2018/2020 303(d) Assessment Methods: Response to Public Comments

CITATION: DIVISION OF WATER QUALITY. 2018. UTAH’S 2018/2020 303(D) ASSESSMENT METHODS: RESPONSE TO PUBLIC COMMENTS. SALT LAKE CITY, UTAH. UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

## 2018/2020 303(d) ASSESSMENT METHODS: Response to Public Comments

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| Public Commenter: First Name | Public Commenter: Last Name | Public Comment Document ID | NEW FORM SORT ID | ATTACHMENT SORT ID | Public Comment to Respond To (UDWQ sometimes splits the original public comments to make sure each comment within a larger comment submission is addressed). | Action | DWQ's Response |
| Dan | Potts | DPotts\_12102018.pdf | 1 |  | Because "beneficial use" data may not be parametric in nature, non-parametric data (e.g. excellent, good, average, bad, extremely bad should also qualify as legitimate measures, even though they may not be necessarily numeric. | None. | DWQ evaluates qualitative data and other non-numeric types of information in the assessment process, provided they meet other aspects of data credibility and availability, as identified in tables 3, 5-9, and 10 of the assessment methods. These types of information are included in the assessment review process described in table 3 and the "Aggregation of Site-Specific Assessments to Assessment Unit Categories", "Secondary Review", and "Appendix 3" sections of the assessment methods. |
| Dan | Potts | DPotts\_12102018.pdf | 2 |  | Evaluation of HAB-produced off-flavor in fish (=poor taste, texture and odor), most commonly the result of cyano-produced geosmyn should be considered in ANY evaluation of "beneficial use" by the public, especially anglers who might be consuming those fish. The decades old channel catfish industry has used techniques to evaluate whether they can/should harvest commercially raised fish for the market from which water quality can (and should) utilize to help evaluate beneficial use (food fish) for the waters of Utah. Just because other states and the Fed have not yet successfully moved in this direction is no reason that Utah could not be the first to utilize an approach to truly assess beneficial use in this mostly non-parametric assessment way. If anglers simply cannot, or will not consume the fish they catch because of a problem of off-flavor then that water certainly cannot be deemed beneficial. | None. | Thank you for your suggestion. Objectionable tastes in edible aquatic organisms is a part of Utah's Narrative Standard and information regarding objectionable tastes may be submitted for consideration by DWQ under the assessment secondary review process (page 80) during the Integrated Report Call for Data. DWQ may consider the addition of methods specific to this type of assessment in the future. |
| Dan | Potts | DPotts\_12102018.pdf | 5 |  | Parametric "numerical" data are not likely to pick up this off-flavor compound regardless of DWQ's various assessment methods to evaluate HABs! Utah Lake provides an excellent example of this condition, where recurring HABs may be occurring in isolated areas protected from the wind (e.g. marinas and shallow protected areas of Provo Bay), however, fish lake wide continue to NOT suffer from any cyano-causing off-flavors that compromise their beneficial use as both sport and food fish! Let's get ahead of the crowd. | None. | Although DWQ's current HAB methods do not include aspects of fish taste, DWQ does consider qualitative data and other non-numeric types of information in the assessment process, provided they meet other aspects of data credibility and availability, as identified in Table 10 of the assessment methods document. These types of information are included in the assessment secondary review process described starting on page 80. DWQ may consider the addition of methods specific to this type of assessment in the future. |
| David | Richards | DRichards\_12042018.pdf | 6 | 35 | NARRATIVE STANDARDS: BIOLOGICAL ASSESSMENTS.  Page 46.  Comment: Based on the following paragraphs in the draft, I am not sure why macroinvertebrate O/E assessments are considered narrative. O/E is one number similar to a temperature or DO value. Perhaps O/E should be considered numerical criteria not narrative. | None. | DWQ is authorized by R317-2-7.3.c. to use quantitative biological assessment methods which are “documented methods that have been subject to technical review and produce consistent, objective and repeatable results that account for methodological uncertainty and natural environmental variability.” Narrative criteria are intended to capture threats to designated uses for which numeric criteria are not applicable. O/E in this context is a numeric translator that is used to assess narrative criteria objectives. |
| David | Richards | DRichards\_12152018\_v1.pdf | 7 | 36 | Page 46. Last sentence.  Comment: I would change wording to read ‘… DWQ uses an empirically based model’ not ‘empirical model’. | Clarified Methods text. | Thank you for this comment. The text was edited to reflect the commenter's suggestion. |
| David | Richards | DRichards\_12152018\_v1.pdf | 8 | 37 | Page 47. Last sentence, first paragraph.  Comment: Most importantly, macroinvertebrates are the designated beneficial use, "aquatic life in the food chain" and consequently need to be explicitly protected. Macroinvertebrates are secondarily a useful measure of conditions. | None. | Thank you for the comment. This is one important reason why DWQ chose to create an assessment method that directly measures aquatic life rather than an indirect measure such as chemical criteria. |
| David | Richards | DRichards\_12152018\_v1.pdf | 9 | 38 | Biological integrity is not a measurable attribute but an abstract idea (latent variable), similar to “human health”. Bioassessments do not quantify integrity, they are only an indicator. | None. | DWQ agrees with the commenter that O/E (or any biological assessment) is not biological integrity, but it is an important aspect of it. Indicators are needed to measure biological integrity because all aspects of this conceptual construct are impossible to quantify completely, particularly for statewide assessments conducted biannually. This does not, however, negate the utility of these indicators to accurately identify sites where biological degradation has occurred. A low O/E score is an indication biological degradation has occurred, inferring the stream is not meeting its biological integrity objectives, and needs to be further evaluated and restored. O/E may not measure all aspects of biological integrity, but the fact that the measure is incomplete does not negate the fact that problems revealed through this metric should be ignored. |
| David | Richards | DRichards\_12152018\_v1.pdf | 10 | 39 | Page 47. 4th sentence, second paragraph…. ‘absence of human-caused disturbance’.  Comment: Obviously, there are no waterbodies in UT that are absent of human-caused disturbance. Suggest rewording to read, ‘least impaired sites that could be limited or affected by the types of impairment not being evaluated or compared with’. | Clarified Methods text. | Thank you for this comment. DWQ agrees that there are no locations in Utah that are absent of human-caused disturbance. The phrase was used conceptually to describe the goal of the model. DWQ removed this phrase from the text and made changes to the section to better describe reference sites.. |
| David | Richards | DRichards\_12152018\_v1.pdf | 11 | 40 | Page 47. 4th sentence, third paragraph  Comment: There apparently are no direct, real world, reference site(s) to compare with the Jordan River, Green River, Colorado Rivers, or Utah Lake (and others). Only generalized, regionwide, summary, and averaged hypothetical reference sites. This absence of benchmarks makes O/E models highly questionable. For example, the Jordan River’s source is Utah Lake, a shallow remnant of Lake Bonneville, and its terminus is the Great Salt Lake. Historically the Jordan River had wide, meandering or sometimes braided channels that migrated across its valley. These conditions make the Jordan River a truly unique river and I assume there is no real-world reference river in the state, only reference conditions based on averaged watershed values. | None. | Each stream and river segment is unique; not just those the commenter identifies. RIVPACS uses real reference site data to estimate the most probable set of taxa that would occur at a given stream. In this sense, the model is heavily weighting reference sites that are physically/chemically similar to the assessed site when estimating the taxa that should occur (E). E is more than a general, hypothetical community that applies everywhere (unless a null model is used). Larger rivers offer more of a challenge to assess because they are more regional rather than isolated to a state. DWQ's model incorporates reference river locations from the intermountain west rather than being limited to Utah-based locations. In addition, DWQ runs a chi-square test to ensure that each assessed site fits within the bounds of the model. Sites that fail this test are not used in the assessment. For example, the Jordan River sites passed that test and were appropriate for this model and assessment. |
| David | Richards | DRichards\_12152018\_v1.pdf | 13 | 42 | The Green River downstream of Flaming Gorge Reservoir should not be considered a reference site if UDWQ has chosen to do so. The Green River is a highly regulated river and does not resemble its condition prior to construction of the dam. | None. | Larger rivers offer more of a challenge to assess because they are more regional rather than isolated to a state. There are also fewer large river reference sites, which further complicates model predictions. Therefore, DWQ's model incorporates reference river locations from the intermountain west rather than being limited to Utah-based locations to tackle these challenges. There are only a handful of undammed rivers in the intermountain west, but when reference sites on dammed rivers are used, such as this instance mentioned by the commenter, they are hundreds of miles downstream on well-regulated rivers. Again, “reference” in this sense, means least-impacted. It is well known that dams cause impacts to aquatic life and DWQ avoids sample collection, even for test sites, immediately below dams. |
| David | Richards | DRichards\_12152018\_v1.pdf | 14 | 43 | Of course, the Colorado River does not have any other river(s) to compare with in Utah and no hypothetical reference rivers and “E” scores should be used on such a national treasure. | None. | Each stream and river segment is unique; not just the Colorado River. DWQ’s model incorporates reference river locations from across the intermountain west and captures the range of watershed predicator variables sufficient to assess Colorado River samples collected thus far. |
| David | Richards | DRichards\_12042018.pdf | 15 | 44 | River Invertebrate Prediction and Classification System Models    Entire section.  Comment: There is no reason to justify using a single measure to describe highly complex biological integrity and report as one numeric index just to summarize into a single, easily interpretable number. Biological integrity/beneficial use is one of the main reasons DWQ conducts biological assessments, determines criteria, and sets regulations. UDWQ is mandated to protect beneficial uses, including aquatic life. To simplify biological integrity into one number just because it is easily interpretable (by who? DWQ trained biologists? Citizens of UT?) is a disservice to citizens of UT and is not the best protection criterion of our waterbodies. I do not know of any other state, federal, tribal, or county agency that relies solely on one biological assessment metric. Utah DWQ is the only one that does this, as far as I know. | None. | O/E is more than richness. It is sensitive to shifts in composition. Based on substantial stakeholder input, DWQ believes it is important that indices be easily interpretable. Ecological interactions can be complex, but assessment tools need not try to expose all of the complexity. From an aquatic life use support context, DWQ assesses whether aquatic life has been impaired. O/E is not biological integrity but an important aspect of it. Other measures such as indices based on tolerances are not measures of overall biotic integrity either. Most invertebrate-based indices are strongly correlated with one another, so they tend to capture the same signals (e.g., please review: Hawkins 2006 and Hawkins et al. 2010). Most importantly, when multi-metric indices are used for assessment purposes they are generally collapsed into one summary metric to simplify impairment determinations. It may be important to point out that O/E, MMI, etc., are indices of an ecological endpoint (biological integrity) that is otherwise very difficult to measure in full. To conduct detailed, full evaluations of ecological structure and function everywhere is unrealistic for a biannual, state-wide assessment process. However, once degraded waters are identified, it is possible to more thoroughly investigate those changes that have occurred to better understand alteration to biological assemblages and likely stressors contributing to the degradation. DWQ, in collaboration with many local entities, has identified the RIVPACS O/E index approach as the most scientifically defensible method for performing bioassessments for assessment purposes for Utah. The rationale for this decision is that RIVPACS models tend to be more precise and often more responsive to known stressors than other indices (e.g., please review Hawkins 2006, Hawkins et al 2010). Many states and countries have made a similar determination with respect to assessment decisions and principally use additional metrics for further exploration of impairments identified by O/E. |
| David | Richards | DRichards\_12042018.pdf | 16 | 45 | This eight-page section River Invertebrate Prediction and Classification System Models€  in the draft appears to be written primarily to justify the use of RIVPACS models by UDWQ. The draft states that Recently, many western states have adopted the RIVPACS model such as Colorado, Montana, and Wyoming. These States indeed use O/E models but the O/E metric is just one of many in a multimetric assessment program (see Table 1). To claim that these states also use O/E models leads the public to believe that UDWQ's use of O/E as a stand-alone metric is valid, which it is not.  Table 1. Some metrics used by other states Bioassessment metrics used by Montana (MDEQ 2016) Ephemeroptera taxa  Plecoptera taxa % EPT % Non-insect % Predator Burrower taxa % Hilsenhoff Biotic Index % EPT excluding Hydropsychidae and Baetidae % Chironomidae % Crustacea and Mollusca Shredder Taxa % Predator EPT taxa % Tanypodinae % Orthocladiinae of Chironomidae Predator taxa % Filterers and Collectors O/E  Bioassessment metrics used by Wyoming (Hargett 2011) Richness and Diversity Metrics % Chironomidae Taxa of Total Taxa % Diptera Taxa of Total TaxaX % Ephemeroptera Taxa of EPT Taxa % Ephemeroptera Taxa of Total Taxa No. Ephemeroptera Taxa No. EPT  No. EPT Taxa (less Arctopsychidae and Hydropychidae) No. EPT Taxa (less Baetidae, Arctopsychidae, Hydropychidae and Tricorythodes) No. EPT Taxa (less Baetidae and Tricorythodes) Shannon Diversity (E) Composition Metrics % Ephemeroptera (less Baetidae and Tricorythodes) % EPT (less Arctopsychidae and Hydropsychidae) % EPT (less Baetidae and Tricorythodes) % Tricorythodes of Ephemeroptera Life History Metrics  [reponse continued below] | None. | The justification is that RIVPACS models tend to be more precise and often more responsive to known stressors than other indices (e.g., please review Hawkins 2006, Hawkins et al 2010). Further, only one of the states the commenter identifies, Montana, uses additional metrics in support of O/E, but that process is used to assess sediment pollution specifically. DWQ's use of O/E is applied more broadly to the full suite of anthropogenic stress. |
| David | Richards | DRichards\_12042018.pdf | 16 | 45 | Ratio of Multivoltine Taxa to Unvoltine Taxa +Semivoltine Taxa Functional Feeding Group/Habitat Metrics % Clinger % Collector-gatherer % Filterer Taxa of Total Taxa % Scraper % Scraper Taxa of Total Taxa No. Burrower Taxa No. Predator Taxa No. Scraper Taxa Tolerance Metrics BCICTQa HBI No. Semivoltine Taxa  No. Univoltine Taxa  Bioassessment metrics used by Idaho (IDEQ 2011). % Chironomidae % clingers  % Ephemeroptera % Ephemeroptera and Plecoptera % filterers % EPT % EPT, excl. Hydropsychidae  % filterers (adjusted)  % Multivoltine  % non-insects % Predators % Scrapers % Tolerant % tolerant (adjusted)  Becks Biotic index  Clinger taxa (adjusted) EPT Taxa EPT taxa (adjusted) HBI (adjusted) Insect Taxa Non-insect % of taxa Non-insect % of taxa (adjusted) Scraper taxa Semi-voltine taxa Simpsons index Sprawler taxa Sprawler taxa (adjusted) Swimmer & Climber Taxa  Tolerant taxa O/E | None. | [see row above for response] |
| David | Richards | DRichards\_12042018.pdf | 17 | 46 | I don't agree that using a single taxon richness-based metric, RIVPACS O/E would constitute a robust index of biological integrity. It is only one metric that does not address anything other than richness and apparently does not do an adequate job of that (Richards 2016). | None. | O/E is more than richness. It is sensitive to shifts in composition. Based on substantial stakeholder input, DWQ believes it is important that indices be easily interpretable. Ecological interactions can be complex, but assessment tools need not try to expose all of the complexity. From an aquatic life use support context, DWQ assesses whether aquatic life has been impaired. O/E is not biological integrity but an important aspect of it. Other measures such as indices based on tolerances are not measures of overall biotic integrity either. Most invertebrate-based indices are strongly correlated with one another, so they do tend to capture the same signals (e.g., please review: Hawkins 2006 and Hawkins et al. 2010). Further, O/E, MMI, etc., are indices of an ecological endpoint (biological integrity) that is otherwise very difficult to measure in full. To conduct detailed, full evaluations of ecological structure and function everywhere is unrealistic for a biannual state-wide assessment process. |
| David | Richards | DRichards\_12042018.pdf | 18 | 47 | There is also no reason to make a ‘robust IBI’ easily interpretable. Ecological interactions between dozens of organisms and their responses to human caused impairment are anything but easily interpretable. RIVPACS O/E models themselves are not easily interpretable. The data and algorithms used in these models are extremely difficult to obtain and often not available, thus not transparent. Other metrics used by other agencies, such as taxa richness, functional feeding group, etc. are very transparent and easily calculable. | None. | Ecological interactions can be complex, but assessment tools need not try to expose all of the complexity. From an aquatic life use support context, DWQ assesses whether aquatic life has been impaired. O/E is not biological integrity but an important aspect of it. Other measures such as indices based on tolerances are not measures of overall biotic integrity either. Most invertebrate-based indices are strongly correlated with one another, so they do tend to capture the same signals (e.g., please review: Hawkins 2006 and Hawkins et al. 2010). Further, O/E, MMI, etc., are indices of an ecological endpoint (biological integrity) that is otherwise very difficult to measure in full. To conduct detailed, full evaluations of ecological structure and function everywhere is unrealistic for a biannual state-wide assessment process. |
| David | Richards | DRichards\_12042018.pdf | 19 |  | Arbitrary cut- off points, no statistical justification for choices in Decision Tree (Figure 7) or Use Determination (Table 13). Apparently mostly a best guess. | None. | Thresholds are derived based on an understanding of model error (which is based on actual field measures) and the specific values represent an attempt to balance type I (false positive) and type II (false negative) errors. This is a common dilemma for any regulatory agency in general and perhaps more so with those using biological data. DWQ has stated in the chapter the cost-benefit of ensuring that type I and II errors are appropriately balanced and not arbitrarily set. |
| David | Richards | DRichards\_12042018.pdf | 20 | 68 | Methods are lacking in the draft to evaluate biological integrity/aquatic beneficial uses. There are no zooplankton, benthic macroinvertebrate, or fish numeric or narrative metrics. Without such metrics, there likely is no possibility of evaluating whether biological beneficial uses are supported or not supported. A program needs to be started by UDWQ to develop robust multimetric biological assessments for lentic waters. | None. | O/E is not biological integrity but an important aspect of it. DWQ agrees that the development of biological assessment tools for additional assemblages would be useful and has taken preliminary steps to accomplish this task. Nevertheless, the use of O/E, which has been repeatedly demonstrated to be a robust indicator of biological degradation, provides a useful way to identify whether a site is biologically degraded. More nuanced evaluations of the nature and extent of this degradation can always be evaluated once biologically degraded sites are identified. To conduct detailed, full evaluations of ecological structure and function everywhere is unrealistic for a biannual state-wide assessment process. With respect to biological assessments of lentic ecosystems, DWQ has developed a MMI for impounded wetlands. In addition, many of the metrics used for the assessment of lakes and reservoirs are biological indicators of the condition of these ecosystems. Nevertheless, DWQ is open to expanding these approaches as resources permit. DWQ has participated in the national assessment of lakes and reservoirs and these data could potentially be used to expand the number of indicators used to assess lentic ecosystems. |
| David | Richards | DRichards\_12042018.pdf | 21 | 69 | In many instances UDWQ refers to cold-water vs. warm-water uses. Temperatures that exceed 20O C do not necessary mean impaired. It is possible that the water body is naturally a warm water fishery and may have been misclassified or that increased temperatures due to climate change have affected temperatures. This is a problem with stream assessments as well (e.g. Jordan River). | None. | As explained in UTAH’S NUMERIC CRITERIA AND BENEFICIAL USES section in the Assessment Methods, current data are compared to current water quality criteria in the IR process. If the current temperature criterion is 20⁰ C in R317-2 , Standards of Quality for Waters of the State, and the data exceed 20⁰ C, the water quality is impaired for temperature. An identified impairment is typically followed by more intense monitoring. One potential outcome of these investigations is that the beneficial use for a waterbody may be misclassified which can be corrected by a Water Quality Standards change. Standards changes are beyond the scope of the IR. Recommendations for use classification changes should be made to DWQ's water quality standards program (https://deq.utah.gov/water-quality/water-quality-standards). |
| David | Richards | DRichards\_12042018.pdf | 22 | 70 | There is also no reason for UDWQ to infer that a cold-water fishery is superior to a warm water fishery by stating that cold water uses are a higher use than warm water use. For example, UDWQ states their goal is to meet the highest attainable use. We need to get away from the idea that cold-water mountain streams and lakes have some greater innate value than lower elevation warm-water bodies. Global climate change may insure this, eventually. | None. | DWQ does not infer differences in value among aquatic life use classes. It appears that this is a general comment regarding beneficial use classifications which are out of scope for the IR. Water quality criteria to protect aquatic life uses may be more or less stringent from use class to use class depending on the sensitivity of organisms occurring in those use classes to various pollutants, but this does not imply higher or lower intrinsic value of various types of ecosystems. Recommended beneficial use or water quality standards changes should be directed towards DWQ's Standards program (https://deq.utah.gov/water-quality/water-quality-standards). |
| David | Richards | DRichards\_12042018.pdf | 23 | 71 | My overall conclusion is that the UDWQ 2018 Draft reflects a concerted effort by UDWQ to manage Utah's waters that are protective of biological integrity (and other uses) and is to be commended. | None. | DWQ appreciates your encouragement and feedback regarding the Integrated Report and the 303(d) assessment methods. |
| David | Richards | DRichards\_12042018.pdf | 24 | 72 | However, the draft is heavy on numeric -criteria based- measures such as DO and weak on how these metrics actually relate to biological integrity, the real measure of water quality as mandated by the Clean Water Act. | None. | The Clean Water Act (CWA) aims to prevent, reduce, and eliminate pollution in the nation's waters in order to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters"(emphasis added), as described in CWA section 101(a). In practice, the protection of chemical integrity involves regular assessments to determine whether or not numeric chemical criteria are violated. Some of these numeric criteria were established to protect aquatic life uses, so an evaluation of these criteria provides an indirect evaluation of biological integrity objectives. Sites that meet these criteria infer supporting aquatic life uses. Similarly, biological assessments are intended as another indicator of biological integrity objectives. As the commenter notes elsewhere, biological integrity is an abstract idea that cannot be measured directly or completely, so DWQ and other regulatory agencies depend on indicators that quantify important components of this CWA objective. |
| David | Richards | DRichards\_12042018.pdf | 25 | 73 | Finally, there seems to be no clear scientific or otherwise causal link between the numeric based metrics and the beneficial uses particularly biological, that UDWQ is evaluating. | None. | The biological assessment process is based on Utah's Narrative Water Quality standard. Applicability of the narrative standard is not wholly dependent on the specific beneficial uses ascribed to an individual waterbody. Nevertheless, from an aquatic life use support context, DWQ assesses whether aquatic life has been impaired. O/E is not biological integrity but an important aspect of it. Numerous studies have demonstrated that O/E can quantify biological degradation to a wide range of human-caused stressors, which provides confidence the metric as a robust measure of condition. More nuanced investigations of the nature and extent of the degradation that has occurred and the stressors that caused the degradation to occur can be evaluated once impairments are identified. |
| David | Richards | DRichards\_12042018.pdf | 26 | 74 | A few Recommendations and Suggestions  1. UDWQ needs to provide user-friendly public access to RIVPAC O/E and PRISM models. Transparency (repeatability) is a key component of scientifically validity. | None. | RIVPACS O/E scores have been, and will continue to be, made available with publication of the Integrated Report. The underlying models require additional information and some instruction to be used properly, so have traditionally been provided to interested stakeholders upon request. PRISM data are not proprietary and are freely available. They have been independently tested and validated. They are used by a very large community of scientists across a wide range of disciplines and are continually updated and corrected. Please contact DWQ’s Standard and Technical Services Section manager for public access to the RIVPAC O/E and PRISM models. |
| David | Richards | DRichards\_12042018.pdf | 27 | 75 | 2. Macroinvertebrates are the corner stone of biological integrity. As such, UDWQ should put much more effort into developing useful macroinvertebrate metrics in a multimetric assessment program that could include an O/E metric. | None. | At this time, DWQ has identified the RIVPACS O/E index approach as the most scientifically defensible method for performing bioassessment for purposes of identifying sites that experienced biological degradation. This does not preclude the use of other indicators of biological integrity or to provide insights into the nature and extent of any biologically degraded sites that are identified. Both multiple metric indices (MMIs) and O/E indices have potential strengths and weaknesses. Alternative biological assessment methods would require the same level of technical review and documentation that has been completed for the currently employed RIVPACS approach if they are to be used for assessment purposes. |
| David | Richards | DRichards\_12042018.pdf | 28 | 76 | 3. There is a need to include references or links in the draft to UDWQ field macroinvertebrate sampling protocols or add one or two sentences in the draft that include methods used such as riffle/run habitats, 8 composite samples, 600 organism subsample including large and rare, taxonomic resolution used, etc.  Literature Cited and Suggested Readings  Hargett, E. G. 2011. The Wyoming stream integrity index (WSII) multimetric indices for assessment of wadeable streams and large rivers in Wyoming. Wyoming Department of Environmental Quality. Cheyenne, WY.  Idaho Department of Environmental Quality. 2011. Biological assessment frameworks and index development for rivers and streams in Idaho. IDEQ. Boise, Idaho.  Jessup, B. Recalibration of the macroinvertebrate multi-metric index for Colorado. Colorado Department of Public Health and Environment. Water Quality Control Division. Denver, CO.  Jones, J. and J. Woods 2007 to 2010. A statewide assessment of Arizona's streams. Arizona Department of Environmental Quality.  Leitao, R. P. et al. 2016. Rare species contribute disproportionately to the functional structure of species assemblages. Proceedings of the Royal Society B: Biological Sciences. Vol. 283. Issue 1828.  Montana Department of Environmental Quality. 2008. An assessment of the ecological conditions of the streams and rivers of Montana using environmental monitoring and assessment program (EMAP) method. Montana Department of Environmental Quality. Helena MT.  New Mexico Environmental Department. 2006. Benthic macroinvertebrate stream condition indices for New Mexico wadeable streams. New Mexico Environmental Department. Santa Fe, New Mexico.  Nijboer, R. C. and A. Schmidt-Kloiber. 2004. The effect of excluding taxa with low abundances or taxa with small distribution ranges on ecological assessment. Hydrobiologia. Vol. 515 1:347-363. Pimm, S. L. et al. 2014. The biodiversity of species and their rates of extinction, distribution, and protection. Science. Vol. 344. Issue 6187. Review.  Richards, D. C. 2016. Real and Perceived Macroinvertebrate Assemblage Variability in the Jordan River, Utah can Affect Water Quality Assessments. Draft Technical Report. Submitted to the Jordan River/Farmington Bay Water Quality Council. Salt Lake City, UT. Oreohelix Consulting, Vineyard, UT.    [response continued below] | None. | The online location of the benthic macroinvertebrate collection Standard Operating Procedure (SOP), along with all IR relevant SOPs, is identified In the Data Quality section on page 30 in the IR methods.   Also, thank you for providing the literature references. These were helpful when reviewing your comments on the assessment methods. |
| David | Richards | DRichards\_12042018.pdf | 28 | 76 | Richards, D. C. 2016. Does Phylogeny Predict Sensitivity to Ammonia in Freshwater Animals using USEPA Ammonia Criteria Data? Submitted to the Wasatch Front Water Quality Council. Salt Lake City, UT. Oreohelix Consulting, Vineyard, UT.  Richards, D. C. 2016. Is Reliance on a Single Bioassessment Metric for Assessing Water Quality in Utah's Rivers and Streams Prudent? Draft Technical Report to Wasatch Front Water Quality Council. Salt Lake City, UT. Oreohelix Consulting, Vineyard, UT.  Stout III, Ben M. "River Continuum Concept as an Analytical Template for Assessing Watershed Health" Wheeling Jesuit University. 2003.  Thorp J.H., Delong M.D.: The Riverine Productivity Model: An Heuristic View of Carbon Sources and organic processing in large river ecosystems. In: Oikos 70 (2) :305-308. Blackwell, Oxford 70 .1994.  Turak, E. and K. Koop. 2003. Use of rare macroinvertebrate taxa and multiple-year data to detect low-level impacts in rivers. Aquatic ecosystem health and management. 167-175.  UDWQ et al. 2017. Utah and Colorado Water Survey for Mussels and Snails. Final Report. Original Draft-July 1, 2017. Revised Draft-.  Vannote R.L., G. W. Minshall, K. W. Cummins,Can. J. River Continuum Concept Fish. Aquatic Science. March 2005.  Vannote R.L., G.W. MINSHALL, K.W. Cummins, J.R. Sedell, C.E. Cushing: The River Continuum Concept. Canadian Journal of Fisheries and Aquatic Sciences. 37.1980,1 Ottawa, 130-137.  Ward J.V., J.A. Stanford: The Serial Discontinuity Concept of River Ecosystems. T.D. Fontaine, S.M. Bartell: Dynamics of Lotic Ecosystems. Science Publications, Ann Arbor Mich 29-42. 1983. | None. | [see row above for response] |
| David | Richards | DRichards\_12152018\_v1.pdf | 30 |  | I entered my responses in the electronic format by copying and pasting from Word document but it appears that the formats for headings, literature cited did not transcribe. Therefore, I am also submitting my comments as additional comments in the native Word format. Thanks! | Requested improvement on form functionality. | DWQ appreciates your feedback regarding the form's formatting issues and thanks you for using the electronic public comment submission form. Your notes regarding the form's formatting issues have been communicated to DEQ's Office of Planning and Public Affairs Web Manager and Specialists who are looking into whether or not special formatting can be accommodated in the form's text box properties. These comments are helpful for enhancing our forms for the next public comment period. |
| Marian | Rice | MRice\_12072018.pdf | 101 |  | This letter transmits comments from Salt Lake City Department of Public Utilities (SLCDPU) in response to the DRAFT 2018/2020 303(d) Assessment Methods. Salt Lake City (City) supports the Utah Division of Water Quality (DWQ) efforts to monitor assess, and protect the surface and ground waters of the state. Thus, we appreciate the opportunity to provide feedback and comment on the DRAFT 2018/2020 303(d) Assessment Methods. | None. | DWQ appreciates your encouragement and feedback regarding the Integrated Report and the 303(d) assessment methods. |
| Mark | Allen | MAllen\_11272018.pdf | 111 |  | In meetings with DWQ it has been stated that there are not any standards for heavy metals bonded with sediments that flow in high water years, into irrigation systems. There are standards for dissolved heavy metals in the water column, but we all know that the heavy metals that are not dissolved can end up in backyards via the irrigation system and then rain that is acidic can release these heavy metals. American Fork Canyon is particularly prone to this problem. Please create a standard to protect the public health from this known problem. | Out of scope. | Thank you for your comment. Sediment assessments are currently beyond the scope of the IR, although the Division continues to investigate potential sediment standards for heavy metal laden waters.   DWQ continues to work with the Utah Department of Health to ensure human health is protected with regards to potentially contaminated sediment in American Fork Canyon (see https://deq.utah.gov/destinations/updates-tibble-fork-reservoir-sediment-release-august-2016).   DWQ is also coordinating with the EPA to support the ongoing American Fork Canyon CERCLA Preliminary Assessment. Recommendations from PA are expected in 2019. |
| Mark | Allen | MAllen\_11272018.pdf | 112 |  | Please put in place measures to dredge the heavy metals that are still in Tibble Fork Reservoir. | Out of scope. | DWQ appreciates the comment and underlying concern; however, this comment is not within the scope of the IR. DWQ continues to work with the Utah Department of Health to ensure human health is protected with regards to potentially contaminated sediment in American Fork Canyon (see https://deq.utah.gov/destinations/updates-tibble-fork-reservoir-sediment-release-august-2016). DWQ is also coordinating with the EPA to support the ongoing American Fork Canyon CERCLA Preliminary Assessment. Recommendations from Preliminary Assessment are expected in 2019. |
| Mark | Allen | MAllen\_11272018.pdf | 113 |  | Please put the discharge permit that was promised 2 years ago to the outflows of the Yankee Mine and address the problems with the Globe Mine complex at the headwaters of American Fork River. | Out of scope. | DWQ appreciates the comment and underlying concern; however, this comment is not within the scope of the IR. Please contact the DWQ Surface Water Utah Pollutant Discharge Elimination System Section Manager for more information at https://deq.utah.gov/legacy/permits/water-quality/utah-pollutant-discharge-elimination-system/index.htm). |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 114 |  | EPA recommends that UDEQ include a link to the State's Vision Document. | Clarified Methods table. | DWQ appreciates the feedback and added a hyperlink to the "Assessment Category Description" for the 5-alt EPA assessment category in Table 1 of the assessment methods. DWQ did not include a section in the assessment methods document on Utah’s prioritization of the 303(d) list as this was out of scope for the IR. For more information on the Prioritizing Utah's 303(d) List, please see https://deq.utah.gov/legacy/programs/water-quality/watersheds/docs/2016/303d-list-for%20tmdl-development.pdf |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 115 |  | The list of required data elements under 305(b) Summary and 303(d) Assessment Results is not consistent with EPA guidance document. EPA recommends deleting the lists and pointing the public to the ATTAINS website. | Revised Methods text. | DWQ appreciates the comment and suggestion to simplify the "Developing the Components of the Draft Integrated Report and 303(d) List" section of the assessment methods. For this reporting cycle, DWQ decided to keep the bulleted list for the current assessment methods and will review whether to simplify this section in a future assessment method document. To ensure the current language does not conflict with the 2018 guidance document (https://www.epa.gov/tmdl/integrated-reporting-guidance-under-cwa-sections-303d-305b-and-314) and 40 CFR 130.7 (b)(6), DWQ added the following language to the "Developing the Components of the Draft Integrated Report and 303(d) List" section:  305(b) Summary  At a minimum, this summary will address the following elements for current assessments (and previous assessments where new data and information did not result in an EPA-defined categorical change):  303(d) Assessment Results  At a minimum, the following information will be provided for current assessments (and previous assessments where new data and information did not result in an EPA-defined categorical change):  305(b) and 303(d) Assessment Data and Information To support DWQ’s decision to list or not list waters, DWQ will provided (at a minimum) the following supporting information and documentation as referenced in CFR 130.7 (b)(6): • A description of (or access to) the data records and information used in the IR’s current period of record, • A rational for (and access to) any data and information that was obtained or submitted to DWQ during the call for data but did not meet DWQ’s readily available or credible data requirements and was not used for 305(b) and 303(d) assessments, and  • A rational for (and access to) any rejected data records and information |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 116 |  | Table 6. Does UDEQ have validation criteria for high frequency datasets other than dissolved oxygen? | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | For the 2018/2020 IR, DWQ is focusing only on assessing high frequency data for dissolved oxygen. This decision is based on: (1) the foundation that was laid out in Chapter 7 of the 2016 IR, and (2) our commitment made in the 2016 IR response to public comment process to scale the Chapter 7 pilot study for assessing high frequency data on the Jordan River to all assessed waterbodies of the State in the 2018/2020 303(d) Assessment Methods and IR. Currently, DWQ has not yet developed assessment methods for other parameters with high frequency data. DWQ welcomes EPA (and others) to provide any studies or examples from other states that assess high frequency data. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 117 |  | Table 8. Has UDEQ considered expanding this table for macroinvertebrate data to include the list of requirements to parallel the list of requirements for toxics and other conventional parameters? For example, include in this table the following information: number of organisms counted and level of taxonomic resolution. | Clarified Methods table. | DWQ appreciates EPA's suggestions to clarify what the credible data requirements are for 305(b) and 303(d) assessment purposes. To be consistent with the SOP submission requirements communicated in the "Standard Operating Procedures Guidelines and Examples" section of the methods, DWQ added a QAPP column to Tables 5-8. The QAPP discusses subsample organism counts and taxonomic resolution. Also, we added an essential metadata element across all data types including macroinvertebrates to further ensure consistency. DWQ will continue to seek ideas to align requirements in the next IR cycle without causing unintentional and unnecessary burden to organizations submitting data. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 118 |  | Please clarify what is meant by water years? | Clarified Methods text. | DWQ uses the same definition as the U.S. Geologic Survey (https://water.usgs.gov/nwc/explain\_data.html) and defines the water year as the 12-month period between October 1 and September 30 of the following year. As an example, a 2018 water year begins on October 1, 2017 and ends on September 30, 2018. This clarification has been added to the Period of Record section of the methods. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 119 |  | EPA recommends including the actual water quality criteria in the table. | Clarified Methods table. | To reduce errors and avoid inconsistencies in information between multiple documents and files, DWQ is working towards minimizing the duplication of data and information in the division’s files. Beginning with the 2016 IR, DWQ started using hyperlinks to direct readers to the primary document or source of information to ensure that users were referring to the most current and accurate information. DWQ has continued this practice in the 2018/2020 303(d) Assessment Methods. To better assist users of the assessment methods, DWQ added hyperlinks to the numeric criteria in UAC R317-2 in Table 2 of the 303(d) Assessment Methods . |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 120 |  | Has UDEQ considered assessing the 30-day average with high frequency dissolved oxygen data? | None. | For high frequency dissolved oxygen (DO) data, DWQ assesses three dissolved oxygen criteria independently of each other (i.e., the minimum, 7-day average, and 30-day average). The 30-day average minimum DO assessment for high frequency data is outlined in Figure 5 of the Assessment Process section of the assessment methods and is described in more detail under Figure 4's caption. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 121 |  | Does UDEQ have a process to assess turbidity data? | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | Currently, DWQ does not have an assessment method process for assessing Utah's water quality standard for turbidity. The criteria is expressed as a change in turbidity. The difficulty in establishing an assessment methodology lies with the inability to establish an appropriate baseline from which to evaluate the change in turbidity. DWQ implements the turbidity standard in Section 401 water quality certifications by limiting turbidity increases in receiving waters caused by activities covered under those permits to 10-15 NTU's. As briefly noted in Table 6 of the assessment methods, DWQ is working towards developing methods for high frequency data, including temperature and pH. As DWQ moves forward with the development of high frequency data assessment methods and research studies specific to temperature and pH, DWQ will review turbidity as well. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 122 |  | Figure 2. EPA recommends UDEQ delete this figure. When assessing all designated uses more than just conventional pollutants should be considered. | None. | When evaluating the impacts of measured pollutant concentrations on environmental and human health for 305(b) and 303(d) assessment purposes, DWQ assesses and reports every beneficial use with numeric criteria that has credible and readily available data. DWQ does not assess just the most environmentally protective criterion and/or use for a parameter and IR waterbody type. For more information on how DWQ assesses non-conventional pollutants, please refer to the following sections in the assessment methods: "Narrative Standards: Biological Assessments", "Assessments Specific to Lake, Reservoirs, and Ponds", "Toxics Parameter Assessment for All Waters", "Escherichia Coli Assessment for All Waters", "Pollution Indicator Assessments of All Waters", and "Narrative Standards for All Waters". |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 123 |  | Data Sufficiency. EPA recommends that UDEQ reconsider greater than or equal to 39 complete days of contiguous data. This approach is a significant data requirement and DO could be assessed against the daily minimum criterion or 7-day average which require less data. | None. | DWQ appreciates the feedback and concerns regarding the method's "High Frequency Assessments for Dissolved Oxygen" section and Figures 3-5. The original intent of requiring ≥39 complete days of contiguous data within the period of record was to ensure that the 30-day, 7-day, and daily minimum criteria could all be fully assessed. However, after review of the publicly submitted comments, DWQ understands how this may have been miscommunicated as a significant or restrictive data requirement and prevent data submissions for further evaluation in 305(b) and 303(d) assessments. DWQ agrees with the commenter that 39 contiguous days of high frequency dissolved oxygen (DO) data are not needed to fully assess the 7-day average minimum DO criteria. DWQ reviewed the original language and removed the ≥39 day requirement from the "Data Sufficiency" section. The section now reads, "To ensure that daily minima are captured and that daily averages can be accurately calculated, high frequency data must capture complete days. DWQ defines a complete day as a calendar day (i.e. 12:00 am – 11:59 pm) in which at least one measurement is made in each hour. Incomplete days will not be included in the high frequency DO assessment."   DWQ also removed the ≥39 day requirements in Figures 3 and 4. Instead, data are considered sufficient for assessment if at least ten daily minima or 7 or 30 day averages can be calculated over the period of record. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 124 |  | Figure 3. In the box that starts with, calculate the daily, EPA recommends that UDEQ consider specifying that either the 7-day or 30-day averages could be calculated with continuous data. | None. | DWQ appreciates the comment and suggestion to help further clarify the high frequency dissolved oxygen (DO) assessment process and figure. However, after further review DWQ decided to keep the Assessment Process figure as is. For 305(b) and 303(d) reporting purposes, DWQ assesses each minimum DO criterion independently of one another. To help communicate that decision clearly to reviewers and users of the assessment methods, DWQ prefers not to reference the other high frequency DO criterion or assessment processes in Figure 3. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 125 |  | Figure 4. Has UDEQ considered completing the assessment outlined with fewer days using continuous dissolved oxygen data? See comment submitted for Page 43. | None. | DWQ appreciates the feedback and concerns regarding the method's "High Frequency Assessments for Dissolved Oxygen" section and Figures 3-5. The original intent of requiring ≥39 complete days of contiguous data within the period of record was to ensure that the 30-day, 7-day, and daily minimum criteria could all be fully assessed. However, after review of the publicly submitted comments, DWQ understands how this may have been miscommunicated as a significant or restrictive data requirement and prevent data submissions for further evaluation in 305(b) and 303(d) assessments. DWQ agrees with the commenter that 39 contiguous days of high frequency dissolved oxygen (DO) data are not needed to fully assess the 7-day average minimum DO criteria. DWQ reviewed the original language and removed the ≥39 day requirement from the "Data Sufficiency" section. The section now reads, "To ensure that daily minima are captured and that daily averages can be accurately calculated, high frequency data must capture complete days. DWQ defines a complete day as a calendar day (i.e. 12:00 am – 11:59 pm) in which at least one measurement is made in each hour. Incomplete days will not be included in the high frequency DO assessment."   Instead, data are considered sufficient for assessment if at least ten daily minima or 7 or 30 day averages can be calculated over the period of record. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 126 |  | Does UDEQ give additional weight to continuous dissolved oxygen data compared to grab samples? | None. | DWQ recognizes the importance of diurnal variation in water quality parameters, particularly dissolved oxygen, and is actively expanding its capacity to collect and analyze high frequency data with sonde deployments in waterbodies throughout the state. However, this effort is resource intensive, and it is not currently feasible to deploy high frequency sondes at all monitoring locations. As such, DWQ assesses all available data for this parameter, including instantaneous measures. As discussed in the "Analyzing Multiple DO Datasets at a Site" section of the 303(d) assessment methods, DWQ assesses instantaneous and high frequency measurements independently of each other and follows the aggregation and secondary review process described in "Determinations of Impairment: All Assessment Units" and "Appendix 3". The same level of secondary review is applied when reviewing delistings. If during the secondary review, DWQ applies additional weight to instantaneous or high frequency dissolved oxygen data, a secondary review rationale with supporting documentation is provided during the draft IR public comment period and submission to EPA for final review. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 127 |  | Does the RIVPACS model apply to larger non-wadeable streams? | None. | Larger rivers offer more of a challenge to assess because they are more regional rather than isolated to a state. DWQ's model incorporates reference river locations from the intermountain west rather than being limited to Utah-based locations to ensure that the model is applicable to as many non-wadeable streams as possible. In addition, DWQ runs a chi-square test to ensure that each assessed site fits within the bounds of the model. If a larger river is sufficiently dissimilar from these larger river reference sites then chi-squared test would fail and assessments would not be conducted. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 128 |  | Has UDEQ updated the RIVPACS model since 2002? | None. | DWQ periodically updates the model once a sufficient number of reference sites have been sampled to increase the likelihood that the model can better differentiate between different types of streams located throughout Utah. The most recent update occurred in 2012. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 129 |  | Figure 7. The line from the top left diamond has a Yes going to Beneficial Use Not Supported. Should this line indicate No and point to the diamond that says Do at least 2 O/E samples score <0.69.   The line between the top two diamonds should indicate Yes, and the arrow should point to is the average O/E score >.76. | None. | This figure is as intended and correct as applied. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 130 |  | Table 13. Figure 7 and Table 13 do not appear to align. EPA recommends modifying the scenarios in the table to align with Figure 7.   The scenario in the third row of the table should read insufficient data.   Please clarify the last scenario in this Table. | Clarified Methods table. | Figure 7 and Table 13 do align correctly. However, the row that identified a scenario when < 3 samples with a mean O/E score ≥ 0.76 as fully supporting is redundant and potentially confusing, so it was removed. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 131 |  | Page 56 indicates that if 10% of the DO measurements are below the criterion, the standard is exceeded. Shouldn't the left column also apply to dissolved oxygen instead of the >50% water column exceedence? | Corrected error. | Thank you for identifying the error in Figure 8. The figure has been updated to 10%. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 132 |  | Recommend moving Figure 14 up to follow Figure 8. | None. | Figure 14 describes the tier II lakes assessment process and follows the text and figures that describe the tier I assessment processes. As readers may find it confusing to jump to the tier II assessment process without going through the tier I assessment process, DWQ is maintaining the current position of the figure. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 133 |  | pH. Is the outlined process the same for both lakes and streams? If so, should these indicators be referenced in the stream section? | None. | The processes for pH assessment for lakes and streams are separate processes. pH assessments in streams are conducted following the streams 'Conventional Parameter Assessments' process described on page 40. Lake pH assessments follow the profile assessment process described on pages 54-55. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 134 |  | EPA suggests removing Figures 9 and 10 and simply indicate that pH, temperature, and dissolved oxygen are assessed using profile data. | None. | DWQ believes that these figures provide useful examples of what profile data are and how they are used in the assessment process and is retaining them for this IR cycle. DWQ will consider improvements or clarifications to these figures in future cycles. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 135 |  | Streams and Lakes and Reservoirs.     \* Should this section only reference Lakes and Reservoirs. | None. | DWQ is unclear what section the commenter is referring to. The "Assessments Specific to Lakes, Reservoirs, and Ponds" section does not include any methods which are applied to rivers or streams. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 136 |  | \* Assuming the only difference between the assessment process for mixed vs. stratified systems is the approach to dissolved oxygen, EPA suggests revising this section as follows: 1) describe the process for interpreting pH, 2) describe the process for analyzing dissolved oxygen and temperature for mixed lakes, 3) describe the process for analyzing dissolved oxygen and temperature for stratified lakes, 4) discuss Tier 2 analysis. | Clarified Methods text. | DWQ agrees with the order of information suggested in the comment. The process is generally described in the order recommended. However, the section headers are somewhat confusing. The pH assessment process applies to both stratified and non-stratified profile assessments. The difference between the assessment process for stratified and non-stratified profiles is the use of a joint assessment of temperature and dissolved oxygen in the stratified profiles. The headers were reorganized to clarify the process. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 137 |  | Figure 11. Does this figure refer to at least 3 continuous meters meeting the dissolved oxygen criterion? | Clarified Methods figure. | The text, "Is an adequate habitable zone for aquatic life present?" in Figure 11 refers to the presence of at least 3 continuous meters in the water column meeting both dissolved oxygen and temperature criteria. The text in the figure has been updated to better correspond to the text and clarify the assessment process. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 138 |  | Figure 11. Recommend explaining the process separately for evaluating dissolved oxygen and temperature data. | None. | Figure 11 describes the process for jointly assessing dissolved oxygen and temperature under stratified lake conditions. The separate evaluations for dissolved oxygen and temperature conducted under mixed conditions are described in the preceding section under the headers 'Mixed Lake and Reservoirs': 'Temperature' and 'Dissolved Oxygen'. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 139 |  | Figure 12 explanation. EPA recommends clarifying this explanation to more clearly communicate that Panel B is not meeting the designated use because of temperature and not dissolved oxygen. Without knowledge of the state's assessment process a reader may not understand as written. | Clarified Methods figure. | Panel B in Figure 12 is not meeting aquatic life uses because: although there are regions in the water column where dissolved oxygen and temperature criteria are met separately, the region of overlap in the water column where both temperature and dissolved oxygen criteria (approximately 8 meters depth) is less than 3 meters thick. This has been clarified in the figure caption. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 140 |  | Figure 13. Please explain UDEQ's rationale for requiring a two-sample requirement for TDS as a minimum dataset compared to other parameters that require 10 samples? | None. | DWQ's minimum data requirements for TDS assessments in lakes reflect the frequency of sampling typically conducted under DWQ's lake monitoring program. Sampling frequencies tend to be higher for stream monitoring, so a higher minimum data requirement of 10 samples is applied to streams conventional assessments. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 141 |  | Figure 14. Under the first diamond, should the line have a no? | Corrected error. | Yes. The arrow directly under the first diamond should be labeled "No". This label has been added to the figure. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 142 |  | Figure 14. How did UDEQ decide on a TSI > 50 as a decision point? | None. | A TSI of 50 is a commonly used benchmark in lake management to categorize a waterbody as eutrophic and potentially indicative of cultural eutrophication. DWQ recognizes that trophic states occur on a continuum, but a general benchmark is useful for performing tier II assessments of lakes. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 143 |  | EPA recommends removing the TSI-SDD and TSI-TP discussion because UDEQ is not using TSI-SDD or TSI-TP for assessment. This level of detail should be included as an appendix. The location of this information in the document gives the reader the impression that TSI for chl-a, TP and SDD are calculated for the assessment. | Revised Methods text. | DWQ agrees with the commenter. Secchi disk and total phosphorus based TSIs are not currently used in the lake assessment methods. This section has been removed from the assessment methods. Rather than including them in an appendix here, these types of methods will be included in other documents when they are used by other programs. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 144, 145, 146 |  | Does UDEQ intend to assess the Great Salt Lake using the narrative standard?  How will UDEQ consider all readily available data and/or information for the Great Salt Lake?  The EPA regulations at 40 C.F.R. Â§130.7(b)(6) require States to include, as part of their submissions to the EPA, documentation to support decisions for using or excluding data and/or information and decisions to list or not list waters. | None. | The Narrative Standard applies to all waters of the State, including Great Salt Lake, and DWQ will consider all readily available and credible data, including data from Great Salt Lake, in the assessment process. However, current Narrative Standard based assessment methods (e.g. harmful algal blooms, and macroinvertebrate O/E) are not applicable to Great Salt Lake’s beneficial uses. DWQ's goal is to evaluate whether these types of methods are applicable to GSL and develop GSL-specific methods in the future. DWQ is in the process of developing Water Quality Standards and Assessment Methods for Great Salt Lake as outlined in the Great Salt Lake Water Quality Strategy Document (https://documents.deq.utah.gov/water-quality/standards-technical-services/gsl-website-docs/gsl-wq-strategy/DWQ-2019-000535.pdf) Once the standards or methods are fully developed, they will be incorporated in the assessment methods for future Integrated Report cycles. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 147 |  | UDEQ indicates that a single sample is sufficient for assessment; however, at the bottom of the page, UDEQ indicates that 4 samples is the minimum sample size? Please explain. | None. | In the toxic parameter assessments section of the methods, DWQ requires at least four samples for the sample site's dataset to be sufficient in size. If the location has ≥ 4 samples, the site has sufficient data and will be assessed as not supporting (i.e., ≥ 2 samples exceeds the criterion) or supporting (i.e., <2 samples exceed the criterion). If a sample location has < 4 samples, the site does not have sufficient data to assess and will be reported as insufficient data with exceedances if one of the measurements exceeds the criterion. If none of the measurements in the smaller dataset exceed the criterion, the site will be reported as insufficient data without exceedances. Following this procedure, while one sample is sufficient to conduct an assessment, ≥ 4 samples is required to report either supporting or non-supporting. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 148 |  | Figure 16. Please clarify how Insufficient Data: Exceedances are implemented and whether they result in some waters being a higher priority for additional monitoring? | Out of scope. | DWQ agrees with the commenter on the importance of following up on assessments that are reported as Category 3 due to insufficient data and information to determine if the waters were supporting or not supporting their designated beneficial uses. However, determining the strategy and process for following up on Category 3 (or Category 5 - impaired) waters is outside of the scope of the IR. Follow up monitoring due to insufficient data and information or to identify causes, sources, or develop remediation strategies are addressed through individual project plans that focus on TMDLs, watershed plans, BMPs, NPSs, delisting opportunities, etc. For more information on DWQ's monitoring strategies, please contact the Monitoring Section manager. Link to Strategic Monitoring Plan: https://deq.utah.gov/water-quality/strategic-monitoring-plan-water-quality |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 149 |  | UDEQ only included a Data Preparation section for E. coli but not the other parameters discussed. Would this type of information be helpful for other parameters as well or presented more generally? | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | In previous assessment methods, the flowing surface waters and lake, reservoir, and ponds sections had separate data preparation sections resulting in duplicated text. To reduce redundancy in the 2018/2020 assessment methods, DWQ created one section that discusses the Data Preparation for Conventional and Toxic Assessments for All Waters. DWQ maintained separate data preparation sections for high frequency dissolved oxygen and E. coli assessments because the data collection and sampling frequency is much different from conventional and toxic data collection and assessment processes. As DWQ continues to better clarify and streamline future assessment methods, DWQ will review and further define the data preparation steps for applicable narrative and lake specific assessments. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 150 |  | Figure 20. EPA suggests that the left pathway of the flow diagram in Figure 20. conclude with the following decision ovals: Insufficient Data with Exceedances and Insufficient Data without Exceedances. This allows for an equivalent minimum sample size when determining full support and non-support in Scenario C. | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | DWQ agrees with the commenter that the left side of Figure 20 (Scenario C: A seasonal geometric mean assessment of E. coli) should be reviewed and edited in a future assessment method document. DWQ is working to conduct analysis and research on how to edit the left side of Figure 20, so that DWQ can better quantify and address potential E. coli concerns. During the next internal methods workshop, DWQ will evaluate and strongly consider EPA's suggestion. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 151 |  | Table 16. EPA requests details on how UDEQ will assess for Gross alpha and Gross beta. | Clarified Methods text. | For the Class 1C designated use, gross alpha and gross beta are evaluated as a toxicant using comparisons to the numeric criteria in UAC R317-2-14, Table 2.14.1. For the Class 3 aquatic life designated uses, gross alpha and gross beta are evaluated as an indicator in accordance with UAC R317-2-14, Table 2.14.2, and footnote 10 that states: "Investigation[s] should be conducted to develop more information where these levels are exceeded".   To capture this footnote in the assessment process, DWQ will review the preliminary pollution indicator assessment during the secondary review process to determine whether or not gross-alpha, -beta, and other pollution indicators demonstrate clear and convincing evidence of supporting or not supporting the beneficial uses assigned to the waterbody in UAC R317-2. Secondary reviews will incorporate indicator data into assessment category determinations, relying on multiple lines of evidence including pollution indicator thresholds, the presence or absence of other indicator-associated water quality issues, potential pollutant sources, and other site or watershed specific knowledge to determine whether listing or delisting on a pollution indicator parameter is appropriate or whether to prioritize waterbodies for additional monitoring.  As noted in in the Secondary Review and Appendix 3 sections of the assessment methods document and CFR 140 130.7 (b)(6)(ii) and (iii), DWQ will provide a rationale and documentation for any decision to report pollution indicators as supporting or not supporting the beneficial uses in UAC R317-2-14, Tables 2.14.1 and 2.14.2.  To better capture this process, DWQ removed table 16 from the assessment methods document and added the pollution indicator evaluation process described above to Appendix 3, Application of Secondary Review Process. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 152 |  | Table 16. Total Phosphorus. All categorical assessments for aquatic life uses (Class 3) will be overwritten to Category 3. Does UDEQ intend to provide delisting rationales for these waters? The EPA regulations at 40 C.F.R. Â§130.7(b)(6) require States to include, as part of their submissions to the EPA, documentation to support decisions for using or excluding data and/or information and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and/or information used to identify waters; (3) a rationale for any decision not to use any existing and readily available data and/or information 40 C.F.R. Â§ 130.7(b)(5), and (4) any other reasonable information requested by the Region. | None. | When good cause can be demonstrated, DWQ will delist Total Phosphorus as P and provide the necessary documentation as described in the Delisting and Appendix 6 sections of the assessment methods document. Any delisting documentation and justifications will be available for review during the public comment process of the draft IR. To clarify, any Total Phosphorus as P assessments that are delisted or removed from the 303(d) list will undergo the same level of review and documentation as any other parameter DWQ removes from the 303(d) list. Examples of previous delisting documentation are available on the last four pages of Chapter 3 of the Final 2016 IR (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/chapter-3-river-and-stream-assessments-final2016ir-v2-1.pdf). |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 153 |  | Figure 21. Please clarify the rationale for determining if the bottom diamond arrow is no, the determination is Insufficient Data with Exceedances? | Clarified Methods figure. | As noted in the figure caption, Figure 21 in DWQ’s assessment methods is based off of EPA’s Consolidated Assessment and Listing Methods (CALM) guidance that was published in 2002 (https://www.epa.gov/sites/production/files/2015-09/documents/consolidated\_assessment\_and\_listing\_methodology\_calm.pdf). In EPA’s CALM guidance document, Figure 3-2 describes a scenario where there are two or more types of data that do not indicate consistent attainment status, and the differences in attainment status are not artifacts of data quality issues. Under this scenario, EPA’s recommendation is to document and submit examples to them of where these situations occur. In Figure 21 of DWQ’s assessment methods, DWQ expands on EPA’s guidance by notifying EPA of the example(s), documenting the conflicting assessment(s), and following the secondary review process outlined in DWQ’s assessment methods. DWQ will edit Figure 21 to reflect that the next step is to highlight the preliminary assessment for secondary review and not move directly to an insufficient data category (i.e., Category 3). |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 154 |  | Figure 22. Bottom right box. Please clarify the implications for these subcategories in terms of follow-up actions (e.g., monitoring, future assessments). | Out of scope. | DWQ agrees with the commenter on the importance of following up on assessments that are reported as Category 3 because there was insufficient data and information to determine if the waters were supporting or not supporting their designated beneficial uses. However, determining the strategy and process for following up on Category 3 (or Category 5 -impaired) waters is outside of the scope of the IR. Follow up monitoring due to insufficient data and information or to identify causes, sources, or develop remediation strategies are addressed through individual project plans that focus on TMDLs, watershed plans, BMPs, NPSs, delisting opportunities, etc. For more information on follow up monitoring, please contact the Monitoring Section manager. Link to Strategic Monitoring Plan: https://deq.utah.gov/water-quality/strategic-monitoring-plan-water-quality |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 155 |  | Please elaborate on the types of information that UDEQ considers for a secondary data review. | None. | As part of DWQ's assessment and secondary review process, DWQ reviews and considers any quantitative and qualitative data (as described in greater detail in "Type of Data to Submit" and Table 10 of the assessment methods) that is readily available and credible. Appendix 3 provides some examples of the kind of information that may be considered during the secondary review. An example of the type of information submitted for secondary review, is documented in comment ID #343 from the 2016 IR. During the public comment process of the 2016 IR a commenter provided information that the data exceeding criteria was collected under flow conditions that were rare and not representative of normal operating conditions. DWQ agreed with the commenter that the data in question did not meet several data concerns as outlined in Appendix 3. For tracking and transparency to the public, DWQ documented the original category assignment, provided a brief justification for implementing the secondary review, and the final category assignment with the data in question removed. Examples of this secondary review and others from the 2016 IR are located here: https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/dwq-response-to-public-comments-final2016ir-v2-1.pdf |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 156 |  | Does UDEQ complete a secondary review on all assessments? | None. | DWQ performs a secondary review on all 305(b) and 303(d) assessments. However, not supporting and supporting assessments that result in a delisting are prioritized for multiple levels of review prior to releasing the report for public comment. Assessments where a secondary review recommendation is applied and overwrites a preliminary supporting or not supporting site or assessment unit decision also undergoes multiple levels of review prior to releasing the draft report. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 157 |  | Appendix 7 doesn't include information about Vision priorities. Has the UDEQ assessment and listing staff coordinated with the TMDL staff? | Clarified Methods text. | DWQ did not include a section in the assessment methods document on Utah’s prioritization of the 303(d) list as this was out of scope for the IR. However, DWQ decided to reference and add a hyperlink to DWQ's 303(d) Vision document in Appendix 7 of the assessment methods. The first sentence of the second paragraph of the appendix now reads, "As described in the Division of Water Quality's (DWQ) 303(d) vision document <insert hyperlink to https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/303d-list-for-tmdl-development-final2016ir.pdf., DWQ prioritizes impairments to human and ecological health." The rest of the paragraph discusses additional considerations DWQ may include when prioritizing TMDL development. |
| Shera | Reems | EPA\_Region8\_12072018.pdf | 158 |  | UDEQ should reference here and Appendix 7 the state Vision prioritization document and/or revise the current description to reflect that process & results. See: https://deq.utah.gov/legacy/programs/water-quality/watersheds/docs/2016/303d-list-for%20tmdl-development.pdf | Clarified Methods text. | DWQ did not include a section in the assessment methods document on Utah’s prioritization of the 303(d) list as this was out of scope for the IR. However, DWQ decided to reference and add a hyperlink to DWQ's 303(d) Vision document in Appendix 7 of the assessment methods. The first sentence of the second paragraph of the appendix now reads, "As described in the Division of Water Quality's (DWQ) 303(d) vision document <insert hyperlink to https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/303d-list-for-tmdl-development-final2016ir.pdf., DWQ prioritizes impairments to human and ecological health." The rest of the paragraph discusses additional considerations DWQ may include when prioritizing TMDL development. |
| Theron | Miller | TMiller\_12202018.pdf | 166 |  | Page 40, Table 11. Conventional parameters. Numerous recurrence intervals are listed. 30-day averages are used for assessments based on grab samples. 30- and 7-day averages and minimums are used for assessments based on high frequency data, and early life stages are assumed present for the 7-day and minimum high frequency assessments. Some site-specific standards have been generated, which are used for assessment purposes.   Comment: Need to clarify the phrase: Numerous recurrence intervals are listed. | Clarified Methods text. | Thank you for the comment. To avoid confusion DWQ removed the sentence in question and now only lists when specific dissolved oxygen minimums, 7-, and 30-day averaging periods are used based on the DO data type being assessed. |
| Theron | Miller | TMiller\_12202018.pdf | 167 |  | Also, the sentence, 30-day averages are used for assessments based on grab samples is also unclear. It appears that grab samples are used for calculating 30-day averages. Yet, the figures presented describe the instantaneous minimum, 7-day and 30-day criteria, which appear to incorporate the use of high-frequency data. Hence, either the description needs to be re-written or the figures need to be re-drawn. If, however, the use of high-frequency data has been incorporated into the assessment methodology for the 7-day and 30-day dissolved oxygen (DO) criteria, this is a welcome change, which I applaud. | Clarified Methods table. | DWQ appreciates the commenter's encouragement regarding the addition of high frequency dissolved oxygen (DO) minimum, 7-day, and 30-day assessments into the methods. As noted in Table 11 and the Conventional Parameter Assessments section of the methods, DWQ assesses instantaneous/ DO grab samples and DO high frequency datasets under separate assessment methods. To help clarify that two different sample collection methods will be used to assess DO, DWQ added assessment notes to Table 11. The information in the table now reads:  "DO measurements collected by instantaneous/ grab samples are assessed against the 30-day averages in UAC R317-2 and follow the assessment process in Figure 2 and the "Assessments Specific to Lakes, Reservoirs, and Ponds" section of the methods. DO measurements that are collected by high frequency data probes are assessed against the 30- and 7-day averages and minimums in UAC R317-2 and follow the assessment process in Figures 3-5. Note: for high frequency DO assessments, DWQ assumes early life stages are present for the 7-day and minimum. Some site-specific standards have been generated, which are used for assessment purposes." |
| Theron | Miller | TMiller\_12202018.pdf | 168 |  | P. 40, Table 11. Some site-specific standards have been generated, which are used for assessment purposes.   Comment: The only waterbody with site-specific DO criteria is the Jordan River. The only documentation I can find supporting this determination is from a report submitted to Central Valley Water Reclamation Facility by Bio-West (Hugie 1987), where it was believed (absent any actual data) that DO in the Jordan River influences the DO concentrations in downstream wetlands. This was thought to be a potentially critical issue in the prevention of avian botulism outbreaks. The reasoning for this decision was that Clostridium botulinum is an obligate anaerobic bacterium and producer of the botulinum toxin, whose spores and mature cells reside in anaerobic sediments. Apparently, it was thought that higher DO in the river would help prevent avian botulism outbreaks in the wetlands. Yet, sixteen years of subsequent monitoring in the impounded wetlands of Farmington Bay by monitoring and research staff of both the Wasatch Front Water Quality Council and DWQ, have found NO connection between Jordan River DO and DO in downstream impounded wetlands (Miller et al. 2013, additional unpublished data). In fact, DO in the water column of healthy wetlands typically ranges from near or at 0.0 mg/L in the morning to > 20 mg/L in the afternoon (DWQ DO and pH UAA, GSL wetlands). This is the case regardless of season, hydraulic residence time, or whether source water is the Surplus Canal or the Jordan River/State Canal. The referenced use attainability analysis resulted in DWQ issuing new water quality criteria for the impounded wetlands and removing numerical DO and pH criteria from these waterbodies.   Furthermore, after decades of monitoring botulism outbreaks, the only demonstrated relationship between inflows and botulism was that outbreaks were likely to occur during years of elevated winter/spring runoff or the rare elevated summer flows. In turn, these were thought to cause fluctuations in water level in impoundments or flooding of mudflats (Barras and Kadlec 2000, Kadlec, 2002). In a review of dozens botulism outbreaks across the globe, Rocke and Bolinger (2007) summarized the potential causes with two general hypotheses: (1) large quantities of decaying organic matter leads to a depletion of oxygen, which allows germination of botulinum spores and toxin production; and temperature, pH, and dissolved salts in the water were considered important corollary factors; and (2) C. botulinum type C germinates and produces toxin in small, discrete, particulate substances (invertebrate carcasses) that are independent of the ambient environment.   [reponse continued below] | Out of Scope | This comment is out of scope for the IR and should instead be directed towards DWQ's Standards Coordinator to discuss the potential for conducting a Use Attainability Analysis (UAA) to revise the site-specific DO criteria on the Jordan River. |
| Theron | Miller | TMiller\_12202018.pdf | 168 |  | After decades of observations of GSL outbreaks, Kadlec (2002), offers different hypotheses. The historical record of avian botulism at the Bear River Refuge strongly suggests that major out-breaks are more likely in years of high spring and summer rainfall and high flows in the Bear River entering the Refuge (Barras and Kadlec 2000). Thus, hot, dry years, low flows, and deteriorating water quality associated with those conditions appear not to be involved in causing major outbreaks. (emphasis added). Sampling of invertebrates (J. A. Kadlec, unpublished data) does not lend support to the hypothesis that invertebrate mortality is involved in causing outbreaks. Rather, Kadlec (2002) suggested that the abundant midge and other wetland benthic invertebrates ingest the C. botulinum directly during foraging, followed by ingestion of these invertebrates by the waterfowl or shorebirds; hence there is an element of bioaccumulation. These hypotheses suggest that abundant living invertebrates may be more important, as Dodge (1972) speculated. Certainly, these more recent hypotheses need further investigation. But these multiple lines of evidence make it clear that DO in the Jordan River has nothing to do with avian botulism outbreaks. Therefore, DWQ should perform a use attainability analysis for the purpose of removing the more stringent site-specific DO criterion for the Lower Jordan. | Out of Scope | [see response above] |
| Theron | Miller | TMiller\_12202018.pdf | 169 |  | Page 43. Data sufficiency to ensure that daily minima are captured and that daily averages can be accurately calculated, high frequency data must capture complete days. DWQ defines a complete day as a calendar day (i.e. 12:00 am â€“ 11:59 pm) in which at least one measurement is made in each hour. For 303(d) assessment purposes DWQ considers a high frequency dataset of sufficient size for assessment when there are â‰¥39 complete days of contiguous data within the period of record. This ensures measurements are adequately spaced and representative of DO concentrations over the course of a day and that the 30-day, 7-day, and daily minimum criteria can all be fully assessed. If both of these conditions are not met, the data will be flagged as insufficient in size and not included in the current IR cycle.   Comment: This intensive sampling routine appears obviously focused on the Jordan River DO problem. No other stream in Utah receives such attention. | None. | DWQ installs high frequency probes on many of Utah's waters, and the length of deployments can vary based on the objectives of sampling analysis plans. Examples of waterbodies with longer high frequency probe deployments include: Jordan River, Jordanelle Reservoir, Utah Lake, and Scofield Reservoir. For this IR, DWQ's high frequency data assessment is limited to assessing Dissolved Oxygen in rivers and streams. DWQ also leverages high frequency data collected by U.S. Geologic Survey (https://nrtwq.usgs.gov/ut) and other agencies and groups who submit data during the Integrated Report's Call for Data. |
| Theron | Miller | TMiller\_12202018.pdf | 170 |  | While it is necessary to measure an appropriate number of days to assess the 7-day and 30-day criteria, there is no inherent mathematical or EPA requirement to measure 39 contiguous days to determine whether DO violates the minimum DO standard. | Revised Methods text. | DWQ appreciates the feedback and concerns regarding the method's "High Frequency Assessments for Dissolved Oxygen" section and figures 3-5. The original intent of requiring ≥39 complete days of contiguous data within the period of record was to ensure that the 30-day, 7-day, and daily minimum criteria could all be fully assessed. However, after review of the publicly submitted comments, DWQ understands how this may be a significant or restrictive data requirement and prevent data submissions for assessment. DWQ agrees with the commenter that 39 contiguous days of high frequency dissolved oxygen (DO) data are not needed to fully assess the 7-day average minimum DO criteria. DWQ reviewed the original language and removed the ≥39 day requirement from the "Data Sufficiency" section. The section now reads, "To ensure that daily minima are captured and that daily averages can be accurately calculated, high frequency data must capture complete days. DWQ defines a complete day as a calendar day (i.e. 12:00 am – 11:59 pm) in which at least one measurement is made in each hour."   DWQ also removed the ≥39 day requirements in Figures 3 and 4. Instead, data are considered sufficient for assessment if at least ten daily minima or 7 or 30 day averages can be calculated over the period of record. |
| Theron | Miller | TMiller\_12202018.pdf | 171 |  | Rather, it is likely that such contiguous recordings will only capture a single high-flow runoff event and if there are 39 contiguous days of data, only 4 days of values below the 1-day minimal are necessary to claim impairment. This hardly assures that measurements are adequately spaced. The high-frequency data recording sondes have revealed that the great majority of low DO events are associated with high-flow storm events. In each of these events, the DO drops precipitously, as the methane and hydrogen sulfide-rich anaerobic sediments are mobilized. This is followed by a 2- to 4-day recovery where morning DO concentrations may drop below the minimum DO standard. The DO minimum standard could therefore be violated in 10 percent of measurements during a single high-flow event, which is contrary to the goal of being adequately spaced. | Clarified Methods text. | The phrase, "adequately spaced," in this context refers to the spacing of dissolved oxygen readings throughout the course of any given day, not the spacing of days on which exceedances are observed. This ensures that all samples are not collected during one particular part of the day and that accurate daily minima and means can be calculated for each day. This has been clarified in the assessment methods. |
| Theron | Miller | TMiller\_12202018.pdf | 172 |  | More important, such violations during high-flow events would not occur if the Jordan River was not suffering from human-caused severe channel alterations and significant flow diversions that leave the river dewatered and accruing enormous amounts of decomposing organic matter through sediment deposition. As EPA has instructed, such severe hydrologic modification can be the cause of nonattainment of beneficial uses (40 CFR 131.10(g) factors 3, 4 and 5 “ related to degraded habitat and dewatering)causing unnatural sedimentation of sand, silt and copious amounts of decomposing organic matter, that by themselves require dredging every few years (depending on frequency and severity of high-flow events). After 18 years of more intensive monitoring and countless meetings, there is neither the political or regulatory teeth, nor the financial resources to control the organic matter loads originating from this urban watershed. Therefore, at a minimum, DWQ should develop a use attainability analysis for the purpose of removing the more stringent site-specific DO criterion for the Lower Jordan. | Out of Scope. | DWQ agrees with the commenter on the importance of evaluating impairments that are caused by pollution. However, determining sources of pollution and site specific Use Attainability Analysis are outside the scope of the Integrated Report. Sources are determined as part of the TMDL or related source assessment studies. (See section Unknown Sources in the assessment methods for more information on how sources are identified and tracked in the assessment process). Concerns relating to water quality standards are addressed through the Triennial Review process. Information on the Triennial Review can be found at the following web address: http://www.deq.utah.gov/ProgramsServices/programs/water/wqmanagement/standards/triennialrev.htm.  For source concerns specifically related to the Jordan River, the commenter should refer to the ongoing development of a dissolved oxygen TMDL for the Jordan River (https://deq.utah.gov/water-quality/watershed-monitoring-program/jordan-river-dissolved-oxygen-tmdl-watershed-management-program) |
| Theron | Miller | TMiller\_12202018.pdf | 173 |  | Additional evidence now exists describing the consequences of severe habitat destruction (channelizing and frequent dredging) and severe hydrologic diversions (leaving the lower JR dewatered and consequently, one long depositional zone). These three factors, are present and clearly dominate the physical and biological conditions of the river. | Out of scope. | The purpose of the Integrated Report assessment is to identify whether or not waters are exceeding numeric criteria and supporting their designated beneficial uses(s). Identification of sources and causes of pollution are not part of the Integrated Report process and are addressed as part of the TMDL or related source studies and assessments (https://deq.utah.gov/water-quality/watershed-monitoring-program/jordan-river-dissolved-oxygen-tmdl-watershed-management-program).   For source concerns specifically related to the Jordan River, the commenter should refer to the ongoing development of a dissolved oxygen TMDL for the Jordan River (https://deq.utah.gov/water-quality/watershed-monitoring-program/jordan-river-dissolved-oxygen-tmdl-watershed-management-program). |
| Theron | Miller | TMiller\_12202018.pdf | 174 |  | No feasible BMPs are currently available, even if there were political and financial will to attempt to mitigate this loading and settling of organic matter. Yet this is causing the extremely high sediment oxygen demand values that cause the DO impairment particularly the unmitigable remobilization of oxygen-demanding methane and hydrogen sulfide and even fresh debris such as grass clippings (known to drop the DO to 0.0 mg/L), when occasional thunderstorms rush through the watershed. | Out of Scope. | Determining the causes and sources of impairments are outside the scope of the Integrated Report and are addressed as part of the TMDL or related source studies and assessments.  For source concerns specifically related to the Jordan River, the commenter should refer to the ongoing development of the dissolved oxygen TMDL for the Jordan River (https://deq.utah.gov/water-quality/watershed-monitoring-program/jordan-river-dissolved-oxygen-tmdl-watershed-management-program). |
| Theron | Miller | TMiller\_12202018.pdf | 175 |  | Page 47. Measuring biological communities directly has the advantage of integrating the combined effects of all pollutants, which allows a direct examination of how pollutants are interacting to affect the condition of a stream ecosystem (Karr, 1981).â€    Comment: This is only true if physical conditions are comparable between reference sites and between reference sites and target sites. In the case of the Jordan River, we know that it is extremely habitat limited and there are no reference sites for the JR. DWQ needs to justify how O/E is used when there are no reference sites. | None. | Each stream and river segment is unique; not just the Jordan River. RIVPACS uses real reference site data to estimate the most probable set of taxa that would occur at a given stream. In this sense, the model is heavily weighting reference sites that are physically/chemically similar to the assessed site when estimating the taxa that should occur (E). E is more than some general, hypothetical community that applies everywhere (unless a null model is used). Larger rivers offer more of a challenge to assess because they are more regional rather than isolated to a state. DWQ's model incorporates reference river locations from the intermountain west rather than being limited to Utah-based locations. In addition, DWQ runs a chi-square test to ensure that each assessed site fits within the bounds of the model. Sites that fail this test are not used in the assessment. For example, the Jordan River sites passed that test and were appropriate for this model and assessment. |
| Theron | Miller | TMiller\_12202018.pdf | 176 |  | Page 47. The biological integrity of sites can be evaluated by comparing the biological composition observed at a site against a subset of ecologically similar reference sites. Collectively, such comparisons are referred to as biological assessments.   In aquatic biological assessments, reference sites are selected to represent the best available condition for waterbodies with similar ecological, physical, and geographical characteristics (Hughes et al., 1986; Suplee et al., 2005; Western Center for Monitoring and Assessment of Freshwater Ecosystems website). When reference sites are selected for water quality programs, conditions vary regionally depending on adjacent historical land use. For example, reference sites in Utah mountains are generally more pristine than in valleys. As a result, there are more biological benchmarks in areas of the state that receive less human-made disturbance than those with more disturbances.   Comment: Unfortunately, DWQ acknowledged that for several valley stream sites, particularly in the Jordan River, there are no river sites across the state that quality as reference condition for the Jordan River. This has been discussed with Dr. Chuck Hawkins, who admitted that the RIVPACS model does not work well when there are no usable reference sites with which to determine macroinvertebrate reference condition (David Richards personal communication based on discussions with Dr. Hawkins at a recent EPA Pacific Northwest Bioassessment Workshop held in Astoria, WA). This important factor should be acknowledged by DWQ and should prompt DWQ to choose a different biological assessment approach. | None. | RIVPACS uses real reference site data to estimate the most probable set of taxa that would occur at a given stream. In this sense, the model is heavily weighting reference sites that are physically/chemically similar to the assessed site when estimating the taxa that should occur (E). E is more than some general, hypothetical community that applies everywhere (unless a null model is used). Larger rivers offer more of a challenge to assess because they are more regional rather than isolated to a state. To address this limitation, DWQ's model incorporates reference river locations from the intermountain west rather than being limited to Utah-based locations. DWQ uses a RIVPACS model that incorporates a chi-squared test to determine if any site of interest has comparable reference sites, if this test is failed then O/E scores are not calculated. With respect to the selection of alternative methods, it is worth noting that unless historical data are available all biological assessments are dependent on comparisons to similar reference sites, so these limitations are not limited to RIVPACS approaches. RIVPACS approaches address this better than most other biological assessment methods because O/E predictions are site-specific. In contrast, other methods, like MMIs, frequently use broad, a priori classifications (e.g., all streams within an ecoregion) to establish what reference streams are comparable to a stream of interest. |
| Theron | Miller | TMiller\_12202018.pdf | 177 |  | Page 47. O/E has some very useful properties as an index of biological condition. First, it has an intuitive biological meaning. Species diversity is considered the ecological capital on which ecosystem processes depend; therefore, O/E can be easily interpreted by researchers, managers, policy-makers, and the public. Second, O/E is universally spatial, which allows direct and meaningful comparison throughout the state on a site-specific scale. This is particularly important for Utah, where streams vary considerably from high-altitude mountain environments to the arid desert regions. Third, its derivation and interpretation do not require knowledge of stressors in the region; it is simply a biological measuring tool. Finally, the value of O/E provides a quantitative measure of biological condition.   Comment: It is not an asset that O/E's derivation and interpretation do not require knowledge of stressors in the region. Rather, O/E's inability to inform is one of the limitations of the single O/E metric. I believe that any supplemental watershed or stream condition information, including evidence of human disturbance, that explains observed biological characteristics is valuable. Virtually all states that use biological assessments, including DWQ's wetland assessment protocol, use a multiple of metrics in the assessment process. As I comment further below, focusing only on O/E ignores additional valuable information which can be obtained through knowledge of habitat requirements of sentinel species and environmental tolerances that are available for most Utah resident species. Another example is intermittent streams, which have reduced and/or substantially different macroinvertebrate assemblages than perennial streams and require different bioassessment approaches. (Richards 2010, Richards 2013) Many of the streams that DWQ considers perennial may very well be intermittent. | None. | In the context of identifying biologically degraded sites, it is an asset that O/E does not need knowledge of stressors. DWQ is charged with assessing streams statewide and a tool that allows the identification of problems efficiently is necessary to meet this obligation. Once impairments are identified, both biological and habitat data can be examined more closely, on a site-specific basis, to better understand the relative importance of different sources of stress. Using the specific example provided by the commenter, these investigations may reveal that water withdrawals are significant contributors to the problem. It is also possible that they reveal that other stressors, either natural (e.g., droughts) or human-caused (e.g., riparian degradation), contribute to the observed degradation. Thorough site-specific evaluations of existing and new data sources are a necessary step in the development of effective remediation plans. The fact that DWQ relies on O/E for assessment purposes does not preclude the use of biological alternative indicators for other purposes. |
| Theron | Miller | TMiller\_12202018.pdf | 178 |  | Page 48. Despite the mathematical complexities of model development, O/E is easily interpreted because it simply represents the extent to which taxa are missing as a result of human activities. For example, an O/E ratio of 0.40 implies that, on average, 60% of the taxa are missing as a result of human-caused alterations to the stream.   Comment: Apparently DWQ assumes that the use of broad geographical variables avoids the biases of differences due to human disturbance, but there is no evidence that this is true. | None. | All biological assessment methods are inevitably more sensitive to some types of stressors than others and RIVPACS is not an exception. Nevertheless, O/E has been demonstrated to be sensitive to a breadth of different stressors and is generally considered to be among the more sensitive measures of biological degradation. One reason for this is that the geographic predictors allow the models to make site-specific predictions of expected taxa (E). However, this does not avoid biases resulting from the relative sensitivity of different resident taxa to different types of human-caused stressors. |
| Theron | Miller | TMiller\_12202018.pdf | 179 |  | Alternatively, actual site-specific-scale habitat measures, including those that will assess the degree of human disturbance (rather than being based on probabilities), need to be part of the assessment to determine the value of this assumption. | None. | O/E intrinsically quantifies the magnitude of biological degradation that has occurred at a stream. Whether or not a loss of taxa scales with a specific type of human-caused stress (e.g., habitat degradation) is a separate question. The advantage of O/E measuring the magnitude of biological degradation without consideration of human-caused stress is that it allows DWQ to identify problems so that follow-up investigations, such as those suggested by the commenter, can be conducted to evaluate the combination of stressors that have caused the degradation to occur. Given the scale of statewide assessments that DWQ is required to conduct, such thorough evaluations cannot be routinely conducted everywhere and the identification of biologically degraded sites allows DWQ to focus these efforts where they are most needed. |
| Theron | Miller | TMiller\_12202018.pdf | 180 |  | For example, what if a flash flood occurred 30 days prior to the sampling? | None. | DWQ does make note of recent flooding activity and has chosen to not assess sites using O/E due to signs of recent flooding activity. However, there may be circumstances where recent flash floods were undetected by field staff, which could potentially result in atypically low O/E scores. This is one of the reasons why DWQ requires the collection of several unique samples, from different field seasons, prior to concluding that a site is impaired based on O/E. The assumption is that the likelihood that DWQ would happen to visit a site where recent events created undetectable sources of bias over several different years is small. |
| Theron | Miller | TMiller\_12202018.pdf | 181 |  | Another example is East Canyon Creek, which a few times in recent years has been severely dewatered from drought and excess diversions. A third example is Silver Creek, upstream from the Silver Creek POTW, which is left a trickle every drought summer. These are examples where prior knowledge of the habitat or flow characteristics can account for a low O/E score and inform the assessment process as well as steer restoration efforts. | None. | In some cases, DWQ will not collect biological assessment data in a stream that has been severely dewatered, particularly if this condition is natural, but not typical (e.g., extreme drought). If samples are collected under extreme, low flow conditions, over several different field seasons, and if the site is determined to be impaired, then the role of flow diversions would manifest in subsequent investigations into the cause of the impairment. |
| Theron | Miller | TMiller\_12202018.pdf | 182 |  | Moreover, the 303(d) reporting process to EPA requires that causes and sources be identified for each impaired waterbody. O/E does not provide this necessary information. DWQ should re-think this assessment strategy because it ignores available site-specific information obtained from site visits which should inform actual causes and sources of potential impairment. | Out of scope. | DWQ agrees that identifying the causes and sources of impairments benefits from site-specific information obtained through additional site monitoring, visits, and additional analyses. For these reasons identifying causes and sources of impairments are not part of the Integrated Report process and are addressed through either a TMDL, pollution prevention plan, or other related source and cause assessments. Once identified through these processes, cause and source information for impairments are updated and populated in ATTAINS. |
| Theron | Miller | TMiller\_12202018.pdf | 183 |  | As another example of erroneous application of data, the 2014 IR reported excess P as the cause of the low O/E score for the Jordan River. Clearly, this was just a guess. After further study, nutrients were found not even to be a cause of low DO events. Moreover, severe habitat loss has been identified earlier by Miller (2012, 2014), and more recently by Richards (2016). | Out of scope. | In the 2014 IR for the Jordan River-3 Assessment Unit, O/E and TP were list as separate parameters that were not meeting beneficial uses. Both were originally listed as impaired in the 2008 IR and both were independently listed as separate impairments. There was no connection made between them in the 2014 and 2016 IRs as well.  Comments on the 305(b) and 303(d) assessments results (from both current and historical reports) can be submitted during the public comment period of the Draft 2018/2020 Integrated Report. |
| Theron | Miller | TMiller\_12202018.pdf | 184 |  | Further, as described in the introduction, trained field biologists perform independent assessments of candidate reference sites and I assume that this assessment includes the use of UCASE/EMAP protocols to quantify and assess important habitat characteristics. Therefore, data hypothetically exists to compare taxa lists, including sensitive species (e.g. EPT taxa) and guild diversity (e.g. functional feeding groups) to habitat availability and complexity. Developing predictive models based on modeled average watershed characteristics and reduction of taxa lists to simple presence/absence for the purposes of expediency ignores the principles of river continuum theory. Using a single number/metric that is used to describe biological and physical integrity is nothing short of a large step backward in utilizing stream ecological knowledge and principles. | None. | Site-specific, GIS-based predictor variables are used to develop RIVPACS models rather than regional watershed means. The spatial resolution for these predictor variables is 800 m which makes the assessment at reach segment scale rather than watershed. The text was changed to better explain the nature of RIVPACS predictor variables after the same comment was made during the last Integrated Report cycle. River continuum theory does not speak to habitat complexity, but instead is a conceptual model that describes functional and structural ecological characteristic changes naturally from headwaters to larger rivers downstream. The specific predictor variables used in model construction align closely with this theory because many could be used to place a specific site in its position along this continuum. |
| Theron | Miller | TMiller\_12202018.pdf | 185 |  | It is highly presumptive, if not outright inaccurate, to assert that a meaningful measure of species richness and ecological capital can be based on a probability of > 50% capture. Where are the scientific underpinnings for such an assumption? Indeed, rare species that occupy limited or specialized niches or diverse functional feeding groups are much more valuable in assessing the quality of habitat and degree of biological integrity and resilience â€“ as these taxa are most often those that disappear first in the presence of stress (Richards 2017). Moreover, the relaxation of taxonomic accuracy further reduces the ability to detect subtle indicators of stress. | None. | Considerable research has demonstrated that RIVPACS models tend to be more precise and often more responsive to known stressors than other indices (e.g., please review Hawkins 2006, Hawkins et al 2010) when a Pc >0.5 is used as opposed to a Pc >0. Similarly, a relatively large amount of literature empirically shows that the use of coarse (family) taxa can often provide similar assessment scores as fine level taxonomic resolution in O/E models. There are many states that use just family level data. There are tradeoffs in use of fine versus coarse taxonomic resolution data. Coarse data are easier to model (more precise) but use of fine resolution data may produce more responsive indices. Please review Hawkins 2006 to understand a few good examples of these tradeoffs. |
| Theron | Miller | TMiller\_12202018.pdf | 186 |  | Page 49. Table 12. Final predictor variables used in model construction.  Comment: While the use of predictor variables at the watershed level is an improvement over regional scales, the use of PRISM model results for the various geographical variables introduces additional uncertainty in determining meaningful environmental tolerances. For example, many macroinvertebrate taxa have known temperature tolerance ranges that have been used to establish temperature criteria (e.g. Richards et al. 2018). Also, actual daily measures of extraordinary stream temperature or watershed air temperature can vary enormously from mean stream temperatures or mean annual air watershed temperatures and sufficiently to cause the loss of local species â€“ and which may take months or years to recover. | None. | This comment reflects a misunderstanding of how appropriate predictor variables are used in the construction of RIVPACS models. Conceptually, the purpose of physical predictor variables is to identify the proximity, in multivariate space, of a site of interest to all reference sites. This is best accomplished using predictors that are reflective of general, naturally occurring, long-term differences in different types of streams. Variables that change naturally over short time scales are not good candidates. Another critical assumption is that the predictor variables cannot be strongly affected by human-caused activities, because doing so would make E a prediction of degraded conditions. The variables that were empirically selected for Utah’s RIVPACS models allow sites to be differentiated based on major environmental gradients (e.g., wet vs. dry conditions) and position along a longitudinal continuum. |
| Theron | Miller | TMiller\_12202018.pdf | 187 |  | Page 62. Phytoplankton Community: DWQ routinely collects phytoplankton to evaluate the composition and relative abundance of algae and cyanobacteria. These data are used to identify waterbodies potentially undergoing cultural eutrophication that may negatively impact beneficial uses.   Comment: Natural eutrophication has been occurring for a much longer period than cultural eutrophication and many lakes have already naturally exceeded the tipping point of regime change. Supporting data indicating domination by cyanobacteria historically and prehistorically has been reported numerous times in the literature using paleolimnological techniques, including the recent report on Great Salt Lake by Levitt et al. (2013). Paleolimnological techniques should be a standard procedure when contemplating any restoration effort, as paleo data can date the age of sediments that contain cyanobacteria and other sentinel species of diatoms and thereby help identify the degree of restoration that is reasonably possible and thereby appropriate objectives - including the condition the lake was in during 1975. This is critically important when contemplating massive and expensive remedial practices that more and more are reported in the literature as failures, particularly for shallow lakes (e.g. Sondergaard et al. 2007, Jeppesen et al. 2007). These authors have identified several causes of restoration failures as well as other challenges that require understanding of particularly shallow lake ecology. It is not merely as simple as determining cell counts and relative abundance of cyanobacteria. | None. | Restoration and restoration goals are beyond the scope of the IR because decisions regarding restoration are not part of the assessment process. Restoration is typically addressed during the TMDL process. With regards to paleolimnological data, Utah's assessment methods do not include methods for assessing this type of data nor are they being considered. As documented in the PERIOD OF RECORD section of the methods, the assessment is of current water quality and the data assessed cannot be more than 10 years old. Paleolimnological data are intended to be representative of historical conditions by definition and are not intended to be representative of current conditions. |
| Theron | Miller | TMiller\_12202018.pdf | 188 |  | Page 64. DWQ targets dissolved metals sample collection to 1 meter above the bottom at the deepest site of the waterbody, as this location is the most likely to identify dissolved metal exceedances if they exist in a lake.   Comment: The reason why metal concentrations are often elevated at the sediment surface is a result of relatively low pH and/or redox chemistry where anaerobic/anoxic conditions reduce the oxidation state of redox-sensitive metals or induce the methylation of some metals such Hg and Se. While concentrations may be elevated at 1 m above the sediment surface, this is only due to the physics of diffusion away from the source. More importantly, the required anaerobic/anoxic conditions, for their dissolution, themselves preclude the presence of most aquatic life. Listing a lake for metal toxicity based on this sampling approach is misleading and overly protective and actually describes a phenomenon that cannot be remedied without expensive intervention such as aeration or chemical treatment. Rather, a more appropriate and accurate approach would be to measure metal concentrations at the bottom of the metalimnion or where the DO concentration falls below the instantaneous criterion. In other words, available habitat will dictate whether aquatic organisms are exposed to metals. | None. | Recommended changes to sampling protocols are out of scope for the IR and should be addressed towards DWQ's monitoring program. Aquatic organisms may be exposed to toxic metals through multiple pathways. As described by the commenter, diffusion from anoxic sediments to the water column is one potential pathway. DWQ's routine metal sampling methods for lakes are intended to capture the potential for toxic metals to enter the water column or food web and negatively impact aquatic life uses. However, where additional metals data are available at other depths, they are also assessed following the toxic parameter assessment methods. Although in some cases, an anoxic layer exceeding 1 meter in thickness at the bottom of a lake may exclude certain organisms, particularly fish, other organisms are still likely present and potentially exposed. The cost or practicality of any potential pollutant remediation is out of scope for the IR. These considerations are incorporated into other programs including TMDLs or standards development (e.g. site-specific standards, use attainability analyses, or water quality variances) and recommendations regarding those processes should be addressed to those programs. |
| Theron | Miller | TMiller\_12202018.pdf | 190 |  | Page 74. HABs and Cell Counts   Comments: Lake closures and particularly 303(d) listings should not be based merely on cell counts. Existing evidence indicates that these actions are based on weak, anecdotal and incomplete data as described by EPA documentation (EPA 2016, Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin). Notably, EPA has rejected recommending cell counts or chlorophyll a because they are not scientifically justified. Indeed, there are many more peer-reviewed studies that denounce the linkage between cell counts and allergic or gastrointestinal symptoms than those that support these metrics. In fact, all reports of these allergic responses, including those reported for Utah Lake, are merely anecdotal and/or require removal of a portion of the sample volunteers (e.g. Pilotto, 1997) to establish some level of significance. This suggests that merely announcing the warnings, or briefing volunteer participants prior to data collection (the power of suggestion), may invite hypersensitivity (hypochondria) and lead to unsupported reports of symptoms. Reports may also fail to record the level or type of exposure â€“ such as swimming, wading, waterskiing, fishing, or even walking through or near the hyper-allergenic phragmites which surrounds most of Utah Lake. Therefore, retaining these criteria in state regulations, without the underlying EPA criteria recommendations, is inappropriate and should not be used as a basis for regulatory or assessment decisions by DWQ. Following this line of reasoning, DWQ and UDPH should initiate a program to eradicate all grasses, including phragmites, as well as ragweed, cottonwood trees, mold and many other common allergens â€“ because they cause similar symptoms. We owe it to the people of Utah to base such decisions on more rigorous, conclusive data. | None. | The issuance of recreational advisories or closures is a separate process from water quality assessment. Suggestions regarding the health advisory process should be addressed to the Water Quality and Health Advisory Panel (https://deq.utah.gov/legacy/divisions/water-quality/health-advisory/index.htm).  DWQ's HAB assessment methods directly reflect Utah's Narrative Standard which stipulates that the presence of scums, nuisances such as color, odor, or taste, or water quality conditions that may cause undesirable human effects are a violation of the state's water quality rules.   EPA's development of draft criteria for any particular cyanotoxin does not constitute a rejection of other forms of assessment and does not preclude DWQ's use of other indicators of impairment that are reflective of Utah's Narrative Standard. EPA's draft recommended criterion document for microcystin specifically identifies cyanobacteria cell densities as indicators of the ecological health of a waterbody and includes substantial discussion of the available eco-epidemiological evidence associating cyanobacteria exposure and human health symptoms. Based on DWQ's review of this evidence, and discussions with the authors of EPA's draft microcystin and cylindrospermopsin criteria, DWQ has determined that a HAB assessment approach that does not include cyanobacteria cell densities would not be protective of recreational uses.  The use of cell counts in DWQ's assessment process was a point of substantial discussion during the 2016 IR. Please see DWQ's 2016 IR response to comments, appendix A, responses 2, 3, and 9 for additional information (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/dwq-response-to-public-comments-final2016ir-v2-1.pdf). |
| Theron | Miller | TMiller\_12202018.pdf | 191 |  | Backer et al. (2009) reported: The second important component of environmental epidemiologic studies is an accurate measure of the health outcome. Based on anecdotal reports and earlier studies (Pilotto et al., 1997; Stewart et al., 2006a), we hypothesized in this and our previous study (Backer et al., 2008) that exposure to aerosolized MC during recreational activities in lakes with M. aeruginosa blooms would result in increased frequencies of self-reported acute dermal or respiratory symptoms over baseline (emphasis added). Some study participants reported throat and skin irritation after being in the bloom-affected waters. However, these are common symptoms with myriad causes and only a few participants reported such symptoms. Thus, we were not able to demonstrate differences in symptom reporting between exposed and unexposed participants, nor were we able to examine associations between reported symptoms and environmental measurements (cyanobacterial cell concentrations, water and air MC concentrations, or other water quality parameters).â€  Again, the important point here is that while the EPA carefully chose NOT to recommend criteria based on cell counts, UDWQ and UDPH are implementing cell counts in the assessment criteria for lake and beach/marina closures, as well as for listing on the 303(d) list, as is the case for Utah Lake. During the WQHAP meeting on January 12, the EPA representative stated that while there was useful data suggesting that cell counts are linked to dermal or respiratory distress, data were not quantitative and were absent of any dose-response relationship necessary to recommend criteria values for cyanobacterial cell counts. Even so, the representative mentioned that he would not be opposed to the use of cell counts if states choose to do so. It is inconsistent for EPA to officially not recommend the use of cell counts in its document, but yet still say to the group and regulatory agencies that cell counts and allergic responses could still be used. Clearly, the greater wisdom of EPA's upper management team that wrote the recommendation dictated that there is indeed insufficient information to include cell counts. Part of this decision appears to be the fact that dermal or respiratory or digestive symptoms are simply not toxicological responses in the tradition of describing lethal or sublethal effects of chemicals or metals on a dose-response basis. At least part of EPA’s decision is based on the fact that researchers have attempted to link  [response continued below] | None. | Thank you for your providing this paper excerpt. DWQ recognizes the inherent difficulty in attributing causation for human health systems in eco-epidemiological studies.  Recommended health advisory procedures are developed in conjunction with state and local health departments and stakeholders through DWQ's Water Quality and Health Advisory Panel (https://deq.utah.gov/legacy/divisions/water-quality/health-advisory/index.htm). Recommendations for the health advisory process can be made to that program. The inclusion of cell counts as an indicator in DWQ's HAB assessment methods directly reflects Utah's Narrative Standard which stipulates that the presence of scums, nuisances such as color, odor, or taste, or water quality conditions that may cause undesirable human effects are a violation of the state's water quality rules.  EPA's development of draft criteria for any particular cyanotoxin does not constitute a rejection of other forms of assessment and does not preclude DWQ's use of other indicators of impairment that are reflective of Utah's narrative water quality standard. EPA's draft recommended criterion document for microcystin specifically identifies cyanobacteria cell densities as indicators of the ecological health of a waterbody and includes substantial discussion of the available eco-epidemiological evidence associating cyanobacteria exposure and human health symptoms. Based on DWQ's review of this evidence, and discussions with the authors of EPA's draft microcystin and cylindrospermopsin criteria, DWQ has determined that a HAB assessment approach that does not include cyanobacteria cell densities would not be protective of recreational uses.  The use of cell counts in DWQ's assessment process was a point of substantial discussion during the 2016 IR. Please see DWQ's 2016 IR response to comments, appendix A, responses 2, 3, and 9 for additional information (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/dwq-response-to-public-comments-final2016ir-v2-1.pdf). |
| Theron | Miller | TMiller\_12202018.pdf | 191 |  | the allergic respiratory or dermal symptoms to lipopolysaccharides (LPS; molecules that are rooted in the cell membrane of mostly gram-negative heterotrophic bacteria such as E. coli or Salmonella). For example, these well-studied structures have been found to be responsible for the adverse inflammatory cascading responses of our immune system (sore throat, congestion, itchy eyes, mucus secretion, etc.). In most ways these responses have been reported to be akin to typical inflammatory responses to everyday allergens such as pollen, dust or mold. Clearly, EPA has chosen to not try to establish assessment criteria based on cell counts, because there is virtual ly no quantitative data that links a threshold of cell counts to an allergic or gastrointestinal response. Moreover, LPS, of themselves, are not toxic, but actually require specific host proteins (such as within our mucus membranes) for LPS to display full agonist potency. Most notable, the link between cyanobacterial LPS and allergic responses is indeed a very weak one. Stewart et al. (2006), also cited in the EPA document, provides perhaps the most thorough review of the literature that might describe such a link.  [Response continued below in the "Mercury Assessment Process" box] | None. | [see response above] |
| Theron | Miller | TMiller\_12202018.pdf | 192 |  | Here are some excerpts of the Stewart et al. review:    Several authors note that the health implications of cyanobacterial LPS are poorly understood and the topic requires more research [6, 7, 8, 9, 10, 11, 12, 13, 14, 15]. Carmichael [16] suggests that the relationship between ingested LPS and illness in an immunologically competent population is debatable, there being little evidence that people with a normal LPS-containing gut flora would be affected by LPS from water supplies. (emphasis added)  The reason that cyanobacterial LPS has not been discussed here is simply that the required research has not been done as yet (emphasis added). No cyanobacterial lipid A structures have been published, therefore no inferences can be deduced as to their likely endotoxic potential, or lack of it. But with the knowledge that endotoxic potential can vary in the most fundamental way across Gram-negative bacteria, from agonistic to weakly active to inactive to antagonistic, it should be incumbent on the cyanobacteria research community to cease attributing biological activity and clinical symptoms to cyanobacterial LPS without specific research evidence. (emphasis added). Cyanobacteria may not be typical Gram-negative organisms because of their unusual cell wall architecture, and cyanobacteria will have experienced very different selection pressures to gut-dwelling Gram-negative bacteria, which may be reflected in different lipid A structures.   Some observations on the behaviour of Gram-negative bacterial LPS in the gut serve to cast doubt on the suspicions that cyanobacterial LPS alone is responsible for initiating acute gastro-intestinal illness in humans by the oral route:  Commensal gut flora: The human intestinal tract houses an enormous population of bacteria, many of which are Gram-negative. The Enterobacteriaceae are found in normal faecal flora at some 108â€“109 per gram [130]. The number of microbes in the gut lumen exceeds the number of eukaryotic cells in the human body by an order of magnitude [49, 131], an observation that may lead some to unkindly suggest that the principal reason for human existence is to serve as bags for the housing and transport of bacteria. Nanthakumar et al [132] note that mature enterocytes are 100 to 1,000 times less sensitive to LPS than neutrophils and hepatocytes, which is not surprising since they are exposed to Gram-negative bacteria and their endotoxins since birth when the gut is colonised.  [response continued below] | None. | Thank you for providing these excerpts. DWQ is familiar with the Stewart et al. 2006 study which provides a review of the available evidence in the scientific literature associated with one proposed pathway through which cyanobacteria may elicit negative human health effects, cyanobacterial lipopolysaccharides. DWQ agrees with the authors that additional research regarding causes of human health effects apparently associated with cyanobacteria or cyanotoxin exposure is well warranted. |
| Theron | Miller | TMiller\_12202018.pdf | 192 |  | Non-virulent strains: Most Gram-negative organisms are non-pathogenic. Pathogenicity involves a complex interaction between host-related and specific microbial virulence factors â€“ the latter including pili, fimbriae and heat shock proteins [133, 134]. Infectious, i.e. colonising, microbes are the most common cause of diarrhoea worldwide; pathogenic strains commonly cause disease by the action of enterotoxins [135]. That virulence factors other than lipid A structures of LPS are responsible for gastro-intestinal disease is seen in the protective effects of attenuated or mutant Gram-negative bacteria when used as live oral vaccines against pathogenic strains [133, 136, 137, 138]. Some E. coli strains are used as probiotics for the treatment of gastrointestinal disease and infection prophylaxis in neonates [139].  Anecdotal reports of consumption of non-hazardous cyanobacteria: Heaney [39] reports observations of cattle seen drinking from two Irish lakes affected by thick scums of Anabaena flos-aquae and Aphanizomenon flos-aquae without ill effect. Author IS can add a similar observation: during recruitment for an epidemiology study [140] at Lake Coolmunda in southern Queensland, a frank Microcystis aeruginosa bloom was in attendance. A group of six or seven dogs were seen playing vigorously in the water, and three dogs were observed drinking from it. The owners of the animals were questioned the following day; all denied observing any adverse effects. The consumption of Spirulina and other cyanobacteria provides further evidence that cyanobacterial LPS cannot all be harmful. | None. | [see response above] |
| Theron | Miller | TMiller\_12202018.pdf | 193 |  | Based on this information it is clear that DWQ’s and DPH’s decision to push for retaining cell counts as assessment, closure, and listing criteria is not founded in solid science, but rather on incomplete, anecdotal epidemiological reports that are largely non-quantitative in terms of linking cell counts to the presence of cyanotoxins. The reported allergenic and nontoxic response that DWQ and DPH are so adamant to report lacks the necessary scientific underpinnings that link LPS to any of the reported allergenic or gastrointestinal pathogenic symptoms such as diarrhea. | None. | The issuance of recreational advisories or closures is a separate process from water quality assessment as part of the IR. Suggestions regarding the health advisory process should be addressed to the Water Quality and Health Advisory Panel (https://deq.utah.gov/legacy/divisions/water-quality/health-advisory/index.htm).  The inclusion of cell counts as an indicator in DWQ's HAB assessment methods directly reflect Utah's narrative water quality standard which stipulates that the presence of scums, nuisances such as color, odor, or taste, or water quality conditions that may cause undesirable human effects are a violation of the state's water quality rules.  Based on DWQ's review of HAB related eco-epidemiological evidence and other HAB related literature DWQ has determined that a HAB assessment approach that does not include cyanobacteria cell densities would not be protective of recreational uses.  The use of cell counts in DWQ's assessment process was a point of substantial discussion during the 2016 IR. Please see DWQ's 2016 IR response to comments, appendix A, responses 2, 3, and 9 for additional information (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/dwq-response-to-public-comments-final2016ir-v2-1.pdf).  Cyanobacteria lipopolysaccharides are one potential pathway proposed by some authors in the scientific literature through which exposure to cyanobacteria blooms may result in undesirable human health effects. Multiple potential causes of human health symptoms associated with cyanobacteria bloom exposure have been proposed. DWQ has not attempted link human health symptoms to any specific property of cyanobacteria cells. Instead, based on a review of the available eco-epidemiological evidence and other HAB related literature DWQ has determined that a HAB assessment approach that does not include cyanobacteria cell densities would not be protective of recreational uses. |
| Theron | Miller | TMiller\_12202018.pdf | 195 |  | [Response continued below in the "General Comments on Narrative Standards for All Waters" box] | Requested improvement on form functionality. | Thank you for using the public comment form and indicating that your response was continued in another text box in the form. DWQ will review text box character limits for the next IR public comment forms. |
| Theron | Miller | TMiller\_12202018.pdf | 196 |  | What are the implications of such an unsupported decision?    Here are the facts:  1.The open water of Utah Lake was sampled about 48 times in 2016 and 2017 for microcystins. Of these, only three samples contained measurable microcystins (toxins in the great majority of samples were below detection limits) and all three of these samples contained less than 4 ug/L microcystin. Yet, due to an abundance of precaution and elevated cell counts, the entire lake was closed for about four weeks. In turn, this was used as support for DWQ's decision to add Utah Lake on the 303(d) list based on 2014 data cell count data.  2. This listing ignored the EPA initial recommended criteria of 20 ug/L microcystin â€“ and NOT cell counts. This EPA decision to not use cell counts for assessments was due to a lack of quantitative and appropriate basic research that needs to be performed. The discussion outlined above explains a lot of EPA's reasoning.   Therefore, the decision to retain cell counts as assessment criteria is simply not scientifically supported, and hence, not supported by a major policy decision by EPA.  Moreover, Utah Lake blooms are most often dominated by Aphanezomenon flos aquae, a very weak to non-toxin producer (it has been identified as a weak microcystin producer; although whether this species was completely isolated from other microcystin producers is questionable), for which there are not sufficient scientific underpinnings to demonstrate toxicity, or an LPS/allergenic reaction. In fact, quantification of our early zooplankton data found 5 out of the 6 most common species doubled or tripled their populations during the peak of the 2016 bloom. Perhaps most notably, the data indicates that even if appropriate linkages to allergenic responses were to be established, these symptoms are not pathologic and constitute nothing more than a nuisance allergic response that is no more serious than hay fever. Just for comparison, this is akin to the notion that perhaps we need to put out a public policy to destroy the grasses and weeds in our open spaces and even in our yards because they produce pollen, or the cottonwood trees because, darn it, this hay fever is a nuisance. Just how much government regulation do we need to control nontoxic allergens?   Perhaps it is these types of decisions, whether to close a beach or a lake, in the interest of public health protection and recreation interests, that the charge of DWQ and DPH appear to converge. But it should remain clear that their responsibilities are indeed different. I can somewhat understand why local county health departments, in the spirit of zeal, may endeavor to close a beach or harbor based on cell counts. But DWQ has much greater responsibility under EPA-delegated state authority, to implement and enforce EPA recommended water quality criteria. Moreover, this should particularly apply in situations of performing beneficial use assessments that have always strictly adhered to EPA recommended criteria.   This then begs the question: should DWQ and DPH be given the latitude to impose a regulatory value to be used for lake closures and even the ability to list the lake as 303(d)-impaired using a parameter that has no EPA-recommended criteria, but is rather based solely on the possibility that nontoxic nuisance allergic responses MIGHT occur from recreating in the lake, or maybe even just walking or driving next to the lake?  [see response below] | None. | The inclusion of cell counts as an indicator in DWQ's HAB assessment methods directly reflect Utah's narrative water quality standard which stipulates that the presence of scums, nuisances such as color, odor, or taste, or water quality conditions that may cause undesirable human effects are a violation of the state's water quality rules. EPA's development of draft criteria for any particular cyanotoxin does not constitute a rejection of other forms of assessment and does not preclude DWQ's use of other indicators of impairment that are reflective of Utah's narrative water quality standard.  The use of cell counts in DWQ's assessment process was a point of substantial discussion during the 2016 IR. Please see DWQ's 2016 IR response to comments, appendix A, responses 2, 3, and 9 for additional information (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/dwq-response-to-public-comments-final2016ir-v2-1.pdf). In their review and comments on the 2016 Integrated Report, EPA approved and supported the recreational use impairment determination for Utah Lake for harmful algal blooms stating, "Based on a comparison to the HABS methodology and information from the multiple lines of evidence considered in the state’s assessment, EPA agrees that Utah Lake is impaired".  The issuance of recreational advisories or closures is a separate process from water quality assessment. Suggestions regarding the health advisory process should be addressed to the Water Quality and Health Advisory Panel (https://deq.utah.gov/legacy/divisions/water-quality/health-advisory/index.htm).  Water quality based recreational advisories or closures of waterbodies protected for recreational uses are direct indicators that recreational uses are not being attained. |
| Theron | Miller | TMiller\_12202018.pdf | 196 |  | The other concern that I have with this type of action (listing an entire lake on cell counts alone), is consideration of where this has led - that DWQ has moved forward to establish water quality criteria that are based only on cell count data and the weak, anecdotal linkage that these cells MIGHT induce some allergenic responses. Not only is this unnecessary, with the type of bloom that occurs on Utah Lake and many others, but it imbues in the court of public opinion the undeserved reputation that particularly Utah lake is toxic and people should not recreate there - which is just simply not the case. This type of publicity is more about raising fear and support for unfounded closures that further support DWQ's nutrient-removal agenda at any cost. Warnings and closures should be based on sound science â€“ rather than the common species in recent blooms that are not strong toxin producers.   This leads to my biggest concern site-specific criteria are being developed using only cell counts, which, in the case of Utah Lake has thus far included dominant species that are benign toxin producers, rather than EPA-recommended cyanotoxin concentrations. This will lead to a TMDL that will require cell counts to be < 100,000 or even < 20,000 - even if the bloom is benign. Moreover, the current literature on nutrient thresholds of cyanobacterial blooms suggests that reaching this goal would require the most remote possibility of achieving total P concentrations in the range of 20 to 30 ug/L or lower, and this will unquestionably be the conclusion of the Science Panel final report. Initial calculations suggest that this would require total P loadings of < about 20 tons per year. While this seems like a lot, preliminary estimates from monitoring and research on the sources of P to Utah Lake indicate that even if POTW loadings were reduced to zero, the unregulated nonpoint sources (urban and rural), or the potential high rates of P recycling from sediments would preclude achieving such low nutrient concentrations. Moreover, and truly surprising, the initial estimates from the last 24 months of weekly monitoring atmospheric P deposition, alone range from 50 to 170 tons per year â€“ resulting in 40 to 150 ug/L in the water column from this source alone. Indeed, the whole of these potential loads suggests that reaching 20 to 30 ug/L will be impossible. Moreover, as these additional sources become further understood and quantified, this raises the question of whether the narrative criteria (i.e. It is illegal for any human to discharge or place any waste in such a way that it may become offensive) even applies. Rather, the dominant loadings appear thus far to be from unregulated urban and rural sources as well and airborne atmospheric sources that likely originate from the west desert. We need to document where Utah Lake lies with regard to regime shift and alternative stable state. This should be a major consideration with regard to the ability, degree and strategies for restoration success as well as carefully quantifying what is to blame or who is to blame for various nutrient loads before making such drastic and very expensive speculations. | None. | [see response above] |
| Theron | Miller | TMiller\_12202018.pdf | 197 |  | Literature Cited  Backer, L. C. S. V. McNeel, T. Barber, B. Kirkpatrick, C. Williams, M. Irvin, Y. Zhou, T. B. Johnson, K. Nierenberg, M. Aubel, R. LePrell, A. Chapman, A. Foss, S. Corum, V. R. Hill, S. M. Kieszak and Y. Cheng. 2009. Recreational exposure to microcystins during algal blooms in two California lakes. Toxicon: 2009: 1â€“13  Barras, S.C. and J. A. Kadlec. 2000. Abiotic predictors of avian botulism outbreaks in Utah. Wildlife Society Bulletin (1973-2006) Vol. 28, No. 3 (Autumn, 2000), pp. 724-729  Jeppesen, E. Ã† M. Meerhoff Ã† B. A. Jacobsen Ã† R. S. Hansen Ã† M. SÃ¸ndergaard Ã† J. P. Jensen Ã† T. L. Lauridsen Ã† N. Mazzeo Ã† C. W. C. Branco. 2007. Restoration of shallow lakes by nutrient control and biomanipulationâ€”the successful strategy varies with lake size and climate. Hydrobiologia 581:269â€“285.  Kadlec, J.A. 2002. Avian Botulism in Great Salt Lake Marshes: Perspectives and Possible Mechanisms. Wildlife Society Bulletin (1973-2006) Vol. 30, No. 3 (Autumn, 2002), pp. 983-989.   Miller, T. G. 2012. Research Compendium. A summary of 2009 to 2011 Studies on Jordan River and Farmington Bay wetlands. Report to Jordan River/Farmington Bay Water Quality Council.   Miller T.G. 2014. A Physical, Chemical and Biological Assessment of the Jordan River: 2009-2013 Report to Wasatch Front Water Quality Council.   Pilotto, L.S., R. M. Douglas, M. D. Burch, S. Cameron, M. Beers, G. J. Rouch, P. Robinson, M. Kirk, C.T. Cowie, S. Hardiman, C. Moore and R. G. Attewell. 1997. Health effects of exposure to cyanobacteria (blue-green algae) during recreational water-related activities. Aust N Z J Public Health 1997; 21: 562-6)  Richards, D. C. 2010. Characterization of temperature, dissolved oxygen, and macroinvertebrate communities of targeted intermittent streams. Report to Idaho Department of Environmental Quality, Boise, Idaho. 189 pp.  [see response below] | None. | Thank you for providing the literature references that you cited and used to support of your comments. These were reviewed when responding to your comments. |
| Theron | Miller | TMiller\_12202018.pdf | 197 |  | Richards, D. C. 2013. Arizona Intermittent Streams Macroinvertebrate Index of Biological Integrity. Developed for the Arizona/New Mexico Mountain Ecoregion. Final Report. Biocriteria Program Monitoring Unit, Water Quality Division, Arizona Department of Environmental Quality, Phoenix AZ. 59 pp.  Richards, D. C. 2016. Real and Perceived Macroinvertebrate Assemblage Variability in the Jordan River, Utah can Affect Water Quality Assessments. Draft Technical Report. Submitted to the Jordan River/Farmington Bay Water Quality Council. Salt Lake City, UT. Oreohelix Consulting, Vineyard, UT.  Richards, D. C. 2017. Native Unionoida Surveys, Distribution, and Metapopulation Dynamics in the Jordan River-Utah Lake Drainage, UT. Report to: Wasatch Front Water Quality Council. Salt Lake City, UT. OreoHelix Consulting, Vineyard, UT. Version 1.5 May, 26, 2017.  Richards, D. C. 2016. Is Reliance on a Single Bioassessment Metric for Assessing Water Quality in Utahs Rivers and Streams Prudent? Draft Technical Report to Wasatch Front Water Quality Council. Salt Lake City, UT. Oreohelix Consulting, Vineyard, UT.  Richards, D. C., Lester, G., Pfeiffer, J. and J. Pappani. 2018. Temperature Threshold Models for Benthic Macroinvertebrates in Idaho Wadeable Streams and Neighboring Ecoregions. Environmental Monitoring and Assessment. 190: 120. https://doi.org/10.1007/s10661-018-6478-9.  Rocke, T.K. and T. K. Bollinger. 2007. Avian Botulism. PP 377-417. In: N.J. Thomas, D. B. Hunter and C. T. Atkinson (Eds.) Infections diseases of wild birds. Blackwell Publishing.   Sondergaard, M. E. Jeppesen, T.L. Lauridsen, C. Skov, E.H. Van Ness R. Roujackers, E Lammensand R. Portielje. 2007. Lake restoration: successes, failures and long-term effects. J. Appl. Ecol.44 (6): 1095-1105.  Stewart, I, P J Schluter and G R Shaw. 2006. Cyanobacterial lipopolysaccharides and human health â€“ a review. Environmental Health. 2006. 5:7 | None. | [see response above] |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 31 | I would like to thank Utah Division of Water Quality (UDWQ) for providing citizens with the opportunity to comment on their 2018/2020 303(d) Assessment Methods draft. UDWQ has done a tremendous job in trying to evaluate and protect Utah’s valuable water resources and it is reflected in this draft. UDWQ should be commended for its efforts. | None. | DWQ appreciates your encouragement regarding the improvements made to the water quality assessment program and the Draft 2018/2020 303(d) Assessment Methods. Thank you for providing comments on the methods, so we can better assess and report on Utah's surface waters. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 32 | However, I do have some comments that may prove helpful in the next revision of the draft and in particular on how biological evaluations are presently being conducted. Hopefully UDWQ is in the process of revising its biological assessment program to better reflect the state of science and in particular, to address the pitfalls of over reliance on RIVPAC O/E models. | None. | DWQ appreciates the time and effort spent in making recommendations for improvements to Utah’s biological assessment method. Improvements to all programs can always be made and it is important to seek advice from others when making a change to any water quality program. However, DWQ and the primary scientific literature disagree with your opinion about the effectiveness of using O/E models for evaluating stressor disturbance (e.g., please review: Hawkins, C.P. 2006. Quantifying biological integrity by taxonomic completeness: it’s utility in regional and global assessments. Ecological Applications 16(4): 1277-1294). The fact that O/E is a scientifically defensible and a well-established method for assessing biological degradation does not mean that other methods are invalid. All biological assessment approaches have strengths and weaknesses. DWQ is open to expanding on the existing biological assessment methods in the future, provided that resources can be deflected from other water quality priorities to do so. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 33 | Introduction Table 1. U.S. Environmental Protection Agency categorization of assessed surface waterbodies for integrated report purposes. EPA Assessment Category 4C. Non-Pollutant Impairment. Waterbodies that are not supporting designated uses are placed in this category if the impairment is not caused by a pollutant but rather by pollution such as hydrologic modification or habitat degradation. Similar to Categories 4A and 4B, if the waterbody has other pollutants that need a TMDL, or there is an approved TMDL or pollution-control mechanism in place, the waterbody may also be listed in Categories 4A, 4B, and 5. Therefore, an AU with a pollution control…  Comment: Many waterbodies in Utah likely fall under this category, which will affect all other assessment criteria. For example, the Jordan River has undergone severe habitat degradation and hydraulic modification. The river has been channelized, dewatered, and not allowed to flush out sediments, including organic matter, that were typically flushed in the past during high water events. In addition, the Jordan River naturally flows through unconsolidated fine sediments including silts, clays, sands, and small gravels. These factors, human caused and natural, directly affect all other types of ‘pollution,’ resulting in increased temperatures, reduced dissolved oxygen (DO) levels, lower O/E scores, etc. Therefore, in many instances, impairments to lotic systems are not caused by a pollutant but rather by ‘pollution’ as defined by EPA. More emphasis by UDWQ should be placed on these types of impairments when evaluating ‘supporting’ or ‘not supporting’ beneficial uses. | None. | DWQ agrees with the commenter on the importance of evaluating impairments that are caused by pollution. However, identifying sources of pollution is not part of the Assessment Methods of the IR. Instead sources are determined as part of the TMDL or related source assessments. (See section Unknown Sources in the assessment methods for more information on how sources are identified and tracked in the assessment process). DWQ is in the process of drafting implementation guidance for Category 4C and 5-alt. For more information, contact DWQ’s Watershed Protection Section Manager.  For source concerns specifically related to the Jordan River, the commenter should refer to the ongoing development of a dissolved oxygen TMDL for the Jordan River (https://deq.utah.gov/water-quality/watershed-monitoring-program/jordan-river-dissolved-oxygen-tmdl-watershed-management-program). |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 34 | Assessments Specific to Flowing Surface Waters of the State and Canals CONVENTIONAL PARAMETER ASSESSMENTS Page 40. Table 11. Conventional parameters and associated designated uses as identified for assessment purposes. Total dissolved solids (TDS)  Comment: TDS are also known to negatively affect aquatic life. Recommend adding Aquatic Life to Designated Use. | Out of Scope. | DWQ is committed to protecting aquatic life uses of Utah's waterbodies. Utah does not currently have aquatic life use numeric TDS criteria and the development of standards are outside the scope of the Integrated Report. Utah water quality standards are reviewed every 3 years (see https://deq.utah.gov/water-quality/triennial-review-water-quality) and as of the last review, USEPA had not published Clean Water Act Section 304(A) recommendations for TDS aquatic life criteria. The development of standards are outside the scope of the Integrated Report. Information on the Triennial Review can be found at the following web address: https://deq.utah.gov/water-quality/triennial-review-water-quality. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 48 | Although O/E may have an intuitive biological meaning, there are so many assumptions, generalizations, and errors associated with derivation of results that its accuracy in assessing loss of taxa and impairment is highly questionable. | None. | DWQ and the primary scientific literature disagree with your opinion about the effectiveness of using O/E models for evaluating stressor disturbance (e.g., please review: Hawkins, C.P. 2006. Quantifying biological integrity by taxonomic completeness: it’s utility in regional and global assessments. Ecological Applications 16(4): 1277-1294). All biological assessment methods have intrinsic assumptions and errors. Well over 100 peer-reviewed studies, many of which have been cited in the biological assessment chapter associated with the Integrated Report, have evaluated the assumptions and errors associated with RIVPACS methods and have found the approach to be on par or superior to other methods for purposes of accurately identifying sites that have experienced biological degradation. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 49 | There are several other diversity metrics in use throughout the world that are much simpler to derive and interpret than RIVPACS O/E (Table 1 for example and see Literature Cited). These metrics can easily substitute for O/E or at least supplement it. For example, richness and evenness are better indicators than O/E for several reasons, 1) they are not confounded with other models (e.g. PRISM, a costly and proprietary model that is not transparent except for those who can afford to pay for its use), 2) they are independently verifiable, and 3) they allow assessment of change at local-scale due to point source impacts. | None. | Diversity measures were abandoned long ago by the ecological assessment community because they are strongly influenced by natural setting and are not easily interpretable when used in this context. In that sense, they are not at all substitutable for O/E, which attempts to parse out natural signals from stressor signals. Please review Hawkins and Carlisle 2001 for an example that shows how O/E is preferable to plain taxa richness. As the commenter suggests, other metrics may provide additional information about the nature of biological degradation and clues to the types of stressors causing the disturbance. However, these are often highly correlated, which complicates combining the scores for purposes of making an impairment determination. Additionally, 1) PRISM data are not proprietary and are freely available. They have been independently tested and validated. They are used by a very large community of scientists across a wide range of disciplines and are continually updated and corrected, 2) any O/E model is independently verifiable, 3) O/E can be used for point source assessments and sometimes must be used to avoid pseudoreplication issues when BACI designs cannot be implemented. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 50 | As I have emphasized to UDWQ on numerous occasions, RIVPACS O/E models do not quantify loss of predicted taxa. In the case of UDWQ assessments, O/E quantifies only those taxa that were identified from a single (N = 1) composite sample collected from several types of habitats (including riffles and runs) that can exhibit much variability between the macroinvertebrate assemblages. Samples were also identified in the laboratory using a subsample (typically 600 organisms, with large and rare counts). O/E simply quantifies what was observed in a sample, nothing more. Taxa not identified may have or may not have been lost from the waterbody; UDWQ can only conclude that they simply weren’t observed. | Clarified Methods text. | The commenter is correct with the assertion that the “loss” of a taxon from a waterbody is strictly an inference made from model results. DWQ removed the text from the Narrative Standards: Biological Assessment section . O/E does not simply quantify what was observed in a sample; it quantifies those taxa that were observed in a sample that were predicted to occur in the absence of human disturbance. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 51 | Probability of Capture > 50% Again, as I have discussed on numerous occasions, probability of captures (Pc’s) >50% preclude those very macroinvertebrate taxa that constitute biological integrity in a water body. As an example, waters in the Bonneville Basin and in some other parts of UT have unique mollusk assemblages found nowhere else in the world. Most of Utah’s mollusks, including native mussels, clams, and non pulmonate snails do not occur in UT waters at Pc rates > 50%. By relying on RIVPACS O/E > 50% Pc, UDWQ failed to protect the unique mollusk assemblages in UT and apparently was completely unaware of their declines during the time period when continued molluscan viability may have been protected/ensured. This reliance on a single metric with > 50% Pc to assess biological integrity also likely is not protecting other rare and uncommon macroinvertebrates (< 50% Pc) that are again, by definition, biological integrity. | None. | In short, the use of a Pc >0.5 helps more accurately identify sites that have been biologically degraded. With a few exceptions, O/E based on Pc >0.5 is more sensitive and precise than O/E based on all possible taxa (Pc >0). The reason is that common/core taxa that are characteristic of a given stream are typically the ones that are most sensitive to anthropogenic alteration at that site. Due to these scientific facts supported in peer-reviewed, scientific literature, most States and countries use Pc >0.5. A suite of research citations that evaluated different Pc thresholds in different contexts is provided. It is true that these O/E calculations may result in a failure to consider rare taxa. Rare taxa are often relatively low in abundance, in which case their presence or absence at a site is strongly influenced by sampling error. This is likely why the use of Pc >0.5 is more sensitive to degradation and precise than the use of Pc >0. In other cases, rare taxa are limited to a small number of locations, which all biological assessment methods cannot easily incorporate because they are dependent on comparisons against regional reference composition. Rare species are important, but their identification and protection is beyond the scope and intent of biological assessments conducted for purposes of the Integrated Report. The protection of rare and endangered species is an important concern, addressed through the Endangered Species Act, not the Clean Water Act. To our knowledge, the disappearance of rare mollusks occurred long before DWQ conducted biological assessments. The Division of Wildlife Resources, who works with the US Fish and Wildlife Service on Endangered Species Act concerns, has that regulatory authority. It is aware of the loss of mollusks and working on this problem. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 52 | Calculating ‘E’ using a probability of capture (Pc) of >50% is extremely problematic and results in a poor assessment of biological integrity. Taxa with Pcs < 50% are likely the most sensitive taxa and the very taxa that respond to impairment more that those with Pc > 50%. The statement that “Using a Pc limit set at greater than 50% typically results in models that are more sensitive and precise, which results in a better ability to detect biological stress” is based on two relatively limited studies that evaluated precision using their own methods, i.e. circular reasoning and these were hardly typical. UDWQ is setting a precedent by using Pc > 50% based on results that are not solidly supported in the literature and not established scientific fact but based on a vague, ill-defined term in the two studies: ‘sensitivity’. | None. | DWQ is not setting precedent by using a Pc >0.5. The methods include eight peer reviewed articles on the topic that provide these results and also include extensive discussion about why this is the case. In the early stages of RIVPACS approaches, models were routinely constructed using both a Pc >0 and Pc >0.5; however, most biological assessment programs throughout Europe, Australia, New Zealand, and the United States that use RIVPACS methods have settled on a Pc >0.5 because they are almost always more accurate, precise and sensitive to anthropogenic degradation than lower Pc values. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 53 | From the lengthy discussion in the draft, it appears that UDWQ is more interested in the continued reliance on a single metric (O/E) that had good statistical properties (e.g. more sensitive and precise) than incorporating other metrics or using a < 50% Pc that may prevent loss of rare, uncommon, and unique taxa and provide greater insights into the types of impairments that Utah waterbodies experience. | None. | At this time, DWQ has identified the RIVPACS O/E index approach as the most scientifically defensible method for performing bioassessments for making impairment determinations. Other methods can be used to better understand the nature of biological degradation for any impairments that are identified using O/E. Alternative biological assessment methods would require the same level of technical review and documentation that has been completed for the currently employed methods. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 54 | It is my opinion that O/E models may be able to detect large levels of biological stress, but not biological integrity. | None. | O/E is not biological integrity but an important aspect of it. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 55 | RIVPACS O/E precision and predictive ability The new O/E model in the draft is claimed to be a less precise predictive model than the previous one used by UDWQ. A loss of precision in the updated model should be critically reevaluated. | None. | The new model incorporated a wider range of reference sites, including larger rivers and has an expanded index period. This is the most likely explanation for the slight decrease in model accuracy and precision. However, the accuracy and precision of the current model are at a level considered acceptable for conducting biological assessments by regulatory agencies worldwide. It is also important to note that the most important reason for expanding the breadth of conditions applicable to the model has led to considerable savings in public resources. DWQ is now able to better partner with state and federal agencies to leverage our resources, saving well over $100,000/year in sample collection and processing costs. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 56 | Was this updated model selected because in saves time and money? | None. | While it is true that the model has saved DWQ and natural resource agency partners’ considerable time and money by enabling us to more effectively collaborate sample collection and results in a consistent manner, this was not the principal impetus for the update. DWQ routinely updates the model whenever sufficient data from new reference sites suggests that work to construct a new model is warranted. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 57 | Several problems in simplifying the model are as follows:  Incorporation of 1st order and 8th plus order streams and rivers. There is a big difference in macroinvertebrate assemblages in typical 1st order vs. 2nd to 5th order streams and between 8th plus rivers and 2nd to 5th order streams (please review the River Continuum Concept by Vannote et al.). | None. | DWQ is aware of naturally-occurring longitudinal changes in biological composition in stream ecosystems and the seminal article on this topic cited by the commenter. Several predictor variables in the RIVPACS model were included (e.g., watershed area, mean watershed elevation) so the model predictions could account for such differences. This means that the models predictions for the taxa expected at a site (E) explicitly account for stream size. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 58 | Taxonomic resolution. A coarser taxonomic resolution results in a major loss of valuable information provided by individual taxa when 'rolled up' to higher taxonomic level. It also means that some unique or ecologically valuable taxa may be unaccounted for and lost from the AU without knowledge by UDWQ. For example: combining all species of caddisflies in the genus Rhyacophila at least 5 species or more could be lost without UDWQs knowledge. Or by combining all species of the mayfly genus Baetis, several of the more sensitive species may have been lost. UDWQ is well aware that taxonomic (phylogenetic) similarity has very little predictive power for sensitivity to different types of impairment (Richards 2016, UDWQ 2017). | None. | O/E is an effective indicator of biological condition. The primary goal of this tool for water quality management is to discover whether the aquatic life use is supported. A relatively large amount of literature empirically shows that the use of coarse (family) taxa can often provide similar assessment scores as fine level taxonomic resolution in O/E models. There are many states that use just family level data. There are tradeoffs in the use of fine versus coarse taxonomic resolution data. Coarse data are easier to model (more precise) but use of fine resolution data may produce more responsive indices. Please review Hawkins 2006 to understand a few good examples of these tradeoffs. DWQ's model is perhaps less sensitive, but more precise while also providing the cost effectiveness of incorporating water quality partner collected invertebrate data; creating critical efficiency of DWQ's resources. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 60 | Seasonality effects Seasonality also affects macroinvertebrate assemblages. Summer season has fewer taxa in larval stages that are needed for taxonomic identification and O/E derivation. Comparing summer collected vs. late autumn to early spring samples increases variability and thus O/E results (e.g. summer samples likely will have fewer taxa and lower O).   Because of these pitfalls, I caution UDWQ not to try to accommodate broader spatial and temporal data into O/E models simply to cut costs. This will result in loss of predictive power in ability to detect impairment. Remember that all assessments and monitoring efforts will eventually have to be measured at the watershed or site-specific level and a macroinvertebrate assessment program that reduces variability at the onset will be more cost effective in the long run. | None. | The RIVPACS model was constructed from reference sites with repeat visits across seasons. Therefore, the temporal range of variability across seasons is implicit in the model. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 61 | UDWQ is in an ideal situation to vastly improve macroinvertebrate biological assessments. UDWQ has a strong working relationship with the USU Bug lab, including the leading developers of RIVPACS models at USU and other entities. It should take full advantage of this opportunity to develop a robust biological assessment program comparable to other federal, state, tribal, and county agencies in the region. | None. | At this time, DWQ, in collaboration with many of the entities recommended by the commenter, has identified the RIVPACS O/E index approach as the most scientifically defensible method for performing bioassessments for assessment purposes. The rationale for this decision is that RIVPACS models tend to be more precise and often more responsive to known stressors than other indices (e.g., please review Hawkins 2006, Hawkins et al 2010). Many states and countries have made a similar determination with respect to assessment decisions and principally use additional metrics for further exploration of impairments identified by O/E. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 62 | It appears to me that many millions of dollars have been spent developing RIVPACs O/E regional models when it would have been much more prudent to train UDWQ staff to recognize the macroinvertebrate taxa that occur in UT and become proficient in understanding their ecology, natural and life history, in order to examine sample results and easily evaluate which taxa were missing and why at the watershed level. | None. | DWQ has not spent millions of dollars developing regional O/E models. Much of the data that was used to develop models was collected from EPA-funded projects that used the information for other purposes. DWQ has partnered with the US Forest Service, BLM, EPA, and Salt Lake County—who all use O/E—to offset costs and ensure that biological data meet the needs of multiple agencies. Model construction was conducted by DWQ staff working in collaboration with national experts. The types of heuristic evaluations that the commenter recommends are not well suited to making assessment decisions because they are difficult to conduct consistently and objectively. Instead they are better positioned to assist with further evaluations of impairments identified through empirically derived indices such as O/E. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 63 | Model Construction and Performance Page 49. Table 12. Comment: These predictor models and variables are mostly watershed based. It is commendable that UDWQ is now assessing biological integrity at the watershed level rather than at the region wide level, as it has done in the past. | None. | Site-specific, GIS-based predictor variables are used to develop RIVPACS models rather than regional watershed means. The spatial resolution for these predictor variables is 800 m which makes the assessment at reach segment scale rather than watershed. DWQ has conducted biological assessments since the 2008 IR using the same site-specific approach. It is true that DWQ has extrapolated site-specific assessment results to better understand the extent of degradation that has occurred regionally, but these analyses have never been used to formally assess specific waterbodies. Instead, these regional results have been used to better understand broad patterns of biological degradation for planning purposes. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 64 | By assessing biological integrity at the watershed level, more accurate and precise conclusions will be made. However, watershed averages are just that: averages. Macroinvertebrate assemblages can easily change from the top of a watershed to the bottom, and an average value likely will not capture those responses. | None. | Site-specific, GIS-based predictor variables are used to develop RIVPACS models rather than regional watershed means. The spatial resolution for these predictor variables is 800 m which makes the assessment at reach segment scale rather than watershed. Many of the empirically derived predictor variables that are used in Utah’s RIVPACS model were likely selected because they help ensure that E is calculated based, in part, on the site position along a river continuum. |
| David | Richards | DRichards\_12152018\_v1.pdf |  | 65 | As discussed in earlier comment letters, PRISM models are proprietary (black box) and as such are not independently verifiable and thus scientifically invalid. The scientific method requires the possibility of independent validations. PRISM models are not reproducible or transparent, which is what we are all striving for. PRISM models rely on historic data (e.g. most of the climate data metrics in Table 12). As an example, “Watershed maximum of mean 1961-1990 annual number of wet days’ was 28-year-old data. Conditions likely have changed substantially in 28 years. The past has absolutely nothing to do with the macroinvertebrates collected next year. Similarly, the average of multiple years has nothing to do with invertebrate assemblages that are mostly multivoltine or univoltine. Their lives are shaped only by the conditions in the years during which they lived… not over multiyear averages. Variables in Table 12 had nothing to do with environmental conditions during the time when the sampled invertebrates lived. This introduces an unmeasurable and significant error to every Pc calculated and prevents the use of field data, which would be site specific. It may have been useful in developing regional models… but it has no place in continued assessment/monitoring and should never be used as such. Only field measurements should be used when possible. | None. | While the model building methodology is explained in the methods, including why GIS-based predictor variables are used rather than in-stream physical data, it is worth reiterating. While the model predictions are site-specific, the overarching objective is to use the watershed descriptors to determine the suite of reference sites that are most comparable to the site of interest. Variables such as “Watershed maximum of mean 1961-1990 annual number of wet days” was likely statistically significant because it helped distinguish between wetter and dryer areas of the state, a distinction that the commenter would likely agree to be important when accounting for natural variation in macroinvertebrate composition statewide. It is true that this has likely changed in the past 29 years, but this would only matter with respect to model predictions if they changed disproportionately. In other words, if areas of Utah that were once dry are now among the wetter areas of the state. Similar reasoning also explains why averaging over a longer period of record is preferable to contemporary data. Weather patterns vary from year-to-year, in any given year it is often true that some areas of the state receive above average precipitation while other areas receive below average precipitation. As a result, averaging over several years provides a better indication of climatic difference from one place in the state to another. PRISM data are not proprietary and are freely available. They have been independently tested and validated. They are used by a very large community of scientists across a wide range of disciplines and are continually updated and corrected |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 77 | Thank you for the opportunity to comment on the proposed 2018 Listing Methodology. Our comments and requests for clarification are rather limited as the document is solid and well thought through. Below are the issues we see. | None. | DWQ appreciates your encouragement and feedback regarding the 303(d) assessment methods. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 79 | Table 10, likewise, does not provide the needed clarification. For instance, what is “Landscape Analysis”? | Clarified Methods table. | 40 CFR section 130.7(b)(5) requires that “Each State shall assemble and evaluate all existing and readily available water quality related data and information to develop the list.” In EPA's July 29, 2005, guidance (https://www.epa.gov/sites/production/files/2015-10/documents/2006irg-report.pdf), EPA recommended that states solicit data and information from several different data types, including results from relevant landscape analyses. However, EPA didn't define types of "landscape analysis" data, so DWQ removed landscape analysis from Table 10. Thank you for the comment. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 80 | Is Multiple Indicators Monitoring (MIM) suitable for listing under habitat degradation? If so, what are the criteria or triggers for departure that would result in listing. | None. | The first step in the assessment process is to determine whether the waterbody is meeting water quality standards (both numeric and narrative), regardless of surrounding land uses. If the waterbody is considered not meeting any of the uses, it will be identified on the 303(d) list for further evaluation such as the cause(s), source(s), and magnitude of potential pollutants. The physical data the commenter is referring are not currently used in conducting water quality assessments. All are potential candidates for evaluating the extent to which habitat degradation is contributing to biological degradation; however, DWQ has not developed definitive methods quantifying habitat degradation. DWQ agrees that habitat methods would be useful, but the integration of available tools would require the same level of technical review and documentation that has been completed for the biological assessment program. If the commenter has a specific proposal for how these approaches could be integrated into an integrative habitat assessment, DWQ would be interested in seeing these details. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 81 | Is Proper Functioning Condition (PFC) data useful for listing determinations? | None. | DWQ is currently developing water quality standards and assessment methods specific to wetlands. Until the standards and methods are vetted internally and have undergone a public comment or DWQ stakeholder review process, DWQ will not assess Proper Functioning Condition (PFC) data that is traditionally used to characterize and assess the physical functioning of riparian-wetland areas. If, however, there are PFC data that (1) meet DWQ's readily available and credible data requirements, (2) are associated with waterbodies that are assessed by the IR, and (3) have beneficial uses and numeric criteria associated with them in UAC R317-2, DWQ would encourage the commenter to submit the data during the IR's Call for Data. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 82 | Is Aquatic AIM, the BLM’s method of riparian condition assessment and inventory suitable for listing determinations?  This issue needs much more elaboration in order to be useful. | None. | Thank you for this recommendation. DWQ works closely with the US BLM's AIM Program to ensure our field and lab protocols and quality control are consistent. Therefore, we routinely incorporate the BLM AIM Program benthic macroinvertebrate results into this assessment. It is a shared goal of our programs to formalize riparian condition assessment methods. However, this project continues and is not yet available for implementation into the IR. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 83 | At 19, the ability to reject data based on undefined “resource limitations” does not meet the CWA’s “existing and readily available data” standard.. We understand resource limitations but the process needs to be designed to accept and use all “existing and readily available data”. If dates or deadlines need to be adjusted then the process needs to do that as opposed to simply rejecting data that is “existing and readily available” simply because of, for instance, budget cuts or staffing issues.  Table 3 contains the same issues as discussed above. | Revised Methods text. | DWQ appreciates the feedback and concerns regarding the method's "Existing and Readily Available Data Defined" section and Table 3. The original intent of the section and table was to demonstrate the tools and processes DWQ developed since the previous IR to accommodate the many different forms and types of data and information that are submitted during the IR's Call for Data. However, after review of the publicly submitted comments, DWQ understands how this may have been miscommunicated in the methods. DWQ reviewed the original language and removed the text that discussed resource limitations and the "partially available" and "unavailable" rows from Table 3. Thank you for the feedback. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 85 | In addition, it is unclear what “Data are collected at pre-determined locations” means. We collect data under an SAP that allows for locations to be selected based on observed conditions. As such, specific locations are not defined in the SAP. From the language, it appears DEQ could reject data based on this current wording. We suggest the phrase be removed. | Clarified Methods text. | DWQ agrees with the commenter that this phrase is too general. This phrase has been removed from the document. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 86 | In Table 3, we are concerned that existing and readily available data could be rejected based on database issues. For instance, habitat degradation or narrative standards data may not fit into structured databases such as dozens or hundreds of photos or field sheets from habitat assessment methodologies. This would clearly be “existing and readily available data” | Revised Methods text. | DWQ agrees with the commenter and added a footnote to Table 3 that "DWQ data submission templates and processes are designed to allow for data and information that may not fit the data structure of EPA’s Water Quality Exchange System or may be used to support a credible data review (Tables 5-8) or perform a narrative or high frequency data assessments". For further clarification, DWQ also added to the "Existing and Readily Available Data Defined" section of the assessment methods that existing and readily available data for the IR may include: "Data collected for narrative assessments (see Narrative Assessment: Biological Assessments and Narrative Standards for All Waters)", "Data obtained through EPA’s Water Quality Portal (WQP), "Data and information obtained through the IR’s public Call for Data", "Data and information submitted to EPA’s Water Quality Exchange System or DWQ’s Call for Data to support a credible data submission (e.g., Tables 5-8)", and "Data included in the Data Types Matrix in Table 10.". At this time, DWQ does not have methods for assessing physical habitat data or field photos. However, DWQ can evaluate qualitative data and other non-numeric types of information in the assessment process, provided they meet other aspects of data credibility and availability, as identified in tables 3, 5-9, and 10 of the assessment methods. These types of information are included in the assessment review process described in table 3 and the "Aggregation of Site-Specific Assessments to Assessment Unit Categories", "Secondary Review", and "Appendix 3" sections of the assessment methods. DWQ appreciates the feedback. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 87 | In the “partially available” section we see “may have been collected for the purposes of answering specific questions or addressing specific issues.” Nearly all data could fall under this description. Certainly the data we collect is to answer the specific question of what are e coli levels at this stream reach. This criteria needs to be removed as a trigger for putting data into this category. | Revised Methods text. | DWQ agrees with the commenter and removed the "partially available" row from Table 3. The table now focuses on how DWQ incorporates readily available information and datasets that are obtained or submitted to DWQ during the IR's Call for Data. DWQ would also like to add that should DWQ not include data and information that is obtained by or submitted to DWQ during the IR's Call for Data, DWQ will clearly document which information and dataset (or datasets) were not included and why. DWQ does this for transparency purposes to reviewers and to meet the requirements of CFR 130.7 (b)(6)(iii). Any concerns with data and information rejections (or data and information gaps), can be reviewed and publically commented on during the Draft IR's public comment period. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 88 | Again, data collected for narrative standards or habitat degradation may require data formats that do not fit in the normal EPA database setup. This data is still existing and readily available. | Revised Methods text. | DWQ appreciates the feedback and concerns regarding the method's Table 3 and "Existing and Readily Available Data Defined" section. The original intent of the table and section was to demonstrate the tools and processes DWQ developed since the previous IR to accommodate the many different forms and types of data and information that are submitted during the IR's Call for Data. However, after review of the publicly submitted comments, DWQ understands how this may have been miscommunicated and made several edits to the table and section described below. DWQ can evaluate qualitative data and other non-numeric types of information in the assessment process, provided they meet other aspects of data credibility and availability, as identified in tables 3, 5-9, and 10 of the assessment methods. These types of information are included in the assessment review process described in table 3 and the "Aggregation of Site-Specific Assessments to Assessment Unit Categories", "Secondary Review", and "Appendix 3" sections of the assessment methods.  DWQ removed the "unavailable" and "partially available" rows from Table 3 and added a footnote explaining that for readily available data, "DWQ data submission templates and processes are designed to allow for data and information that may not fit the data structure of EPA’s Water Quality Exchange System or may be used to support a credible data review (Tables 5-8) or perform a narrative or high frequency data assessments". DWQ also added to the "Existing and Readily Available Data Defined" section of the assessment methods that existing and readily available data for the IR may include: "Data collected for narrative assessments (see Narrative Assessment: Biological Assessments and Narrative Standards for All Waters)", "Data obtained through EPA’s Water Quality Portal (WQP), "Data and information obtained through the IR’s public Call for Data", "Data and information submitted to EPA’s Water Quality Exchange System or DWQ’s Call for Data to support a credible data submission (e.g., Tables 5-8)", and "Data included in the Data Types Matrix in Table 10." |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 89 | In the “unavailable” category, PDF’s, such as field sheets or photos, are cited as unavailable. Again, we are concerned that limits beyond what the CWA intended are being applied. | Revised Methods text. | DWQ appreciates the feedback and concerns regarding the method's Table 3 and "Existing and Readily Available Data Defined" section. The original intent of the table and section was to demonstrate the tools and processes DWQ developed since the previous IR to accommodate the many different forms and types of data and information that are submitted in the IR's Call for Data. However, after review of the publicly submitted comments, DWQ understands how this may have been miscommunicated in the methods and made several edits to the table and section described below. DWQ can evaluate qualitative data and other non-numeric types of information in the assessment process, provided they meet other aspects of data credibility and availability, as identified in tables 3, 5-9, and 10 of the assessment methods. These types of information are included in the assessment review process described in table 3 and the "Aggregation of Site-Specific Assessments to Assessment Unit Categories", "Secondary Review", and "Appendix 3" sections of the assessment methods.  DWQ removed the "unavailable" row from Table 3 and added a footnote explaining that for readily available data, "DWQ data submission templates and processes are designed to allow for data and information that may not fit the data structure of EPA’s Water Quality Exchange System or may be used to support a credible data review (Tables 5-8) or perform a narrative or high frequency data assessments". DWQ also added to the "Existing and Readily Available Data Defined" section of the assessment methods that existing and readily available data for the IR may include: "Data collected for narrative assessments (see Narrative Assessment: Biological Assessments and Narrative Standards for All Waters)", "Data obtained through EPA’s Water Quality Portal (WQP), "Data and information obtained through the IR’s public Call for Data", "Data and information submitted to EPA’s Water Quality Exchange System or DWQ’s Call for Data to support a credible data submission (e.g., Tables 5-8)", and "Data included in the Data Types Matrix in Table 10." |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 90 | Page 30: Since starting data collection in Utah many years ago, we have tried to move our approved Wyoming SAP over to Utah and get it officially approved and signed by Utah DEQ but have not gotten feedback as to what Utah DEQ sees as needed changes. Staff have told us that the Wyoming SAP is sufficient for their immediate purposes of reviewing our data but the process to get a fully approved Utah SAP has not happened. We would appreciate clarification as to what updates are needed in order to get Utah DEQ approval. | None. | DWQ appreciates the feedback and apologizes that the commenter has not received a response on the SAP that was previously submitted for DWQ approval. Please contact Jodi Gardberg, the Watershed Protection Manager, who will process the SAP. DWQ would like to clarify that the commenter does not need a DWQ approved QAPP, SAP, SOPs, etc. DWQ requests this information during the IR's Call for Data to ensure results from disparate data sources are repeatable and scientifically defensible. For examples of the types of content EPA and DWQ require for their data quality documents, please refer to the "Components for Credible Data" section of the assessment methods. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 91 | Also our SAP incorporates the elements of a QAPP. It appears from pages 29 and 30 that we need to separate out these two aspects of the SAP into two separate documents. Is that correct? | None. | QAPPs, SAPs, and SOPs that are submitted to DWQ during the Integrated Report's Call for Data may be submitted electronically as either one or several smaller documents. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 92 | In Table 5, we see that flow data has been made mandatory for all Grade A data. Is this necessary for all grab sample parameters? | None. | In Table 5, flow data is not required for Grade A data. However, if during the secondary review process, DWQ or public commenters have any data concerns (as defined in the Conflicting Assessments of Water Quality Standards and Appendix 3 sections of the assessment methods), DWQ may request flow or any other Grade A or B credible data documentation. DWQ requests and requires this information when data concerns are raised, so that DWQ can further evaluate the extent to which data is representative and demonstrates clear and convincing evidence of supporting or not supporting the beneficial uses assigned to the waterbody in UAC R317-2. If the requested information was not preemptively submitted during the Call for Data or provided upon DWQ request, the data of concern may be rejected and removed from assessments. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 93 | In Table 9, we see that, under QA/QC is “incubation”. It should be clarified as to what aspect of “incubation” information is required. Is it time in and time out, temp in and out, both or other information. | Revised Methods text. | In Table 9 "incubation" refers to data and information that is recorded on DWQ's E. coli bench sheets and relates to time and temperature (i.e., time samples were placed in and taken out of the incubator and the temperature of the incubator when samples were placed in and taken out of it). For an example of how DWQ records this information, please refer to Appendix 3 of DWQ's Standard Operating Procedure for Escherichia coli (E. coli) and Total Coliform Quantification Using the IDEXX QUANTI-TRAY/2000 System (https://deq.utah.gov/legacy/monitoring/water-quality/docs/2014/05May/SOP\_EcoliSampleAnalysis\_5.1.14\_Rev%201.2.pdf). DWQ added a footnote to table 9 with this clarification. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 94 | At 41, discussing minimum number of grab samples for determining exceedances, is there a minimum time between samples or has this not been defined in the regulations? | None. | DWQ does not define a minimum time between samples for conventional grab sample assessments. However, if there are multiple grab sample measurements in a single day, DWQ will only assess a single daily value (i.e., the highest result for parameters with not-to-exceed criteria in UAC R317-2, or the lowest reported value for parameters with minimum criteria in UAC R317-2). For assessments with sample temporal requirements, the commenter should refer to the "High Frequency Assessments for Dissolved Oxygen" and "Escherichia Coli Assessment for All Waters" sections of the assessment methods. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 95 | Figure 2 – Assuming 10 samples are collected and 2 exceed the standard by, for example, 100%, and 2 samples are collected and both exceed by 100%. It is not clear what the rationale is for rejecting latter dataset as insufficient, given they both show the exact same exceedances. | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | DWQ agrees with the commenter that with conventional assessments based on grab sample data there may be an exceedance frequency threshold where it may be appropriate to list a waterbody as impaired using an insufficiently sized dataset. DWQ is working to conduct analysis and research on what that threshold may be, so that DWQ can better quantify and address not supporting water quality concerns. DWQ welcomes Western Watersheds and others to provide studies and data that could be used in evaluating what that threshold may be, balanced against an appropriate minimum sample size. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 96 | At 13 and elsewhere, there is a much greater need to define acceptable data types and methods for determining listing and impairment under the categories of hydrologic modification and habitat degradation. These issues are widespread throughout Utah, but there is little to no guidance in acceptable data documenting these conditions. The proposed listing methodology document needs to go much further in clarifying this currently murky issue. | None | DWQ agrees with the commenter on the importance of evaluating impairments that are caused by pollution. However, identifying sources of pollution is not part of the Assessment Methods of the IR. Instead sources are determined as part of a TMDL or related source assessments process. (See section Unknown Sources in the assessment methods for more information on how sources are identified and tracked in the assessment process). DWQ is in the process of drafting implementation guidance for Category 4C and 5-alt. For more information, contact DWQ’s Watershed Protection Section Manager. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 97 | Assuming there is a need for more than one sample to exceed in order to list it makes no difference whatsoever if more than the minimum number of samples are collected. | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | DWQ agrees with the commenter that with conventional assessments based on grab sample data there may be a threshold where an insufficiently sized dataset may be impaired regardless of how much additional data is collected in an IR period of record. DWQ is working to conduct analysis and research on what that threshold may be, so that DWQ can better quantify and address not supporting water quality concerns. DWQ welcomes Western Watersheds and others to provide studies and data that could be used in evaluating what that threshold may be. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 98 | At 42, the document states “For readily available and credible data within the period of record, DWQ will correct or remove all questionable data points (i.e., sensor drift, calibration shift, strange anomalous points, and battery issues) before data analysis and interpretation begins”  These issues would have been flagged as ‘qualified’ or ‘invalid’ during the submitter’s QC processes. Without being determined ‘qualified’ or ‘invalid’ by the sampler and QC officer it would be nearly impossible for the DEQ to determine what should be ‘qualified’ or ‘invalid’ (described as “questionable” above. We are concern that valid data could be rejected based on this undefined “questionable” determination. | Clarified Methods text. | DWQ agrees with the comment that any necessary corrections or removal of data points in high frequency data should be performed and identified by the data collector or submitter. In these cases, DWQ will use the corrected dataset and ensure that data identified for removal are not included in the assessment. DWQ has clarified this text to state that, "For assessments, DWQ will use corrected high frequency data as documented by the data submitter. If during the assessment DWQ determines that additional corrections may be required, DWQ will contact the data submitter for clarification and additional information." As described in Table 6, submitters of high frequency dissolved oxygen data should submit documentation of the QA/QC procedures performed on raw data for their submitted data to be included in the assessment. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 99 | If the DEQ thinks some data are “questionable” and they are not flagged by the submitted as ‘qualified’ or ‘invalid’, the DEQ needs to question the submitter to investigate the cause. | Out of scope. | Following up with submitters whose data record(s) have been rejected by the submitter is outside the scope of the IR. However, DWQ agrees with the commenter that collectors and data submitters should be aware of problems with data that was rejected for 305(b) and 303(d) assessment purposes. To assist with this and help communicate concerns with data, DWQ publishes all data from the IR period of record that was used for the current assessment cycle. In the published datasets, DWQ populates "IR Flag" and "IR Comment" columns, where reviewers can see if a data record was rejected and why. Trainings hosted by DWQ’s Monitoring Section should help reduce these issues in the future. |
| Jonathan | Ratner | JRatner\_12062018.pdf |  | 100 | Page 84: Reasonable time period is way too vague. This needs to be more fully defined. | Out of Scope. | Developing a pollution control plan for category 4B assessments is outside the scope of the IR. Pollution control plans go through a robust internal and external review process, including a presentation to DWQ’s Water Quality Board for approval and a submission to EPA for final approval. Concerns regarding the time frame specified in plans for pollution-control requirements to bring impaired waters back into attainment should be raised to DWQ’s Watershed Protection Section manager when a plan is being developed. For more information about the development and approval of a pollution control plan, please refer to EPA’s Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and314 of the Clean Water Act and Information Concerning 2008 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions. |
| Marian | Rice | MRice\_12072018.pdf |  | 102 | After review of the DRAFT 2018/2020 303(d) Assessment Methods document we would like to provide the following comments:  Existing and Readily Available Data Defined  • Salt Lake City supports use of Citizen Scientist’s efforts and data collected to help provide education and capacity building to the public. Also, we support use of the data collected to qualitatively identify a potential issue. However, as the data and collection methods could be inconsistent and thus questionable, we do not support use of the data to determine if the waterbody is supporting or not supporting the assigned beneficial use and numeric criteria. Furthermore, any data utilized must be credible, and needs to be thoroughly reviewed by DWQ  prior to use. | None. | DWQ appreciates the comment and concern about assessing readily available and credible data. As mandated in 40 CFR 130.7(b)(5)(i), (iii), and (iv) DWQ must assemble and evaluate all existing and readily available data in determining whether a waterbody is supporting or not supporting the assigned beneficial uses and numeric criteria in UAC R317-2. During the IR Call for Data process DWQ can receive data from citizen groups, government agencies, private companies, etc.. To ensure that the data used for 305(b) and 303(d) assessments purposes are of high quality, consistent across various sampling techniques from disparate data sources, representative of ambient conditions, and appropriately documented, DWQ goes through a thorough credible data requirements review as outlined in the Data Quality section of the methods. Following DWQ's review, any readily available data that are of Grade A or B quality are then used for 305(b) and 303(d) assessments regardless of who collects and submits data. |
| Marian | Rice | MRice\_12072018.pdf |  | 103 | • Data collected needs to follow appropriate methodologies and adhere to appropriate QA and QC procedures. | None. | DWQ agrees with the commenter on the importance of demonstrating that data collected and used for 305(b) and 303(d) assessment purposes follows established protocols, procedures, and methods. In the Data Quality section of the assessment methods DWQ requires that collectors and data submitters provide documentation identified in the assessment methods’ credible data matrices when any concerns are raised surrounding the quality of that data. (In previous reporting cycles, this request usually occurred during DWQ’s secondary reviews prior to publishing the draft report or when responding to public comments on the draft 305(b) and 303(d) lists). If documentation is missing or does not demonstrate that the data is of known quality or defensible, DWQ assigns a lower grade to the data record(s) in question.    For more information on how DWQ and DWQ Cooperators collect, process, and calibrate equipment for data collection, please contact DWQ's Monitoring Section manager. If there are concerns or suggestions on DWQ’s quality process, please contact DWQ’s Quality Assurance Officer and Laboratory Coordinator in the Information and Data Services section. |
| Marian | Rice | MRice\_12072018.pdf |  | 104 | Conventional Parameter Assessments  • High Frequency Assessments – SLCDPU supports the use of high frequency data collection for parameters such as DO, ph, Temperature, etc. We request the water quality sondes are calibrated on a regular schedule as well as if there is an event that requires additional calibration. | None. | DWQ agrees with the commenter on the importance of regular and proper calibration and requires that any field sample data used for 305(b) and 303(d) assessment purposes follows established protocols, procedures, and methods. DWQ also specifies in the Data Quality section of the assessment methods document that to support and demonstrate that data is of high quality, collectors and data submitters must provide documentation identified in the assessment methods’ credible data matrices when any concerns are raised surrounding the quality of that data. If documentation is missing or does not demonstrate that the data is of known quality or defensible, DWQ assigns a lower grade to the data record(s) in question (as outlined in the method's credible data matrices).   For more information or any concerns on how DWQ and DWQ Cooperators calibrate instantaneous and high frequency data probes, please contact DWQ's Monitoring Section manager. |
| Marian | Rice | MRice\_12072018.pdf |  | 105 | We request that outlier and questionable data points be assessed and removed as applicable. If correction occurs, that data corrected needs annotation stating the correction. | None. | As part of DWQ's secondary review process, one of the potential data concerns DWQ evaluates is the presence of outliers in a sample location's dataset. However, as noted in Appendix 3, DWQ does not rely solely on a statistical test to identify a potential outlier; instead, the identification of an outlier is based on a scientific or a quality assurance basis, such as: QA/QC field sampling blanks, duplicates/replicates, laboratory analytical batch QC, or the value is nonsensical (e.g., cannot be measured with field/laboratory methods or there are concerns with the data quality).   If during the secondary review process, a record is identified as an outlier, the record will be rejected and a DWQ comment will be populated, so during the public comment period of the Draft IR, reviewers will be aware of the secondary review decision. Examples of this type of documentation are available in the 2016 IR dissolved oxygen river and stream excel data file. The commenter should refer to the "draft2016ir\_do\_datareport" worksheet table and the "Flag\_Comment" column (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/2016-integrated-report-data.htm). |
| Marian | Rice | MRice\_12072018.pdf |  | 106 | Components for Credible Data  • Monitoring locations – As DWQ assesses data from partners and performs their  own Basin-specific data collection efforts, SLCDPU wants to ensure the  monitoring locations are representative of the Basin as well as the specific Assessment Unit (AU). A single monitoring location per AU is not sufficient to determine if an AU and waterbody is supporting the assigned beneficial use and numeric criteria. Thus, we request there are multiple sampling locations per AU to provide a better and more holistic picture of the health of the waterbody. | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | DWQ agrees with the commenter that it is important that assessment sites be representative of the waters in the AU. DWQ's AU's were delineated into discrete units with the intent of grouping waters likely to share similar characteristics. As a result, AU's across the state range in size from first order tributaries to segments of larger river basins. Likewise, the number of sites that inform listing decisions in each of those AU's range from one to many sites. As described in the section "Determinations of Impairment: All Assessment Units" of the assessment methods, DWQ assesses each individual beneficial use and parameter for a single site (regardless of the site's location in an assessment unit (AU) or drainage area). As a first step towards better addressing the representativeness of a site to an AU, DWQ expanded on the secondary review section in the 2018/2020 methods by adding the section “Assessment Unit Re-segmentation”. This section allows DWQ to reevaluate the delineation of AU's in relation to assessment sites to more accurately characterize the extent of water quality assessments in an AU (especially when there is conflicting assessment results at the site level). DWQ will further consider the commenter's recommendation to expand on the secondary review and AU re-segmentation sections of the assessment methods by considering sample site density and distribution within an AU in future IRs. |
| Marian | Rice | MRice\_12072018.pdf |  | 107 | • Data collection during or recently after a precipitation event (rain, snow) needs to be identified and assessed as such. Ideally, the data collected should be dry  weather monitoring. | None. | To ensure that data used for 305(b) and 303(d) assessment decisions are of high quality, representative of ambient conditions, and appropriately documented, DWQ requires that data collectors and submitters must provide documentation identified in the assessment methods’ credible data matrices when any concerns are raised surrounding the quality of that data. This includes field documentation of sampling conditions, flow data, and sampling analysis plans. With this information DWQ is able to better evaluate during the secondary review if sample conditions have a bias in their sampling design or are not representative due to environmental factors, such as extreme events. DWQ’s process for this is located in the secondary review section and Appendix 3 of the assessment methods document. |
| Marian | Rice | MRice\_12072018.pdf |  | 108 | • Data Outliers-We ask for specific information on how outliers are identified and resolved in datasets. | None. | As part of DWQ's secondary review process, one of the potential data concerns DWQ evaluates for is the presence of outliers in a sample location's dataset. However, as noted in Appendix 3, DWQ does not rely solely on a statistical test to identify a potential outlier; instead, the identification of an outlier is based on a scientific or a quality assurance basis, such as: QA/QC field sampling blanks, duplicates/replicates, laboratory analytical batch QC, or the value is nonsensical (e.g., cannot be measured with field/laboratory methods or there are concerns with the data quality).   If during the secondary review process, a record is identified as an outlier, the record will be rejected and a DWQ comment will be populated, so during the public comment period of the Draft IR, reviewers will be aware of the secondary review decision. |
| Marian | Rice | MRice\_12072018.pdf |  | 109 | Harmful Algal Blooms (HAB)  • DWQ states the goal of the HAB assessment method is to identify waterbodies that experience HAB events that impair Class 2 recreational uses. In addition, we request the goal of the HAB assessment method is to also identify waterbodies  that experience HAB events that impair Class 4 agricultural uses. We encourage coordination with the Utah Department of Agriculture and Food (UDAF) to  identify methods associated with agriculture. | None. | DWQ agrees with the commenter that HABs have the potential to negatively impact agricultural uses. DWQ continues to coordinate with the Utah Department of Agriculture and Food regarding potential benchmarks for agricultural use advisories or use assessments. However, at this time, DWQ has not identified sufficient information to recommend agricultural use assessment benchmarks for HABs and as such agricultural uses are not currently assessed under the HAB assessment methods. DWQ encourages the commenter to participate in broader discussions with DWQ, local health departments, and UDAF regarding this issue. |
| Marian | Rice | MRice\_12072018.pdf |  | 110 | • Cell Counts- We do not believe cell counts alone should be utilized to drive an Advisory of a waterbody. We request there is a review and possible revision of recreational guidance criteria. | None. | The issuance of recreational advisories or closures is a separate process from water quality assessment as part of the IR. Recommended health advisory procedures are developed in conjunction with state and local health departments and stakeholders through DWQ's Water Quality and Health Advisory Panel (https://deq.utah.gov/legacy/divisions/water-quality/health-advisory/index.htm). Recommendations for the health advisory process can be made to that program. The inclusion of cell counts as an indicator in DWQ's HAB assessment methods directly reflects Utah's Narrative Standard which stipulates that the presence of scums, nuisances such as color, odor, or taste, or water quality conditions that may cause undesirable human effects are a violation of the state's water quality rules. |
| Shera | Reems | EPA\_Region8\_12072018.pdf |  | 159 | The EPA commends the work of the Department of Environmental Quality on implementing outcomes from the continuous improvement process that has been underway for a few years. We want to thank you for providing the EPA the opportunity to review and provide comments on the Draft 2018/2020 303(d) Assessment Methods. This letter highlights a few of our more important comments that we would like to bring to your attention. We have provided additional comments and suggestions via the on-line submission tool located at https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/draft-2020-methodology-for-integrated-report.htm. | None. | DWQ appreciates your encouragement regarding the improvements made to the water quality assessment program and the Draft 2018/2020 303(d) Assessment Methods. Thank you for using the public comment submission form and for providing feedback on the draft 303(d) assessment methods. |
| Shera | Reems | EPA\_Region8\_12072018.pdf |  | 160 | Data Sufficiency In interpreting macroinvertebrate RIVPACs results, the state proposes to apply different minimum sample size requirements to make a fully supporting use decision vs. non-supporting use decision. Table 13 (page 52) indicates that a minimum of one sample is required to make a fully supporting use determination, whereas a minimum of three samples is required to make a non-supporting use decision. The EPA recommends that UDEQ apply the same minimum sample size to make fully supporting and non-supporting use decisions when interpreting data  for macroinvertebrates or pollutants. | None. | DWQ made the decision to use different sample size requirements based on reasonable assumptions with respect to the interpretation of biological data. An O/E score closer to 1 indicates that a stream is indistinguishable from reference condition and fully supporting the biological uses. There are not obvious sources of bias that could lead to an alternative conclusion. In contrast, it is possible that a single low O/E score is strongly influenced by atypical environmental conditions (e.g., undetected flash flood, extreme drought). The decision to make impairment decisions based on data collected over several samples avoids making erroneous impairment conclusions based on samples collected in atypical, naturally occurring conditions. |
| Shera | Reems | EPA\_Region8\_12072018.pdf |  | 161 | Dissolved Oxygen The EPA recognizes the inherent challenges with assessing dissolved oxygen (DO) in Utah’s lakes and reservoirs. Based on the assessment methods, it is unclear whether the state’s proposed approach for assessing for DO impairments in lakes and reservoirs is consistent with the state’s DO water quality standards. The EPA recommends that UDEQ provide additional clarification on this assessment method and its harmonization with the DO water quality standards.  Additionally, for high frequency assessments (assessment of continuous data loggers), the EPA requests that UDEQ provide additional information explaining the selection of a 39 contiguous-day minimum dataset to make an assessment determination. This approach appears to represent a significant da\ta/workload requirement and does not provide the flexibility to consider DO averaging periods that could be assessed using less data collected over shorter timeframes (e.g.,  daily minimum value, 7-day average). | Issue added to the Methods Current Review Topics Tracking Workplan list for future IRs. | DWQ agrees with the comment that there is inconsistency in the way DO criteria have been interpreted under the DO assessment approaches between lakes & reservoirs and rivers & streams. However, the comment does not identify a specific point of confusion and does not make specific method change recommendations. DWQ has added this issue to the methods review topics tracking system for future IR methods and will continue to work to improve DO assessment methods during future IR cycles, collaborating with stakeholders and EPA.  DWQ agrees with the commenter that 39 contiguous days of high frequency dissolved oxygen (DO) data are not needed to fully assess the 7-day average minimum DO criteria. DWQ reviewed the original language and removed the ≥39 day requirement from the "Data Sufficiency" section. The section now reads, "To ensure that daily minima are captured and that daily averages can be accurately calculated, high frequency data must capture complete days. DWQ defines a complete day as a calendar day (i.e. 12:00 am – 11:59 pm) in which at least one measurement is made in each hour."   DWQ also removed the ≥39 day requirements in Figures 3 and 4. Instead, data are considered sufficient for assessment if at least ten daily minima or 7 or 30 day averages can be calculated over the period of record. |
| Shera | Reems | EPA\_Region8\_12072018.pdf |  | 162 | Assessment of Wetlands The EPA applauds the work that UDEQ has undertaken to compile the information collected over the past several years for the wetlands surrounding the Great Salt Lake and to develop an approach to assess these wetlands. EPA found the presentation, “What Should the Water Quality Goals for Great Salt Lake Wetlands Be?” from the Watershed Symposium on November 15, 2018, to be very informative. Based on the information presented and the work conducted to date, EPA recommends including a section that discusses UDEQ’s approach to assessing the  wetlands surrounding the Great Salt Lake and other wetland ecosystems in the 2018/2020 Assessment Methods document. | Out of scope. | DWQ appreciates your encouragement regarding the improvements made to developing an approach for assessing wetlands. However, for the 2018/2020 Assessment Methods DWQ is not reporting on assessments methods that are still under development. DWQ's assessment methods reflect methods and processes that are heavily vetted internally and have undergone a public comment or DWQ stakeholder review process. DWQ encourages the commenter and other stakeholders to follow the research and assessment method development process for wetlands by visiting DWQ's Wetlands Program website (https://deq.utah.gov/water-quality/wetlands-program/wetlands-program). |
| Shera | Reems | EPA\_Region8\_12072018.pdf |  | 163 | Great Salt Lake / Farmington Bay UDEQ’s draft assessment methodology does not specify whether UDEQ intends to complete an assessment of the Great Salt Lake based on an interpretation of the narrative standard. The EPA requests an update on the state’s plan to develop assessment methods for parameters other than Selenium including Harmful Algal Blooms in Great Salt Lake/Farmington Bay. | None. | DWQ is in the process of developing Water Quality Standards and Assessment Methods for Great Salt Lake as outlined in the Great Salt Lake Water Quality Strategy Document (https://documents.deq.utah.gov/water-quality/standards-technical-services/gsl-website-docs/gsl-wq-strategy/DWQ-2019-000535.pdf) Once the standards or methods are fully developed and vetted by stakeholders and the Water Quality Board, they will be incorporated in the assessment methods for a future Integrated Report. |
| Shera | Reems | EPA\_Region8\_12072018.pdf |  | 164 | Delisting of Waters In Table 16 (page 73), UDEQ noted that for Nitrate as N and Total Phosphorus as P, “…all categorical assessments for aquatic life uses (Class 3) will be overwritten to Category 3.” Consistent with 40 C.F.R. § 130.7(b)(5) and the 2006 Integrated Reporting Guidance and subsequent clarification memos, the EPA encourages states to demonstrate good cause (e.g., data and/or information) for not including individual segments (including previously listed segments) on the 303(d) list. We request that UDEQ provide additional information documenting the state’s rationale to delist waters based on a review of the site-specific data. | None. | When good cause can be demonstrated, DWQ will delist Total Phosphorus as P and provide the necessary documentation as described in the Delisting and Appendix 6 sections of the assessment methods document. Any delisting documentation and justifications will be available for review during the public comment process of the draft IR. To clarify, any Total Phosphorus as P assessments that are delisted or removed from the 303(d) list will undergo the same level of review and documentation as any other parameter DWQ removes from the 303(d) list. Examples of previous delisting documentation are available on the last four pages of Chapter 3 of the Final 2016 IR (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/chapter-3-river-and-stream-assessments-final2016ir-v2-1.pdf). |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 198 | Because of the way we drafted our comments, it's hard to re-engineer them to fit into all the various boxes. For that reason, we thought we'd just attach a complete letter here. (In other words, all our comments are included in the attached.) Thank you. | Requested improvement on form functionality. | Thank you for using the electronic public comment submission form and the form's attachment section. For future assessment method and Integrated Report public comment forms, DWQ will review the form's structure, function, and text box character limits. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 204 | Second, while we appreciate the opportunity to submit comments electronically, electronic submission requires the use of set fields with word limits, which makes it difficult for the public to take a crafted set of comments like this and then shoehorn those comments into a set of word-limited fields that may or may not track the document's organizational structure. | Requested improvement on form functionality. | DWQ appreciates your feedback regarding the form's structure and text box limits and thanks you for using the electronic public comment submission form. To help commenter's identify the methods section(s) they were commenting on, DWQ's comment form followed the same structure as the assessment methods Table of Contents. In addition, DWQ provided an "Additional Comments on the Draft 303(d) Assessment Methods" comment box, as well as a section for submitters to attach documents. DWQ will also re-evaluate whether the text box limit set at two pages of text per section was adequate and not limiting. For future IR public comment forms, DWQ will review the form's structure, function, and text box character limits. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 205 | In some ways, that challenge reflects our broader concern with the Draft Assessment Methods. Just as there is more than one way to collect scientifically valid data, there is more than one valid way to organize comments in response to a call for public comment. In both cases, artificially limiting the way information is submitted can undermine e the broader goals behind asking for information in the first place. | Requested improvement on form functionality. | DWQ agrees with the commenter that there is more than one way to collect scientifically valid data. DWQ's credible data requirements, which includes submitting SAPs, SOPs, etc., are required when requested by DWQ, so that the Division can ensure results from disparate data sources are repeatable and scientifically defensible. DWQ believes that this level of review is necessary for instilling confidence in the 305(b) and 303(d) lists.  See also response to Comment 204. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 206 | Comments and Concerns Regarding the Substance of the Draft Assessment Methods  (1) Application of the Draft Assessment Methods may exclude robust and legitimate data sets that inform the question of whether GSL is healthy or should be listed as impaired under Section 303(d).  In designing our data collection protocols, the Cooperative made a conscious decision to prioritize greater sample quantity and breadth. For example, the nutrient , temperature, oxygen, and chlorophyll-a measures the Cooperative has collected on Gilbert Bay span nine sites over multiple years, which allows us to better assess temporal and spatial trends and ecologically relevant correlations and relationships.  While we follow careful and defensible protocols in collecting samples, we lack the resources to collect that same depth and breadth of samples using the elaborate Standard Operating Procedures ("SOP") and protocol requirements of the EPA. For example, we do not use EPA Clean Hands/Dirty Hands for obtaining lake water samples. Instead, we take care to avoid touching or allowing external contaminants to come in contact with the interior surfaces of the water sampler, the sample itself, and sample collection bottles. Similarly, we purchase and use new aseptic sampling bottles for nutrient sampling and acid wash containers in-house for heavy metal sampling rather than use acid washed containers supplied by the lab that performs the analysis.  In each case, our protocols cost considerably less than the EPA protocols, but still yield scientifically defensible and valid results. More to the point: adopting the more stringent EPA protocols in the context of our GSL sampling would not likely change the dataset. The EPA protocol is designed to prevent contamination of samples, which is a concern when moving between dissimilar water bodies, or in oligotrophic, nutrient poor waters in which a small amount of contamination will have a large proportional effect on the sample. In a t terminal , saline lake like GSL, however, nutrient and chlorophyll levels are generally much higher than in freshwater bodies located higher in a watershed, greatly reducing the effect of between-sample contamination. That assumption is validated by comparisons between the Cooperative's measured ammonia levels, which correlate strongly with measurements by the United States Geological Survey ("USGS") that were collected using more rigid protocols. Similarly, we frequently record chlorophyll-a levels below our outside laboratory's detection limit during key summer months, suggesting contamination is not a large concern in our sampling program.1 Additionally we have split samples between certified research labs and derived similar results. Given that, we believe our sampling protocols are scientifically defensible and the resulting data sets would qualify for inclusion in a peer-reviewed scientific journal. In most cases, however, those same data sets would not meet the strict availability and credibility standards laid out in the Draft Assessment Methods. | Revised and clarified language in credible data section and Tables 5 - 9. | As described in the "Data Quality" section of the assessment methods document, data collected under a repeatable and scientifically defensible QAPP and SAP are considered high quality and incorporated in the assessment process for further evaluation. Submitters are not obligated to collect data under the specifications of any of EPA's or DWQ's established monitoring protocols. The QAPP, SAP, and SOP guidelines and examples in the assessment methods document are intended to provide stakeholders with an example that can be used as a template for establishing scientifically defensible QAPPs and SAPs. This has been further clarified in the methods.  DWQ encourages the commenter to submit data and information (as outlined by the processes in the assessment methods) to DWQ during the IR's Call for Data, so that DWQ can evaluate the data for the assessment. DWQ can provide a general review of the commenter's credible data documents outside of the IR's Call for Data process if this feedback would be helpful. (Please contact DWQ's Watershed Protection Section manager for more details). |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 207 | The Cooperative is willing to work with DWQ to do a side-by-side comparison of testing protocols to see whether the more rigorous protocols make a meaningful difference in the results. We strongly suspect they would not. | Out of Scope. | DWQ thanks you for the offer to collaborate on comparisons among sampling protocols. DWQ recommends that the commenters contact DWQ's Great Salt Lake (GSL) program coordinator (Jake Vander Laan, jvander@utah.gov) if they are interested in further pursuing comparisons of GSL datasets. Testing protocols is out of scope for the IR. As described in the response to Comment 206, DWQ does not require a specific testing protocol to consider data to be credible. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 208 | Readily Available Data. DWQ allows data submitted by outside entities, but is more likely to consider data in 303(d) assessments if it is submitted in a format that fits the EPA Water Quality Portal ("WQP"). The Draft Assessment Methods (see Table 3, at p. 20) rank datasets in descending order of "fit." Ideal datasets are uploaded into the WQP, and those are eligible for full consideration. Three inferior categories exist below this ideal, with the bottom category of " unavailable" being ineligible for consideration. Our initial evaluation suggests that GSL datasets would likely fall into this category as currently defined. | Table 3 modified. | DWQ appreciates the feedback and concerns regarding the method's "Existing and Readily Available Data Defined" section and Table 3. The readily available data section aims to balance consideration of all data with reasonable expenditure of resources to accommodate disparate data formats. Recognizing the ambiguity in the table, DWQ has revised the table to clarify how various types of data will be used in the Integrated Report and has removed the “partially available” and “unavailable” rows.  DWQ, however, did not remove the "Readily available, additional processing required" row because this is still considered readily available data, pending further evaluation from DWQ. To clarify how DWQ may integrate this type of data for 305(b) and 303(d) assessments, DWQ added to the assessment uses column of Table 3 that DWQ, "fully incorporates this data into IR assessment tools if interface tools have been developed. If interface tools are still in the development phase, DWQ will (1) screen data for exceedances for the waterbodies described in 40 CFR 130.7(b)(5)(i), (iii), and (iv), or (2) manually assess data for specific sites, dates, and parameters at the request of stakeholders or data submitters for waterbodies described in 40 CFR 130.7(b)(5)(i), (iii), and (iv). Results are fully incorporated into DWQ’s Conflicting Assessments of Water Quality Standards and Secondary Reviews.  DWQ would like to further clarify that should DWQ not include any data and information that is obtained by or submitted to DWQ during the IR's Call for Data, DWQ will clearly document which information and dataset (or datasets) were not included and why. DWQ does this for transparency purposes to reviewers and to meet the requirements of CFR 130.7 (b)(6)(iii). Any concerns with data and information rejections (or data and information gaps), can be reviewed and publically commented on during the Draft IR's public comment period. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 209 | While the Draft Assessment Methods contemplate a "partially available" category of data that DWQ might consider if it could be reformatted by DWQ staff "as time and resources allow," inclusion of otherwise scientifically defensible data is now subject to procedural rather than substantive objection, and even the procedural objections remain highly subjective and potentially arbitrary. | Revised Table 3. | DWQ appreciates the feedback and concerns regarding the method's "Existing and Readily Available Data Defined" section and Table 3. DWQ reviewed the original language and removed the "partially available" category from Table 3. Thank you for the feedback. Please see the revised category “Readily available (additional processing may be required by DWQ)”. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 210 | Data Credibility. Under the Draft Assessment Methods, DWQ will assess data credibility based on adherence to the DWQ's Quality Assurance Project Plan ("QAPP") which is in turn based on EPA's QAPP. Seep. 29. Conforming our future data collection to meet those QAPP standards would impose significant costs-likely as much as three times current costs-and it would be impossible to fix retroactively our existing datasets. | Revised and clarified language in credible data section and Tables 5 - 9. | As described in the 'Data Quality' section of the methods document, data collected under a scientifically defensible QAPP and SAP and submitted to DWQ are considered of high quality and incorporated in the assessment process. Submitters are not obligated to collect data under the specifications of any of DWQ's established monitoring protocols. The QAPP and SAP guidelines and examples provided in the "Components for Credible Data" sections of the assessment methods are intended to provide stakeholders with an example that can be used as a template for establishing scientifically defensible QAPPs and SAPs. This has been further clarified in the methods. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 211 | Tables 5 and 7 on page 32 of the Draft Assessment Methods summarize DWQ's methodology, ranking data quality for water grab samples, which the Cooperative's nutrient, temperature, oxygen, chlorophyll-a, and salinity data would fall under. Based on a preliminary assessment, Cooperative data would likely rank as a "C," owing largely to our data not meeting an "approved" or "equivalent" QAPP and our inconsistent recording of instrument calibration readings, which the Draft Assessment Method suggests would fall outside the data eligible for consideration under 303(d}.  We do use a professional lab for the analysis of nutrient s and chlorophyll-a, so we would likely rank highly in those lab-determined factors. Even so, it difficult to know, without more, how DWQ weighs these factors when assigning the A-D quality grade. | Revised and clarified language in credible data section and Tables 5 and 7. | As described in the "Data Quality" section of the methods document, data collected under a repeatable and scientifically defensible QAPP are considered high quality and incorporated in the assessment process for further evaluation. Submitters are not obligated to collect data under the specifications of any of DWQ's or EPA's established quality assurance protocols. The QAPP and SAP guidelines and examples in the assessment methods are intended to provide stakeholders with an example that can be used as a template and suggestions for the documentation for establishing scientifically defensible QAPPs and SAPs. This has been further clarified in the methods.  As noted by the commenter, DWQ relies on the availability of documentation from data submitters to demonstrate that the field collection processes associated with the data are well documented, followed established protocols and methods, and are scientifically defensible and repeatable. As outlined in the credible data matrices this may include information such as QAPPs, calibration reports, information on the accuracy and ranges of properly calibrated probes, descriptions of method collections, laboratory protocols, and essential metadata elements for different data types. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 212 | The trouble begins with water chemistry sampling protocols, which affect our nutrient, chlorophyll-a, and any contaminant sampling. These Standard Operating Procedures ("SOPs") call for very specific and time-consuming equipment cleaning and QA/QC processes to avoid contamination. Based on our research needs and the unique conditions of GSL, we do not follow the referenced Clean Hands/Dirty Hands sampling method, the water sampler cleaning between sites, or the use of field blanks and equipment blanks. We also do not preserve our nutrient samples with H2SO4 because our laboratory' s methods do not require it. Given that, DWQ could readily dismiss our large nutrient and chlorophyll databases in making a Section 303(d) determination. | Revised and clarified language in credible data section and Tables 5 -9.Clarified assessment methods. | The QAPP, SAP, and SOP guidelines and examples presented in the IR methods document are intended to provide stakeholders with an example that can be used as a template for establishing scientifically defensible QAPPs and SAPs. As described in the 'Data Quality' section of the methods document, data collected under a scientifically defensible QAPP and SAP and submitted to DWQ are considered of high quality and incorporated in the assessment process for further evaluation. Submitters are not obligated to collect data under the specifications of any of DWQ's or EPA's established monitoring protocols. This has been further clarified in the methods. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 213 | In the aforementioned QAPP, DWQ references two SOPs for the collection of water chemistry samples, and they are not consistent on Clean Hands/Dirty Hands. For example, the SOP for GSL-specific " Total and Dissolved Water Sampling" (https://deq.utah.gov/legacy/destinations/g/great-salt-lake/monitoring-research/index.htm) calls for the Clean Hands/ Dirty Hands protocol and laboratory blanks. Ironically, the non-GSL lake sampling SOP "Collection of Lake Water Samples" (https: // deq.utah.gov/ legacy/monitoring/ water-quality/quality -assurance e-quality ­ control.htm ) appears less stringent than the GSL-specific protocol as it does not call for Clean Hand s/Dirty Hands. That SOP specifies a simple triple-rinse in lake water at the sample site, which the Cooperative does use in its GSL sampling. | Clarified assessment methods | Because data quality objectives may vary from project to project, sampling planners and collectors may develop and use different SOPs. Similarly, stakeholders and data submitters are free to determine appropriate sampling protocols that satisfy their data quality objectives.  The commenter has identified an example of different SOPs, both of which are acceptable, for purposes of collecting data that could be used for assessment purposes. The SOP for the Great Salt Lake water chemistry samples was originally developed by USGS to collect mercury samples for which Clean Hands/ Dirty Hands protocol is appropriate. DWQ is evaluating whether a broader SOP may be appropriate for collection of other Great Salt Lake samples. We welcome the Brine Shrimp Cooperative’s participation in this review effort. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 214 | The temperature, pH, dissolved oxygen, and conductivity data that we routinely collect at multiple depths and multiple sites would also fail to meet DWQ's QAPP standards. DWQ requires frequent calibration of the water quality probe with documentation to verify. While we do calibrate our instruments prior to each sampling program, our data still would not meet the QAP standards. Why isn't our calibration more stringent? Because we are more interested in trends and patterns than the precise absolute values. | None. | DWQ's Integrated Report focuses on evaluating whether or not surface waters are supporting or not supporting the currently defined beneficial uses and numeric criteria in UAC R317-2. Though DWQ agrees with the commenter that there are other uses of water quality data, including evaluation of trends and patterns, especially when evaluating the cause and sources of impairments, these analyses are addressed by other programs (e.g., TMDL, Nonpoint Source etc.). The purpose of the assessment is to evaluate whether a water body exceeds water quality standards and therefore relies on confidence in the absolute value of data included in the analysis.  Please see response to Comment 206 regarding credible data. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 215 | The methods that we employ follow guidelines outlined by a certified water quality laboratory and through discussions with their chief scientist. In short, they meet all reasonable guidelines necessary to preserve accuracy and quality of samples. | Revised and clarified language in credible data section and Tables 5 - 9. | DWQ relies on the availability of documentation from data submitters to demonstrate that the field collection processes associated with the data are well documented, followed established protocols and methods, and are scientifically defensible and repeatable. As outlined in the credible data matrices this may include information such as QAPPs, calibration reports, information on the accuracy and ranges of properly calibrated probes, descriptions of method collections, laboratory protocols, and essential metadata elements for different data types. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 216 | (2) Complying with DWQ's QA/QC requirements would impose unreasonable costs on the Cooperative's data collection and/or force us to greatly reduce the scope of our sampling, which would impair the ability to assess important determinants of GSL's health.  We estimate that complying with DWQ's QA/QC requirements for sampling would at least triple the cost of our current sampling efforts, forcing us to either shoulder those order-of-magnitude increased costs and/or curtail the scope of our sampling. Again, in a nutrient rich water body like GSL, our protocols reflect the need to use a large number of sample sites so as to better assess temporal and spatial trends and ecologically relevant correlations and relationships-in short, to better understand nutrient cycling and ecosystem health, which should be the foremost goal of any regulatory regime that purports to assess the health of a waterbody. As a result of those efforts to broaden the scope and scale of our sampling, the Cooperative's database on nutrient, chlorophyll, temperature, salinity, and dissolved oxygen-all of which could be subject to dismissal under the Draft Assessment Methods--contains a spatio-temporal scale that other available datasets simply cannot match. It strikes us as arbitrary for DWQ to categorically exclude such information from its 303(d) assessments. | Revised and clarified language in credible data section and Tables 5 - 9. | Regarding DWQ’s QA/QC requirements, please see response to comment 206.  DWQ welcomes the opportunity to collaborate with the Brine Shrimp Cooperative to leverage our collective resources for data collection, recognizing the multiple uses of data for evaluation of the health of Great Salt Lake. DWQ is in the process of developing Water Quality Standards and Assessment Methods for Great Salt Lake as outlined in the Great Salt Lake Water Quality Strategy Document (https://documents.deq.utah.gov/water-quality/standards-technical-services/gsl-website-docs/gsl-wq-strategy/DWQ-2019-000535.pdf). Standards specific to Great Salt Lake will be developed in collaboration with stakeholders and will require Water Quality Board approval. Once standards or methods are fully developed, they will be incorporated in the assessment methods for future Integrated Report cycles. DWQ does not intend to assess Great Salt Lake during the current IR cycle. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 217 | (3) Other categorical restrictions on data may undermine DWQ's ability to make full and fair determinations under Section 303(d).  On page 37 of the Draft Assessment Methods, DWQ specifies a "period of record" of eight years and states further that "DWQ will not consider data and other information older than the period of record" in making 303(d) determinations. While an eight-year period seems generally reasonable, the question arises whether older data could in fact inform a current assessment. We think it could. Take, for example, evaluations of Harmful Algal Blooms (HABs) in areas of GSL like Farmington Bay. If older data such as core samples showed HABs occurred routinely in Farmington Bay before settlement, that data would certainly inform the question of whether HABs occurring today represent a true "impairment" of the ecosystem. | None. | The focus of the Integrated Report is to evaluate whether the currently defined uses of a waterbody have been attained during the recent period of record. DWQ agrees with the commenter that older data or paleolimnological techniques are important for characterizing historic conditions, determining the cause and sources for impairments, or reviewing appropriate use classifications. However, these analyses are outside the scope of the IR and are addressed by other programs (e.g., TMDL, Nonpoint Source, Standards, etc.).  Regarding HAB assessments in Great Salt Lake (GSL), the current Narrative Standard based assessment method is not directly applicable to Great Salt Lake’s beneficial uses. DWQ is in the process of developing Water Quality Standards and Assessment Methods for Great Salt Lake as outlined in the Great Salt Lake Water Quality Strategy Document (https://documents.deq.utah.gov/water-quality/standards-technical-services/gsl-website-docs/gsl-wq-strategy/DWQ-2019-000535.pdf).. GSL specific assessment methods will be incorporated into future Integrated Report cycles. DWQ does not intend to assess Great Salt Lake during the current IR cycle. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 218 | Another concern regarding an arbitrary and one-size-fits-all time frame for data acceptance is that there are well established, cyclical, biological and climatic patterns that exert a tremendous influence on water quality, biological responses, nutrient levels, and population dynamics within the GSL ecosystem. To impose an arbitrary time frame for information to be considered is to disregard biological factors that are well known to exert a significant influence on water quality. | Revision to ‘Period of Record’ section. | The focus of the Integrated Report is to evaluate whether the currently defined uses of a waterbody have been attained during the recent period of record. That does not preclude DWQ from using older data, including the data types described by the commenter, to characterize historic conditions, determine restoration goals, evaluate the appropriateness of and potentially reclassify beneficial uses, or develop or update water quality standards for Utah's waters as a part of TMDL, standards, or other DWQ programs. This has been further clarified in the methods. However, these processes are out of scope for the assessment process. Recommendations regarding these techniques and their uses should be made to specific TMDL or standards development processes. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 219 | Again, the problem is not with setting a general period of record, but rather in establishing a categorical limit on information that could otherwise be relevant to a scientific determination, particularly as those limits may limit the ability of DWQ to understand or craft appropriate regulations relative to water quality in GSL and its ecosystem. | Revision to ‘Period of Record’ section. | The development or alteration of water quality standards, permits, waste load allocations, or other regulatory processes are outside the scope of the IR. The IR's period of record and data credibility and availability requirements do not limit DWQ's ability to use older or other types of data in developing or updating water quality standards or goals. DWQ can consider older or other data and information as part of a secondary review of an impairment determination. This has been clarified in the revised document. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 220 | (4) The cyanotoxin thresholds for recreational use assessments do not comport well with best available science.  At pages 75-76 of the Draft Assessment Methods, DWQ states that, with regard to HABs, a beneficial use is fully supported only if, over the entire period of record, (a) cyanobacterial cell counts "have not exceeded 20,000 cells/ml AND (b) cyanotoxin concentrations have not been identified above recreational use thresholds, AND (c) a warning, danger, or closure has not been issued for recreational access to a waterbody." (Emphasis added.) Is, then, the single occurrence of a warning or closure over the course of an eight year period, even if that warning or closure is arbitrary and/or not tied to specific measurements, sufficient to remove a waterbody from the category of " Beneficial Use Supported"? | None. | As described in the HAB assessment methods, DWQ will identify a waterbody as impaired if a HAB-related recreational warning, danger, or closure notice lasting two or more weeks is issued for that waterbody in two or more years. Waterbodies with a warning, danger, or closure notice lasting less than two weeks or occurring in only one year will be identified as insufficient data with exceedances. Therefore, yes, a single warning, danger, or closure may result in a waterbody not being considered fully supporting its recreational uses due to HAB occurrence. However, if clear and convincing evidence were available to demonstrate that a warning or closure were issued in error or based on incorrect data, that assessment could be modified under the secondary review process to reflect that evidence (please see the ‘Secondary Review’ section of the Assessment Methods for more information). DWQ continues to work with stakeholders and partner agencies to collect HAB related data throughout Utah and adapt and adjust HAB assessment methods as new data and information become available. Specific recommendations for method updates can be made during the next IR assessment methods public comment period. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 221 | Beyond that, we question whether the use of undifferentiated "cyanobacterial cell counts" at 20,000 cells/ml (for Beneficial Use Supported) and 100,000 cells/ml (for Beneficial Use Not Supported) represent scientifically defensible and reasonable standards. As many researchers have observed, arbitrarily adopting WHO initial standards or otherwise using an alert framework based solely on total cyanobacterial cells/ml is not advisable . See, e.g., David C. Szlag et al., "Cyanobacteria and Cyanotoxins Occurrence and Removal from Five High-Risk Conventional Treatment Drinking Water Plant s," Toxins (Basel), 12 June 2015 ("The original WHO Alert Level framework ... provides a useful starting point but should not be arbitrarily adopted The Water Safety Plan approach should be considered as a tool to modify the WHO ALF for local conditions including Alert levels based on cell concentrations of locally pre sent toxin producing genera." ) (available at: https:/ / www .ncbi.nlm.nih.gov/ pmc/ art icles/PM C4488698 /) .  We note that other states have done just that. To cite one example, Oregon previously adopted a Health Advisory system that uses 100,000 cells/ml of "all toxigenic species" or "40,000 cells/ml" of two specific, locally occurring and toxin producing species. See Oregon Health Authority {OHA), " Public Health Advisory Guidelines: Harmful Algal Blooms in Freshwater Bodies, January 2018, at 6 (available at: https:/ / www.oregon.gov/oha/ph/healthyenvironments/recreation/harmfulalgaeblooms/ document s/ habpublichealthadvisoryguidelines.pdf). OHA specifically evaluated the efficacy of using algal cell counts alone as the guideline for issuing advisories for waterbodies contaminated with cyanobacteria, and, after extensive study, concluded that toxin based advisories (TBA) represented a superior and more scientifically defensible means of assessing the risks to the public from cyanotoxins (see David Farrar et al., "Health-Based Cyanotoxin Guideline Values Allow for Cyanotoxin-Based Monitoring and Efficient Public Health Response to Cyanobacterial Bloom s," 5 February 2015; available at: https:/ / www.mdp i.com/ 2072- 6651/7/2/457/htm). That study opined that the pre-existing, cell-based approach was economically harmful and resulted in inefficient use of resources, unnecessary advisories, and increased the risk of "advisory fatigue" among the general population, in which the public ceases to heed to advisories due to the frequency and duration of such advisories. In their closing comments the researchers observed:  Toxin data allow OHA to communicate with the public about actual risks, as opposed to the potential risk represented by cell count data alone. Toxin data give great credibility to health advisories when they are issued and decrease the likelihood that an advisory would be issued unnecessarily. See id.  Many environmental factors serve to regulate the production of toxins by cyanobacteria. The amount of toxin produced depends on the species of cyanobacteria present as well as the presence of other cyanobacteria. Genetic and epigenetic factors are also at play, and a host of nutritional and enzymatic factors influence cyanotoxin production. While it may make sense to use cell counts to trigger further studies of actual cyanotoxin levels in a given waterbody (i.e., as a trigger for further investigation}, it can be inaccurate, misleading, and incorrect to assess risk based on cell counts alone. | None. | Thank you for identifying these studies and recreational health advisory policies from other states. The issuance of recreational advisories or closures is a separate process from water quality assessment. Suggestions regarding the health advisory process should be addressed to the Water Quality and Health Advisory Panel (https://deq.utah.gov/legacy/divisions/water-quality/health-advisory/index.htm). In developing recreational use assessment methods for HABs, DWQ reviewed indicators used by states throughout the country for water quality assessment or health advisory issuance (see https://www.epa.gov/sites/production/files/2016-12/documents/draft-hh-rec-ambient-water-swimming-document.pdf, appendix B for details). States use a wide variety of indicators including cyanobacteria cell counts (total and lists of pre-determined potentially toxigenic taxa), cyanobacteria relative abundances, cyanotoxin concentrations, and assessments of the presence of cyanobacteria scum layers. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 222 | For all these reasons, we question whether the use of undifferentiated "cyanobacterial cell counts" at 20,000 cells/ml(for Beneficial Use Supported} and 100,000 cells/ml (for Beneficial Use Not Supported) represent scientifically defensible and reasonable standards. | None. | DWQ's HAB assessment methods directly reflect Utah's Narrative Standard which stipulates that the presence of scums, nuisances such as color, odor, or taste, or water quality conditions that may cause undesirable human effects are a violation of the state's water quality rules. Due to the numerous potential toxins and congeners associated with cyanobacteria and the recombinant nature of cyanobacteria resulting in the potential for gene transfer between toxic and non-toxic strains, differentiating between toxic and non-toxic strains or taxa of cyanobacteria is problematic, and limiting cell counts to specific taxa may be not be protective of recreational uses. DWQ has therefore based assessment methods on total cell counts.  The use of cell counts in DWQ's assessment process was a point of substantial discussion during the 2016 IR. Please see DWQ's 2016 IR response to comments, appendix A, responses 2, 3, and 9 for additional information (https://deq.utah.gov/legacy/programs/water-quality/monitoring-reporting/assessment/docs/2016/dwq-response-to-public-comments-final2016ir-v2-1.pdf). |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 223 | Conclusion  Our over-arching concern about the processes and limitations outlined in the Draft Assessment Methods is that the proposed methodology will categorically exclude highly valuable information that has been collected systematically and according to standard scientific methods over long periods of time­ information that could help DWQ better understand the complex biological and ecological processes that exist in the GSl ecosystem and that directly informs the question of whether GSl should be listed as impaired under Section 303(d). DWQ and other GSl stakeholders have often expressed concern that little is known about GSl and more research is needed.4 Given that, we are concerned about proposed methods for categorizing data and incorporating (or not incorporating) it into 303(d) determinations that could effectively eliminate from consideration most of the extant scientific data on GSL. | None. | DWQ appreciates the interest in the assessment process and has clarified our methods to ensure that high quality data is available to the assessment process. DWQ welcomes the opportunity to collaborate with GSL stakeholders in further developing water quality goals and plans for the lake. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 224 | 4 To address that knowledge gap, the U.S. Geological Service (USGS) recently put out a call for data on GSL. That call said, to paraphrase, "please send us any quality data you have on GSL, and make sure you include information on where and how the data was collected." That strikes us as a far more sensible approach to receiving and evaluate in g data than trying to shoehorn it into predetermined categories that may or may not be considered, a strategy that sounds good in theory but risks excluding quality data from regulatory decision-making. | None. | DWQ is aware of and commends USGS' effort to compile GSL related datasets and studies that are not currently publically available elsewhere through the USGS ScienceBase program. The USGS ScienceBase is a data and research catalog and has different data quality objectives from the IR. As suggested in EPA's 2005 Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act, EPA suggests in the "Data Quality Considerations" section to develop scientifically sound data evaluation procedures that include, but are not limited to, QAPPs, descriptions of method collections, laboratory protocols, and required metadata elements for different data types. (https://www.epa.gov/sites/production/files/2015-10/documents/2006irg-report.pdf) |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 225 | We appreciate DWQ' s unique role in protecting Utah's waters, the good working relationship the Cooperative has with DWQ, and our shared goal of preserving the ecologic value and integrity of GSl and its ecosystem. If there is any other information we could provide that would help inform DWQ's 303(d} listing process, please let us know. | None. | Thank you for this comment. DWQ values our collaborative partnerships with stakeholders to protect water quality in Great Salt Lake and statewide. DWQ does not intend to assess Great Salt Lake during this IR cycle because water quality standards and assessment methods have not yet been developed for this unique water body. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 200 | The Great Salt Lake Brine Shrimp Cooperative (the "Cooperative") hereby submits comments regarding the Draft 2018/2020 303(d) Assessment Methods (the "Draft Assessment Methods"). The Cooperative is concerned that the Draft Assessment Methods unduly restrict the types of data that the Division of Water Quality ("DWQ") will use to assess water quality in the Great Salt Lake ("GSL"), including the likely exclusion of robust data sets on various water quality parameters that directly inform the question of whether GSL is healthy or should be listed as impaired under Section 303(d).  While we understand the desire to achieve greater consistency in water quality data, we urge DWQ to resist the temptation to categorically exclude data from consideration. According to the EPA, "States may use any number of ways to determine whether or not a water body meets the water quality standard. However, federal regulations say states must evaluate 'all existing and readily available information' in developing their 303{d) lists (40 C.F.R. §130.7(b) (5)). This means that states cannot select what data/information they use and purposely disregard other." EPA, Overview of Listing Impaired Waters under CWA Section 303{d) at 1 (available at: https: // www.epa.gov/ t mdl/ overview- listing­ impaired-waters-under -cwa-section-303d) (emphasis added.)  Consistent with that EPA guidance, we want to make sure that DWQ has more information rather than less information available to it to make informed decisions affecting the lake and its future. | None. | DWQ appreciates your feedback regarding the 303(d) assessment methods and would like to clarify that DWQ's credible data requirements, which includes submitting SAPs, SOPs, etc., are required when requested by DWQ, so that the division can ensure results from disparate data sources are repeatable and scientifically defensible.  For 305(b) and 303(d) reporting purposes, the available and credible data requirements and documentation outlined in the assessment methods are designed to ensure results from disparate data sources are repeatable and scientifically defensible and instill confidence in the 305(b) and 303(d) lists that DWQ publishes. The requirements and review protocols in the "Data Quality" section and tables 5-9 reflect legitimate data quality concerns when determining whether or not a waterbody is supporting or not supporting the beneficial uses and criteria in UAC R317-2. Should any data and information not be included in the assessment process, DWQ will clearly document which dataset (or datasets) were not included and why (as described and required in 40 CFR 130.7(b)(6)(iii)). This documentation, as well as other data and information described in section "Developing the Components of the Draft Integrated Report and 303(d) List" of the assessment methods, will be tracked and made available for review during the draft IR public comment process.  Please also see response to comment 206. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 201 | Beyond that, we strongly encourage DWQ to consider specific measurements in the context of overall ecosystem health, which is precisely the kind of question our sampling efforts are designed to answer. A hyper­ focus on any one parameter and excluding scientifically valid data undermines that goal and risks losing the forest for the trees. | None. | DWQ's Integrated Report focuses on evaluating whether or not surface waters are supporting or not supporting the currently defined beneficial uses and criteria in UAC R317-2. The identification of the causes and sources of pollution or understanding the overall ecosystem health of surface waters are outside the scope of the IR and are addressed through other DWQ programs including TMDLs, Nonpoint Source, Standards etc.   However, as noted in the "Individual Assessment of Water Quality Standards" section of the assessment methods, DWQ initially assesses each use and parameter for a waterbody at the site level as this provides a more direct measure of supporting or not supporting water quality standards. DWQ recognizes that conflicting assessment results can exist at the individual site or broader assessment unit level. To evaluate the potential conflicting results among different data types and to better quantify the extent of surface waters supporting or not supporting their beneficial uses, DWQ employs several levels of reviews including, but not limited to: (1) independent applicability, (2) secondary reviews, and (3) assessment unit re-segmentation. These reviews are discussed in more detail in the "Conflicting Assessment of Water Quality Standards" and "Appendix 3" sections of the assessment methods. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 202 | The Cooperative recognizes the need to apply reasonable standards to the data that DWQ will consider in making determinations under Section 303(d). Those standards must, however, take into account the context in which the data was collected, including the purposes and methodology behind the data collection, and, in some cases, the unique characteristics of the water body where the data is collected. In the case of GSL, protocols that may make sense in the context of a pristine headwater stream may make little sense in a terminal lake like GSL that is nutrient rich and where reasonable criteria for assessing the health of the waterbody may be entirely different. | None. | DWQ strives to ensure that all data used for 303(d) water quality assessments are of high quality, representative of ambient conditions, and appropriately documented. The IR's credible data requirements do not preclude DWQ from incorporating qualitative information including expert opinions, reviewer comments, available external research, or other forms of site-specific knowledge into the secondary review portion of the assessment or potentially modifying the initial assessment if clear and convincing evidence indicate it appropriate to do so. Please see the section, 'Secondary Review,' starting on page 80 of the methods document for additional detail. The IR's credible data requirements also do not preclude DWQ from using these types of information in other programs. |
| Thomas   Timothy | Bosteels   Hawkes | TBosteels\_12202018.pdf  THawkes\_12202018.pdf |  | 203 | Comments and Concerns Regarding the Process  Before addressing the substance of the Draft Methods, we would like to express a couple of concerns about the process:  First, the cover email from Jodi Gardberg, Manager of the Technical and Standard Services Section at DWQ, contains the following statement:  Call for Data: Right after the public comment period closes for the 303{d) assessment methods, DWQ will issue a formal call for water quality data to be used in DWQ's assessment for the combined 2018/2020 IR. The data must meet the readily available and credible data requirements outlined in the 303(d) assessment methods. (Emphasis added.)  Our concern is this: if DWQ plans to issue a formal call for water quality data "right after" the public comment period closes, and that data "must meet the readily available and credible data requirements outlined in the [Draft Assessment Methods]," how can DWQ reasonably evaluate public comment relative to those Assessment Methods? In short, the schedule seems to presume the validity of the Assessment Methods and does not seem to provide an effective way for DWQ to take into account public comment before applying those Assessment Methods. | IR project timeline adjusted. | DWQ appreciates the feedback from the commenter and as a result, delayed the IR Call for Data until the DWQ Response to comments and the revisions to the 2018/2020 IR Assessment Methods document were released. DWQ received multiple public comments asking for clarification of the definitions and requirements for readily available and credible data. DWQ has addressed these concerns and has made changes to the data submission and review process in the final version of the Assessment Methods document. |