



NWQMC
NATIONAL WATER QUALITY
MONITORING COUNCIL

Working Together for Clean Water

Methods and Data Comparability Board

Water Quality Data Elements for Reporting Water Quality Monitoring Results

Water-quality monitoring data has become dramatically more accessible with the advent of the Internet. At the same time, budget constraints have forced many agencies and organizations to pool their monitoring resources. As a result, multiple users of data are expected, and data may be used to address both current (known) and future (unforeseen) questions. In the face of this emerging reality, it is critical that water-quality monitoring data be reported and stored with adequate documentation, i.e., data elements of information about the data (“metadata”). Data elements serve multiple purposes: some are essential to interpret the data; some are needed to share the data (i.e., to compare the data to other datasets and/or to pool different datasets for a common use); and some are critical for tracking electronic data exchange/transfers.

Data elements, or metadata, include information about:

- **Who** collected and analyzed the data
- **What** data were collected
- **Where** the data were collected
- **When** the data were collected and analyzed
- **Why** the data were collected, and
- **How** the data were collected and analyzed.

The Methods and Data Comparability Board and The National Water-Quality Monitoring Council are preparing lists of what are believed to be the necessary or “core metadata” to allow comparability assessments. The proposed lists are not a set of required information; rather, the use of these lists is recommended in order to help data collectors and database managers more effectively characterize their data and thereby facilitate and promote the use of those data by others.

The Water Quality Data Element (WQDE) Development Process:

January 1999 – Formation of work group: 17 members from 3 Federal agencies, 7 State agencies, and 7 private sector organizations.

June 1999 – Work begun in conjunction with the State/EPA Environmental Data Standards Council (EDSC).

April 2000 – Workshop held to refine list. Attendees include more than 50 representatives from local, State, and Federal agencies, and the private sector.

March 2001 – Revised draft list announced in the Federal Register. 45-day comment period ended on April 30th, 2001. Four public meetings were held during the comment period in Chicago, IL; San Francisco, CA; Denver, CO; and Washington, D.C.

May 15, 2001 – WQDE for Chemistry/Microbiology adopted by the Advisory Committee on Water Information (ACWI)

December, 2001 – Biology WQDE workgroup formed within the Methods Board

February, 2002 – First draft of WQDE for toxicity and population/community circulated for comment

May, 2002 – Draft WQDE for toxicity tests and population/community data presented at the National Water Quality Monitoring Conference in Madison, WI

May, 2004 – Revised WQDE for toxicity and population/community data presented and discussed at workshop during the National Water Quality Monitoring Conference workshop in Chattanooga, TN

May, 2004 – WQDE for toxicity and population/community approved by the National Water Quality Monitoring Council

November, 2005 – WQDE User Guide and revised WQDE for toxicity and population/community adopted by ACWI

Modular WQDE Concept

The broad metadata categories that characterize all types of data—who, what, where, when, why, and how—are being used to develop a modular WQDE approach that can be tailored to specific types of data. This modular approach allows the entire data element list to be divided into subsections (or modules) that can be developed independently as needed for different types of monitoring data (e.g., chemistry, field biological assessments). Some of the modules—contact (who), location (where), date (when), and objective (why)—are “universally” pertinent to all types of water quality monitoring data. Other modules—parameter sampled (what) and sample collection and analyses methods (how)—are often particular to the type of parameter being monitored and perhaps even the specific parameter.

Implementation of Water Quality Data Elements

A strategy has been developed to encourage wide use of the WQDE lists. Press releases, newsletters, and other outreach products will encourage the use of the data elements by focusing on three main points: (1) the data elements should be understood and used because they are an essential part of good practice in monitoring; (2) the data elements can reduce cost by extending the useful life of water quality data and by allowing the information they contain to be used by a wide audience; and (3) their use is not onerous, but some changes

in monitoring program procedures may be needed. Funding organizations will be encouraged to make the data elements a part of their grant requirements.

In addition, the Methods Board, in conjunction with the National Water Quality Monitoring Council, is involved in the following activities related to WQDE:

- Develop a User Guide for WQDE in monitoring programs that includes the WQDE lists adopted by the Advisory Committee on Water Information (ACWI) for chemical, microbiological, toxicological, and population/community (bioassessment) data.
- WQDE lists associated with physical habitat data are currently under development.
- Other WQDE are being considered for tissue analysis, sediment analysis and biomarker data.
- Working with the Environmental Data Standards Council (EDSC), which has developed the Environmental Sampling and Analysis Result (ESAR) data standard, based on the WQDE.
- Encouraging implementation of WQDE in several data exchange networks and state and interstate water monitoring programs.

Status of Water Quality Data Element development by type of monitoring data

[A = Approved; D = in Development; -- = not started]

Type of Monitoring Data	WQDE Module						
	Contact: Who	Parameter: What	Objective: Why	Date/Time: When	Location: Where	Sample Collection: How	Sample Analysis: How
Chemistry/Microbiology	A	A	A	A	A	A	A
Population/Community (Fish, Algae, Macroinvertebrates)	A	A	A	A	A	A	A
Toxicity	A	A	A	A	A	A	A
Habitat	A	D	A	A	A	D	D
Sediment/Tissue/Biomarkers	A	--	A	A	A	--	--

Additional information can be obtained through the Methods and Data Comparability Board’s Web site at:

<http://acwi.gov/methods/>

Information can also be obtained from the Methods Board co-chairs:

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