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

UTAH DEPARTMENT *of* ENVIRONMENTAL QUALITY
WATER QUALITY

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WATER QUALITY

CITATION: DIVISION OF WATER QUALITY. 2019. UTAH'S 2018/2020 303(D) ASSESSMENT METHODS: PUBLIC COMMENTS. SALT LAKE CITY, UTAH. UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

Submissions are Treated as Public Documents

Note: Submissions are treated as public documents and will be published on UDWQ's Water Quality Assessment Website. Though we require submission of an e-mail address or phone number, contact information will not be released to the public. Only commenter name will be published with the submission.

Q172.

Completion Time

Your browser cookies keep track of your progress. To prevent losing your work if you have to take a break or if your cookies get deleted, we recommend drafting your comments beforehand. Ideally, you will submit your comments in one session.
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
NOTE: This form is best displayed on tablet screens or larger.

Q165. Validation

reCAPTCHA V1 IS SHUTDOWN
Direct site owners to **g.co/recaptcha/upgrade**

Privacy & Terms

Q18. Does your submission contain any personal information from third party individual(s)? *

- ○ Yes
- ◉ No

Q228. CSS and HTML

This question was not displayed to the respondent.

Q164.

Third Party Consent

This question was not displayed to the respondent.

Q19. Do you have consent from those third party individuals to include their personal information for submission and publication?*

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Q226. CSS and HTML

Q145.

Type of Submission

Q1. Type of Submission:*

- (•) Individual
- ( ) Government
- ( ) Non-Government Organization
- ( ) Other (specify below) _____

Q2. Government or Organization Name (if applicable):

This question was not displayed to the respondent.

Q229. CSS and HTML

Q3.

Is this your first time submitting comments on the 303(d) Assessment Methods? *

- (•) Yes
- ( ) No

Q4. How did you hear about this public comment process?*

- ( ) Meeting
- (•) UDWQ Listserve
- ( ) UDWQ Website
- ( ) Other (specify below) _____

Q227. CSS and HTML

Q146.

Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

Dan

Q7. Last Name:*

Potts

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

Q224.
CSS and jQuery Skip to TOC

Q142.
Introduction

This question was not displayed to the respondent.

Q182.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q23.
The Clean Water Act and the Integrated Report

This question was not displayed to the respondent.

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Assessment Categories for Surface Water

This question was not displayed to the respondent.

Q25.
Utah's Numeric Criteria and Beneficial Uses

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Q26.
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This question was not displayed to the respondent.

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Assessment Process and Time Frames

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303(d) Assessment Results

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305(b) Summary and 303(d) Assessment Metadata

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Q39.
Finalizing the Integrated Report and 303(d) List

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General Comments on the Assessment Process and Time Frames

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Scope of the Assessment

This question was not displayed to the respondent.

Q186.
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Q43.
Waters of the State

This question was not displayed to the respondent.

Q44.
Waterbody Types

This question was not displayed to the respondent.

Q45.
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This question was not displayed to the respondent.

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Q50.
General Comments on the Scope of the Assessment

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Q148.
Data Quality

Q188.
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Q51.
Credible Data Defined

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.

Q53.
QAPP Guidance and Example

Q54.
Sample Analysis Plan Guidelines and Examples

Q55.
Standard Operating Procedures Guidelines and Examples

Q56.
Sampling Observations and Laboratory Comments

Q57.
Monitoring Location Information

Q58.
Credible Data Matrices

Q59.
General Comments on Data Quality

Q149.

Data Submission Process

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Q190.

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This question was not displayed to the respondent.

Q60.

Type of Data to Submit

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Q61.

Period of Record

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Q62.

Older Data and Information

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Q63.

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Q64.

Data Submission Tools

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Q65.

General Comments on Data Submission Process

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Q150.

Data Preparation for Conventional and Toxic Assessments for All Waters

Q192.

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Q66.
Results Below Detection Limits

Q67.
Duplicate and Replicate Results

Q68.
Initial Assessment: Monitoring Location Site Level

Q69.
General Comments on Data Preparation for Conventional and Toxic Assessments for All Waters

Q151.

Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q194.
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This question was not displayed to the respondent.

Q70.
Conventional Parameter Assessments

This question was not displayed to the respondent.

Q71.
Grab Sample Assessments

This question was not displayed to the respondent.

Q72.
High Frequency Assessments for Dissolved Oxygen

This question was not displayed to the respondent.

Q73.
Narrative Standards: Biological Assessments

This question was not displayed to the respondent.

Q222.
Analyzing Multiple DO Datasets at a Site

This question was not displayed to the respondent.

Q74.
River Invertebrate Prediction and Classification System Models

This question was not displayed to the respondent.

Q75.
Model Construction and Performance

This question was not displayed to the respondent.

Q76.
Assessing Biological Use Support

This question was not displayed to the respondent.

Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q152.

Assessments Specific to Lakes, Reservoirs, and Ponds

Q196.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q79.
Assessment Overview

Q80.
Tier I Assessment

Q81.
Drinking Water Use Support

Q82.
Recreational Use Support

Q83.
Aquatic Life Use Support

Q86.
Tier II Assessment

Q87.
Weight of Evidence Criteria

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. 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.

Q88.
Carlson’s Trophic State Index

Q89.
Phytoplankton Community

Q90.
Great Salt Lake

Q91.
Gilbert Bay Bird Egg Tissue Assessment

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

Q153.
Toxics Parameter Assessments for All Waters

Q198.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q93.
Equation-Based Toxic Parameters

Q89.
Assessment Process

Q90.
General Comments on Toxics Parameter Assessments for All Waters

Q154.
Escherichia coli Assessment for All Waters

This question was not displayed to the respondent.

Q200.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q91.
Data Preparation

This question was not displayed to the respondent.

Q92.
Recreation Season

This question was not displayed to the respondent.

Q93.
Escherichia coli Collection Events and Replicate Samples

This question was not displayed to the respondent.

Q94.
Data Substitution for Calculating the Geometric Mean

This question was not displayed to the respondent.

Q95.
Use Designation

This question was not displayed to the respondent.

Q96.
Annual Recreation Season Assessment

This question was not displayed to the respondent.

Q97.
Summarizing Assessment Results

This question was not displayed to the respondent.

Q98.
General comments on *Escherichia coli* Assessment for All Waters

This question was not displayed to the respondent.

Q155.
Pollution Indicator Assessments for All Waters

This question was not displayed to the respondent.

Q202.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q99.
General Comments on Pollution Indicator Assessment for All Waters

This question was not displayed to the respondent.

Q156.
Narrative Standards for All Waters

This question was not displayed to the respondent.

Q204.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q100.
Drinking Water Closures

This question was not displayed to the respondent.

Q101.
Fish Kills

This question was not displayed to the respondent.

Q102.
Harmful Algal Blooms (HABs)

This question was not displayed to the respondent.

Q105.

Mercury Assessment Process

This question was not displayed to the respondent.

Q106.
Fish Tissue Assessments and Consumption Health Advisories

This question was not displayed to the respondent.

Q107.
General Comments on Narrative Standards for All Waters

This question was not displayed to the respondent.

Q157.
Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q108.
Individual Assessment of Water Quality Standards

This question was not displayed to the respondent.

Q109.
Conflicting Assessments of Water Quality Standards

This question was not displayed to the respondent.

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

This question was not displayed to the respondent.

Q111.
Secondary Review

This question was not displayed to the respondent.

Q112.
Assessment Unit Re-segmentation

This question was not displayed to the respondent.

Q113.
General Comments on Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q158.

Identifying Causes of Impairments

This question was not displayed to the respondent.

Q208.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q117.
Pollutants

This question was not displayed to the respondent.

Q114.
Pollution

This question was not displayed to the respondent.

Q115.
Unknown Sources

This question was not displayed to the respondent.

Q116.
Natural Conditions

This question was not displayed to the respondent.

Q118.
General Comments on Identifying Causes of Impairments

This question was not displayed to the respondent.

Q159.
Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q210.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q119.
Category 4A

This question was not displayed to the respondent.

Q120.
Category 4B

This question was not displayed to the respondent.

Q121.
Category 4C

This question was not displayed to the respondent.

Q122.
Delistings

This question was not displayed to the respondent.

Q123.
Delisting Categorical Pollutant Causes

This question was not displayed to the respondent.

Q126.
303(d) Listings

This question was not displayed to the respondent.

Q127.
Non-303(d) Categorical Listings

This question was not displayed to the respondent.

Q124.
General Comments on Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q160.
303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q212.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q128.
General Comments on 303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q161.
Revision Requests Between Cycles

This question was not displayed to the respondent.

Q214.
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This question was not displayed to the respondent.

Q129.
General Comments on Revision Requests Between Cycles

This question was not displayed to the respondent.

Q162.
Appendices

This question was not displayed to the respondent.

Q216.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q130.
Appendix 1

This question was not displayed to the respondent.

Q131.
Appendix 2

This question was not displayed to the respondent.

Q132.
Appendix 3

This question was not displayed to the respondent.

Q133.
Appendix 9

This question was not displayed to the respondent.

Q134.
Appendix 5

This question was not displayed to the respondent.

Q135.
Appendix 6

This question was not displayed to the respondent.

Q136.
Appendix 7

This question was not displayed to the respondent.

Q163.
Additional Comments and Additional Submission Files

This question was not displayed to the respondent.

Q219.
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This question was not displayed to the respondent.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

This question was not displayed to the respondent.

Q137.
Additional Comments on the Draft 303(d) Assessment Methods

This question was not displayed to the respondent.

Q138. Upload File 01

This question was not displayed to the respondent.

Q167. Upload File 02

This question was not displayed to the respondent.

Q168. Upload File 03

This question was not displayed to the respondent.

Q169. Upload File 04

This question was not displayed to the respondent.

Q170. Upload File 05

This question was not displayed to the respondent.

Q171. Upload File 06

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Q141.
Acknowledgements
This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

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Q166.
Submit Your Comments
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form

multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form menu.

Q180. CSS HTML Style

Location Data

Location: (40.749893188477, -111.92600250244)

Source: GeoIP Estimation

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

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- ( ) Yes
- (•) No

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Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

David

Q7. Last Name:*

Richards

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

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Q73.
Narrative Standards: Biological Assessments

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. Page 46. Last sentence. Comment: I would change wording to read '… DWQ uses an empirically based model' not 'empirical model'. 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. Biological integrity is not a measurable attribute but an abstract idea (latent variable), similar to "human health". Just a reminder; bioassessments do not quantify integrity, they are only an indicator. 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. Maybe reword to read, 'least impaired sites that could be limited or affected by the types of impairment not being evaluated or compared with'. Page 47. 4th sentence, third paragraph Comment: There apparently are no direct, real world, reference site(s) to compare with Jordan River, Green River, Colorado Rivers, or Utah Lake (and others). Only generalized, regionwide, summary, and averaged hypothetical reference sites. This lack of, or entire 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 a 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. 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. 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.

Q222.
Analyzing Multiple DO Datasets at a Site

Q74.
River Invertebrate Prediction and Classification System Models

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. 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 No. Semivoltine Taxa No. Univoltine Taxa 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 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 Simpson's index Sprawler taxa Sprawler taxa (adjusted) Swimmer & Climber Taxa Tolerant taxa O/E 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). 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 r

Q75.
Model Construction and Performance

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). 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 r

Q76.
Assessing Biological Use Support

Arbitrary cut- off points, no statistical justification for choices in Decision Tree (Figure 7) or Use Determination (Table 13). Apparently mostly a best guess.

Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

Q152.

Assessments Specific to Lakes, Reservoirs, and Ponds

Q196.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q79.
Assessment Overview

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. 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). 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.

Q80.
Tier I Assessment

Q81.
Drinking Water Use Support

Q82.
Recreational Use Support

Q83.
Aquatic Life Use Support

Q86.
Tier II Assessment

Q87.
Weight of Evidence Criteria

Q88.
Carlson's Trophic State Index

Q89.
Phytoplankton Community

Q90.
Great Salt Lake

Q91.
Gilbert Bay Bird Egg Tissue Assessment

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

Q153.
Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q198.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q93.
Equation-Based Toxic Parameters

This question was not displayed to the respondent.

Q89.
Assessment Process

This question was not displayed to the respondent.

Q90.
General Comments on Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q154.
Escherichia coli Assessment for All Waters

This question was not displayed to the respondent.

Q200.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q91.

Data Preparation

This question was not displayed to the respondent.

Q92.
Recreation Season

This question was not displayed to the respondent.

Q93.
Escherichia coli Collection Events and Replicate Samples

This question was not displayed to the respondent.

Q94.
Data Substitution for Calculating the Geometric Mean

This question was not displayed to the respondent.

Q95.
Use Designation

This question was not displayed to the respondent.

Q96.
Annual Recreation Season Assessment

This question was not displayed to the respondent.

Q97.
Summarizing Assessment Results

This question was not displayed to the respondent.

Q98.
General comments on *Escherichia coli* Assessment for All Waters

This question was not displayed to the respondent.

Q155.
Pollution Indicator Assessments for All Waters

This question was not displayed to the respondent.

Q202.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q99.
General Comments on Pollution Indicator Assessment for All Waters

This question was not displayed to the respondent.

Q156.

Narrative Standards for All Waters

This question was not displayed to the respondent.

Q204.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q100.
Drinking Water Closures

This question was not displayed to the respondent.

Q101.
Fish Kills

This question was not displayed to the respondent.

Q102.
Harmful Algal Blooms (HABs)

This question was not displayed to the respondent.

Q105.
Mercury Assessment Process

This question was not displayed to the respondent.

Q106.
Fish Tissue Assessments and Consumption Health Advisories

This question was not displayed to the respondent.

Q107.
General Comments on Narrative Standards for All Waters

This question was not displayed to the respondent.

Q157.
Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q108.
Individual Assessment of Water Quality Standards

This question was not displayed to the respondent.

Q109.
Conflicting Assessments of Water Quality Standards

This question was not displayed to the respondent.

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

This question was not displayed to the respondent.

Q111.
Secondary Review

This question was not displayed to the respondent.

Q112.
Assessment Unit Re-segmentation

This question was not displayed to the respondent.

Q113.
General Comments on Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q158.
Identifying Causes of Impairments

This question was not displayed to the respondent.

Q208.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q117.
Pollutants

This question was not displayed to the respondent.

Q114.
Pollution

This question was not displayed to the respondent.

Q115.
Unknown Sources

This question was not displayed to the respondent.

Q116.
Natural Conditions

This question was not displayed to the respondent.

Q118.
General Comments on Identifying Causes of Impairments

This question was not displayed to the respondent.

Q159.
Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q210.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q119.
Category 4A

This question was not displayed to the respondent.

Q120.
Category 4B

This question was not displayed to the respondent.

Q121.
Category 4C

This question was not displayed to the respondent.

Q122.
Delistings

This question was not displayed to the respondent.

Q123.
Delisting Categorical Pollutant Causes

This question was not displayed to the respondent.

Q126.
303(d) Listings

This question was not displayed to the respondent.

Q127.
Non-303(d) Categorical Listings

This question was not displayed to the respondent.

Q124.
General Comments on Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q160.

303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q212.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q128.

General Comments on 303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q161.

Revision Requests Between Cycles

This question was not displayed to the respondent.

Q214.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q129.

General Comments on Revision Requests Between Cycles

This question was not displayed to the respondent.

Q162.

Appendices

This question was not displayed to the respondent.

Q216.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q130.

Appendix 1

This question was not displayed to the respondent.

Q131.

Appendix 2

This question was not displayed to the respondent.

Q132.

Appendix 3

This question was not displayed to the respondent.

Q133.
Appendix 9

This question was not displayed to the respondent.

Q134.
Appendix 5

This question was not displayed to the respondent.

Q135.
Appendix 6

This question was not displayed to the respondent.

Q136.
Appendix 7

This question was not displayed to the respondent.

Q163.
Additional Comments and Additional Submission Files

Q219.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

Q137.
Additional Comments on the Draft 303(d) Assessment Methods

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. 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. 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. 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. 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. 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. 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.

Q138. Upload File 01

Q167. Upload File 02

Q168. Upload File 03

Q169. Upload File 04

Q170. Upload File 05

Q171. Upload File 06

Q141.

Acknowledgements

This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

Q166.

Submit Your Comments

NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form menu.

Q180. CSS HTML Style

Location Data

Location: (40.177001953125, -111.53600311279)

Source: GeoIP Estimation

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

Submissions are Treated as Public Documents

Note: Submissions are treated as public documents and will be published on UDWQ's Water Quality Assessment Website. Though we require submission of an e-mail address or phone number, contact information will not be released to the public. Only commenter name will be published with the submission.

Q172.

Completion Time

Your browser cookies keep track of your progress. To prevent losing your work if you have to take a break or if your cookies get deleted, we recommend drafting your comments beforehand. Ideally, you will submit your comments in one session.
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
NOTE: This form is best displayed on tablet screens or larger.

Q165. Validation

reCAPTCHA V1 IS SHUTDOWN
Direct site owners to **g.co/recaptcha/upgrade**

Privacy & Terms

Q18. Does your submission contain any personal information from third party individual(s)? *

- ○ Yes
- ◉ No

Q228. CSS and HTML

This question was not displayed to the respondent.

Q164.

Third Party Consent

This question was not displayed to the respondent.

Q19. Do you have consent from those third party individuals to include their personal information for submission and publication?*

This question was not displayed to the respondent.

Q20. **NOTE**: If you have not obtained permission, UDWQ may not publish your submission and may only informally respond to your submission outside of the official Assessment process.

This question was not displayed to the respondent.

Q21. May UDWQ contact you (and any third party individuals) about your submission?*

This question was not displayed to the respondent.

Q226. CSS and HTML

Q145.

Type of Submission

Q1. Type of Submission:*

- (•) Individual
- ( ) Government
- ( ) Non-Government Organization
- ( ) Other (specify below) [ ]

Q2. Government or Organization Name (if applicable):

This question was not displayed to the respondent.

Q229. CSS and HTML

Q3.

Is this your first time submitting comments on the 303(d) Assessment Methods? *

- ( ) Yes
- (•) No

Q4. How did you hear about this public comment process?*

- (•) Meeting
- ( ) UDWQ Listserve
- ( ) UDWQ Website
- ( ) Other (specify below) [ ]

Q227. CSS and HTML

Q146.

Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

David

Q7. Last Name:*

Richards

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

Q224.
CSS and jQuery Skip to TOC

Q142.
Introduction

This question was not displayed to the respondent.

Q182.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q23.
The Clean Water Act and the Integrated Report

This question was not displayed to the respondent.

Q24.
Assessment Categories for Surface Water

This question was not displayed to the respondent.

Q25.
Utah's Numeric Criteria and Beneficial Uses

This question was not displayed to the respondent.

Q26.
Priority and Assessed Parameters

This question was not displayed to the respondent.

Q28.
General Comments on the Introduction

This question was not displayed to the respondent.

Q143.
Assessment Process and Time Frames

This question was not displayed to the respondent.

Q184.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q29.
Developing the Methods

This question was not displayed to the respondent.

Q30.
Public Review of the Methods Process and Schedule

This question was not displayed to the respondent.

Q31.
Call for Readily Available Data and Schedule

This question was not displayed to the respondent.

Q32.
Existing and Readily Available Data Defined

This question was not displayed to the respondent.

Q33.
Developing the Components of the Draft Integrated Report and 303(d) List

This question was not displayed to the respondent.

Q34.
Final 303(d) Assessment Methods

This question was not displayed to the respondent.

Q35.
305(b) Summary

This question was not displayed to the respondent.

Q36.
303(d) Assessment Results

This question was not displayed to the respondent.

Q37.
305(b) Summary and 303(d) Assessment Metadata

This question was not displayed to the respondent.

Q38.
Public Review of the 303(d) List

This question was not displayed to the respondent.

Q39.
Finalizing the Integrated Report and 303(d) List

This question was not displayed to the respondent.

Q42.
General Comments on the Assessment Process and Time Frames

This question was not displayed to the respondent.

Q147.
Scope of the Assessment

This question was not displayed to the respondent.

Q186.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q43.
Waters of the State

This question was not displayed to the respondent.

Q44.
Waterbody Types

This question was not displayed to the respondent.

Q45.
Assessment Units

This question was not displayed to the respondent.

Q46.
Assessment Unit Delineation and Identification

This question was not displayed to the respondent.

Q47.
Additional Guidelines for Delineating Assessment Units

This question was not displayed to the respondent.

Q48.
Assessment Unit Datum

This question was not displayed to the respondent.

Q223.
AU Stream Mileage Estimation for Flowing Surface Waters and Canals

This question was not displayed to the respondent.

Q49.
Waters Within and Shared with Other States

This question was not displayed to the respondent.

Q50.
General Comments on the Scope of the Assessment

This question was not displayed to the respondent.

Q148.
Data Quality

This question was not displayed to the respondent.

Q188.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q51.
Credible Data Defined

This question was not displayed to the respondent.

Q53.
QAPP Guidance and Example

This question was not displayed to the respondent.

Q54.
Sample Analysis Plan Guidelines and Examples

This question was not displayed to the respondent.

Q55.
Standard Operating Procedures Guidelines and Examples

This question was not displayed to the respondent.

Q56.
Sampling Observations and Laboratory Comments

This question was not displayed to the respondent.

Q57.
Monitoring Location Information

This question was not displayed to the respondent.

Q58.
Credible Data Matrices

This question was not displayed to the respondent.

Q59.
General Comments on Data Quality

This question was not displayed to the respondent.

Q149.
Data Submission Process

This question was not displayed to the respondent.

Q190.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q60.
Type of Data to Submit

This question was not displayed to the respondent.

Q61.
Period of Record

This question was not displayed to the respondent.

Q62.
Older Data and Information

This question was not displayed to the respondent.

Q63.
Newer Data and Information

This question was not displayed to the respondent.

Q64.
Data Submission Tools

This question was not displayed to the respondent.

Q65.
General Comments on Data Submission Process

This question was not displayed to the respondent.

Q150.
Data Preparation for Conventional and Toxic Assessments for All Waters

This question was not displayed to the respondent.

Q192.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q66.
Results Below Detection Limits

This question was not displayed to the respondent.

Q67.
Duplicate and Replicate Results

This question was not displayed to the respondent.

Q68.
Initial Assessment: Monitoring Location Site Level

This question was not displayed to the respondent.

Q69.
General Comments on Data Preparation for Conventional and Toxic Assessments for All Waters

This question was not displayed to the respondent.

Q151.
Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q194.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q70.
Conventional Parameter Assessments

This question was not displayed to the respondent.

Q71.
Grab Sample Assessments

This question was not displayed to the respondent.

Q72.
High Frequency Assessments for Dissolved Oxygen

This question was not displayed to the respondent.

Q73.
Narrative Standards: Biological Assessments

This question was not displayed to the respondent.

Q222.
Analyzing Multiple DO Datasets at a Site

This question was not displayed to the respondent.

Q74.
River Invertebrate Prediction and Classification System Models

This question was not displayed to the respondent.

Q75.
Model Construction and Performance

This question was not displayed to the respondent.

Q76.
Assessing Biological Use Support

This question was not displayed to the respondent.

Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q152.
Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q196.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q79.
Assessment Overview

This question was not displayed to the respondent.

Q80.
Tier I Assessment

This question was not displayed to the respondent.

Q81.
Drinking Water Use Support

This question was not displayed to the respondent.

Q82.
Recreational Use Support

This question was not displayed to the respondent.

Q83.
Aquatic Life Use Support

This question was not displayed to the respondent.

Q86.
Tier II Assessment

This question was not displayed to the respondent.

Q87.
Weight of Evidence Criteria

This question was not displayed to the respondent.

Q88.
Carlson's Trophic State Index

This question was not displayed to the respondent.

Q89.
Phytoplankton Community

This question was not displayed to the respondent.

Q90.
Great Salt Lake

This question was not displayed to the respondent.

Q91.
Gilbert Bay Bird Egg Tissue Assessment

This question was not displayed to the respondent.

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q153.
Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q198.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q93.
Equation-Based Toxic Parameters

This question was not displayed to the respondent.

Q89.
Assessment Process

This question was not displayed to the respondent.

Q90.
General Comments on Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q154.
Escherichia coli Assessment for All Waters

This question was not displayed to the respondent.

Q200.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q91.
Data Preparation

This question was not displayed to the respondent.

Q92.
Recreation Season

This question was not displayed to the respondent.

Q93.
Escherichia coli Collection Events and Replicate Samples

This question was not displayed to the respondent.

Q94.
Data Substitution for Calculating the Geometric Mean

This question was not displayed to the respondent.

Q95.
Use Designation

This question was not displayed to the respondent.

Q96.
Annual Recreation Season Assessment

This question was not displayed to the respondent.

Q97.
Summarizing Assessment Results

This question was not displayed to the respondent.

Q98.
General comments on *Escherichia coli* Assessment for All Waters

This question was not displayed to the respondent.

Q155.
Pollution Indicator Assessments for All Waters

This question was not displayed to the respondent.

Q202.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q99.
General Comments on Pollution Indicator Assessment for All Waters

This question was not displayed to the respondent.

Q156.
Narrative Standards for All Waters

This question was not displayed to the respondent.

Q204.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q100.
Drinking Water Closures

This question was not displayed to the respondent.

Q101.
Fish Kills

This question was not displayed to the respondent.

Q102.
Harmful Algal Blooms (HABs)

This question was not displayed to the respondent.

Q105.
Mercury Assessment Process

This question was not displayed to the respondent.

Q106.
Fish Tissue Assessments and Consumption Health Advisories

This question was not displayed to the respondent.

Q107.
General Comments on Narrative Standards for All Waters

This question was not displayed to the respondent.

Q157.
Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q108.
Individual Assessment of Water Quality Standards

This question was not displayed to the respondent.

Q109.
Conflicting Assessments of Water Quality Standards

This question was not displayed to the respondent.

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

This question was not displayed to the respondent.

Q111.
Secondary Review

This question was not displayed to the respondent.

Q112.
Assessment Unit Re-segmentation

This question was not displayed to the respondent.

Q113.
General Comments on Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q158.
Identifying Causes of Impairments

This question was not displayed to the respondent.

Q208.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q117.
Pollutants

This question was not displayed to the respondent.

Q114.
Pollution

This question was not displayed to the respondent.

Q115.
Unknown Sources

This question was not displayed to the respondent.

Q116.
Natural Conditions

This question was not displayed to the respondent.

Q118.
General Comments on Identifying Causes of Impairments

This question was not displayed to the respondent.

Q159.
Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q210.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q119.
Category 4A

This question was not displayed to the respondent.

Q120.
Category 4B

This question was not displayed to the respondent.

Q121.
Category 4C

This question was not displayed to the respondent.

Q122.
Delistings

This question was not displayed to the respondent.

Q123.
Delisting Categorical Pollutant Causes

This question was not displayed to the respondent.

Q126.
303(d) Listings

This question was not displayed to the respondent.

Q127.
Non-303(d) Categorical Listings

This question was not displayed to the respondent.

Q124.
General Comments on Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q160.
303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q212.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q128.
General Comments on 303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q161.
Revision Requests Between Cycles

This question was not displayed to the respondent.

Q214.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q129.
General Comments on Revision Requests Between Cycles

This question was not displayed to the respondent.

Q162.
Appendices

This question was not displayed to the respondent.

Q216.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q130.
Appendix 1

This question was not displayed to the respondent.

Q131.
Appendix 2

This question was not displayed to the respondent.

Q132.
Appendix 3

This question was not displayed to the respondent.

Q133.
Appendix 9

This question was not displayed to the respondent.

Q134.
Appendix 5

This question was not displayed to the respondent.

Q135.
Appendix 6

This question was not displayed to the respondent.

Q136.
Appendix 7

This question was not displayed to the respondent.

Q163.
Additional Comments and Additional Submission Files

Q219.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

Q137.
Additional Comments on the Draft 303(d) Assessment Methods

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!

Q138. Upload File 01

UDWQ Response Letter to Draft 2018 2020 303d Assessment Methods Draft Edited.docx
169.3KB
application/vnd.openxmlformats-officedocument.wordprocessingml.document

Q167. Upload File 02

Q168. Upload File 03

Q169. Upload File 04

Q170. Upload File 05

Q171. Upload File 06

Q141.

Acknowledgements

This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

Q166.

Submit Your Comments

NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form menu.

Q180. CSS HTML Style

Location Data

Location: (40.177001953125, -111.53600311279)

Source: GeoIP Estimation

Utah Department of Water Quality Draft 2018/2020 303(d) Assessment Methods

Comment Letter

To:
Utah Department of Water Quality
Salt Lake City, UT

From:
David C. Richards, Ph. D.
OreoHelix Consulting
Vineyard, UT
Phone: 406.580.7816
Email: oreohelix@icloud.com

Date:
December 2, 2018

RE: Utah Department of Water Quality Draft 2018/2020 303(d) Assessment Methods

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. 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.

My background

I have been conducting ecological research on biological criteria related to water quality for several decades. My MS Thesis (Richards 1996) was titled, "The use of macroinvertebrates as indicators of water quality in mountain streams of Montana." My Ph.D. dissertation focused on population viability of a sensitive aquatic mollusk and its interactions with an invasive freshwater taxon (Richards 2004). I was employed by one of the leading macroinvertebrate taxonomy labs in the western USA, EcoAnalysts Inc. for approximately 13 years conducting many biological assessments throughout the western USA using and developing a multitude of bioassessment methods and metrics. I contributed extensively in the development of biocriteria programs for the States of Montana, Idaho, and Arizona using a multimetric approach. Along with my colleagues from EcoAnalysts Inc. and Idaho Department of Environmental Quality, I recently published a paper in the journal *Environmental Monitoring and Assessmen*t titled, "Temperature threshold models for benthic macroinvertebrates in Idaho wadeable streams and neighboring ecoregions" (Richards et al. 2018). I have been conducting ecological research on several waterbodies in Utah including the Jordan River, Provo River, Utah Lake, Great Salt Lake, and numerous others, much of which focuses on bioassessment evaluations. I bring exceptional expertise in our efforts to develop useful and meaningful assessment criteria for Utah's waterbodies based on the best available science, so that we can continue to protect these valuable resources.

The following are my comments not necessarily listed in order of importance:

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.

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.

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 rather than narrative.

Page 46. Last sentence.

Comment: I would change wording to read '… DWQ uses an empirically based model' not 'empirical model'.

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.

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.

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'.

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. 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. 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.

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 reporting 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.

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, when 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
No. Semivoltine Taxa
No. Univoltine Taxa
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

<u>Bioassessment metrics used by Idaho (IDEQ 2011).</u>

% 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
Simpson's index
Sprawler taxa
Sprawler taxa (adjusted)
Swimmer & Climber Taxa
Tolerant taxa
O/E

Using a single taxon richness-based metric, RIVPACS O/E, does not 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). 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.

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. 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.

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.

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.

Calculating 'E' using a probability of capture (P_c) of $\geq$50% is extremely problematic and results in a poor assessment of biological integrity. Taxa with P_cs < 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'.

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.

It is my opinion that O/E models may be able to detect large levels of biological stress, but not biological integrity.

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. Was this updated model selected because in saves time and money?

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.).

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).

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.

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.

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.

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. 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.

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.

PRISM data errors are also spatially derived mostly from misuse of regional models to monitor local scale changes. These models will complicate every O/E assessment conducted anywhere that there are natural gradients, introducing error in every local assessment. PRISM data often are not precise, and values can change substantially between small changes in elevation within a watershed and sometimes within a few hundred meters. In addition, PRISM values are model-predicted values and subject to error.

Assessments Specific to Lakes, Reservoirs, and Ponds

Starting on page 53

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.

In many instances UDWQ refers to cold-water vs. warm-water uses. Temperatures that exceed 20° C do not necessarily 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). 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 that its 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 ensure this, eventually.

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). 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. 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.

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.

2. Macroinvertebrates are the cornerstone 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.

3. UDWQ should include references or links in the draft to UDWQ field macroinvertebrate sampling protocols or add one or two sentences in the draft that address methods used such as riffle/run habitats, 8 composite samples, 600 organism subsample including large and rare, taxonomic resolution used, etc.

If you have questions concerning my comments, please feel free to contact me at any time.

Sincerely,

David C. Richards, Ph. D.
OreoHelix Consulting
Vineyard, UT 84059

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.

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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.

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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.

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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.

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

Submissions are Treated as Public Documents

Note: Submissions are treated as public documents and will be published on UDWQ's Water Quality Assessment Website. Though we require submission of an e-mail address or phone number, contact information will not be released to the public. Only commenter name will be published with the submission.

Q172.

Completion Time

Your browser cookies keep track of your progress. To prevent losing your work if you have to take a break or if your cookies get deleted, we recommend drafting your comments beforehand. Ideally, you will submit your comments in one session.
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
NOTE: This form is best displayed on tablet screens or larger.

Q165. Validation

reCAPTCHA V1 IS SHUTDOWN
Direct site owners to **g.co/recaptcha/upgrade**

Privacy & Terms

Q18. Does your submission contain any personal information from third party individual(s)? *

- ○ Yes
- ◉ No

Q228. CSS and HTML

This question was not displayed to the respondent.

Q164.

Third Party Consent

This question was not displayed to the respondent.

Q19. Do you have consent from those third party individuals to include their personal information for submission and publication?*

This question was not displayed to the respondent.

Q20. **NOTE**: If you have not obtained permission, UDWQ may not publish your submission and may only informally respond to your submission outside of the official Assessment process.

This question was not displayed to the respondent.

Q21. May UDWQ contact you (and any third party individuals) about your submission?*

This question was not displayed to the respondent.

Q226. CSS and HTML

Q145.

Type of Submission

Q1. Type of Submission:*

- ○ Individual
- ◉ Government
- ○ Non-Government Organization
- ○ Other (specify below)

Q2. Government or Organization Name (if applicable):

Q229. CSS and HTML

Q3.

Is this your first time submitting comments on the 303(d) Assessment Methods? *

- ◉ Yes
- ○ No

Q4. How did you hear about this public comment process? *

- ○ Meeting
- ○ UDWQ Listserve
- ○ UDWQ Website
- ◉ Other (specify below) Email from UDEQ

Q227. CSS and HTML

Q146.

Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

Shera

Q7. Last Name:*

Reems

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

Q224.
CSS and jQuery Skip to TOC

Q142.
Introduction

Q182.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q23.
The Clean Water Act and the Integrated Report

Q24.
Assessment Categories for Surface Water

EPA recommends that UDEQ include a link to the State's Vision Document.

Q25.
Utah's Numeric Criteria and Beneficial Uses

Q26.
Priority and Assessed Parameters

Q28.
General Comments on the Introduction

Q143.
Assessment Process and Time Frames

Q184.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q29.
Developing the Methods

Q30.
Public Review of the Methods Process and Schedule

Q31.
Call for Readily Available Data and Schedule

Q32.
Existing and Readily Available Data Defined

Q33.
Developing the Components of the Draft Integrated Report and 303(d) List

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.

Q34.
Final 303(d) Assessment Methods

Q35.
305(b) Summary

Q36.
303(d) Assessment Results

Q37.
305(b) Summary and 303(d) Assessment Metadata

Q38.
Public Review of the 303(d) List

Q39.
Finalizing the Integrated Report and 303(d) List

Q42.
General Comments on the Assessment Process and Time Frames

Q147.
Scope of the Assessment

Q186.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q43.
Waters of the State

Q44.
Waterbody Types

Q45.
Assessment Units

Q46.
Assessment Unit Delineation and Identification

Q47.
Additional Guidelines for Delineating Assessment Units

Q48.
Assessment Unit Datum

Q223.
AU Stream Mileage Estimation for Flowing Surface Waters and Canals

Q49.
Waters Within and Shared with Other States

Q50.
General Comments on the Scope of the Assessment

Q148.
Data Quality

Q188.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q51.
Credible Data Defined

Q53.
QAPP Guidance and Example

Q54.
Sample Analysis Plan Guidelines and Examples

Q55.
Standard Operating Procedures Guidelines and Examples

Q56.
Sampling Observations and Laboratory Comments

Q57.
Monitoring Location Information

Q58.
Credible Data Matrices

Table 6. Does UDEQ have validation criteria for high frequency datasets other than dissolved oxygen? 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.

Q59.
General Comments on Data Quality

Q149.
Data Submission Process

Q190.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q60.
Type of Data to Submit

Q61.
Period of Record

Please clarify what is meant by water years?

Q62.
Older Data and Information

Q63.
Newer Data and Information

Q64.
Data Submission Tools

Q65.
General Comments on Data Submission Process

Q150.
Data Preparation for Conventional and Toxic Assessments for All Waters

Q192.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q66.
Results Below Detection Limits

Q67.
Duplicate and Replicate Results

Q68.
Initial Assessment: Monitoring Location Site Level

Q69.
General Comments on Data Preparation for Conventional and Toxic Assessments for All Waters

Q151.
Assessments Specific to Flowing Surface Waters of the State and Canals

Q194.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q70.
Conventional Parameter Assessments

EPA recommends including the actual water quality criteria in the table. Has UDEQ considered assessing the 30-day average with high frequency dissolved oxygen data? Does UDEQ have a process to assess turbidity data?

Q71.
Grab Sample Assessments

Figure 2. EPA recommends UDEQ delete this figure. When assessing all designated uses more than just conventional pollutants should be considered.

Q72.
High Frequency Assessments for Dissolved Oxygen

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. 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. Figure 4. Has UDEQ considered completing the assessment outlined with fewer days using continuous dissolved oxygen data? See comment submitted for Page 43.

Q73.
Narrative Standards: Biological Assessments

Q222.
Analyzing Multiple DO Datasets at a Site

Does UDEQ give additional weight to continuous dissolved oxygen data compared to grab samples?

Q74.
River Invertebrate Prediction and Classification System Models

Does the RIVPACS model apply to larger non-wadeable streams? Has UDEQ updated the RIVPACS model since 2002?

Q75.
Model Construction and Performance

Q76.
Assessing Biological Use Support

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”. 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.

Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

Q152.

Assessments Specific to Lakes, Reservoirs, and Ponds

Q196.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q79.

Assessment Overview

Q80.

Tier I Assessment

Q81.

Drinking Water Use Support

Q82.

Recreational Use Support

Q83.

Aquatic Life Use Support

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? Recommend moving Figure 14 up to follow Figure 8. pH. Is the outlined process the same for both lakes and streams? If so, should these indicators be referenced in the stream section? EPA suggests removing Figures 9 and 10 and simply indicate that pH, temperature, and dissolved oxygen are assessed using profile data. Streams and Lakes and Reservoirs. * Should this section only reference Lakes and Reservoirs. * 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. Figure 11. Does this figure refer to at least 3 continuous meters meeting the dissolved oxygen criterion? Figure 11. Recommend explaining the process separately for evaluating dissolved oxygen and temperature data. 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. 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?

Q86.
Tier II Assessment

Q87.
Weight of Evidence Criteria

Figure 14. Under the first diamond, should the line have a “no”? Figure 14. How did UDEQ decide on a TSI > 50 as a decision point?

Q88.
Carlson’s Trophic State Index

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.

Q89.
Phytoplankton Community

Q90.
Great Salt Lake

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. §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.

Q91.
Gilbert Bay Bird Egg Tissue Assessment

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

Q153.

Toxics Parameter Assessments for All Waters

Q198.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q93.

Equation-Based Toxic Parameters

Q89.

Assessment Process

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. Figure 16. Please clarify how Insufficient Data: Exceedances are implemented and whether they result in some waters being a higher priority for additional monitoring?

Q90.

General Comments on Toxics Parameter Assessments for All Waters

Q154.

Escherichia coli Assessment for All Waters

Q200.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q91.

Data Preparation

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?

Q92.
Recreation Season

Q93.
Escherichia coli Collection Events and Replicate Samples

Q94.
Data Substitution for Calculating the Geometric Mean

Q95.
Use Designation

Q96.
Annual Recreation Season Assessment

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.

Q97.
Summarizing Assessment Results

Q98.
General comments on *Escherichia coli* Assessment for All Waters

Q155.

Pollution Indicator Assessments for All Waters

Q202.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q99.

General Comments on Pollution Indicator Assessment for All Waters

Table 16. EPA requests details on how UDEQ will assess for Gross alpha and Gross beta. 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. §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. § 130.7(b)(5), and (4) any other reasonable information requested by the Region.

Q156.

Narrative Standards for All Waters

Q204.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q100.

Drinking Water Closures

Q101.

Fish Kills

Q102.

Harmful Algal Blooms (HABs)

Q105.
Mercury Assessment Process

Q106.
Fish Tissue Assessments and Consumption Health Advisories

Q107.
General Comments on Narrative Standards for All Waters

Q157.
Determination of Impairment: All Assessment Units

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q108.
Individual Assessment of Water Quality Standards

Q109.
Conflicting Assessments of Water Quality Standards

Figure 21. Please clarify the rationale for determining if the bottom diamond arrow is no, the determination is Insufficient Data with Exceedances?

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

Figure 22. Bottom right box. Please clarify the implications for these subcategories in terms of follow-up actions (e.g., monitoring, future assessments).

Q111.
Secondary Review

Please elaborate on the types of information that UDEQ considers for a secondary data review. Does UDEQ complete a secondary review on all assessments?

Q112.
Assessment Unit Re-segmentation

Q113.
General Comments on Determination of Impairment: All Assessment Units

Q158.
Identifying Causes of Impairments

Q208.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q117.
Pollutants

Q114.
Pollution

Q115.
Unknown Sources

Q116.
Natural Conditions

Q118.
General Comments on Identifying Causes of Impairments

Q159.
Revising the 303(d) List and Other Categorical Assessments

Q210.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q119.
Category 4A

Q120.
Category 4B

Q121.
Category 4C

Q122.
Delistings

Q123.
Delisting Categorical Pollutant Causes

Q126.
303(d) Listings

Q127.
Non-303(d) Categorical Listings

Q124.
General Comments on Revising the 303(d) List and Other Categorical Assessments

Q160.
303(d) Vision and TMDL Priority Development

Q212.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q128.
General Comments on 303(d) Vision and TMDL Priority Development

Appendix 7 doesn't include information about Vision priorities. Has the UDEQ assessment and listing staff coordinated with the TMDL staff? 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

Q161.
Revision Requests Between Cycles

Q214.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q129.
General Comments on Revision Requests Between Cycles

Q162.
Appendices

Q216.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q130.
Appendix 1

Q131.
Appendix 2

Q132.
Appendix 3

Q133.
Appendix 9

Q134.
Appendix 5

Q135.
Appendix 6

Q136.
Appendix 7

Appendix 7 doesn't include information about Vision priorities. Has the UDEQ assessment and listing staff coordinated with the TMDL staff? 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

Q163.
Additional Comments and Additional Submission Files

Q219.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

Q137.

Additional Comments on the Draft 303(d) Assessment Methods

Q138. Upload File 01

EPA R8 Comments on UT 2018 2020 Assess Methods.pdf
168.5KB
application/pdf

Q167. Upload File 02

Q168. Upload File 03

Q169. Upload File 04

Q170. Upload File 05

Q171. Upload File 06

Q141.

Acknowledgements

This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

Q166.

Submit Your Comments

NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form

menu.

Q180. CSS HTML Style

Location Data

Location: (38.887100219727, -77.093200683594)

Source: GeoIP Estimation

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
Denver, CO 80202-1129
Phone 800-227-8917
www.epa.gov/region8

December 7, 2018

Ref: 8WP-CWQ

Dr. Erica Gaddis, Director
Utah Division of Water Quality
Department of Environmental Quality
195 North 1950 West
P.O. Box 144780
Salt Lake City, Utah 84114-4870

Re: The State of Utah's Draft 2018/2020 303(d) Assessment Methods

Dear Dr. Gaddis:

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.

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.

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 data/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).

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.

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.

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.

Thank you again for the opportunity to provide input and comments on this document. We look forward to continued collaboration with the UDEQ on the development of the 2018/2020 Integrated Report. If you have questions or require additional information on these comments, please contact Shera Reems of my staff [redacted].

Sincerely

Sandra D. Spence
Manager, Water Quality Unit

cc: Shera Reems, 303(d) Coordinator

Wyoming Office
PO Box 171
Bondurant, WY 82922
Email: Wyoming@WesternWatersheds.org
Web site: www.WesternWatersheds.org

Working to protect and restore Western Watersheds

Western Watersheds Project

Jodi Gardberg
Utah Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

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December 6, 2018

Jodi Gardberg
Utah Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Re: 2018 Listing Methodology Comments

Dear Ms. Gardberg,

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.

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.

Table 10, likewise, does not provide the needed clarification. For instance, what is "Landscape Analysis"? 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. Is Proper Functioning Condition (PFC) data useful for listing determinations? 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.

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. 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.

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"
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.

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.

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.

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.

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?

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?

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.

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?

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.

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.

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. 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.

Page 84: Reasonable time period is way too vague. This needs to be more fully defined.

Sincerely yours,

Jonathan B Ratner
Director, WWP –Wyoming Office

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

Submissions are Treated as Public Documents

Note: Submissions are treated as public documents and will be published on UDWQ's Water Quality Assessment Website. Though we require submission of an e-mail address or phone number, contact information will not be released to the public. Only commenter name will be published with the submission.

Q172.

Completion Time

Your browser cookies keep track of your progress. To prevent losing your work if you have to take a break or if your cookies get deleted, we recommend drafting your comments beforehand. Ideally, you will submit your comments in one session.
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
NOTE: This form is best displayed on tablet screens or larger.

Q165. Validation

reCAPTCHA V1 IS SHUTDOWN
Direct site owners to **g.co/recaptcha/upgrade**

Privacy & Terms

Q18. Does your submission contain any personal information from third party individual(s)? *

- ○ Yes
- ◉ No

Q228. CSS and HTML

This question was not displayed to the respondent.

Q164.

Third Party Consent

This question was not displayed to the respondent.

Q19. Do you have consent from those third party individuals to include their personal information for submission and publication?*

This question was not displayed to the respondent.

Q20. **NOTE**: If you have not obtained permission, UDWQ may not publish your submission and may only informally respond to your submission outside of the official Assessment process.

This question was not displayed to the respondent.

Q21. May UDWQ contact you (and any third party individuals) about your submission?*

This question was not displayed to the respondent.

Q226. CSS and HTML

Q145.

Type of Submission

Q1. Type of Submission:*

- ○ Individual
- ○ Government
- ○ Non-Government Organization
- ◉ Other (specify below)

Q2. Government or Organization Name (if applicable):

This question was not displayed to the respondent.

Q229. CSS and HTML

Q3.

Is this your first time submitting comments on the 303(d) Assessment Methods? *

- ◉ Yes
- ○ No

Q4. How did you hear about this public comment process? *

- ○ Meeting
- ○ UDWQ Listserve
- ○ UDWQ Website
- ◉ Other (specify below) EMAIL

Q227. CSS and HTML

Q146.

Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

Mark

Q7. Last Name:*

Allen

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

Q224.
CSS and jQuery Skip to TOC

Q142.
Introduction

This question was not displayed to the respondent.

Q182.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q23.
The Clean Water Act and the Integrated Report

This question was not displayed to the respondent.

Q24.
Assessment Categories for Surface Water

This question was not displayed to the respondent.

Q25.
Utah's Numeric Criteria and Beneficial Uses

This question was not displayed to the respondent.

Q26.
Priority and Assessed Parameters

This question was not displayed to the respondent.

Q28.
General Comments on the Introduction

This question was not displayed to the respondent.

Q143.
Assessment Process and Time Frames

This question was not displayed to the respondent.

Q184.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q29.
Developing the Methods

This question was not displayed to the respondent.

Q30.
Public Review of the Methods Process and Schedule

This question was not displayed to the respondent.

Q31.
Call for Readily Available Data and Schedule

This question was not displayed to the respondent.

Q32.
Existing and Readily Available Data Defined

This question was not displayed to the respondent.

Q33.
Developing the Components of the Draft Integrated Report and 303(d) List

This question was not displayed to the respondent.

Q34.
Final 303(d) Assessment Methods

This question was not displayed to the respondent.

Q35.
305(b) Summary

This question was not displayed to the respondent.

Q36.
303(d) Assessment Results

This question was not displayed to the respondent.

Q37.
305(b) Summary and 303(d) Assessment Metadata

This question was not displayed to the respondent.

Q38.
Public Review of the 303(d) List

This question was not displayed to the respondent.

Q39.
Finalizing the Integrated Report and 303(d) List

This question was not displayed to the respondent.

Q42.
General Comments on the Assessment Process and Time Frames

This question was not displayed to the respondent.

Q147.
Scope of the Assessment

This question was not displayed to the respondent.

Q186.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q43.
Waters of the State

This question was not displayed to the respondent.

Q44.
Waterbody Types

This question was not displayed to the respondent.

Q45.
Assessment Units

This question was not displayed to the respondent.

Q46.
Assessment Unit Delineation and Identification

This question was not displayed to the respondent.

Q47.
Additional Guidelines for Delineating Assessment Units

This question was not displayed to the respondent.

Q48.
Assessment Unit Datum

This question was not displayed to the respondent.

Q223.
AU Stream Mileage Estimation for Flowing Surface Waters and Canals

This question was not displayed to the respondent.

Q49.
Waters Within and Shared with Other States

This question was not displayed to the respondent.

Q50.
General Comments on the Scope of the Assessment

This question was not displayed to the respondent.

Q148.
Data Quality

This question was not displayed to the respondent.

Q188.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q51.
Credible Data Defined

This question was not displayed to the respondent.

Q53.
QAPP Guidance and Example

This question was not displayed to the respondent.

Q54.
Sample Analysis Plan Guidelines and Examples

This question was not displayed to the respondent.

Q55.
Standard Operating Procedures Guidelines and Examples

This question was not displayed to the respondent.

Q56.
Sampling Observations and Laboratory Comments

This question was not displayed to the respondent.

Q57.
Monitoring Location Information

This question was not displayed to the respondent.

Q58.
Credible Data Matrices

This question was not displayed to the respondent.

Q59.
General Comments on Data Quality

This question was not displayed to the respondent.

Q149.
Data Submission Process

This question was not displayed to the respondent.

Q190.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q60.
Type of Data to Submit

This question was not displayed to the respondent.

Q61.
Period of Record

This question was not displayed to the respondent.

Q62.
Older Data and Information

This question was not displayed to the respondent.

Q63.
Newer Data and Information

This question was not displayed to the respondent.

Q64.
Data Submission Tools

This question was not displayed to the respondent.

Q65.
General Comments on Data Submission Process

This question was not displayed to the respondent.

Q150.
Data Preparation for Conventional and Toxic Assessments for All Waters

This question was not displayed to the respondent.

Q192.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q66.
Results Below Detection Limits

This question was not displayed to the respondent.

Q67.
Duplicate and Replicate Results

This question was not displayed to the respondent.

Q68.
Initial Assessment: Monitoring Location Site Level

This question was not displayed to the respondent.

Q69.
General Comments on Data Preparation for Conventional and Toxic Assessments for All Waters

This question was not displayed to the respondent.

Q151.
Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q194.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q70.
Conventional Parameter Assessments

This question was not displayed to the respondent.

Q71.
Grab Sample Assessments

This question was not displayed to the respondent.

Q72.
High Frequency Assessments for Dissolved Oxygen

This question was not displayed to the respondent.

Q73.
Narrative Standards: Biological Assessments

This question was not displayed to the respondent.

Q222.
Analyzing Multiple DO Datasets at a Site

This question was not displayed to the respondent.

Q74.
River Invertebrate Prediction and Classification System Models

This question was not displayed to the respondent.

Q75.
Model Construction and Performance

This question was not displayed to the respondent.

Q76.
Assessing Biological Use Support

This question was not displayed to the respondent.

Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q152.
Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q196.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q79.
Assessment Overview

This question was not displayed to the respondent.

Q80.
Tier I Assessment

This question was not displayed to the respondent.

Q81.
Drinking Water Use Support

This question was not displayed to the respondent.

Q82.
Recreational Use Support

This question was not displayed to the respondent.

Q83.
Aquatic Life Use Support

This question was not displayed to the respondent.

Q86.
Tier II Assessment

This question was not displayed to the respondent.

Q87.
Weight of Evidence Criteria

This question was not displayed to the respondent.

Q88.
Carlson's Trophic State Index

This question was not displayed to the respondent.

Q89.
Phytoplankton Community

This question was not displayed to the respondent.

Q90.
Great Salt Lake

This question was not displayed to the respondent.

Q91.
Gilbert Bay Bird Egg Tissue Assessment

This question was not displayed to the respondent.

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q153.
Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q198.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q93.
Equation-Based Toxic Parameters

This question was not displayed to the respondent.

Q89.
Assessment Process

This question was not displayed to the respondent.

Q90.
General Comments on Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q154.
Escherichia coli Assessment for All Waters

This question was not displayed to the respondent.

Q200.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q91.
Data Preparation

This question was not displayed to the respondent.

Q92.

Recreation Season

This question was not displayed to the respondent.

Q93.
Escherichia coli Collection Events and Replicate Samples

This question was not displayed to the respondent.

Q94.
Data Substitution for Calculating the Geometric Mean

This question was not displayed to the respondent.

Q95.
Use Designation

This question was not displayed to the respondent.

Q96.
Annual Recreation Season Assessment

This question was not displayed to the respondent.

Q97.
Summarizing Assessment Results

This question was not displayed to the respondent.

Q98.
General comments on *Escherichia coli* Assessment for All Waters

This question was not displayed to the respondent.

Q155.
Pollution Indicator Assessments for All Waters

Q202.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q99.
General Comments on Pollution Indicator Assessment for All Waters

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. Please put in place measures to dredge the heavy metals that are still in Tibble Fork Reservoir. 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.

Q156.
Narrative Standards for All Waters

This question was not displayed to the respondent.

Q204.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q100.
Drinking Water Closures

This question was not displayed to the respondent.

Q101.
Fish Kills

This question was not displayed to the respondent.

Q102.
Harmful Algal Blooms (HABs)

This question was not displayed to the respondent.

Q105.
Mercury Assessment Process

This question was not displayed to the respondent.

Q106.
Fish Tissue Assessments and Consumption Health Advisories

This question was not displayed to the respondent.

Q107.
General Comments on Narrative Standards for All Waters

This question was not displayed to the respondent.

Q157.
Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q108.
Individual Assessment of Water Quality Standards

This question was not displayed to the respondent.

Q109.
Conflicting Assessments of Water Quality Standards

This question was not displayed to the respondent.

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

This question was not displayed to the respondent.

Q111.
Secondary Review

This question was not displayed to the respondent.

Q112.
Assessment Unit Re-segmentation

This question was not displayed to the respondent.

Q113.
General Comments on Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q158.
Identifying Causes of Impairments

This question was not displayed to the respondent.

Q208.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q117.
Pollutants

This question was not displayed to the respondent.

Q114.
Pollution

This question was not displayed to the respondent.

Q115.
Unknown Sources

This question was not displayed to the respondent.

Q116.
Natural Conditions

This question was not displayed to the respondent.

Q118.
General Comments on Identifying Causes of Impairments

This question was not displayed to the respondent.

Q159.

Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q210.

NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q119.

Category 4A

This question was not displayed to the respondent.

Q120.

Category 4B

This question was not displayed to the respondent.

Q121.

Category 4C

This question was not displayed to the respondent.

Q122.

Delistings

This question was not displayed to the respondent.

Q123.

Delisting Categorical Pollutant Causes

This question was not displayed to the respondent.

Q126.

303(d) Listings

This question was not displayed to the respondent.

Q127.

Non-303(d) Categorical Listings

This question was not displayed to the respondent.

Q124.

General Comments on Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q160.

303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q212.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q128.
General Comments on 303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q161.
Revision Requests Between Cycles

This question was not displayed to the respondent.

Q214.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q129.
General Comments on Revision Requests Between Cycles

This question was not displayed to the respondent.

Q162.
Appendices

This question was not displayed to the respondent.

Q216.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q130.
Appendix 1

This question was not displayed to the respondent.

Q131.
Appendix 2

This question was not displayed to the respondent.

Q132.
Appendix 3

This question was not displayed to the respondent.

Q133.
Appendix 9

This question was not displayed to the respondent.

Q134.
Appendix 5

This question was not displayed to the respondent.

Q135.
Appendix 6

This question was not displayed to the respondent.

Q136.
Appendix 7

This question was not displayed to the respondent.

Q163.
Additional Comments and Additional Submission Files

This question was not displayed to the respondent.

Q219.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

This question was not displayed to the respondent.

Q137.
Additional Comments on the Draft 303(d) Assessment Methods

This question was not displayed to the respondent.

Q138. Upload File 01

This question was not displayed to the respondent.

Q167. Upload File 02

This question was not displayed to the respondent.

Q168. Upload File 03

This question was not displayed to the respondent.

Q169. Upload File 04

This question was not displayed to the respondent.

Q170. Upload File 05

This question was not displayed to the respondent.

Q171. Upload File 06

This question was not displayed to the respondent.

Q141.

Acknowledgements

This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

This question was not displayed to the respondent.

Q166.

Submit Your Comments

NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form menu.

Q180. CSS HTML Style

Location Data

Location: (41.087905883789, -111.97039794922)

Source: GeoIP Estimation

JACQUELINE M. BISKUPSKI
Mayor

LAURA BRIEFER
DIRECTOR

December 7, 2018

Ms. Erica Gaddis
Division Director
Utah Division of Water Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Subject: Comments to DRAFT 2018/2020 303(d) Assessment Methods

Dear Ms. Gaddis:

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.

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.

- Data collected needs to follow appropriate methodologies and adhere to appropriate QA and QC procedures.

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. We request that outlier and questionable data points be assessed and removed as applicable. If correction occurs, the data corrected needs annotation stating the correction.

1530 SOUTH WEST TEMPLE
SALT LAKE CITY, UTAH 84115

WWW.SLCGOV.COM
TEL 801-483-6900 FAX 801-483-6818

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.
- Data collected 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.
- Data Outliers-We ask for specific information on how outliers are identified and resolved in datasets.

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.
- 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.

Other Comments

Thank you for your consideration of our comments and concerns. Please do not hesitate to contact us if you have any questions or would like to discuss further.

Sincerely,

Marian L. Rice
Water Quality & Treatment Administrator

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

Submissions are Treated as Public Documents

Note: Submissions are treated as public documents and will be published on UDWQ's Water Quality Assessment Website. Though we require submission of an e-mail address or phone number, contact information will not be released to the public. Only commenter name will be published with the submission.

Q172.

Completion Time

Your browser cookies keep track of your progress. To prevent losing your work if you have to take a break or if your cookies get deleted, we recommend drafting your comments beforehand. Ideally, you will submit your comments in one session.
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
NOTE: This form is best displayed on tablet screens or larger.

Q165. Validation

reCAPTCHA V1 IS SHUTDOWN
Direct site owners to **g.co/recaptcha/upgrade**

Privacy & Terms

Q18. Does your submission contain any personal information from third party individual(s)? *

- ○ Yes
- ◉ No

Q228. CSS and HTML

This question was not displayed to the respondent.

Q164.

Third Party Consent

This question was not displayed to the respondent.

Q19. Do you have consent from those third party individuals to include their personal information for submission and publication?*

This question was not displayed to the respondent.

Q20. **NOTE**: If you have not obtained permission, UDWQ may not publish your submission and may only informally respond to your submission outside of the official Assessment process.

This question was not displayed to the respondent.

Q21. May UDWQ contact you (and any third party individuals) about your submission?*

This question was not displayed to the respondent.

Q226. CSS and HTML

Q145.

Type of Submission

Q1. Type of Submission:*

- ○ Individual
- ◉ Government
- ○ Non-Government Organization
- ○ Other (specify below)

Q2. Government or Organization Name (if applicable):

Q229. CSS and HTML

Q3.

Is this your first time submitting comments on the 303(d) Assessment Methods? *

- ◉ Yes
- ○ No

Q4. How did you hear about this public comment process? *

- ○ Meeting
- ○ UDWQ Listserve
- ○ UDWQ Website
- ◉ Other (specify below) E-mail from DWQ

Q227. CSS and HTML

Q146.

Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

Marian

Q7. Last Name:*

Rice

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

Q224.
CSS and jQuery Skip to TOC

Q142.
Introduction

This question was not displayed to the respondent.

Q182.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q23.
The Clean Water Act and the Integrated Report

This question was not displayed to the respondent.

Q24.
Assessment Categories for Surface Water

This question was not displayed to the respondent.

Q25.
Utah's Numeric Criteria and Beneficial Uses

This question was not displayed to the respondent.

Q26.
Priority and Assessed Parameters

This question was not displayed to the respondent.

Q28.
General Comments on the Introduction

This question was not displayed to the respondent.

Q143.
Assessment Process and Time Frames

This question was not displayed to the respondent.

Q184.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q29.
Developing the Methods

This question was not displayed to the respondent.

Q30.
Public Review of the Methods Process and Schedule

This question was not displayed to the respondent.

Q31.
Call for Readily Available Data and Schedule

This question was not displayed to the respondent.

Q32.
Existing and Readily Available Data Defined

This question was not displayed to the respondent.

Q33.
Developing the Components of the Draft Integrated Report and 303(d) List

This question was not displayed to the respondent.

Q34.
Final 303(d) Assessment Methods

This question was not displayed to the respondent.

Q35.
305(b) Summary

This question was not displayed to the respondent.

Q36.
303(d) Assessment Results

This question was not displayed to the respondent.

Q37.
305(b) Summary and 303(d) Assessment Metadata

This question was not displayed to the respondent.

Q38.
Public Review of the 303(d) List

This question was not displayed to the respondent.

Q39.
Finalizing the Integrated Report and 303(d) List

This question was not displayed to the respondent.

Q42.
General Comments on the Assessment Process and Time Frames

This question was not displayed to the respondent.

Q147.
Scope of the Assessment

This question was not displayed to the respondent.

Q186.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q43.
Waters of the State

This question was not displayed to the respondent.

Q44.
Waterbody Types

This question was not displayed to the respondent.

Q45.
Assessment Units

This question was not displayed to the respondent.

Q46.
Assessment Unit Delineation and Identification

This question was not displayed to the respondent.

Q47.
Additional Guidelines for Delineating Assessment Units

This question was not displayed to the respondent.

Q48.
Assessment Unit Datum

This question was not displayed to the respondent.

Q223.
AU Stream Mileage Estimation for Flowing Surface Waters and Canals

This question was not displayed to the respondent.

Q49.
Waters Within and Shared with Other States

This question was not displayed to the respondent.

Q50.
General Comments on the Scope of the Assessment

This question was not displayed to the respondent.

Q148.
Data Quality

This question was not displayed to the respondent.

Q188.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q51.
Credible Data Defined

This question was not displayed to the respondent.

Q53.
QAPP Guidance and Example

This question was not displayed to the respondent.

Q54.
Sample Analysis Plan Guidelines and Examples

This question was not displayed to the respondent.

Q55.
Standard Operating Procedures Guidelines and Examples

This question was not displayed to the respondent.

Q56.
Sampling Observations and Laboratory Comments

This question was not displayed to the respondent.

Q57.
Monitoring Location Information

This question was not displayed to the respondent.

Q58.
Credible Data Matrices

This question was not displayed to the respondent.

Q59.
General Comments on Data Quality

This question was not displayed to the respondent.

Q149.
Data Submission Process

This question was not displayed to the respondent.

Q190.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q60.
Type of Data to Submit

This question was not displayed to the respondent.

Q61.
Period of Record

This question was not displayed to the respondent.

Q62.
Older Data and Information

This question was not displayed to the respondent.

Q63.
Newer Data and Information

This question was not displayed to the respondent.

Q64.
Data Submission Tools

This question was not displayed to the respondent.

Q65.
General Comments on Data Submission Process

This question was not displayed to the respondent.

Q150.
Data Preparation for Conventional and Toxic Assessments for All Waters

This question was not displayed to the respondent.

Q192.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q66.
Results Below Detection Limits

This question was not displayed to the respondent.

Q67.
Duplicate and Replicate Results

This question was not displayed to the respondent.

Q68.
Initial Assessment: Monitoring Location Site Level

This question was not displayed to the respondent.

Q69.
General Comments on Data Preparation for Conventional and Toxic Assessments for All Waters

This question was not displayed to the respondent.

Q151.
Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q194.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q70.
Conventional Parameter Assessments

This question was not displayed to the respondent.

Q71.
Grab Sample Assessments

This question was not displayed to the respondent.

Q72.
High Frequency Assessments for Dissolved Oxygen

This question was not displayed to the respondent.

Q73.
Narrative Standards: Biological Assessments

This question was not displayed to the respondent.

Q222.
Analyzing Multiple DO Datasets at a Site

This question was not displayed to the respondent.

Q74.
River Invertebrate Prediction and Classification System Models

This question was not displayed to the respondent.

Q75.
Model Construction and Performance

This question was not displayed to the respondent.

Q76.
Assessing Biological Use Support

This question was not displayed to the respondent.

Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q152.
Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q196.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q79.
Assessment Overview

This question was not displayed to the respondent.

Q80.
Tier I Assessment

This question was not displayed to the respondent.

Q81.
Drinking Water Use Support

This question was not displayed to the respondent.

Q82.
Recreational Use Support

This question was not displayed to the respondent.

Q83.
Aquatic Life Use Support

This question was not displayed to the respondent.

Q86.
Tier II Assessment

This question was not displayed to the respondent.

Q87.
Weight of Evidence Criteria

This question was not displayed to the respondent.

Q88.
Carlson's Trophic State Index

This question was not displayed to the respondent.

Q89.
Phytoplankton Community

This question was not displayed to the respondent.

Q90.
Great Salt Lake

This question was not displayed to the respondent.

Q91.
Gilbert Bay Bird Egg Tissue Assessment

This question was not displayed to the respondent.

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q153.
Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q198.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q93.
Equation-Based Toxic Parameters

This question was not displayed to the respondent.

Q89.
Assessment Process

This question was not displayed to the respondent.

Q90.
General Comments on Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q154.
Escherichia coli Assessment for All Waters

This question was not displayed to the respondent.

Q200.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q91.
Data Preparation

This question was not displayed to the respondent.

Q92.
Recreation Season

This question was not displayed to the respondent.

Q93.
Escherichia coli Collection Events and Replicate Samples

This question was not displayed to the respondent.

Q94.
Data Substitution for Calculating the Geometric Mean

This question was not displayed to the respondent.

Q95.
Use Designation

This question was not displayed to the respondent.

Q96.
Annual Recreation Season Assessment

This question was not displayed to the respondent.

Q97.
Summarizing Assessment Results

This question was not displayed to the respondent.

Q98.
General comments on *Escherichia coli* Assessment for All Waters

This question was not displayed to the respondent.

Q155.
Pollution Indicator Assessments for All Waters

This question was not displayed to the respondent.

Q202.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q99.
General Comments on Pollution Indicator Assessment for All Waters

This question was not displayed to the respondent.

Q156.
Narrative Standards for All Waters

This question was not displayed to the respondent.

Q204.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q100.
Drinking Water Closures

This question was not displayed to the respondent.

Q101.
Fish Kills

This question was not displayed to the respondent.

Q102.
Harmful Algal Blooms (HABs)

This question was not displayed to the respondent.

Q105.
Mercury Assessment Process

This question was not displayed to the respondent.

Q106.
Fish Tissue Assessments and Consumption Health Advisories

This question was not displayed to the respondent.

Q107.
General Comments on Narrative Standards for All Waters

This question was not displayed to the respondent.

Q157.
Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q108.
Individual Assessment of Water Quality Standards

This question was not displayed to the respondent.

Q109.
Conflicting Assessments of Water Quality Standards

This question was not displayed to the respondent.

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

This question was not displayed to the respondent.

Q111.
Secondary Review

This question was not displayed to the respondent.

Q112.
Assessment Unit Re-segmentation

This question was not displayed to the respondent.

Q113.
General Comments on Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q158.
Identifying Causes of Impairments

This question was not displayed to the respondent.

Q208.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q117.
Pollutants

This question was not displayed to the respondent.

Q114.
Pollution

This question was not displayed to the respondent.

Q115.
Unknown Sources

This question was not displayed to the respondent.

Q116.
Natural Conditions

This question was not displayed to the respondent.

Q118.
General Comments on Identifying Causes of Impairments

This question was not displayed to the respondent.

Q159.
Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q210.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q119.
Category 4A

This question was not displayed to the respondent.

Q120.
Category 4B

This question was not displayed to the respondent.

Q121.
Category 4C

This question was not displayed to the respondent.

Q122.
Delistings

This question was not displayed to the respondent.

Q123.
Delisting Categorical Pollutant Causes

This question was not displayed to the respondent.

Q126.
303(d) Listings

This question was not displayed to the respondent.

Q127.
Non-303(d) Categorical Listings

This question was not displayed to the respondent.

Q124.
General Comments on Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q160.
303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q212.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q128.
General Comments on 303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q161.
Revision Requests Between Cycles

This question was not displayed to the respondent.

Q214.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q129.
General Comments on Revision Requests Between Cycles

This question was not displayed to the respondent.

Q162.
Appendices

This question was not displayed to the respondent.

Q216.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q130.
Appendix 1

This question was not displayed to the respondent.

Q131.
Appendix 2

This question was not displayed to the respondent.

Q132.
Appendix 3

This question was not displayed to the respondent.

Q133.
Appendix 9

This question was not displayed to the respondent.

Q134.
Appendix 5

This question was not displayed to the respondent.

Q135.
Appendix 6

This question was not displayed to the respondent.

Q136.
Appendix 7

This question was not displayed to the respondent.

Q163.
Additional Comments and Additional Submission Files

Q219.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

Q137.
Additional Comments on the Draft 303(d) Assessment Methods

This is a scan of a formal letter.

Q138. Upload File 01

DWQ2018_20_303(d)_SLCDPU Comments.pdf
128KB
application/pdf

Q167. Upload File 02

Q168. Upload File 03

Q169. Upload File 04

Q170. Upload File 05

Q171. Upload File 06

Q141.

Acknowledgements

This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

Q166.

Submit Your Comments

NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form menu.

Q180. CSS HTML Style

Location Data

Location: (40.659606933594, -111.91929626465)

Source: GeoIP Estimation

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

Submissions are Treated as Public Documents

Note: Submissions are treated as public documents and will be published on UDWQ's Water Quality Assessment Website. Though we require submission of an e-mail address or phone number, contact information will not be released to the public. Only commenter name will be published with the submission.

Q172.

Completion Time

Your browser cookies keep track of your progress. To prevent losing your work if you have to take a break or if your cookies get deleted, we recommend drafting your comments beforehand. Ideally, you will submit your comments in one session.
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
NOTE: This form is best displayed on tablet screens or larger.

Q165. Validation

reCAPTCHA V1 IS SHUTDOWN
Direct site owners to **g.co/recaptcha/upgrade**

Privacy & Terms

Q18. Does your submission contain any personal information from third party individual(s)? *

- ○ Yes
- ◉ No

Q228. CSS and HTML

This question was not displayed to the respondent.

Q164.

Third Party Consent

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Q19. Do you have consent from those third party individuals to include their personal information for submission and publication?*

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This question was not displayed to the respondent.

Q226. CSS and HTML

Q145.

Type of Submission

Q1. Type of Submission:*

- ○ Individual
- ○ Government
- ○ Non-Government Organization
- ◉ Other (specify below) Corporation

Q2. Government or Organization Name (if applicable):

This question was not displayed to the respondent.

Q229. CSS and HTML

Q3.

Is this your first time submitting comments on the 303(d) Assessment Methods? *

- ◉ Yes
- ○ No

Q4. How did you hear about this public comment process?*

- ○ Meeting
- ◉ UDWQ Listserve
- ○ UDWQ Website
- ○ Other (specify below)

Q227. CSS and HTML

Q146.

Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

Thomas

Q7. Last Name:*

Bosteels

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

Q224.
CSS and jQuery Skip to TOC

Q142.
Introduction

This question was not displayed to the respondent.

Q182.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q23.
The Clean Water Act and the Integrated Report

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Assessment Categories for Surface Water

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General Comments on the Introduction

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Q29.
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Q34.
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305(b) Summary

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Q36.
303(d) Assessment Results

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Q37.
305(b) Summary and 303(d) Assessment Metadata

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Q38.
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Q42.
General Comments on the Assessment Process and Time Frames

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Q147.
Scope of the Assessment

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Q43.
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Credible Data Matrices

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General Comments on Data Quality

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Q149.
Data Submission Process

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Q150.
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Results Below Detection Limits

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Q67.
Duplicate and Replicate Results

This question was not displayed to the respondent.

Q68.
Initial Assessment: Monitoring Location Site Level

This question was not displayed to the respondent.

Q69.
General Comments on Data Preparation for Conventional and Toxic Assessments for All Waters

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Q151.
Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

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Q71.
Grab Sample Assessments

This question was not displayed to the respondent.

Q72.
High Frequency Assessments for Dissolved Oxygen

This question was not displayed to the respondent.

Q73.
Narrative Standards: Biological Assessments

This question was not displayed to the respondent.

Q222.
Analyzing Multiple DO Datasets at a Site

This question was not displayed to the respondent.

Q74.
River Invertebrate Prediction and Classification System Models

This question was not displayed to the respondent.

Q75.
Model Construction and Performance

This question was not displayed to the respondent.

Q76.
Assessing Biological Use Support

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Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

This question was not displayed to the respondent.

Q152.
Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q196.
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Q80.
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Q81.
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Q82.
Recreational Use Support

This question was not displayed to the respondent.

Q83.
Aquatic Life Use Support

This question was not displayed to the respondent.

Q86.
Tier II Assessment

This question was not displayed to the respondent.

Q87.
Weight of Evidence Criteria

This question was not displayed to the respondent.

Q88.
Carlson's Trophic State Index

This question was not displayed to the respondent.

Q89.
Phytoplankton Community

This question was not displayed to the respondent.

Q90.
Great Salt Lake

This question was not displayed to the respondent.

Q91.
Gilbert Bay Bird Egg Tissue Assessment

This question was not displayed to the respondent.

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

This question was not displayed to the respondent.

Q153.
Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q198.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q93.
Equation-Based Toxic Parameters

This question was not displayed to the respondent.

Q89.
Assessment Process

This question was not displayed to the respondent.

Q90.
General Comments on Toxics Parameter Assessments for All Waters

This question was not displayed to the respondent.

Q154.
Escherichia coli Assessment for All Waters

This question was not displayed to the respondent.

Q200.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q91.
Data Preparation

This question was not displayed to the respondent.

Q92.
Recreation Season

This question was not displayed to the respondent.

Q93.
Escherichia coli Collection Events and Replicate Samples

This question was not displayed to the respondent.

Q94.
Data Substitution for Calculating the Geometric Mean

This question was not displayed to the respondent.

Q95.
Use Designation

This question was not displayed to the respondent.

Q96.
Annual Recreation Season Assessment

This question was not displayed to the respondent.

Q97.
Summarizing Assessment Results

This question was not displayed to the respondent.

Q98.
General comments on *Escherichia coli* Assessment for All Waters

This question was not displayed to the respondent.

Q155.
Pollution Indicator Assessments for All Waters

This question was not displayed to the respondent.

Q202.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q99.
General Comments on Pollution Indicator Assessment for All Waters

This question was not displayed to the respondent.

Q156.
Narrative Standards for All Waters

This question was not displayed to the respondent.

Q204.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q100.
Drinking Water Closures

This question was not displayed to the respondent.

Q101.
Fish Kills

This question was not displayed to the respondent.

Q102.
Harmful Algal Blooms (HABs)

This question was not displayed to the respondent.

Q105.
Mercury Assessment Process

This question was not displayed to the respondent.

Q106.
Fish Tissue Assessments and Consumption Health Advisories

This question was not displayed to the respondent.

Q107.
General Comments on Narrative Standards for All Waters

This question was not displayed to the respondent.

Q157.
Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q108.
Individual Assessment of Water Quality Standards

This question was not displayed to the respondent.

Q109.
Conflicting Assessments of Water Quality Standards

This question was not displayed to the respondent.

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

This question was not displayed to the respondent.

Q111.
Secondary Review

This question was not displayed to the respondent.

Q112.
Assessment Unit Re-segmentation

This question was not displayed to the respondent.

Q113.
General Comments on Determination of Impairment: All Assessment Units

This question was not displayed to the respondent.

Q158.
Identifying Causes of Impairments

This question was not displayed to the respondent.

Q208.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q117.
Pollutants

This question was not displayed to the respondent.

Q114.
Pollution

This question was not displayed to the respondent.

Q115.
Unknown Sources

This question was not displayed to the respondent.

Q116.
Natural Conditions

This question was not displayed to the respondent.

Q118.
General Comments on Identifying Causes of Impairments

This question was not displayed to the respondent.

Q159.
Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q210.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q119.
Category 4A

This question was not displayed to the respondent.

Q120.
Category 4B

This question was not displayed to the respondent.

Q121.
Category 4C

This question was not displayed to the respondent.

Q122.
Delistings

This question was not displayed to the respondent.

Q123.
Delisting Categorical Pollutant Causes

This question was not displayed to the respondent.

Q126.
303(d) Listings

This question was not displayed to the respondent.

Q127.
Non-303(d) Categorical Listings

This question was not displayed to the respondent.

Q124.
General Comments on Revising the 303(d) List and Other Categorical Assessments

This question was not displayed to the respondent.

Q160.
303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q212.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q128.
General Comments on 303(d) Vision and TMDL Priority Development

This question was not displayed to the respondent.

Q161.
Revision Requests Between Cycles

This question was not displayed to the respondent.

Q214.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q129.
General Comments on Revision Requests Between Cycles

This question was not displayed to the respondent.

Q162.
Appendices

This question was not displayed to the respondent.

Q216.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

This question was not displayed to the respondent.

Q130.
Appendix 1

This question was not displayed to the respondent.

Q131.
Appendix 2

This question was not displayed to the respondent.

Q132.
Appendix 3

This question was not displayed to the respondent.

Q133.
Appendix 9

This question was not displayed to the respondent.

Q134.
Appendix 5

This question was not displayed to the respondent.

Q135.
Appendix 6

This question was not displayed to the respondent.

Q136.
Appendix 7

This question was not displayed to the respondent.

Q163.
Additional Comments and Additional Submission Files

Q219.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

Q137.
Additional Comments on the Draft 303(d) Assessment Methods

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.

Q138. Upload File 01

Comments on Draft 303(d) Assessment Methods (December 2018).pdf
2.7MB
application/pdf

Q167. Upload File 02

Q168. Upload File 03

Q169. Upload File 04

Q170. Upload File 05

Q171. Upload File 06

Q141.

Acknowledgements

This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

Q166.

Submit Your Comments

NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form menu.

Q180. CSS HTML Style

Location Data

Location: (41.189407348633, -111.94889831543)

Source: GeoIP Estimation

GREAT SALT LAKE
BRINE SHRIMP
COOPERATIVE, INC

19 December 2018

Electronically submitted through the web portal

Utah Division of Water Quality
195 North 1950 West
Salt Lake City, UT 84116

Re: Comments of the Great Salt Lake Brine Shrimp Cooperative on the Draft 2018/2020 303(d) Assessment Methods

Dear Division of Water Quality:

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/tmdl/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. 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.

Background

Organized in 2009, the Cooperative conducts commercial brine shrimp harvest on GSL. Brine shrimp represent a keystone species in GSL, and the success of our business correlates directly to the health of the brine shrimp population, which, in turn, reflects the health of the broader GSL ecosystem. The Cooperative employs several scientists and has collected a wide range of brine shrimp population and water quality data in GSL over a period of decades. This encompasses, in Gilbert Bay, biological data including *Artemia* densities and reproductive assessments, phytoplankton enumeration and

identification, and chlorophyll-a; and hydrochemical and water quality data including nutrient concentrations from the water column, temperature, salinity, and oxygen concentrations, and field collection of *Artemia* tissue contaminant samples. Additional research investigations by the Cooperative include tracking of stable isotopes through the food web, nutrient dynamics, phytoplankton, zooplankton and water quality of Bear River Bay and Farmington Bay in addition to Gilbert Bay. The Cooperative further conducts microcosm experiments to identify biotic responses in GSL epilimnetic water samples to various modifications of nutrient concentrations and substrate types.

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.

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.

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. 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 the broader goals behind asking for information in the first place.

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 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.

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

[1] 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.

consideration. Our initial evaluation suggests that GSL datasets would likely fall into this category as currently defined.

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.

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. *See* p. 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.

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).[2]

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.[3] 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 H_2SO_4 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.

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

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[2] We do use a professional lab for the analysis of nutrients 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.

[3] 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-quality-control.htm) appears less stringent than the GSL-specific protocol as it does not call for Clean Hands/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.

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.

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.

(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.

(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.

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.

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.

(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"?

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 Plants," *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 present toxin producing genera.") (available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4488698/).

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/documents/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 Blooms," 5 February 2015; available at: https://www.mdpi.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.

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.

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.

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.

Respectfully submitted,

Thomas Bosteels
General Manager

[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 evaluating 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.

Q225. CSS and HTML

Q144.

Disclaimers

Q16.

Submissions are Treated as Public Documents

Note: Submissions are treated as public documents and will be published on UDWQ's Water Quality Assessment Website. Though we require submission of an e-mail address or phone number, contact information will not be released to the public. Only commenter name will be published with the submission.

Q172.

Completion Time

Your browser cookies keep track of your progress. To prevent losing your work if you have to take a break or if your cookies get deleted, we recommend drafting your comments beforehand. Ideally, you will submit your comments in one session.
NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
NOTE: This form is best displayed on tablet screens or larger.

Q165. Validation

reCAPTCHA V1 IS SHUTDOWN
Direct site owners to **g.co/recaptcha/upgrade**

Privacy & Terms

Q18. Does your submission contain any personal information from third party individual(s)? *

- ○ Yes
- ◉ No

Q228. CSS and HTML

This question was not displayed to the respondent.

Q164.

Third Party Consent

This question was not displayed to the respondent.

Q19. Do you have consent from those third party individuals to include their personal information for submission and publication?*

This question was not displayed to the respondent.

Q20. **NOTE**: If you have not obtained permission, UDWQ may not publish your submission and may only informally respond to your submission outside of the official Assessment process.

This question was not displayed to the respondent.

Q21. May UDWQ contact you (and any third party individuals) about your submission?*

This question was not displayed to the respondent.

Q226. CSS and HTML

Q145.

Type of Submission

Q1. Type of Submission:*

- ○ Individual
- ○ Government
- ○ Non-Government Organization
- ◉ Other (specify below)

Q2. Government or Organization Name (if applicable):

This question was not displayed to the respondent.

Q229. CSS and HTML

Q3.

Is this your first time submitting comments on the 303(d) Assessment Methods? *

- ◉ Yes
- ○ No

Q4. How did you hear about this public comment process? *

- ◉ Meeting
- ○ UDWQ Listserve
- ○ UDWQ Website
- ○ Other (specify below)

Q227. CSS and HTML

Q146.

Your Contact Information

NOTE: Contact information will not be released to the public. Only commenter name will be published with the submission.

Q6. First Name:*

Theron

Q7. Last Name:*

Miller

Q22. Supply Email **OR** Phone Number*

Q8. Email:

Q9. Phone Number:

Q10. Street Address:

Q11. Apartment or P.O. Box:

Q12. City:

Q14.
State:

Q15. Zip Code:

Q224.
CSS and jQuery Skip to TOC

Q142.
Introduction

This question was not displayed to the respondent.

Q182.
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Q70.
Conventional Parameter Assessments

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.” 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. 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. 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.

Q71.
Grab Sample Assessments

Q72.
High Frequency Assessments for Dissolved Oxygen

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 – 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 ≥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. 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. 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.” 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. 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 “g” factors, are present and clearly dominate the physical and biological conditions of the river. 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.

Q73.

Narrative Standards: Biological Assessments

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).” 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. 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.

Q222.

Analyzing Multiple DO Datasets at a Site

Q74.

River Invertebrate Prediction and Classification System Models

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. 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. 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. For example, what if a flash flood occurred 30 days prior to the sampling? 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. 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. 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). 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. 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 – 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.

Q75.
Model Construction and Performance

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 – and which may take months or years to recover.

Q76.
Assessing Biological Use Support

Q77.
General Comments on Assessments Specific to Flowing Surface Waters of the State and Canals

Q152.
Assessments Specific to Lakes, Reservoirs, and Ponds

Q196.

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Q79.
Assessment Overview

Q80.
Tier I Assessment

Q81.
Drinking Water Use Support

Q82.
Recreational Use Support

Q83.
Aquatic Life Use Support

Q86.
Tier II Assessment

Q87.

Weight of Evidence Criteria

Q88.
Carlson's Trophic State Index

Q89.
Phytoplankton Community

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.

Q90.
Great Salt Lake

Q91.
Gilbert Bay Bird Egg Tissue Assessment

Q92.
General Comments on Assessments Specific to Lakes, Reservoirs, and Ponds

Q153.
Toxics Parameter Assessments for All Waters

Q198.
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Q93.
Equation-Based Toxic Parameters

Q89.
Assessment Process

Q90.
General Comments on Toxics Parameter Assessments for All Waters

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.

Q154.
Escherichia coli Assessment for All Waters

Q200.
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Q91.
Data Preparation

Q92.
Recreation Season

Q93.
Escherichia coli Collection Events and Replicate Samples

Q94.
Data Substitution for Calculating the Geometric Mean

Q95.
Use Designation

Q96.
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Q97.
Summarizing Assessment Results

Q98.
General comments on *Escherichia coli* Assessment for All Waters

Q155.

Pollution Indicator Assessments for All Waters

Q202.

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Q99.

General Comments on Pollution Indicator Assessment for All Waters

Q156.

Narrative Standards for All Waters

Q204.

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Q100.

Drinking Water Closures

Q101.

Fish Kills

Q102.

Harmful Algal Blooms (HABs)

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 – 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 – because they cause similar symptoms. We owe it to the people of Utah to base such decisions on more rigorous, conclusive data. 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).” 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 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 virtually 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]

Q105.
Mercury Assessment Process

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 108–109 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. • Non-virulent strains: Most Gram-negative organisms are non-pathogenic. Pathogenicity involves a complex interaction between host-related and specific microbial virulence factors – 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.” 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. [Response continued below in the "General Comments on Narrative Standards for All Waters" box]

Q106.
Fish Tissue Assessments and Consumption Health Advisories

Q107.
General Comments on Narrative Standards for All Waters

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 – 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? 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 – 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 – 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.

Q157.
Determination of Impairment: All Assessment Units

Q206.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q108.
Individual Assessment of Water Quality Standards

Q109.

Conflicting Assessments of Water Quality Standards

Q110.
Aggregation of Site- Specific Assessments to Assessment Unit Categories

Q111.
Secondary Review

Q112.
Assessment Unit Re-segmentation

Q113.
General Comments on Determination of Impairment: All Assessment Units

Q158.
Identifying Causes of Impairments

Q208.
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Q117.
Pollutants

Q114.
Pollution

Q115.
Unknown Sources

Q116.
Natural Conditions

Q118.
General Comments on Identifying Causes of Impairments

Q159.
Revising the 303(d) List and Other Categorical Assessments

Q210.
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Q119.
Category 4A

Q120.
Category 4B

Q121.
Category 4C

Q122.
Delistings

Q123.
Delisting Categorical Pollutant Causes

Q126.
303(d) Listings

Q127.
Non-303(d) Categorical Listings

Q124.
General Comments on Revising the 303(d) List and Other Categorical Assessments

Q160.

303(d) Vision and TMDL Priority Development

Q212.
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Q128.
General Comments on 303(d) Vision and TMDL Priority Development

Q161.

Revision Requests Between Cycles

Q214.
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Q129.
General Comments on Revision Requests Between Cycles

Q162.

Appendices

Q216.
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Q130.
Appendix 1

Q131.
Appendix 2

Q132.
Appendix 3

Q133.
Appendix 9

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Appendix 5

Q135.
Appendix 6

Q136.
Appendix 7

Q163.
Additional Comments and Additional Submission Files

Q219.
NOTE: Do not use the browser back button. Instead, use the Table of Contents button (page bottom), at any time, to navigate to other portions of this form.

Q218.
Instructions
Submit any additional comments and up to six attachments. To help streamline our process, please briefly explain why the attachments are being included.
Note: There is no way to remove files after uploading them.

Q137.
Additional Comments on the Draft 303(d) Assessment Methods

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: 1–13 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. Æ M. Meerhoff Æ B. A. Jacobsen Æ R. S. Hansen Æ M. Søndergaard Æ J. P. Jensen Æ T. L. Lauridsen Æ N. Mazzeo Æ C. W. C. Branco. 2007. Restoration of shallow lakes by nutrient control and biomanipulation—the successful strategy varies with lake size and climate. Hydrobiologia 581:269–285. 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. 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 Utah's 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 – a review. Environmental Health. 2006. 5:7

Q138. Upload File 01

303(d) Assessment Methods Comment Letter_Wasatch Front Water Quality Council.pdf
340.6KB
application/pdf

Q167. Upload File 02

Q168. Upload File 03

Q169. Upload File 04

Q170. Upload File 05

Q171. Upload File 06

Q141.

Acknowledgements

This form is modeled after Australia's Kakadu National Park draft management plan for Kakadu and Australia's HIA Compliance Codes public comment forms.
Thank you for taking the time to comment on UDWQ's Draft 303(d) Assessment Method.

Q166.

Submit Your Comments

NOTE: Once this form is submitted, you will not be able to change your responses. You are, however, permitted to submit the form multiple times. This allows you to submit comments that might occur to you later.
If you are not ready to submit or would like to review your comments, click the Table of Contents button to return to the comment form menu.

Q180. CSS HTML Style

Location Data

Location: (39.739196777344, -104.98470306396)

Source: GeoIP Estimation

Comments on the UDWQ 305(b), Assessment Methods for the 2018-2020 303(d)

Prepared by

Theron Miller, PhD

Wasatch Front Water Quality Council

Submitted 12/17/2018

Comments:

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." 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.

"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.

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.

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 – 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 ≥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. 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. 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." 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. 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 "g" factors, are present and clearly dominate the physical and biological conditions of the river. 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.

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)."**

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.

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.

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.

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. 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. For example, what if a flash flood occurred 30 days prior to the sampling? 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. 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. 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). 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.

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 – 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.

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 – and which may take months or years to recover.

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.

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.

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 – 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 – because they cause similar symptoms. We owe it to the people of Utah to base such decisions on more rigorous, conclusive data.

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)."

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 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 virtually 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. 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 10^8–10^9 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.*
- ***Non-virulent strains:*** *Most Gram-negative organisms are non-pathogenic. Pathogenicity involves a complex interaction between host-related and specific microbial virulence factors – 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."*

  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.

  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 – 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?

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 – 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 – 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.

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