New Technologies and Methods to Support Monitoring and Assessment

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Reston, VA

USGS

http://water.usgs.gov/owq/

New Methods and Procedures

- ✓Laboratory
- ✓Field

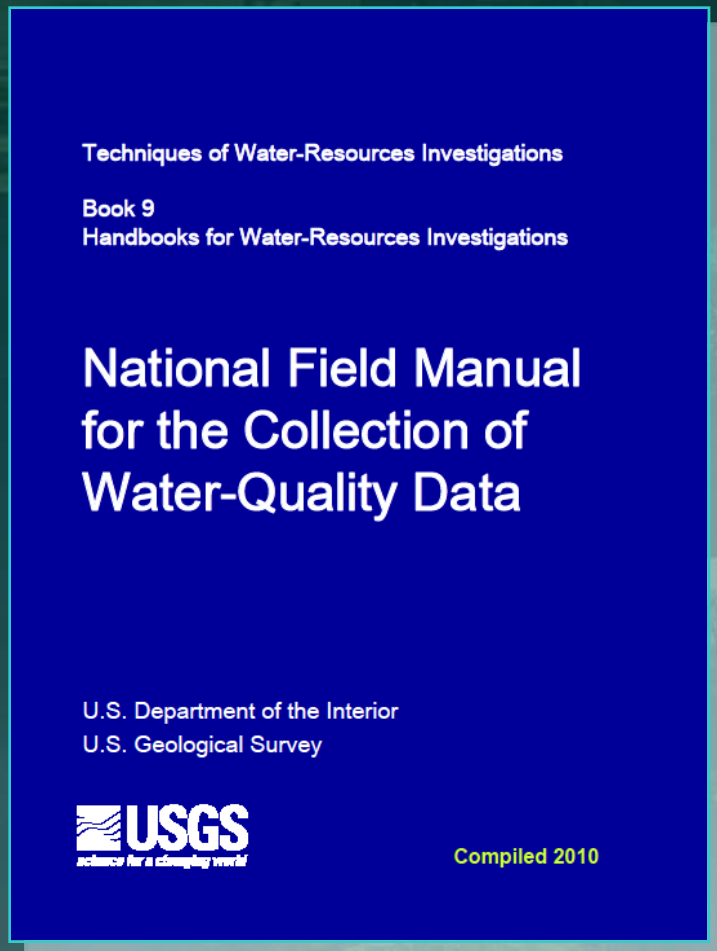
- ✓Faster
- ✓Better
- ✓Less Expensive
- ✓Greener

The NWQL Develops New Chemical Methods for Water Quality Monitoring

National Water Quality Laboratory (NWQL) Denver Federal Center

- High-use pesticides
- Pharmaceuticals
- Personal care products
- High production volume chemicals
- VOCs
- Water, Sediment, Biological Tissue

Standardized field procedures ensure the consistency of monitoring methods



- Sampling Lakes and Reservoirs Chapter coming soon
- Update to Groundwater Purging and Sampling to include detailed instructions for “low flow” “low purge” and “passive” sampling methods

Manual - http://water.usgs.gov/owq/FieldManual/
Fact Sheet http://pubs.usgs.gov/fs/2010/3121/

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Water Quality Response During Hydrologic Extreme Events

- New large river samplers fabricated, tested, and ready to be deployed
- Training for Flooded River Sampling
- National Flood Water Quality Response Plan

Mississippi River Floods of 1993, 2008, 2011, Hurricanes Katrina, Irene, Sandy, T.S. Lee

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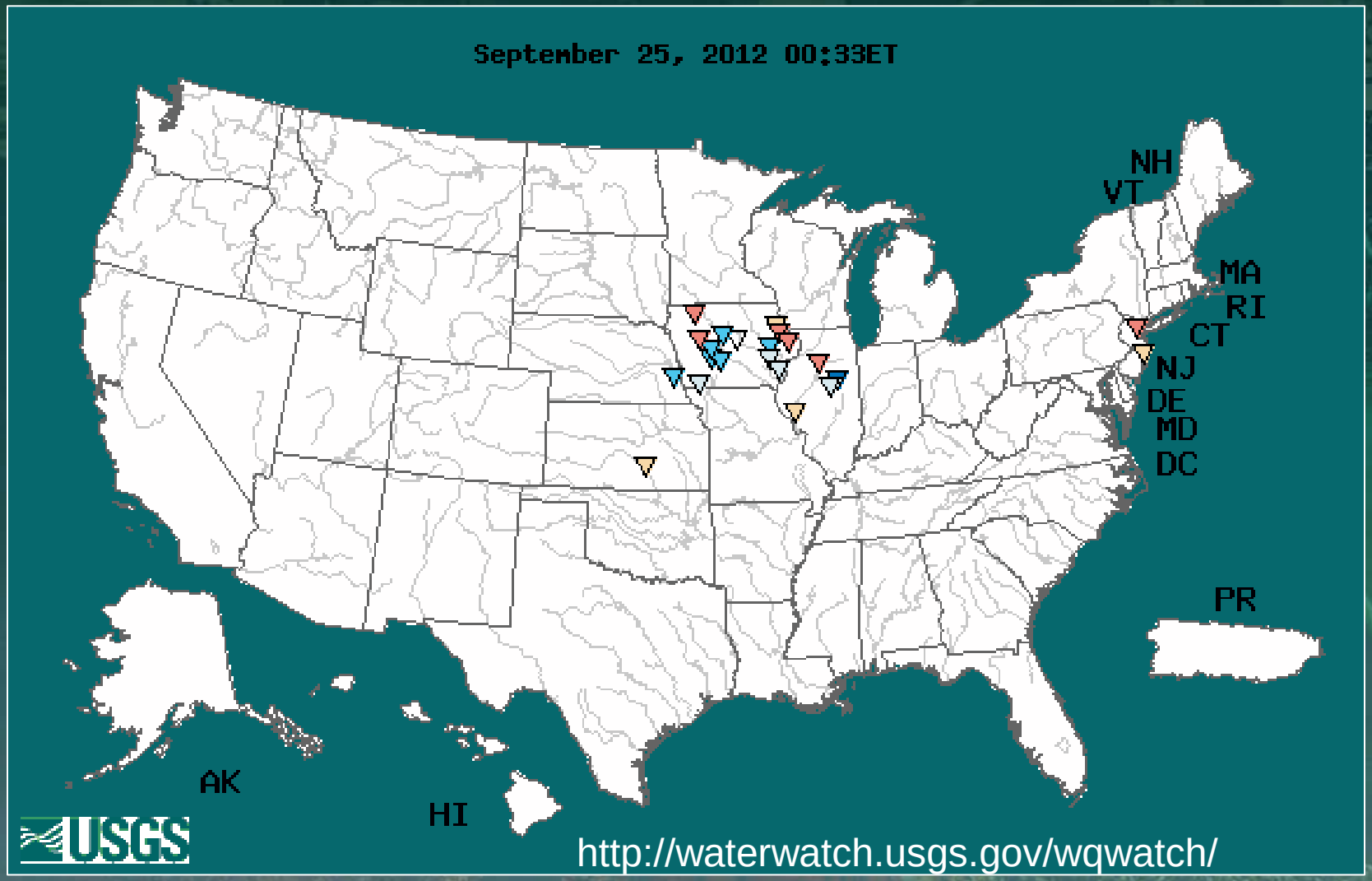
New Procedure for Real Time Nitrate Measurement



New Statistical Techniques and Models Extend Our Monitoring Knowledge to Unsampled Locations and Times

- Next Gen SPARROW watershed models
- Groundwater Quality Statistical Models
- New Statistical Techniques for Trend Analysis
- Need for new and refined approaches to estimate loads
- Technology Enabled Learning

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Data Bases and Applications

- **Develop New Applications in NWIS and NWIS-Web such as Water Quality Watch Page http://waterwatch.usgs.gov/wqwatch/**

- **Develop New Software for Processing Real Time Water Quality Data prior to release on NWIS-Web**

- **Game Changer - Water Quality Portal for NWISWeb and modern STORET in collaboration with National Water Quality Monitoring Council http://www.waterqualitydata.us/**

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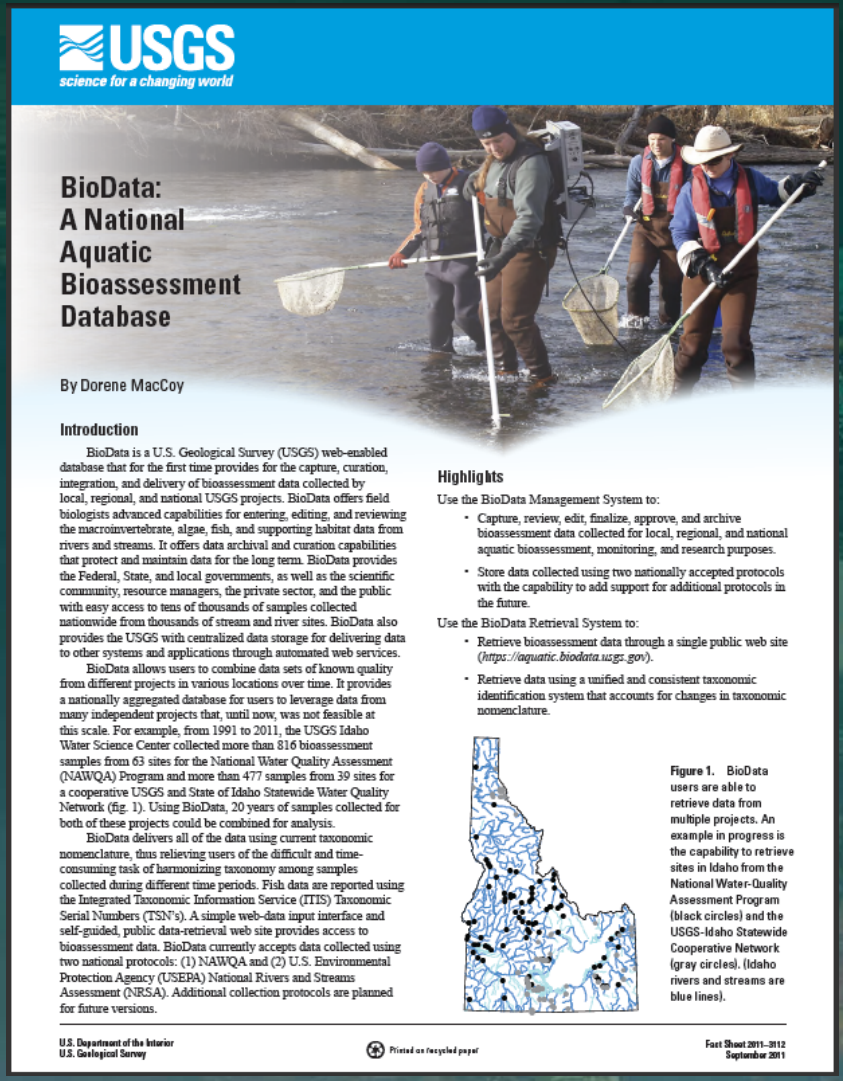
BioData

USGS Fact Sheet 2011-3112



USGS
science for a changing world

BioData: A National Aquatic Bioassessment Database

By Dorene MacCoy

Introduction

BioData is a U.S. Geological Survey (USGS) web-enabled database that for the first time provides for the capture, curation, integration, and delivery of bioassessment data collected by local, regional, and national USGS projects. BioData offers field biologists advanced capabilities for entering, editing, and reviewing the macroinvertebrate, algae, fish, and supporting habitat data from rivers and streams. It offers data archival and curation capabilities that protect and maintain data for the long term. BioData provides the Federal, State, and local governments, as well as the scientific community, resource managers, the private sector, and the public with easy access to tens of thousands of samples collected nationwide from thousands of stream and river sites. BioData also provides the USGS with centralized data storage for delivering data to other systems and applications through automated web services.

BioData allows users to combine data sets of known quality from different projects in various locations over time. It provides a nationally aggregated database for users to leverage data from many independent projects that, until now, was not feasible at this scale. For example, from 1991 to 2011, the USGS Idaho Water Science Center collected more than 816 bioassessment samples from 63 sites for the National Water Quality Assessment (NAWQA) Program and more than 477 samples from 39 sites for a cooperative USGS and State of Idaho Statewide Water Quality Network (fig. 1). Using BioData, 20 years of samples collected for both of these projects could be combined for analysis.

BioData delivers all of the data using current taxonomic nomenclature, thus relieving users of the difficult and time-consuming task of harmonizing taxonomy among samples collected during different time periods. Fish data are reported using the Integrated Taxonomic Information Service (ITIS) Taxonomic Serial Numbers (TSN's). A simple web-data input interface and self-guided, public data-retrieval web site provides access to bioassessment data. BioData currently accepts data collected using two national protocols: (1) NAWQA and (2) U.S. Environmental Protection Agency (USEPA) National Rivers and Streams Assessment (NRSA). Additional collection protocols are planned for future versions.

Highlights

Use the BioData Management System to:

- Capture, review, edit, finalize, approve, and archive bioassessment data collected for local, regional, and national aquatic bioassessment, monitoring, and research purposes.
- Store data collected using two nationally accepted protocols with the capability to add support for additional protocols in the future.

Use the BioData Retrieval System to:

- Retrieve bioassessment data through a single public web site (*https://aquatic.biodata.usgs.gov*).
- Retrieve data using a unified and consistent taxonomic identification system that accounts for changes in taxonomic nomenclature.

Figure 1. BioData users are able to retrieve data from multiple projects. An example in progress is the capability to retrieve sites in Idaho from the National Water-Quality Assessment Program (black circles) and the USGS-Idaho Statewide Cooperative Network (gray circles). (Idaho rivers and streams are blue lines).

U.S. Department of the Interior
U.S. Geological Survey

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- New USGS Approved Database means BioData is an authoritative source for USGS aquatic biological data

https://aquatic.biodata.usgs.gov/aboutUs.action

Emerging challenges in 2012-13

- Climate related:
  - Effects of wild land fire on watersheds and water quality
  - Drought and elevated seasonal water temperatures
    - Temperature alerts possible based on exceeding water-quality criteria for cold, cool and warm water fish
- Energy Related:
  - Methods for water quality monitoring related to unconventional oil and gas development (ASTM D18.26 Committee)

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