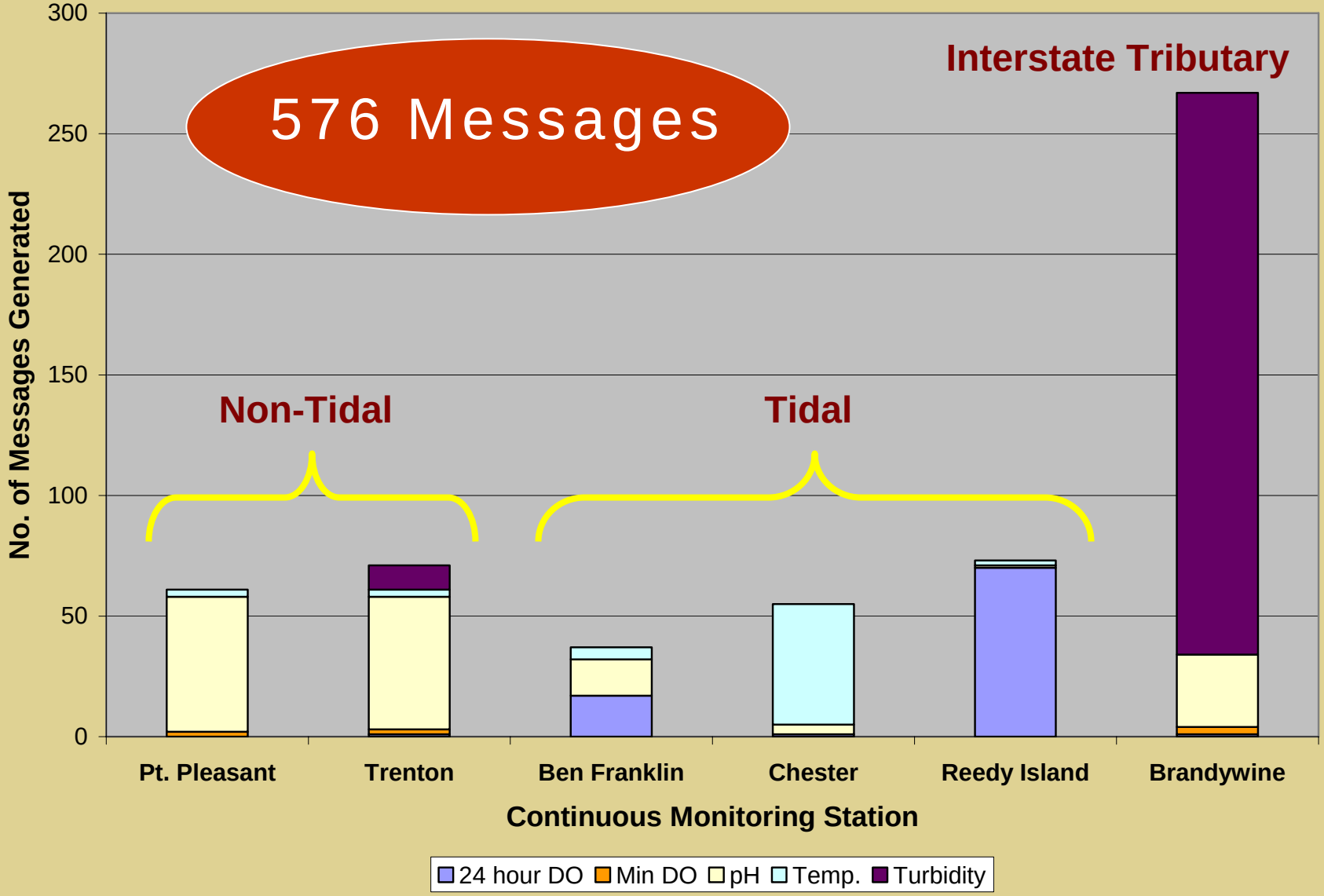
DELAWARE · NEW JERSEY
PENNSYLVANIA · NEW YORK
UNITED STATES OF AMERICA

6th National Monitoring Conference
Atlantic City, NJ
May 22, 2008

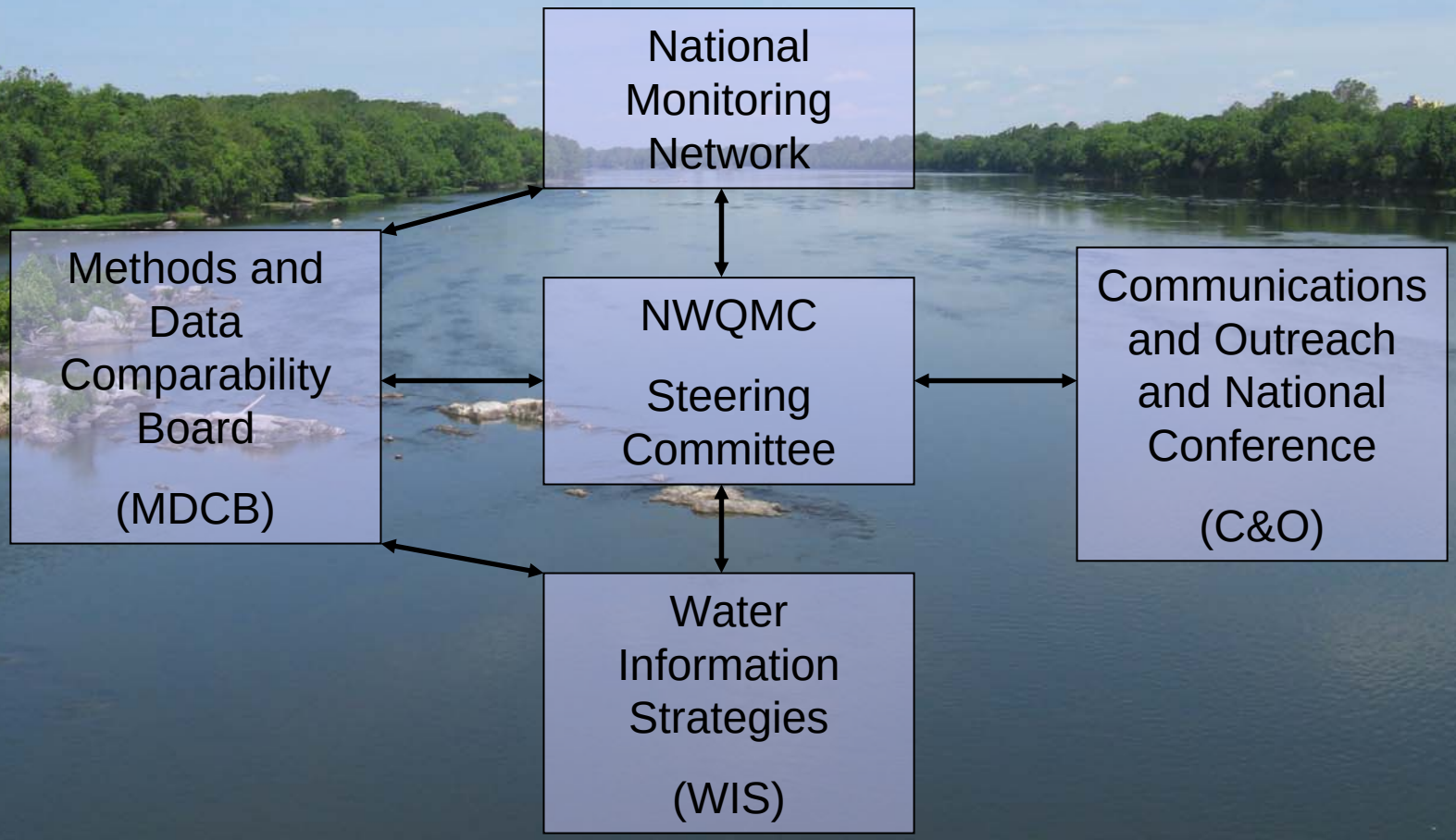
John R. Yagecic, P.E.
Delaware River Basin Commission

Messages Generated

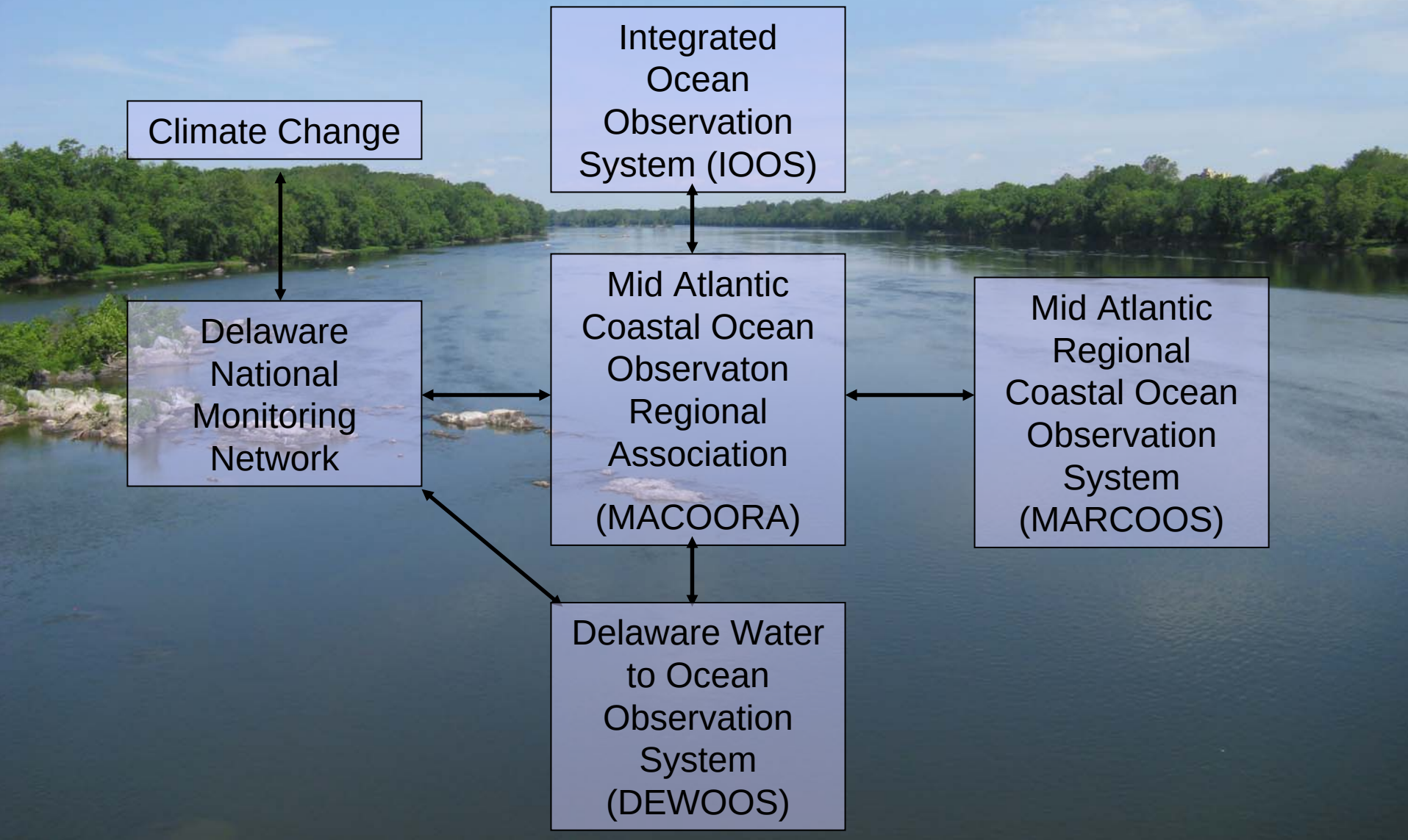
August 29, 2006 to May 14, 2008

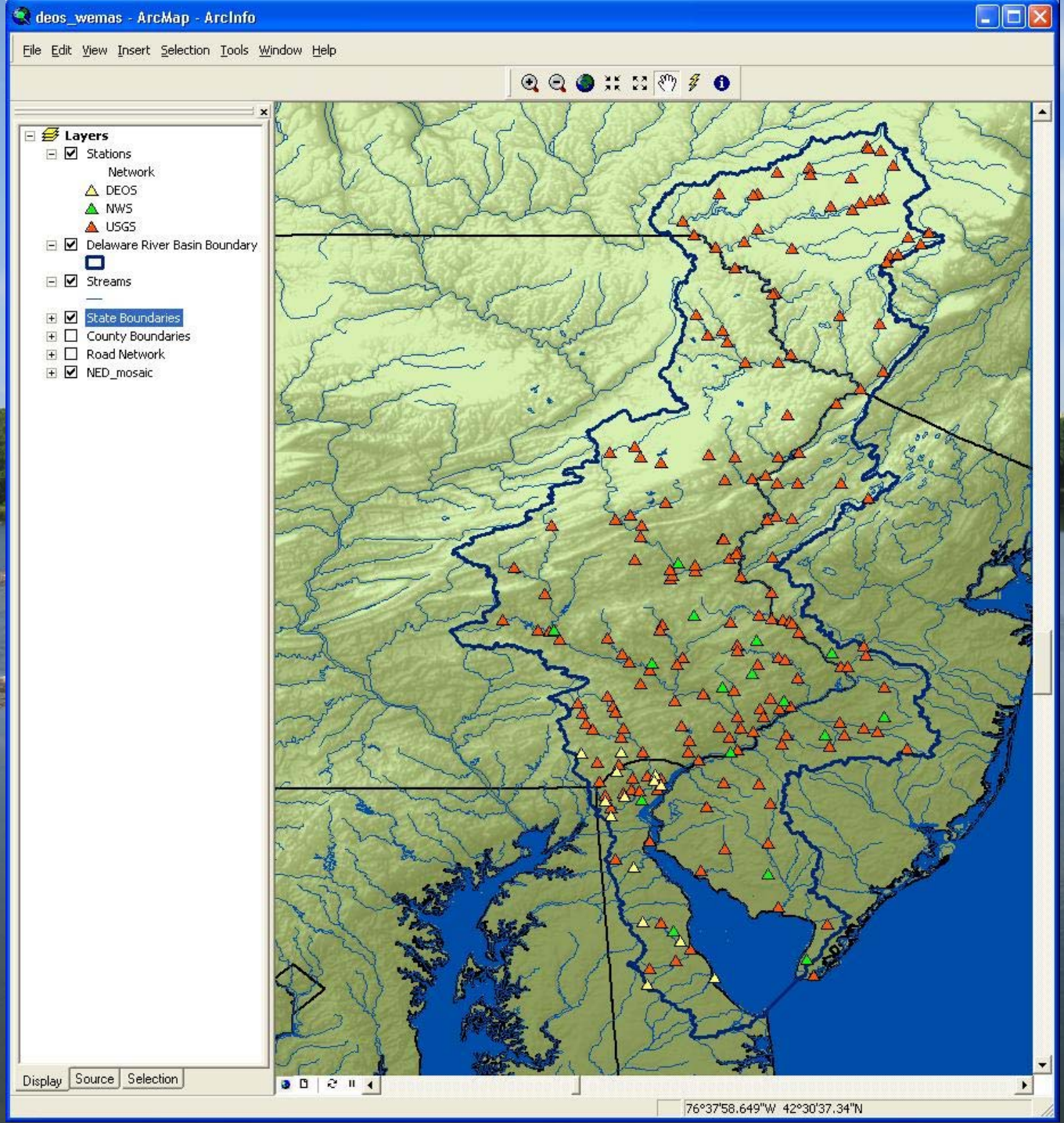


National Water Quality Monitoring Council Work Groups



Water Monitoring in the Delaware Water to Ocean Observation System (DEWOOS)

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USGS
Delaware River Basin Boundary
Streams
State Boundaries
County Boundaries
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