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

Delaware River Basin Commission

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# 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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# The tidal Delaware is a Hard Working River…

- Drinking Water for over one million people;
- 3rd largest petrochemical port - 42 million gallons of crude each day;
- Largest North American port for steel, paper, and meat;
- Largest importer of cocoa beans and fruit on the east coast;
- Worlds largest freshwater port;
- 6 nuclear reactors;
- $19 billion annually;
- Strategic military port;
- Delaware River refinery complex provides 70% of gasoline and heating oil for entire East Coast.

# 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.

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# And Spills Do Happen…

1970 1980 1990 2000

- Explosion and Fire at Allied Signal closes Baxter water intakes
- Tanker near Claymont Delaware spills 300,000 gallons
- Tanker Kentucky spills 12,000 gallons at Mobil Oil refinery in Paulsboro
- Tanker Jahre Spray spills 40,000 gallons at Coastal Eagle Point Refinery
- Tanker Anitra spills 10,000 gallons of oil in Delaware Bay
- Small fuel oil spill near Petty's Island
- Tanker ATHOS 1 Leaked between 30,000 and 475,000 gallons of heavy crude oil near Tinicum Island
- PP&L Martins Creek generating station fly ash basin failure releases 100,000,000 gallons of water and ash to Delaware River upstream of Easton
- all diesel l from ship esedente rmienta at Beckett erminal
- 17,000 gallons spilled at Sun Oil Hog Island Terminal
- Tanker Niki spills 1,500 gallons of fuel at Star Refinery
- Tanker Mystras spills 3,000 to 10,000 gallons of crude
- Explosion at Motiva spills 100,000 gallons sufuric acid
- Up to 1,000,000 gallons of raw sewage from Camden sewer repair
- 19,000 gallons of untreated leachate from GROWS landfill

*Photos of Athos 1 courtesy U.S. Coast Guard*

# 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 | ✓ | ✓ | | ✓ | ✓ | |

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# Sample e-mail

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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

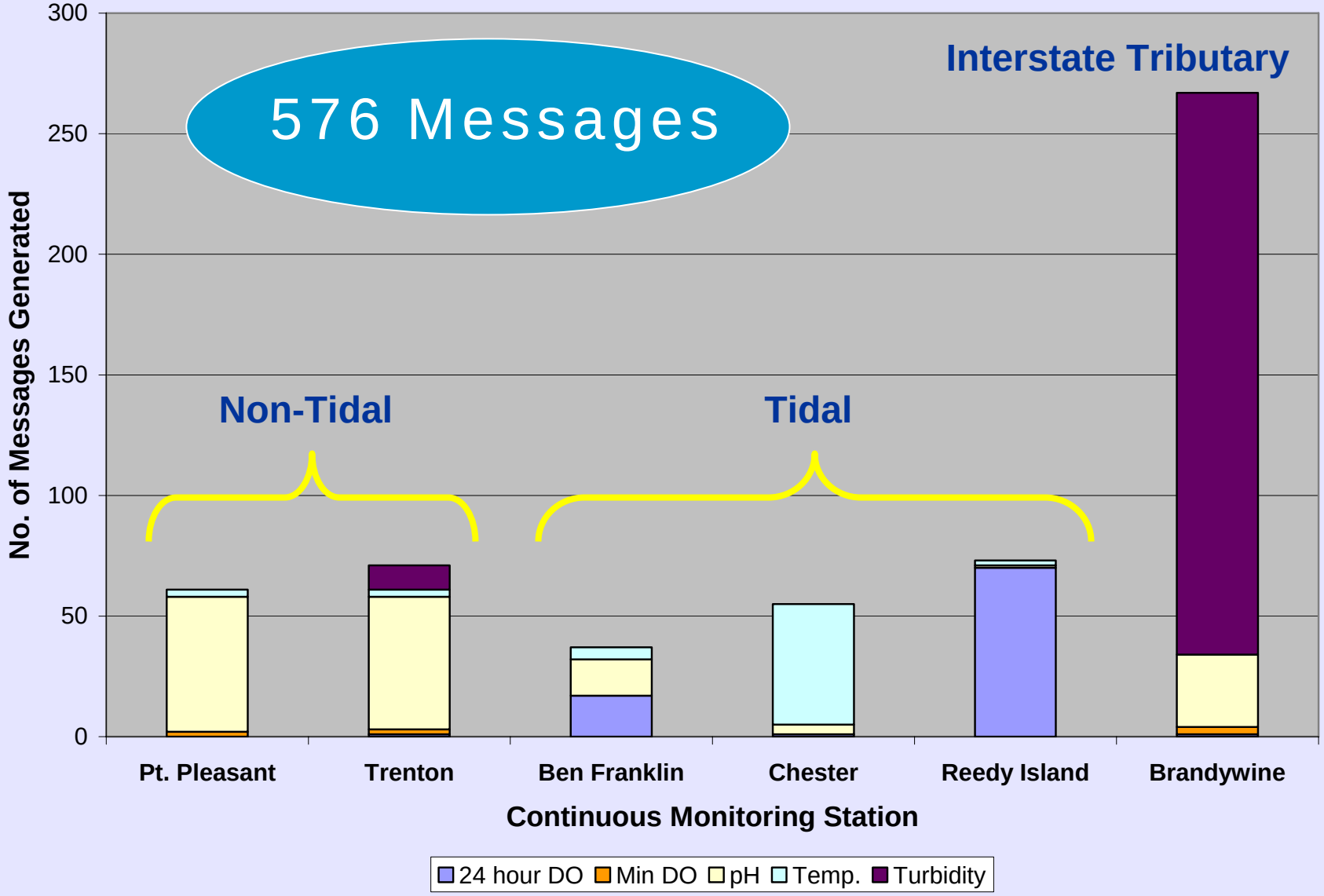
was outside DRBC's criteria for pH not higher than 8.5
including the following dates, and times:

| 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 |

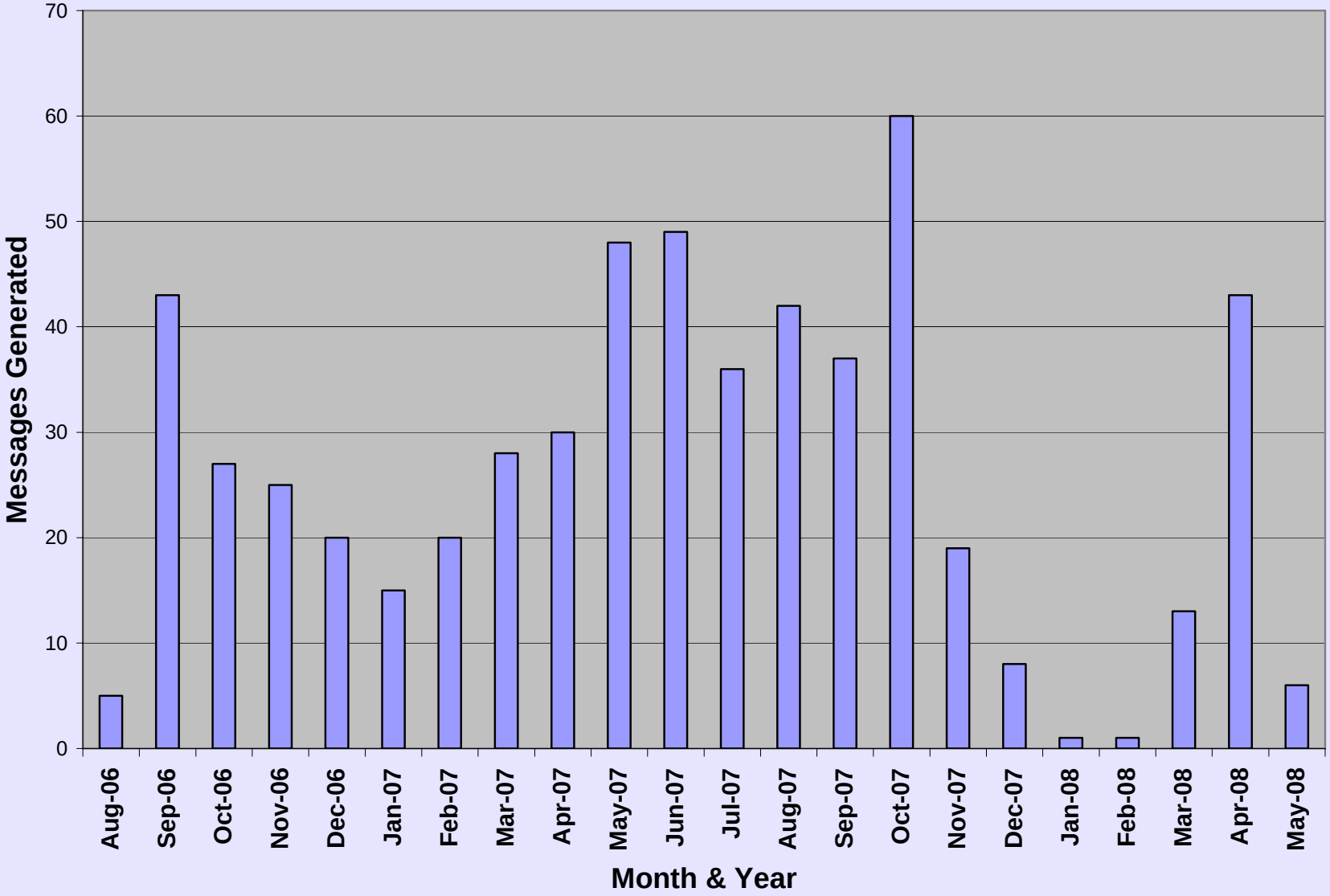
For more information, visit the USGS web page at
http://waterdata.usgs.gov/nwis/current/?type=quality
WARNING: This message is based on PROVISIONAL unconfirmed
observations.
Values outside criteria do not necessarily indicate a violation of water
quality standards.
This service is subject to periodic 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

## August 29, 2006 to May 14, 2008



# 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.

# 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

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# 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

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## Questions?

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www.drbc.net

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