

National Ground-Water Monitoring Network

Tip Sheet on Standard Elements for Water Quality Data Web Services

[Background on Importance of Water-Quality Metadata](#)

Electronic data that are served through avenues such as the NGWMN are valuable because they can be used multiple times by many users and make the most of data collection resources being invested. Combining water-quality data from multiple sources can lead to valuable insights on the regional or national scale that would not otherwise be possible. This use of data beyond the original intent determined by the organization that collected the data is termed “secondary use,” and it is important to make sure data are well-documented with this use in mind.

Studies by both the [USGS](#) (Sprague and others, 2016) and EPA have revealed that data are commonly stored without supporting metadata elements, which prohibit a secondary data user from using the record for interpretation. Each monitoring organization understands their own data well, but issues arise when data are combined from with data from other organizations that may use different methods for reporting the same characteristics. Secondary data users make different assumptions about the same ambiguous data, potentially resulting in different conclusions about important water-quality issues. In order to make data from the NGWMN Data Portal more clear to secondary users, the NGWMN is providing this factsheet to specify how data is to be provided to the NGWMN.

The US EPA has recently published a [‘Best Practices’ document](#) for submitting Nutrient data to the Water Quality Exchange. This specifically addresses concerns with nutrient data and is a good source of information and guidelines for submitting any water-quality data to the NGWMN.

[NGWMN Requirements](#)

Water-quality data can be provided to the NGWMN using several different approaches that will provide the required metadata. In all cases, two additional web services will need to be set up to serve well construction and lithology data as required for the NGWMN. Data can be provided to the NGWMN in three different ways:

- Data providers may load the water-quality data into STORET using WQX web and load the sites into the NGWMN Well Registry using the Storet ID. This will provide the data to the NGWMN through the NWQMC Data Portal.
- Data Providers may also set up web services for water-quality data using the WQX standards available [here](#).
- Data Providers may also establish web services for water-quality data using XML web services as described in the Web Services Tip sheet.

The remainder of this Tip Sheet provides guidance for Data Providers setting up their own web services to provide data to the NGWMN.

Web services established for the NGWMN to serve water-quality data should have the following fields: Date of Sample, Time of Sample, Analyte Name, Analyte Value, Parameter Unit, Sample Fraction, Result Detection

Condition, Detection Limit, Method, and Analytical Method System. Requirements for what is contained in these fields are described below.

Date of Sample

Specify the date of Sample in the following format: YYYY-MM-DD

Time of Sample

Specify the time of the sample in military time: HH:MM:SS TZ (ie 23:50:00 MT). Valid Time zones are ET, CT, MT, PT, HAST, HST

Analyte Name

Characteristics or analytes should be provided using a consistent name so that data can be compared among different sources of data. The analyte names that should be used for the 'Standard List of Analytes' and the 'Extended List of Analytes' recommended for NGWMN water-quality sites as described in the NGWMN Framework Document are listed below. Analytes listed in categories under 'Optional Supplemental List of Analytes' should be from the list specified in this [spreadsheet](#) under the "Characteristics" tab.

It is important that method speciation, or how an analyte is reported as a chemical species, is identified. If one of your analytes is reported using a different speciation than that listed below, please select the proper analyte name (including the correct speciation) from the list of analytes in this [spreadsheet](#).

Standard List of Analytes:

- Temperature (water)
- pH
- Specific Conductance or Electrical Conductivity
- Water Level, Depth below land surface

Extended List of Analytes:

- Sodium
- Calcium
- Magnesium
- Potassium
- Chloride
- Alkalinity (total, as CaCO₃ or as HCO₃)
- Nitrate + nitrite (as nitrogen)
- Ammonia (as nitrogen or as NH₄)
- Orthophosphate (as P or as PO₄)
- Dissolved oxygen (DO, as percent or mg/L)
- Total dissolved solids
- Oxygen reduction potential (ORP)
- Iron
- Manganese

Analyte Value

The Analyte Value is the actual measurement for each characteristic. This is the numerical result, or concentration, of each characteristic. The units used should be specified in the 'Parameter Unit' field.

Censored data contain valuable information and should be stored with supporting metadata. If the result is below the detection limit, the Analyte Value should be 'Not Detected' and the 'Detection Limit' and 'Detection Limit Unit' fields should be populated.

Parameter Unit

Analyte values must be defined by a unit unless the value is typically not stored with a defining unit, such as pH value. A list of units that should be used in setting up web services are provided on this spreadsheet , on the 'Units of Measure' tab.

Detection Limit

If a value is reported as "Not Detected," provide the detection limit (which should be provided by the lab) in the Detection Limit Field and populate the 'Detection Limit Unit' field with the appropriate units.

Detection Limit Unit

Units for Detection Limit reporting

Sample Fraction

Sample Fraction is a description of the portion of the characteristic being analyzed. It is important to clearly define if the analysis has been performed on a whole water (unfiltered) sample or a dissolved (filtered). Please enter either 'filtered' or 'unfiltered' in the 'Sample Fraction' field.

Method

The result analytical method is the analytical procedure used by the lab for analyzing samples. The analytical method may clearly state if the analysis was performed on a whole water or dissolved sample. If available, the analytical method may allow the secondary data user additional insight into the final result value. Please populate the 'Analytical Method' field with a description of the method used.

Detailed information on analytical methods can be found at the [National Environmental Methods Index](#).

Analytical Method System

The source of Analytical methods system used to describe the Method above. Sources of methods are described in the [National Environmental Methods Index](#).