An Environmental Information Lifecycle Analytical Framework

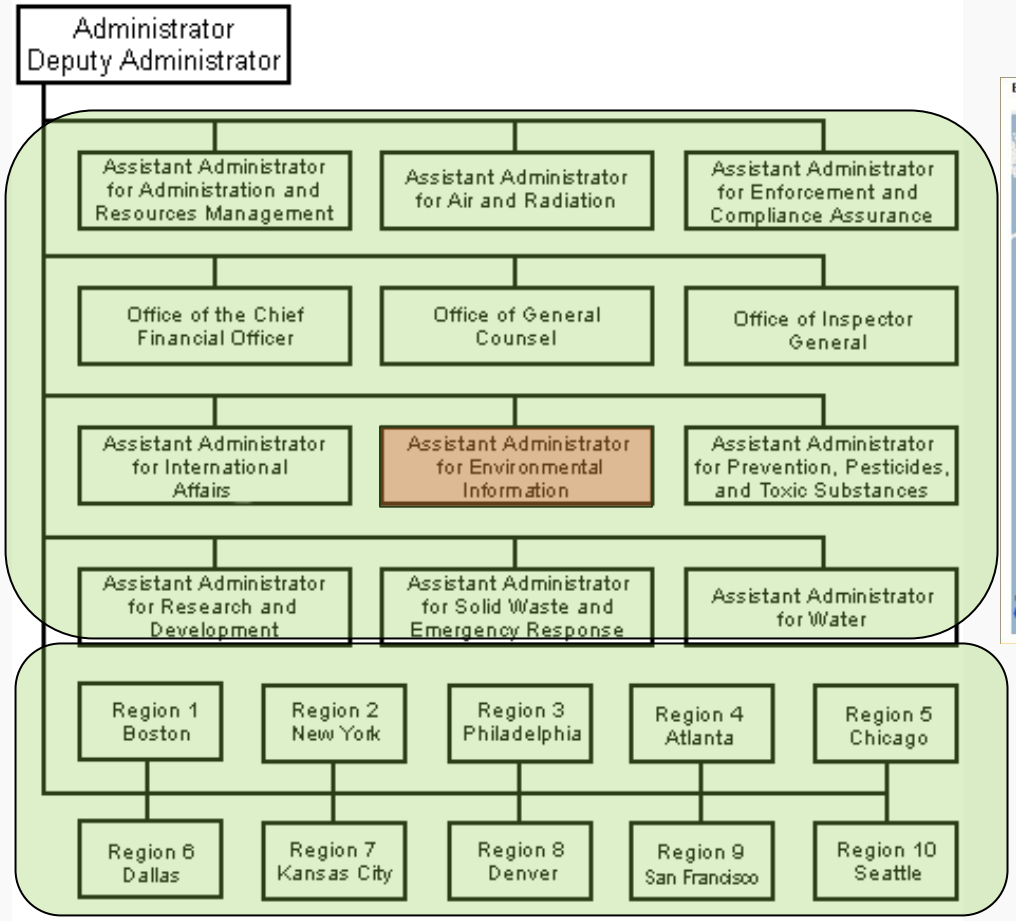
Strengthening the Right to Information for People and the Environment:
Study Tour
World Resources Institute
October 22, 2012

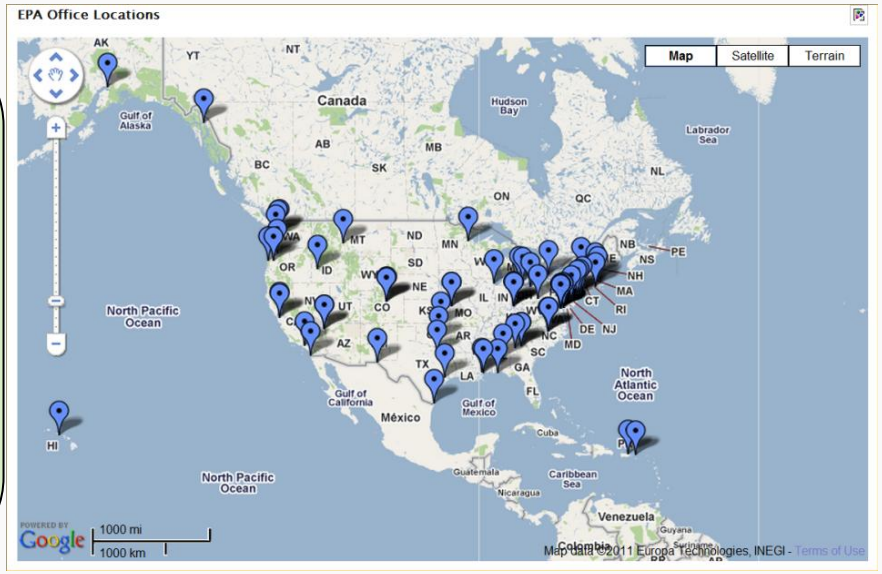
Draft for Discussion Purposes Only

Presentation Outline

1. About EPA and Office of Environmental Information
2. A Draft Environmental Information Lifecycle Analytical Framework
3. Examples of US Environmental Protection Agency Water Quality Data Opportunities
4. Questions/Discussion

USEPA Offices





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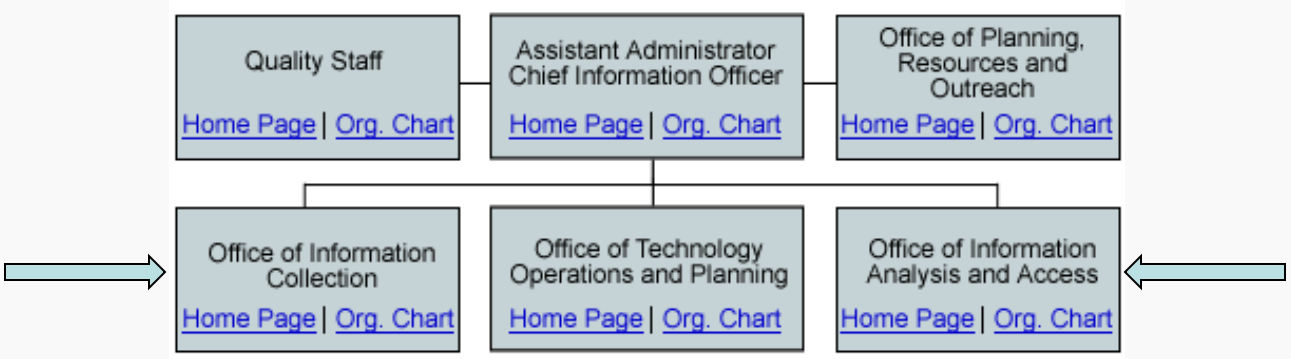
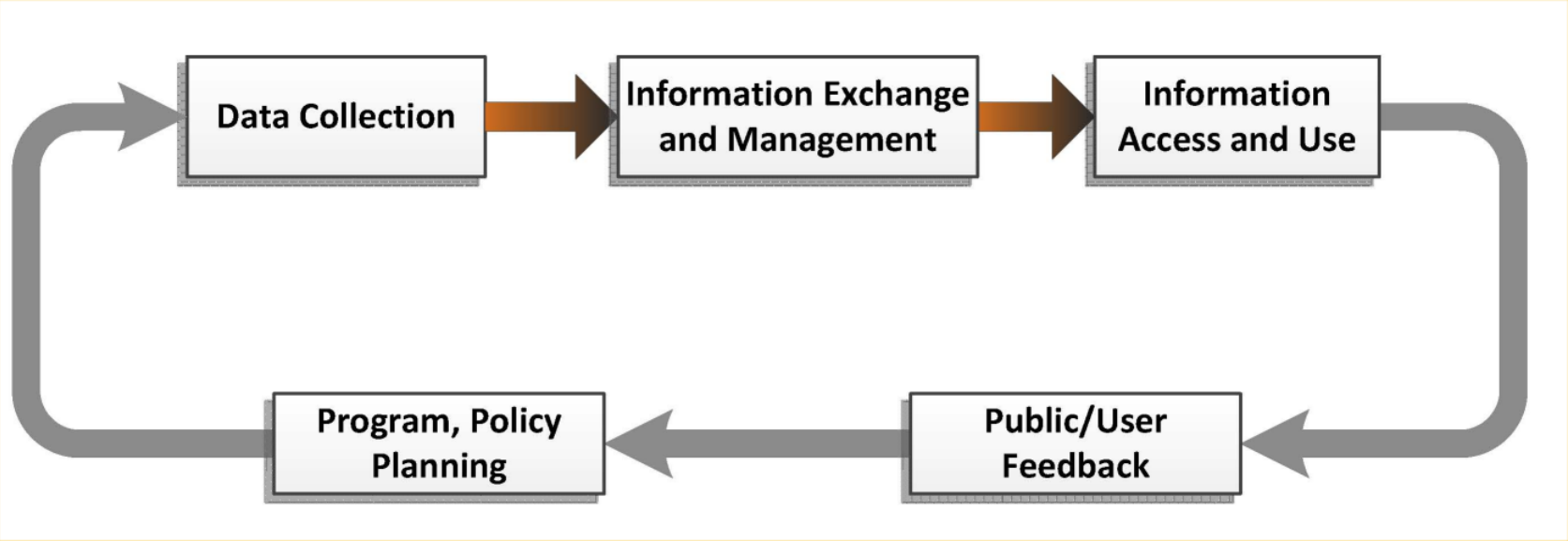
Office of Environmental Information

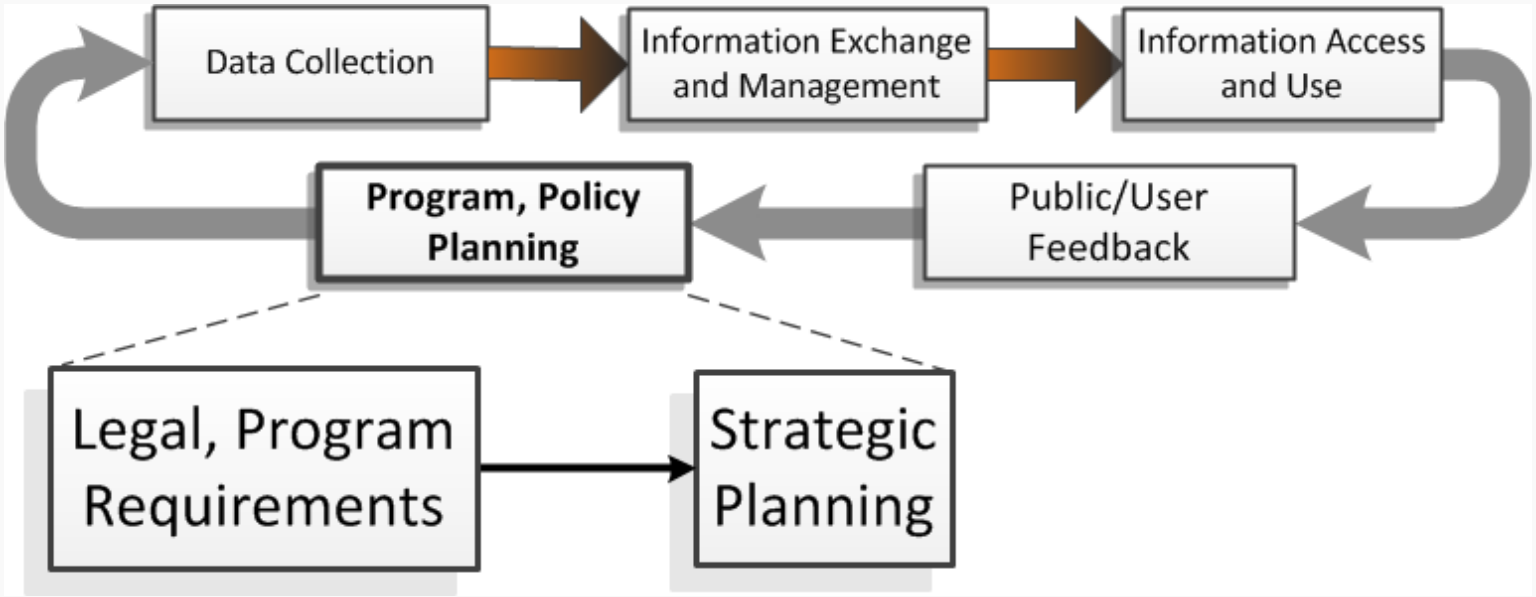


- **Office of Information Collection (OIC)**
  - collects, manages, provides and safeguards environmental information
- **Office of Information Analysis and Access (OIAA)**
  - provides the infrastructure and policies to ensure that EPA has a solid framework for information use and dissemination to provide better analysis and access to environmental information
- **Quality Management Program**
  - develops Agency-wide policies, procedures and tools for quality-related activities relating to the collection and use of environmental information.
- **Office of Technology Operations and Planning (OTOP)**
  - manages EPA's IT infrastructure, supporting the Agency's information systems and information products

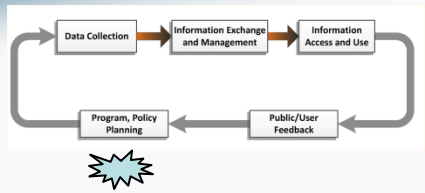
An Environmental Information Lifecycle Analytical Framework



Policy and Program Planning

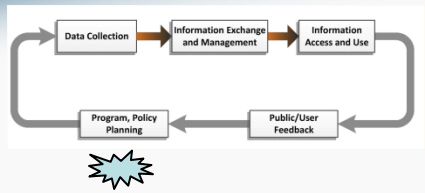


- Legal and/or Program Requirements
- Strategic planning for collection, intended use of data



Legal and Program Requirements and

- Clean Water Act (1972, 1977) and Regulations
  - Establishing, reviewing, and revising water quality standards
  - Determining water quality standards attainment
  - Identifying impaired waters that still require WLAs and TMDLs
  - Identifying causes and sources of water quality impairments
  - Supporting the implementation of water management programs
  - Supporting the evaluation of program effectiveness
  - Guidance on integrated reporting of the above programs

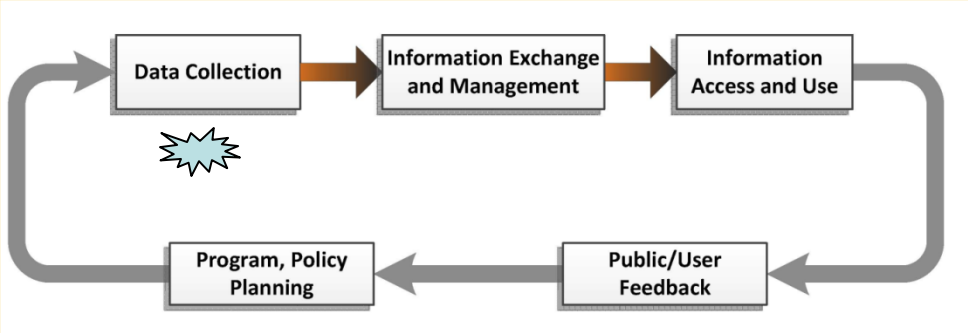


Strategic Planning

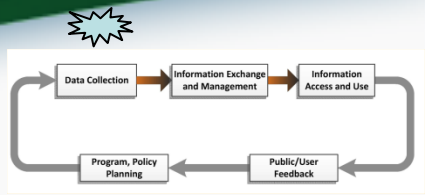
- National Water Program Strategic Plan (2011-2015)
  - Establishes specific water quality goals to achieve
  - WQ-SP13.N11 - Ensure that the condition of the Nation's streams does not degrade
  - there is no statistically significant increase in the percent of streams rated "poor" and
  - no statistically significant decrease in the streams rated "good").

Source:
http://water.epa.gov/resource_performance/planning/upload/NWP_program_guidance_508_Appendix_E.pdf

Data Collection



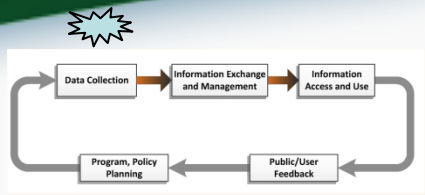
- Using Existing Data
- Who Collects the Data and to Whom are the Data Reported?
- Data Quality Objectives
- **Monitoring Strategy or Plan**
- Metadata for Field and Laboratory Purposes
- Sampling and Analysis Plans
- Preliminary Data Entry and Storage of Field and Laboratory Data



The Recommended Elements of a State Monitoring Program

http://water.epa.gov/type/watersheds/monitoring/elements.cfm

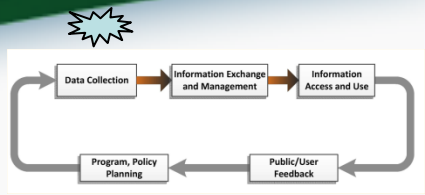
- Monitoring Program Strategy
- Monitoring Objectives
- Monitoring Design
- Core and Supplemental Water Quality Indicators
- Quality Assurance
- Data Management
- Data Analysis and Assessment
- Reporting
- Programmatic Evaluation
- General Support and Infrastructure Planning



Critical Monitoring Elements – Monitoring Design

http://water.epa.gov/grants_funding/cwsrf/upload/2006_10_20_cwfinance_final-tribal-guidance.pdf

Monitoring Design	Uses
Targeted monitoring	• Assess WQS attainment for specific segments. • Measure localized water quality trends. • Identify sources of pollutants to specific waters. • Support development of local management measures (TMDL, NPDES permits, nonpoint source best management practices, WQS).
Statistical survey	• Describe proportion of all waters supporting CWA goals, with documented confidence. • Measure water quality trends and CWA program effectiveness. • Support development of new WQS. • Prioritize targeted monitoring.
Modeling and landscape analysis	• Support development of local management measures (TMDL, NPDES permits, NPS BMPs, WQS). • Predict where water quality is likely impaired. • Predict water quality trends. • Prioritize targeted monitoring.

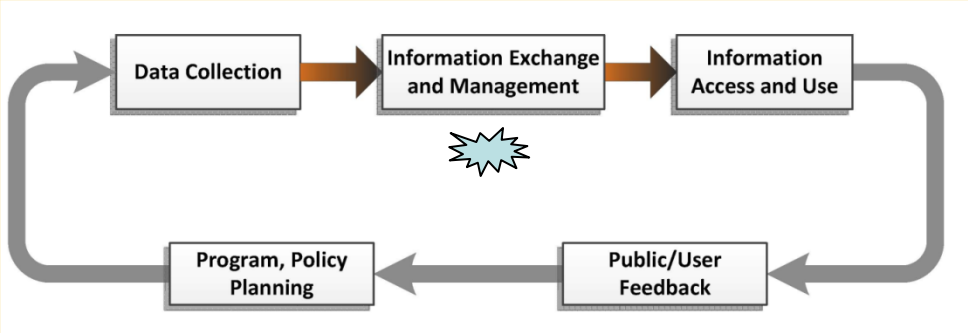


Critical Monitoring Elements – Indicators

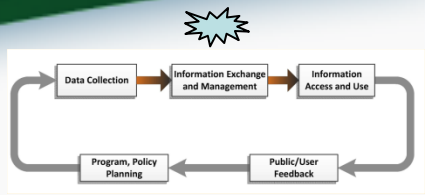
http://water.epa.gov/grants_funding/cwsrf/upload/2006_10_20_cwfinance_final-tribal-guidance.pdf

	Aquatic Life	Recreation	Drinking Water	Fish / Shellfish
CORE	• Biological communities • Basic chemistry (e.g., DO, pH) • Nutrients • Flow • Habitat assessment • Landscape condition	• Pathogen indicators (*E. coli*, enterococci) • Nuisance plant growth • Nutrients • Chlorophyll • Flow • Landscape condition	• Trace metals • Pathogens • Nitrates • Salinity • Sediments/TDS • Flow • Landscape condition	• Pathogens • Mercury • Chlordane • DDT • PCBs • Landscape condition
OTHER	• Ambient toxicity • Sediment toxicity • Other chemicals of concern in water or sediment • Health of organisms	• Other chemicals of concern in water or sediment • Hazardous chemicals • Aesthetics	• Other chemicals of concern in water or sediment • VOCs (in reservoirs) • Hydrophyllic pesticides • Algae	• Other chemicals of concern in water or sediment

Information Exchange and Management

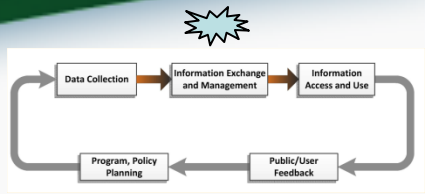


- Type of Information System(s)
- Type of Data Exchange
- Data Standards
- Data Quality Checks, Management
- Services for Retrieving Information



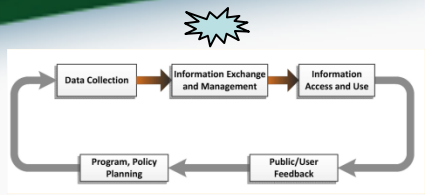
Type of Information System(s)

- Water Quality Exchange
  - States, Tribes reporting to National System
  - Provides a framework for data owners to submit to and EPA to compile water quality monitoring data in the STORage and RETrieval (STORET) Data Warehouse
  - Enables data owners to submit Physical, Chemical, Biological, and Habitat Data
  - Used by State, Tribal, and Federal Agencies, Universities, Watershed Groups



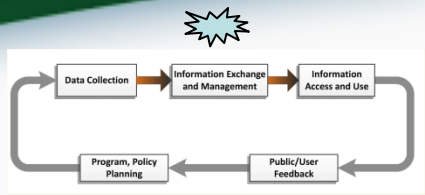
Type of Data Exchange

- Water Quality Exchange (WQX)
  - State, Tribes submit water quality data
  - WQX files can be submitted to EPA STORET through EPA Central Data Exchange (CDX) via Exchange Network node or node client
  - CDX performs the QA check on the XML file and directs it to WQX Database
  - CDX send to WQX Data Warehouse



Data Standards

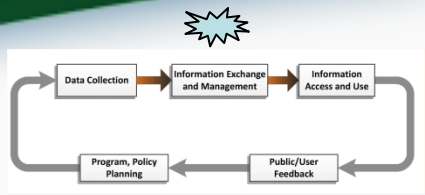
- Governed by a standardized exchange template, so all data must comply with the WQX exchange template data elements, business rules and domain values
- The WQX exchange template uses domain standards from the Substance Registry System
- The WQX exchange template provides a common standard that we can use to share data across sources
- The WQX exchange template enables a common outbound format for the Water Quality Portal (collaborative effort between EPA and USGS)



Data Standards:
Standard Data Tags in WQX Exchange Template

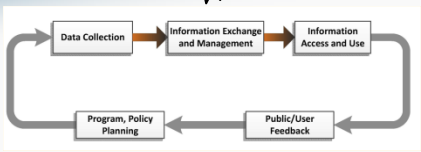
- Organization – who collected the data
- Project – why the data were collected
- Monitoring location – where the data were collected
- Activity – when and how the data were collected
  - **Results – the data (e.g. parameter concentrations, toxicity test results)**
- Activity Groups – A way to associate multiple activities
- Biological and habitat condition scores

"WQX and STORET Warehouse, "Kristen Gunthardt, EPA Office of Water, September 26, 2011



Data Quality Checks, Management

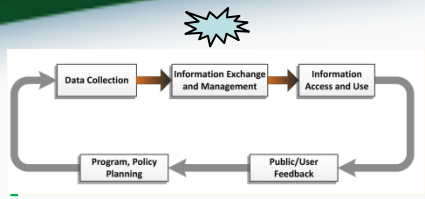
1. **File Structure Correct:** The CDX node performs validation that the submitted file is well correct
2. **File Validation:** If the file does not pass CDX validation, it does not continue on to WQX for processing
3. **Data Processing Checks:** The WQX processing software checks that files conform to WQX data element formats, business rules and domain values
4. **Communicating Results of Checks:** Once a file is submitted and has either "*failed*" or "*completed*", users can download the following:
   - Original file submitted
   - CDX validation report
   - CDX notification file reporting status as either completed or failed
   - WQX processing report summarizing the inserted/updated/deleted data and any encountered errors



Services for Retrieving Information

- Four core services developed by EPA:
  - **Stations service** – provides specific monitoring station information
  - **Results service** – provides results for modeling, analysis, and decision making
  - **Watershed/Station Catalog service** – provides summary information on what data are available
  - **Project Catalog service** – provides summary information by projects based on an input of min/max latitude/longitude
- USGS Collaboration:
  - **Stations service** – provides specific station information
  - **Results service** – provides results for modeling, analysis, and decision making

"WQX and STORET Warehouse, "Kristen Gunthardt, EPA Office of Water, September 26, 2011



Services for Retrieving Information

Queries using WQX Web

http://www.waterqualitydata.us/

Water Quality Portal Home

NATIONAL WATER QUALITY MONITORING COUNCIL

NWQMC

Working Together for Clean Water

Water Quality Portal

The Water Quality Portal (WQP) is a cooperative service sponsored by the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), and the National Water Quality Monitoring Council (NWQMC).

DOWNLOAD DATA

Download water-quality data in Excel, CSV, TSV, and KML formats.

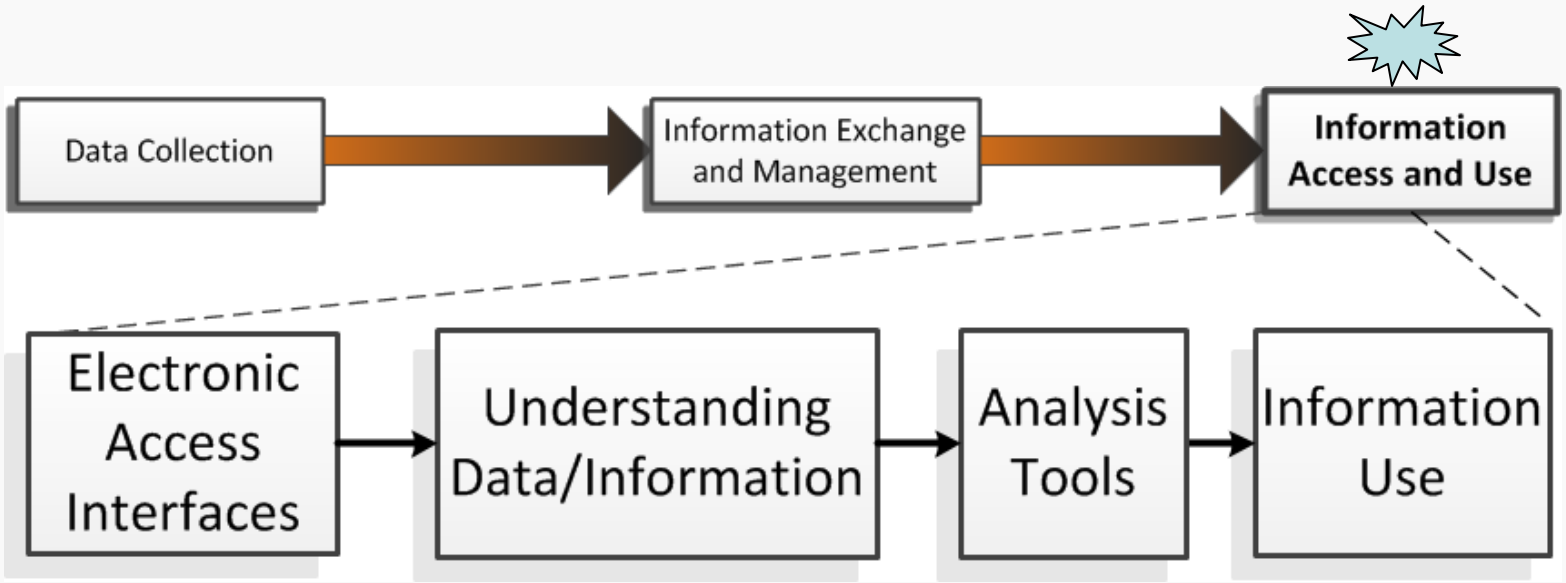
HOW TO USE THE WQP

User Guide
Web Services Guide
FAQs
Upload Data

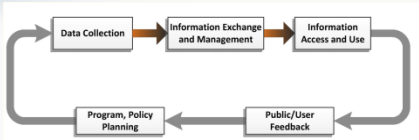
NATIONAL RESULTS COVERAGE

Water-quality data in your state.

Information Access and Use



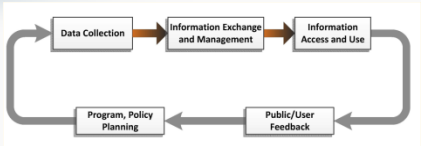
- Public and Other Access
- Access Interfaces
- Understanding Data/Information
- Analysis Tools



Public and Other Access

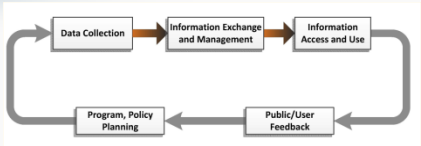
Environmental information disclosure

- 1966 Freedom of Information Act, OPEN Government Act of 2007, OPEN FOIA Act of 2009
- Public participation requirement in Clean Water Act (40CFR 25)
  - § 25.4 Information, notification, and consultation responsibilities.
    § 25.5 Public hearings.
    § 25.6 Public meetings.
    § 25.7 Advisory groups.
    § 25.8 Responsiveness summaries.
    § 25.9 Permit enforcement.
    § 25.10 Rulemaking.
- All data submitted to EPA can be shared except for Confidential Business Information (CBI)
- CBI addresses mostly trade secrets and it must be proven that it is CBI

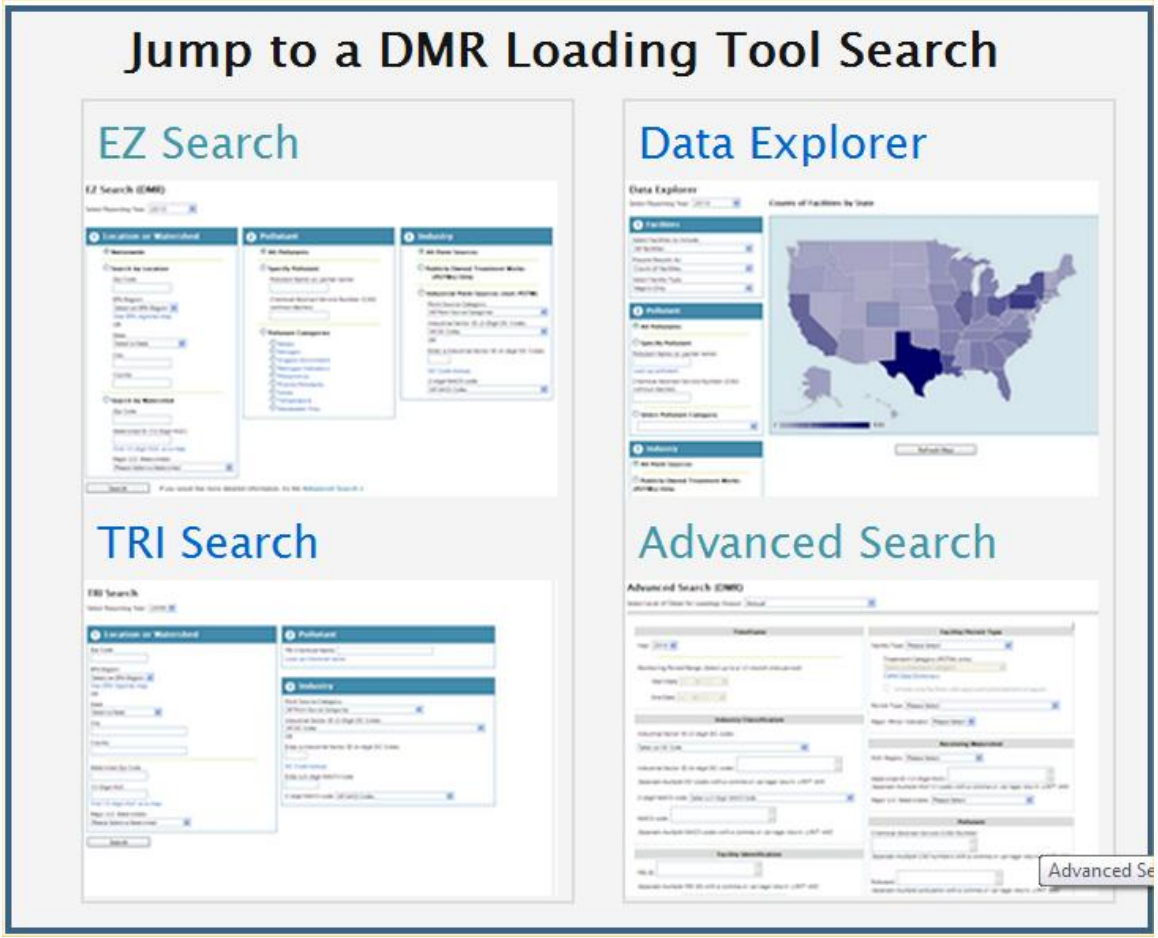


Access Interfaces for Water Program

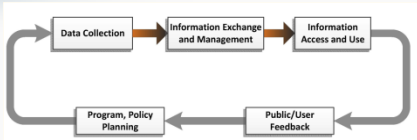
- Condition of the Waters (ambient)
  - MyEnvironment - MyWaters (environmental conditions) http://www.epa.gov/myenvironment/
  - WATERS (Watershed Assessment, Tracking & Environmental Results) http://epa.gov/waters/
  - ATTAINS (assessed and impaired waters database) http://www.epa.gov/waters/ir/index.html
- Facility Discharge (industry)
  - Envirofacts (facility information) http://www.epa.gov/enviro/
  - Discharge Monitoring Report Tool (water facility releases) http://cfpub.epa.gov/dmr/
- Datafinder http://www.epa.gov/data/
- Data.gov http://www.data.gov/



Access Interfaces - Example



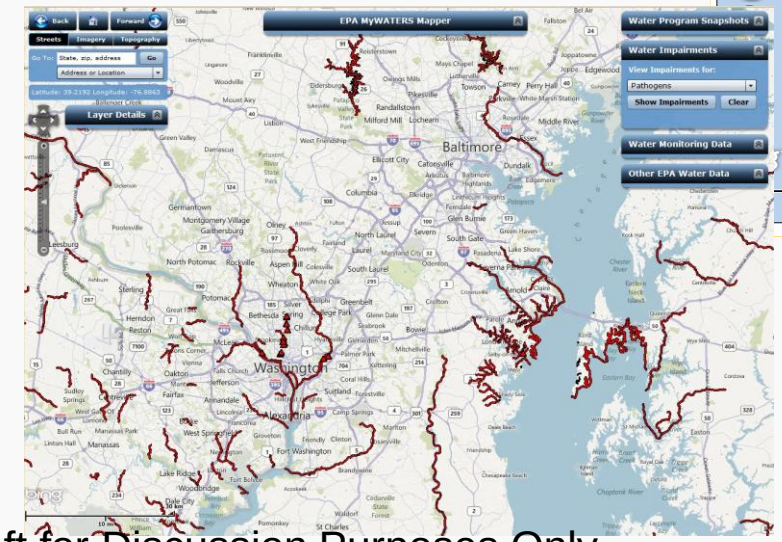
Combines the discharge monitoring report with the Toxics Release Inventory water releases

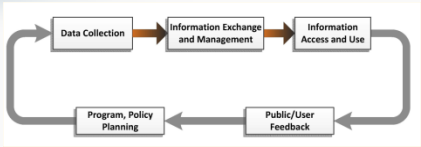


Access Interfaces for Water - Example

MyWaters Mapper

Combines mapping with water quality assessments





Analysis Tools for Water

Mapping

- WATERS mapping and analysis tools
  http://www.epa.gov/waters/tools/index.html

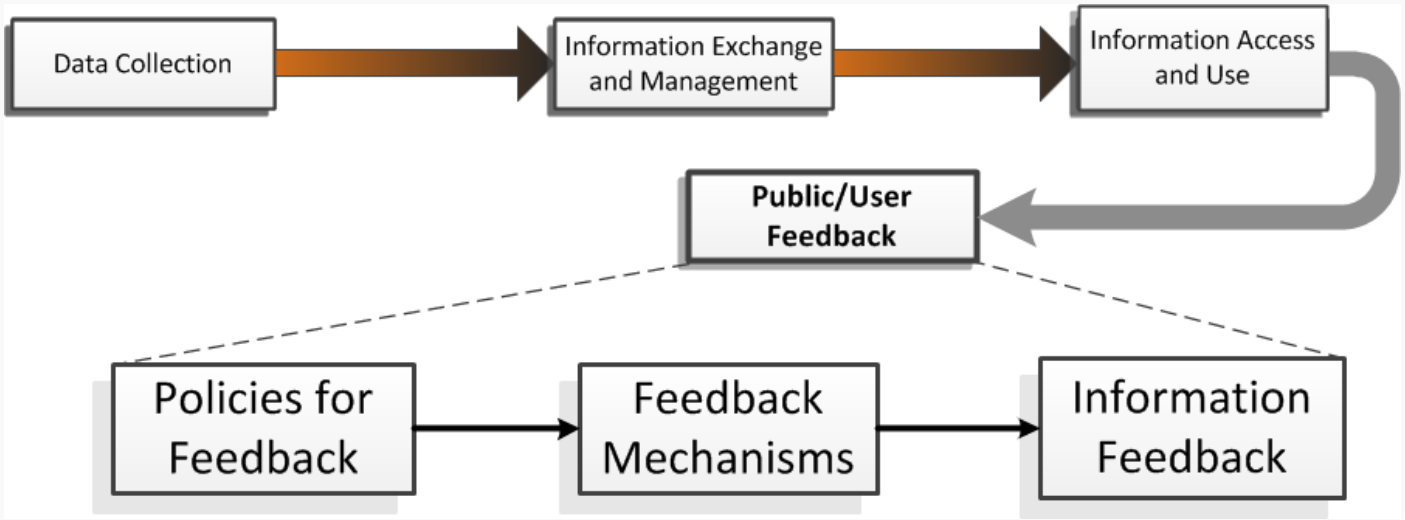
Modeling and Prediction

- Water quality models
  http://water.epa.gov/scitech/datait/models/index.cfm

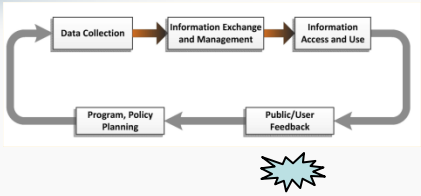
Combining Information

- Watershed planning and analysis tool
  http://java.epa.gov/wsplanner/#

Public/User Feedback

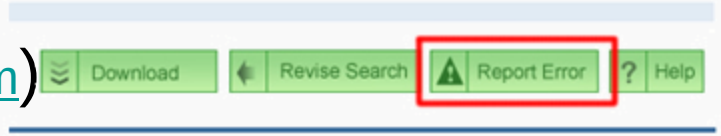


- Information Quality Guidelines
- Stakeholder Outreach and Education
- Correcting Data and Information Errors

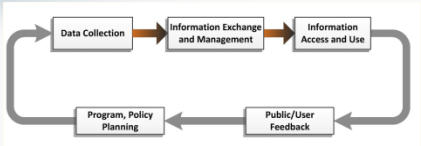


Public/User Feedback

- Stakeholder feedback on all regulatory actions (public participation)
- Stakeholder feedback on guidance documents
- Opportunity for formal correction of information and data through the Information Quality Guidelines
- Error correction for DMR data (http://cfpub.epa.gov/dmr/error_correction.cfm)



- Error correction for enforcement and compliance data (http://www.epa-echo.gov/echo/how_to_report_an_error.html)



Public/User Feedback

Submitter Information

You must enter personal identifying information so that we may keep you involved in the error correction process. This information is not made available for any other purposes (see Notice of Use). EPA will notify you of the progress of your reported error and may ask for additional information or documentation, if it is needed (see Customer Support Standards).

Required fields are marked with an (*)

First Name:* Last Name:*

Email: or Phone: - Ext:

Preferred contact method (one is required): Email Phone

Affiliation type that best describes your role or interest in this error notification:

None Selected

Organization you are representing:

Error Report or Comment

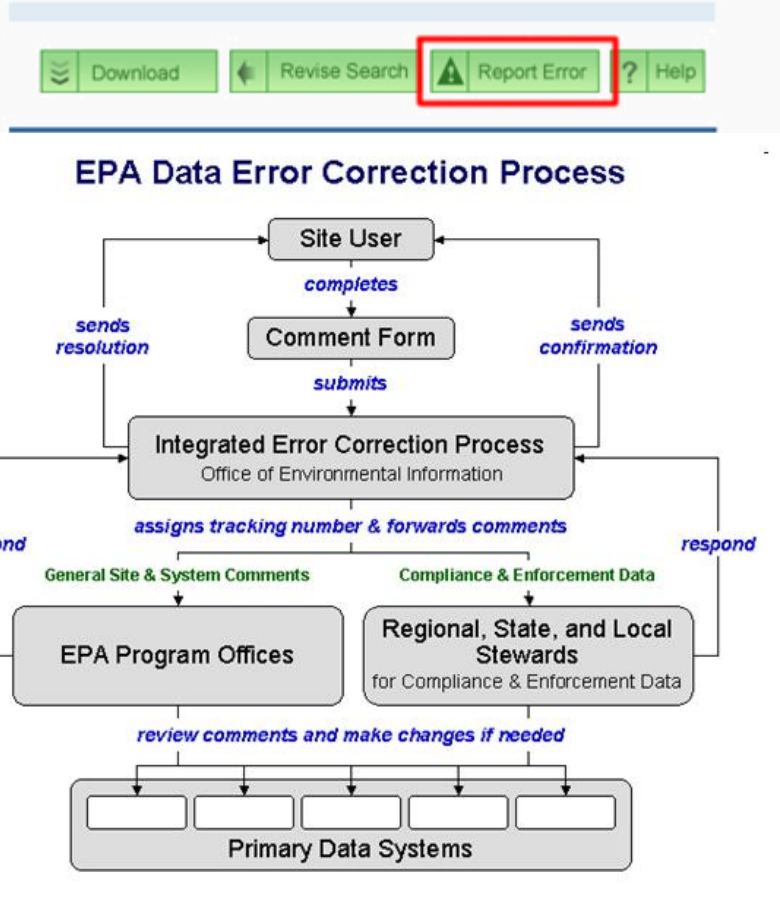
Enter your comment here about the information in the effluent report below. Please include enough information to allow EPA to identify the data in question and to evaluate your comment.

Submit Report Cancel

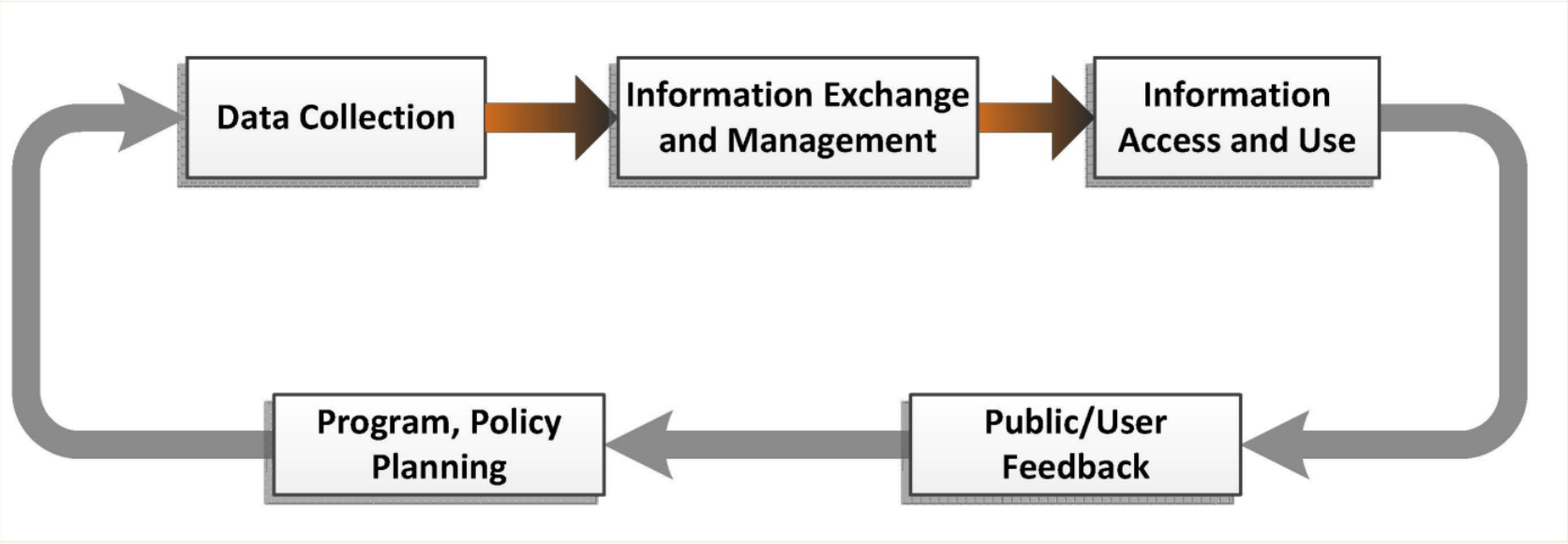
OASPUB Response:

Your Error notification was successfully transmitted.

We value your participation and attention to details. Your help allows EPA to achieve a high level of quality in its data collections.
We will keep you informed on the status of your error notification. Thank you!



An Environmental Information Lifecycle Analytical Framework



For Further Information:

Wayne Davis (davis.wayne@epa.gov)
Roy Chaudet (chaudet.roy@epa.gov)

USEPA Office of Environmental Information
Washington, DC USA
http://www.epa.gov/aboutepa/oei.html