

INTEGRATED REPORT DATA SUBMISSION GUIDELINES

Pursuant to EPA's guidance and regulations, Utah's Division of Water Quality (DWQ) will actively pursue all water quality information and data for use in making impairment decisions. When possible, public notification of the data and information request will be made so that all data can be compiled by April of odd years, to provide staff sufficient time to compile and interpret the information to determine support of the designated uses assigned to Utah's waters. Numerous efforts will be made to ensure that interested stakeholders have the opportunity to submit water quality information to the state, including: e-mail notification, letters, phone calls, newspaper ads, and website notices. The public will have a minimum of thirty (30) days to submit water quality information to the state following the official newspaper announcement.

This broad solicitation of water quality information results in copious amounts of data, which intrinsically vary in scope and quality. For instance, both laboratory and field methods sometimes differ from those employed by DWQ, which can prohibit defensible analyses. Sometimes, QA/QC procedures are not clearly indicated in reports, which make it nearly impossible to scrutinize results. Finally, data submitted by outside entities is typically collected to answer questions other than beneficial use support because the spatial and temporal scope of the work makes it difficult to interpret in an assessment context.

DWQ encourages the submission of any data, reports, or water quality observations that can help us make more informed decisions. Even completely subjective water quality observations (e.g., fish kills, algal blooms) often help agency scientists interpret more-quantitative data. However, the specific manner in which the information is used to determine beneficial use support will vary with each submission. For instance, submission of chemical analytical results will not be treated any differently than data collected by DWQ, provided that we have sufficient information to evaluate data quality. Conversely, it is typically not possible to directly analyze data contained within research reports and papers due to ambiguity with regard to collection or analytical methods, in such cases DWQ will use the study conclusions as one piece of evidence when making final beneficial use support conclusions.

Biological and habitat data are extremely useful sources of information when interpreting aquatic life beneficial use support and likely causes for any impairment that is observed. However, both field and laboratory methods for these data are less standardized than they are for chemistry data. Differences among protocols complicate directly incorporating biological and habitat data obtained from different sources. As a result, it is often more useful for DWQ to receive summary data and information that interprets biological or habitat information in the context of aquatic life use support. In such cases, it is particularly important that ancillary information is supplied that describes how the data were collected and details of subsequent analyses. The scientific rigor employed to obtain information that describe the physical and biological integrity of waters varies extensively; DWQ will apply varying weights to information submitted based on the confidence we have with collection and analytical techniques, and our confidence that the data are representative of watershed conditions.

This document summarizes suggested data requirements, reporting elements, and interpretation methods commonly used by DWQ to determine beneficial use support. DWQ acknowledges that

it may not be possible to obtain all of the elements described in this document. In such cases, DWQ still encourages stakeholders to submit whatever information is available. Some submissions may lack sufficient information to directly augment assessment existing analyses, however the information will still be used qualitatively as DWQ weighs all of the information available to make a final determination of beneficial use support. If different sources suggest conflicting conclusions, then DWQ will place the site in question in category 3A (insufficient data and information) and prioritize these sites for subsequent monitoring to resolve the conflict. In all cases, DWQ will record the information submitted and provide a summary of how the information was used to make assessment decisions.

I. Important Metadata

Please provide as much metadata (data that describes data) as possible to ensure that DWQ places the highest possible weight on the information submitted when making beneficial use support decisions. The guidelines provided here are intended as a general guide. DWQ acknowledges that all of these data may not be available for a given study, nor are all of these elements appropriate for all types of data (i.e., chemical vs. biological, lakes vs. streams). For individuals or institutions who submit data on a regular basis, much of this information can be compiled once, with relatively simple updates of sample-specific information in future submissions. In all cases, please provide as much information as possible along with contact information so that DWQ can seek clarification needed to ensure that data are properly interpreted.

- A. Parameters Measured** - Describe each parameter contained in the dataset. This information should be as specific as possible, for example ammonia as nitrogen. For chemical and physical parameters, only those parameters listed or referenced in Standards of Quality For Waters of the State (DWQ, December 2001) will be considered for direct quantitative assessments of water quality, other parameters will be used as supporting evidence when making final assessment decisions.
- B. Value Measured** - Please include units of measurement for all parameters submitted. If results are less than the minimum detectable limit, it should be entered and identified as such. If the data summarize >1 measurement the summary method (e.g., arithmetic mean, geometric mean, median) and sample variability should also be reported.
- C. Sample Medium** - Describe the soil, water, air, biota (plants and animals), or any other parts of the environment that the data make reference to.
- D. Field Methods** - Provide as much detail as possible about the field methods that were used to collect the data. If the data were collected following documented field protocols, simply provide a copy of these methods along with the data.

For chemistry data, describe whether the data represent a single grab or composite of multiple samples. If the sample was a composite, describe how collection methods for individual samples and how individual samples were compiled,

For biological or habitat data, please provide any information that will help determine the comparability for data collected from other sources. For instance, for macroinvertebrate data it would be useful to know the sample area, habitat type, and net mesh size. Similarly, fish data should be accompanied with information that quantifies field effort (e.g., shocking time for data obtained from electrofishing) and details about fish collection protocols.

- E. Location** – A geographical location must be supplied with the data. The description should be sufficient for an individual location to be located on a 1:24,000 quadrangle map. Whenever possible provide a grid-based numeric description (e.g., latitude/longitude, UTM) with as much precision as possible.
- F. Time** – Note the date and time of sample collection. For time composite samples (i.e., data obtained from deployed probes) provide the beginning and ending times, and frequency of measurement.
- G. Personnel** – Provide contact information for individuals or institutions who can answer questions about field or laboratory methods.
- H. Data Source** - Quantitative site descriptors (i.e., physical and chemical parameters) should be submitted as a comma-delimited file with the following fields: site description, collection date, parameter one, parameter two, etc.
- I. Sample Accuracy and Precision** – Provide any information that can be used to evaluate the accuracy and precision of the data that are submitted. For instance, for chemistry data include any data related to applicable quality control programs (i.e., sample splits, blanks, spikes). Whenever possible, include quality descriptors such as method detection limit, precision and bias. Also, inclusion of analytical reference or method numbers greatly improves our ability to determine how to handle submitted data.

II. Quality of Data

For the most part, field collections following standard State or Federal field procedures, coupled with chemical analyses done in a state- or federally-certified lab, are of sufficient quality to allow standard beneficial use analyses. For instance DWQ routinely obtains and analyzes data collected and processed by the United States Geological Survey (USGS) and local municipalities. Data quality procedures for these programs are well-documented and DWQ has already conducted the work necessary to ensure sample comparability. For data collected following other, more specialized, field and laboratory protocols, please submit a copy of the field and laboratory methods used for collection and analyses.

- A. Representative Sample** – Assessments are intended to capture representative conditions of watersheds (Assessment Units) or for entire lakes and reservoirs. As a result, samples should be representative of the stream segment, lake, or reservoir. For instance, samples should generally not be collected directly from a point source plume. Instead, it is better

to collect the data once mixing has occurred downstream. Similarly, bias can occur if samples are collected from smaller streams segments in uncharacteristically good condition. If data are collected at a site that is not representative, but may inform decisions about watershed boundaries, please provide a description of why bias may be warranted in the context of assessing beneficial use support.

B. Age of Data – Beneficial uses assessments should reflect current conditions. Ideally, data submitted will be based on samples collected within the past five years. Data collected 5-10 years ago will be considered, if supporting documentation or information can be found to indicate that significant changes in hydrology or land use have not occurred since the samples were collected. Data older than 10 years will not be used to determine beneficial use support.

C. Acceptable Laboratory Methods –

For chemistry data, most standard laboratory methods are acceptable, provided that detection limits are below applicable numeric water quality standards.

The following documents provide procedures for the standard methods used to make water quality assessments:

1. *Standard Methods for the Examination of Water and Wastewater*
2. *EPA Methods for Chemical Analysis of Water and Wastes*
3. ASTM Standards, Part 31, Water
4. *EPA Biological Field and Laboratory Methods*
5. Code of Federal Regulations, Title 40, Part 2
6. Other Methods - EPA approved or determined by Division - acceptable for the purpose for which the data they generate are to be used.

Standard laboratory methods do not generally exist for chemistry and biological data. Nonetheless, different techniques can bias water quality interpretations. For instance, inferences of macroinvertebrate collections differ based on subsampling and the typical level of taxonomic resolution to which individuals are identified. For assessment purposes, laboratory methods for biological enumeration and identification do not necessarily have to be identical to those used by DWQ; however, these methods should be clearly identified.

III. Quantity of Data

The quantity of data—both number of sample locations and the number of samples at each location—that are needed to make scientifically rigorous decisions about beneficial use support depends on both sample variability and the magnitude of any water quality standard violations. In general, more samples are needed for highly variable data or relatively data that show relatively minor water quality standards violations. If the quantity of data is insufficient to make an assessment decision, DWQ will assess the site as 3A (insufficient data and information) and

work with our stakeholders to ensure that an assessment decision can be made in the next listing cycle.

All data submitted will be evaluated on a case-by-case basis to determine whether the quantity of data submitted is sufficient to determine beneficial use support. Nonetheless, the following section provides general guidance the quantity of data typically needed to minimize assessment errors.

A. Sampling Locations

If data are available or being developed to assist in assessing a stream segment, lake or reservoir, the quantity of data should be sufficient to be representative of the segment as a whole.

For streams, data from one location, multiple locations, or tributaries may all be valid for assessing quality and the beneficial use support of the segment, given the following criteria:

1. *Single Sampling Location* -Should be on the main stem preferably at a downstream site.
2. *Multiple Sample Sites* -Priority should be given to the main stem with multiple sites located on main stem between major influences (tributaries, dischargers) rather than the tributaries, lakes and reservoirs themselves. Inclusion of specific tributaries, lakes or reservoirs into the monitoring should be undertaken if the intention is to separate them out of an existing segment because it is suspected that they are of a different quality than the rest of the segment.

For lakes and reservoirs, it is often useful to have data collected from >1 location, especially for larger water bodies. At least one sample should be collected from the deepest portion of the lake or reservoir to best capture limiting conditions caused by lake stratification.

B. Number of Samples –

For streams and rivers, DWQ generally considers 10 or more chemical samples that have been collected routinely over a year or more from any segment to be sufficient to determine beneficial use support. Less than 10 samples can be used to make an assessment if conditions limit the ability to collect 10 samples, e.g. site is not accessible year round because of snow, rain, limited by float access and some other time limitations would be considered before using the data for assessment, etc. Where there is an abundance of data, only collected over the most recent five years will be considered to ensure that data are representative of present conditions. Where data are from more than one location within a watershed (AU) they may be combined to increase the sample size provided collection and analytical methods are comparable. For bacteriological data, a minimum of 5 samples collected over a 30-day period would be considered acceptable for recreation use support determination. For biological data, three yearly samples

collected in the same season are considered to be representative of the stream conditions, unless the magnitude of degradation shown by fewer samples is sufficient that it is unlikely that the degradation was the result of year-to-year sample variability.

For lake and reservoir, fewer collection dates are required to make an assessment, however one visit should occur during the most limiting conditions (generally late July through mid-September) when the water body is fully stratified. More important than the number of sample visits is the number of samples collected throughout the water column, it is often necessary to have samples from both the hypolimnion and metalimnion of the lake. Chemical data generally need to be placed in context of the vertical profile (typically temperature and dissolved oxygen) at the sample location. If the lake is not stratified, please provide evidence that this is the case and indicate the location in the water column where the sample was collected.