Collaborative Opportunities for Meeting Environmental Measurement and Monitoring Needs

Michael Shapiro
Deputy Assistant Administrator
Office of Water
U.S. Environmental Protection Agency

August 8, 2012

Today's Presentation

- Provide updates on current measuring and monitoring work under three of our Clean Water Act and Safe Drinking Water Act Programs
- Present some specific opportunities to collaborate on improved test methods and procedures
- Questions

Celebrating 40 Years of Clean Water

- 2012 marks the 40th anniversary of the Clean Water Act (CWA), the nation's law for protecting our most irreplaceable resource.
- We have made great progress in reducing pollution during the past 40 years of implementing the Act
- Many challenges remain, and we must continue working together to protect clean water now and for future generations

http://www.epa.gov/cleanwater40

Sharing Clean Water Act Data

- Sharing water quality data is important for many CWA programs
- State and Tribal Clean Water Act 106 Program
  - Water Quality Programs require Monitoring Strategies that include monitoring objectives, design, etc.
  - Water monitoring data management and sharing is vital
- Beaches Program: Annual requirement to submit monitoring data in support of Beach closure decisions
- Biannual Assessment Reporting
  - State 305(b) and 303(d) programs and Integrated Reporting
  - Cross jurisdictional monitoring data in support of water quality condition assessments

I. CWA Monitoring and Assessment Program

- Collaboration and information sharing among water programs is possible when partners use a common language or data standards
- Data standards enable
  - More robust analysis by incorporating data from multiple partners into models
  - More confidence in data by knowing when, where, how, and by whom data was collected and analyzed
  - More efficient communication by utilizing same naming and formatting processes
  - Greater utility of data and higher return on monitoring investment

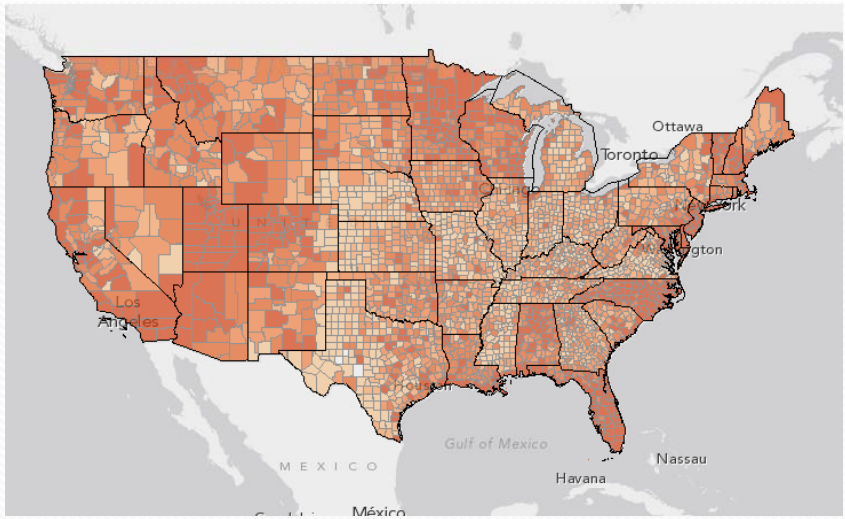
WQX Data Standard

- OW has a common language water data sharing template called the Water Quality eXchange (WQX) schema
  - The WQX schema is an implementation of the ESAR (Environmental Sampling, Analysis and Results) data standard
- WQX enables collection of physical, chemical, biological and habitat data
- WQX submissions go through the Exchange Network via a state Node or through EPA Central Data Exchange (CDX).
- CDX like a website: user must obtain a user id and password to login, then can securely submit data
- WQX facilitates data submittal and exchange via the state shared Exchange Network

WQX Data Partners

- WQX is currently used by:
  - 5 Federal Agencies
  - 175 State, Territorial and Local Agencies
  - 90 Tribal Agencies
  - 75 Public Organizations
- Water Quality Portal
  - Joint effort by EPA and USGS to seamlessly display data using WQX

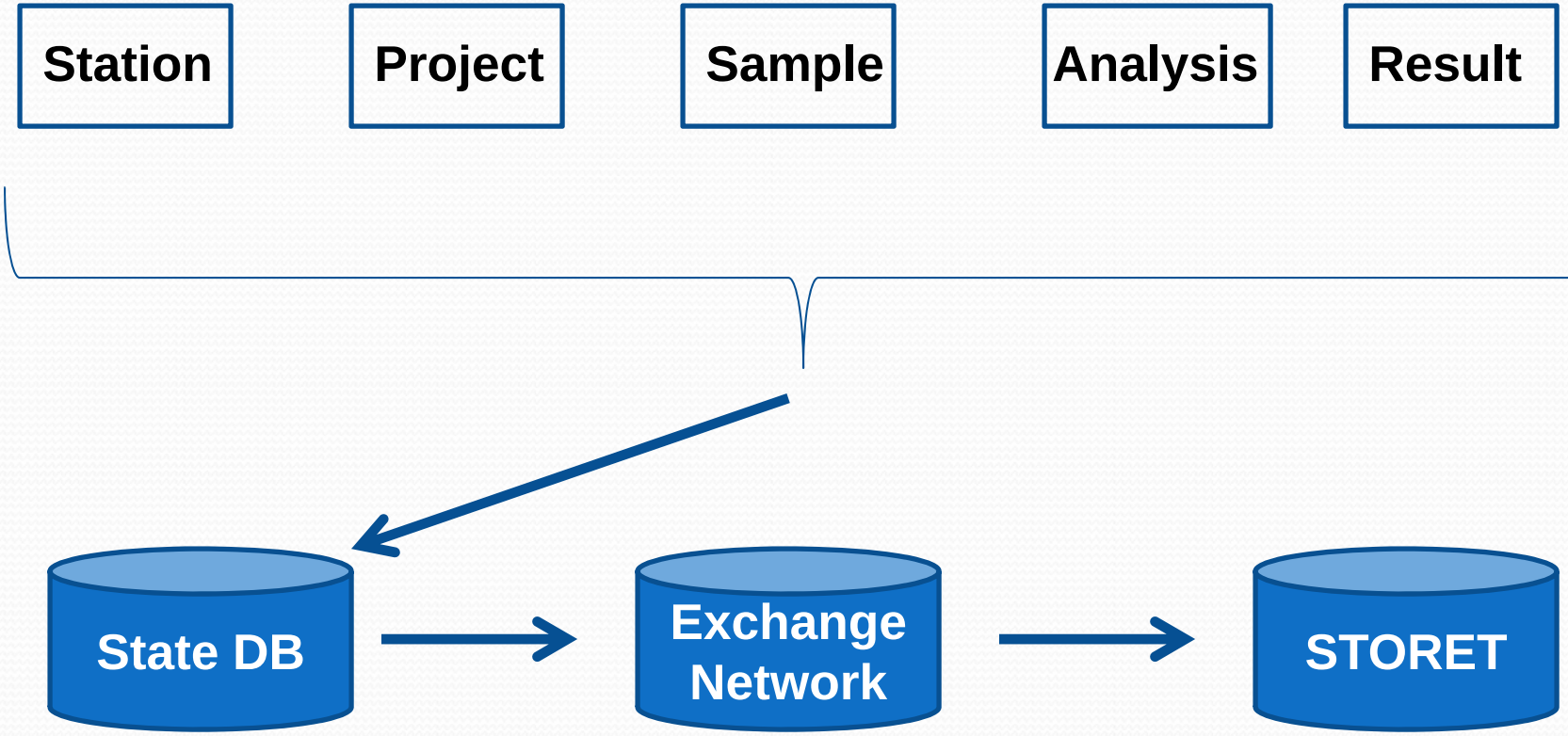
Map of Water Quality Portal Data Holdings



www.waterqualitydata.us/coverage.html

WQX Data Flow Components

Components of a water monitoring data record



1. Data compiled in State DB

2. Exchange Network used to share WQX XML data file

3. Data stored in EPA STORET

Opportunities to Collaborate with Labs

- Labs play an important role by contributing critical meta data on:
  - Who collected the sample and how it was collected
  - Who analyzed the sample, how it was analyzed, and method detection limits
  - What parameter was analyzed and result
- All of these questions (meta data) are required fields in WQX

Opportunities to Collaborate (cont'd)

- Introduce labs to WQX early in the reporting process to ease burden on state water programs
- Labs could utilize WQX format when storing and sharing data with state (e.g. generating a file from the Laboratory Information Management Systems, which would meet WQX format)
- State water program could save time by having the meta data formatted to WQX
- Labs could send meta data forward to EPA via WQX, and then state could perform QA/QC on results before sending to EPA

II. CWA Analytical Methods Program

- Many industries and municipalities permitted under CWA NPDES program to discharge pollutants
- They use analytical methods to analyze the chemical, physical and biological components of wastewater and other environmental samples
- CWA requires EPA, through rulemaking, to establish test procedures to measure pollutants in CWA programs
- EPA promulgates such procedures in 40 CFR Part 136

40 CFR Part 136

- Part 136 contains at least one analytical method for hundreds of parameters
- EPA periodically updates Part 136, promulgating new and revised analytical methods
- On May 18, 2012, EPA published Methods Update Rule
  - New and revised analytical methods
  - New QA/QC requirements
  - Clarifications and corrections to previously approved methods
  - Revisions to preservation and holding times

Flexibility Under the Current Program

- Part 136.6 allows certain chemical method modifications without review, approval, or rulemaking by EPA
- May modify methods to overcome matrix problems, automate methods, or otherwise improve efficiency or accuracy
- Examples of allowed modifications are:
  - Automate manual methods
  - Change equipment or operating parameters, such as temperature and reaction times

Flexibility Under the Current Program (cont'd)

- Modifications not allowed under 136.6
  - Changes to the determinative step (e.g., the detector)
  - Changes to the quality control,
  - Changes that significantly alter chemistry of the method
  - Some changes to methods that measure a method-defined parameter, such as BOD, COD, oil & grease
  - Part 136.6 does not apply to microbiological or biological pollutants

- EPA's Alternate Test Procedures (ATP) program provides way to get EPA review of method that falls outside the flexibility allowed in the Part 136.6

Alternate Test Procedures Program

- CWA Alternate Test Procedures (ATP) Program works with instrument manufacturers, commercial, municipal and private labs to promote use of innovative technologies
- Primary vehicle for non-consensus standard body stakeholders to work collaboratively with EPA on new/improved methods
- Part 136 describes the process and the data requirements associated with ATP review and/or approval

CWA Efforts to Update Methods 624/625

- EPA Analytical Methods 624 and 625 apply to hundreds of semi-volatile and volatile organic pollutants in CWA program
- EPA is now collaborating with interested stakeholders to update these methods
  - Expand list of pollutants to which the method is applicable and bring method in line with modern methods
  - EPA actively worked with states, regions, industry, and the laboratory community to develop a draft version of revisions
  - EPA seeking input on the revisions and data to support such revisions
  - Draft methods revisions this fall; proposed revisions to Part 136 late 2013

Procedures for Detection and Quantitation

- EPA convened Federal Advisory Committee (6/2005) to provide advice/recommendations on approaches for detection and quantitation procedures, and uses in CWA programs
- Committee represented balanced membership from states, environmental community, environmental laboratories, industry, public utilities
- Committee deliberated for 2.5 yrs on challenging policy and technical issues
- Produced report with recommendations and summary of important issues where consensus could not be achieved (Available at water.epa.gov/scitech/methods/cwa/det/upload/final-report-200712.pdf)

EPA Follow-Up

- EPA conducted a laboratory study to evaluate recommended procedures against Committee-recommended measurement quality objectives (MQOs)
- EPA tested two versions of the recommended procedures plus lowest concentration minimum reporting level (LCMRL)
- EPA also conducted analysis of EPA's current approach for detection and quantitation against Committee recommended method quality objectives (MQOs)

Procedures for Detection & Quantitation: More Data Needed

- EPA finds Committee procedures may offer improvement over current procedures
- Because procedures were analyzed for only two methods, more development/testing of Committee procedures are warranted
- EPA interested in obtaining data on these approaches as applied to additional analytical methods and at more laboratories
- EPA strongly encourages interested parties to conduct additional studies of these procedures and submit study results to EPA for review
- Agency welcomes interested parties to share study plans with us prior to such studies to maximize usability
- Submit study proposals to ostcwamethods@epa.gov

III. Office of Ground Water and Drinking Water Technical Support Center

Drinking Water Program collaboration efforts:

1. Drinking Water Method Development
2. Alternate Test Procedure Program
3. Expedited Method Approval
4. Method Availability and Monitoring Data

Example 1: Drinking Water Methods Work

- Method development supports monitoring for regulated drinking water contaminants, per Safe Drinking Water Act (SDWA)
  - Promulgate initial ("reference") method
  - Develop/evaluate/approve subsequent methods
- Support occurrence data gathering ("finished water" monitoring) under the Unregulated Contaminant Monitoring Rule (UCMR)
- UCMR data supports regulatory determinations for chemical and microbial contaminants on the Contaminant Candidate List (CCL)

Drinking Water Method Development Partnerships

- EPA's drinking water method development work historically led by OGWDW's Technical Support Center and ORD's National Exposure Research Laboratory
- Extensive partnering with laboratories, universities, instrument manufacturers, research organizations, and others
- Partnerships provide EPA with valuable insights/perspective, improve pace of method development, and more quickly leads to implementing new technology
- Collaborators assist with: identifying needs; providing technical consultation during method development; conducting peer review of completed methods; performing "second lab" validation of new/revised methods; and performing primary method development

Drinking Water Method Development Goals

- Work to keep pace with technologies to analyze both currently regulated and emerging contaminants
- Maximize flexibility in analytical methods while maintaining data quality needed to make regulatory decisions and monitor compliance
- Consider cost of analysis and laboratory capability/capacity
- Use technologies familiar/available to laboratories, whenever practical

Drinking Water Method Development – Examples

- UCMR monitoring using methods that rely on:
  - LC/MS/MS for the analysis of acetanilide pesticide degradates, hormones, perfluorinated compounds (i.e. PFOS/PFOA)
- Methods recently completed:
  - Method 524.3: Purge and trap GC/MS for VOCs; increased flexibility and enhanced method performance
  - Method 218.7: Ion chromatography with post-column derivatization and UV-Vis for hexavalent chromium; improved sensitivity and extended holding time
  - Method 557: IC/MS/MS method for the analysis of HAAs, bromate and dalapon; expands application of MS/MS technology to compliance parameters
  - Method 525.3: Solid phase extraction GC/MS for SOCs; expanded analyte list and increased flexibility

Example 2: Alternate Test Procedures (ATP) Program

- ATP program is jointly implemented by OST and OGWDW (discussed previously)
- Program provides process where new/modified methods developed by others evaluated against approved methods
- Protocols exist for method evaluation for
  - Chemistry methods
  - Microbiology methods
  - Radiochemical methods
- Program staff collaborate with ATP submitters to facilitate method review and the potential for a drinking water Expedited Method Approval action

Example 3: Expedited Method Approval

- When EPA establishes drinking water contaminant monitoring requirements, the Agency approves at least one "reference" analytical method
- Reference methods incorporated into regulations are approved through the formal rulemaking process (proposal, public-comment process, final rule)
- OW developed the streamlined "Expedited Approval" process, using authority established under SDWA
- OW's Assistant Administrator can use a Federal Register Notice to "expedite" new/modified method approval when determined to be equally effective relative to prior approved reference methods.

Expedited Method Approval (cont'd)

- The Expedited Method Approval Process proposed in April, 2007 (72 FR 17902) and first action published June 3, 2008 (73 FR 31616).
- Methods approved through the Expedited process are listed in Appendix A to Subpart C in 40 CFR 141.
- Types of methods approvals include:
  - Methods evaluated through the drinking water ATP program
  - Updated/revised Voluntary Consensus Standard Body methods (e.g., Standard Methods and ASTM)
  - New or revised EPA methods
- The program offers numerous opportunities for collaboration with consensus method organizations

Example 4: Method Availability and Monitoring Data

- Collaboration with USGS
  - NEMI (National Environmental Monitoring Index)
  - NEMI Downloads analytical methods for monitoring various media from air, water, sediment, tissue and more
  - Monitoring studies and critical review of results
    - USGS scientists routinely present monitoring study plans for priority contaminants to OGWDW staff seeking input
    - These study results provide valuable early information on emerging contaminants helping OW prioritize
- EPA interested in collaborating on other environmental monitoring programs

Websites

- Clean Water Act: www.epa.gov/cleanwater40
- Water Quality Exchange (WQX): www.waterqualitydata.us/coverage.html
- CWA Analytical Methods: water.epa.gov/scitech/methods/cwa/index.cfm
- CWA Methods Update Rule: water.epa.gov/scitech/methods/cwa/update_index.cfm
- SDWA Analytical Methods: water.epa.gov/scitech/drinkingwater/labcert/methods_index.cfm
- USGS National Environmental Monitoring Index www.nemi.gov