

APPENDIX A

AQUATIC LIFE USE (ALU) DATA QUALITY TABLES



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SURFACE WATER QUALITY BUREAU**

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Purpose and Applicability

This document contains the data quality and rigor information for aquatic life use determinations for which multiple data types are currently recognized and utilized. Tables 1 through 3 classify the data level or rigor of a data type by its technical components and describe the level of effort (spatial or temporal coverage) necessary to achieve each level as defined by EPA with minor modifications specific to the SWQB’s standard operating procedures and hydrologic environment (EPA 2002). Level 4 represents data of the highest rigor and the highest level of quality while Level 1 represents the lowest level of quality. Although the table structures imply that data at Level 2 (Fair) level of information, for example, would have the technical components, spatial/temporal coverage, and data quality listed for that data level, it is possible to have different levels of information for each of the three components. SWQB’s current standard MASS rotational survey levels are bolded in each table, and are a combination of Levels 3 and 4 depending on specific survey needs detailed in the associated Field Sampling Plan. Typically, data quality of level 3 or 4 is used to make listing determinations. Data with data quality levels of 3 or 4 are used to make listing determinations. Data with data quality level 2 may be used as supporting information or for planning, screening, or prioritizing further sampling. Data with data quality of level 1 will not be used to make designated use attainment decisions.

Table 1. Bioassessment data levels for evaluation of ALU attainment

LEVEL OF INFO	TECHNICAL COMPONENTS	SPATIAL/TEMPORAL COVERAGE	DATA QUALITY
1 LOW	Visual observation of biota; reference conditions not used; simple documentation	Limited monitoring; extrapolation from other sites	Unknown or low precision and sensitivity; professional biologist not required. Methods not documented.
2 FAIR	One assemblage (usually invertebrates); reference conditions pre-established by professional biologist; biotic index or narrative evaluation of historical records	Limited to a single sampling; limited sampling for site-specific studies; identifications to family level	Low to moderate precision and sensitivity; professional biologist may provide oversight Acceptable SOPs documented and followed
3 GOOD	Single assemblage usually the norm; reference conditions may be site specific, or composite of sites; biotic index (interpretation may be supplemented by narrative evaluation of historical records)	Monitoring of targeted sites during a single season*; may be limited sampling for site-specific studies; may include limited spatial coverage for watershed-level assessments; identifications to genus and species level	Moderate precision and sensitivity; professional biologist performs survey or provides training for sampling; professional biologist performs identification QA/QC protocols followed, QA/QC results adequate Approved SOPs used in field
4 EXCELLENT	Generally two assemblages, but may be one if high data quality; regional (usually based on index sites) reference conditions used; biotic index (single dimension or multi metric index)	Monitoring during 2 sampling seasons*; broad coverage of sites for either site-specific or watershed assessments; identifications to genus and species level; conducive to regional assessments using targeted or probabilistic design	High precision and sensitivity; professional biologist performs survey and identification QA/QC protocols followed, QA/QC results adequate Approved SOPs used in field

NOTES: *Seasons are defined as October – December, January – March, April – June, and July – September.

Table 2. Chemical/physical data levels for evaluation of ALU attainment

LEVEL OF INFO	TECHNICAL COMPONENTS	SPATIAL/TEMPORAL COVERAGE	DATA QUALITY
1 LOW	Any one of the following: <ul style="list-style-type: none"> Water quality monitoring using grab sampling Water data extrapolated from upstream or downstream station where homogeneous conditions are expected BPJ based on land use data, location of sources 	Low spatial and temporal coverage: <ul style="list-style-type: none"> Quarterly or less frequent sampling with limited period of record (e.g., 1 day) Limited data during key periods or at high or low flow (critical hydrological regimes) Data are >5 years old and likely not reflective of current conditions 	Approved QA/QC protocols are not followed or QA/QC results are inadequate Methods not documented Inadequate metadata
2 FAIR	Any one of the following: <ul style="list-style-type: none"> Water quality monitoring using grab sampling Rotating basin surveys involving single visits Synthesis of existing or historical information on fish tissue contamination levels Screening models based on loadings data (not calibrated or verified) Verified volunteer data 	Moderate spatial and temporal coverage: <ul style="list-style-type: none"> Bimonthly or quarterly sampling at fixed stations, or few data points (n<4) Sampling during a key period (e.g. fish spawning seasons, high and/or low flow) Stream basin coverage, multiple sites in a basin 	Low precision and sensitivity, data do not meet the method and detection limit requirements identified in the SWQB QAPP. QA/QC protocols followed, QA/QC results adequate Approved SOPs used for field and lab; limited training Adequate metadata
3 GOOD	Any one of the following: <ul style="list-style-type: none"> Water quality monitoring using grab sampling Rotating basin surveys involving multiple visits or automatic sampling Calibrated models (calibration data <5 years old) Limited use of continuous monitoring instrumentation Verified volunteer data 	Broad spatial and temporal coverage of site with sufficient frequency and coverage to capture acute events: <ul style="list-style-type: none"> Monthly sampling during key periods (e.g. critical hydrological regimes and fish spawning seasons); multiple samples at high and low flows; grab sample n ≥ 4 Period of sampling adequate to monitor for chronic concerns* Lengthy period of record for fixed station sites (sampling over a period of months) 	Moderate precision and sensitivity, data meet the detection limit requirements identified in the SWQB QAPP. QA/QC protocols followed, QA/QC results adequate Approved SOPs used for field and lab Adequate metadata Analytical sampling and analysis methods do not fall under 20.6.4.14.A NMAC
4 EXCELLENT	All of the following: <ul style="list-style-type: none"> Water quality monitoring using composite samples, series of grab samples, or continuous monitoring devices Follow-up sediment quality sampling or fish tissue analyses at sites with high probability of contamination 	Broad spatial coverage (several sites) and temporal (long-term, e.g. 5-years) coverage of fixed sites with sufficient frequency and coverage to capture acute events, chronic conditions, and all other potential chemical/physical impacts: <ul style="list-style-type: none"> Monthly sampling during key periods (e.g., spawning, critical hydrological regimes) including multiple samples at high and low flows Grab sample n>5 for radionuclides and organics, >8 for all others; continuous monitoring (e.g. use of thermographs, sondes, or similar devices) 	High precision and sensitivity, data meet the analytical method and detection limit requirements identified in the SWQB QAPP. QA/QC protocols followed, QA/QC results adequate Approved SOPs used for field and lab; samplers well trained Adequate metadata Analytical sampling and analysis methods fall under 20.6.4.14.A NMAC

NOTES: *See section 3.1.2.2 for additional information. The same data levels are used to make all designated use attainment decisions.

Table 3. Habitat data levels for evaluation of ALU attainment

LEVEL OF INFO	TECHNICAL COMPONENTS	SPATIAL/TEMPORAL COVERAGE	DATA QUALITY
1 LOW	Visual observation of habitat characteristics; no true assessment; documentation of readily discernable land use characteristics that might alter habitat quality; no reference conditions	Sporadic visits; sites are mostly from road crossings or other easy access	Unknown or low precision and sensitivity; professional scientist not required. Methods not documented.
2 FAIR	Visual observation of habitat characteristics and simple assessment; use of land use maps for characterizing watershed condition; reference conditions pre-established by professional scientist	Limited to annual visits non-specific to season; generally easy access; limited spatial coverage and/or site-specific studies	Low precision and sensitivity; professional scientist not involved, or only by correspondence Acceptable SOPs documented and followed
3 GOOD	Visual-based habitat assessment using SOPs; may be supplemented with quantitative measurements of selected parameters; data on land use may be compiled and used to supplement assessment	Assessment during single season usually the norm; spatial coverage may be limited sampling or broad and usually commensurate with biological sampling; assessment may be regional or site-specific	Moderate precision and sensitivity; professional scientist performs survey or provides oversight and training QA/QC protocols followed, QA/QC results adequate Approved SOPs used in field
4 EXCELLENT	Assessment of habitat based on quantitative measurements of in-stream parameters, channel morphology, and floodplain characteristics; usually conducted with bioassessment; data on land use compiled and used to supplement assessment; reference condition used as a basis for assessment	Assessment during 1-2 seasons; spatial coverage broad and commensurate with biological sampling; assessment may be regional or site-specific	High precision and sensitivity; professional scientist performs survey and assessment QA/QC protocols followed, QA/QC results adequate Approved SOPs used in field

REVISION HISTORY:

2016 listing cycle – Moved from Main AP Attachment A to separate appendix. Removed toxicological data level table because SWQB does not make impairment decisions based on toxicological testing. Clarified that chemical/physical of data quality 1, and biological or habitat data of quality 1 or 2, are not used to make designated use attainment decisions.

2018 listing cycle – Minor clarifications added to first paragraph.

2020 listing cycle – Clarified and added additional Data Quality components to each data type. Added chemical/physical data sampling and analysis reference to 20.6.4.14.A NMAC. Clarified that data of data quality 2 are not used to make impairment determinations.

REFERENCES:

U.S. Environmental Protection Agency (EPA). 2002. Consolidated Assessment and Listing Methodology (CALM): Towards a compendium of best practices. Office of Wetlands, Oceans, and Watersheds. Washington, D.C