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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 2022 303(d) Assessment Methods"

Dear Utah Division of Water Quality,

The Great Salt Lake Brine Shrimp Cooperative (the "Cooperative") hereby formally submits comments regarding the "Draft 2022 303(d) Assessment Methods" (the "Draft 2022 Document"). The Cooperative values the opportunity to provide specific comments on the Draft 2022 Document and the Cooperative recognizes the merits that stakeholder input has on implementation of suitable water quality regulations. The Cooperative acknowledges and appreciates the incorporation of some of our previously presented concerns regarding assessment methods that were submitted in response to the Draft 2018/2020 303(d) Assessment Methods (the "Draft 2018/2020 Document) and that appear in the current Draft 2022 Document. Notwithstanding our recognition of the significant progress that has been made in preparing and establishing the Draft 2022 Document the Cooperative does have some further suggestions and concerns. In the following we present recommendations and concerns that should serve to enhance the quality of the final guidelines for 303(d) assessment methods.

Background of the Cooperative

In our previously submitted comments to the Draft 2018/2020 Document we provided a section on the background of the Cooperative and its multi-decade intensive scientific limnological monitoring program on the Great Salt Lake (GSL). We have routinely conducted weekly or bi-weekly scientific field studies on the GSL since 1999 that continue through the present. The field research has been coupled with laboratory and mesocosm studies detailing results from targeted studies on relevant ecological, reproductive, contaminant, and nutrient issues. Over the course of these studies we have collected thousands of water and aquatic biota samples and have recorded detailed information on *Artemia* and phytoplankton population dynamics, other aquatic invertebrates, water quality, physicochemical properties throughout the water column, nutrients, contaminants, DNA barcoding vs microscopy methods, and algal community structure. Our research has been focused on Gilbert Bay, but has also included Farmington Bay and Gunnison Bay. Based on the scope and depth of this research we submit that we are able to provide informed, reasonable and beneficial comments on the Draft 2022

Document. It is our interest, and presumably the interest of all stakeholders, to contribute in a meaningful way to promote the current and future quality of the GSL ecosystem and other waterbodies in the State of Utah.

Specific Comment Regarding Nutrient Assessments Specific to Headwater Streams

The Cooperative recognizes the extensive effort that was involved in the process of defining nutrient assessments specific to headwater streams and that the DWQ served a pivotal role in meeting with involved stakeholders, receiving and processing input, and defining outcomes. The Division of Water Quality was able to develop an innovative approach to nutrient criteria by combining numeric nutrient criteria and associated ecological responses. The cooperative is fully supportive of the process and the outcome of this effort.

Specific Comment and Concerns Regarding Data Acceptance Process

The Draft 2018/2020 Document placed arbitrary restrictions on the acceptability of datasets which did not conform to the format of the EPA Water Quality Portal. Our concern was that valid data could be rejected if DWQ staff did not have the time to reformat it. We appreciate the fact that this appears to have been addressed in the 2022 document and that the details for submitting data are found in the "call for data" presented by DWQ. We are aware of the fact that the acceptance of data may require the development of "interface tools" by DWQ to allow the data to be imported in the correct format. If those tools have not been developed at time of data submission, they cannot be fully incorporated into DWQ's assessment tools and they will be placed in the DWQ Conflicting Assessments of Water Quality Standards and Secondary Review rather than rejected outright. Based on this understanding we want to ensure that stakeholders can request that DWQ manually screen and assess the data for specific parameters, sites, or dates if necessary and that a reasonable effort is made by DWQ to accommodate data. Whereas, the current Draft 2022 Document reveals a willingness of DWQ to work with outside entities in formatting their data for inclusion in the 303(d) process, it still leaves a substantial grey area. DWQ states that it wants "to balance consideration of all data with reasonable expenditure of resources", yet this does not obligate DWQ to accept all data if they judge the expenditure of resources to be unreasonable. The criteria for making this judgment is not given, and thus outside entities must assume acceptance of data decisions are made in good faith and that they support a positive working relationship between stakeholders and DWQ.

In our comments on the Draft 2018/2020 Document we expressed concern about the exclusion of historic data for interpretation of current limnological and ecological conditions of bays of GSL. We remain of the opinion that historic data have merit and that inclusion in the process of interpretation of current results remains valid and necessary.

Specific Comment and Concerns Regarding Data Credibility

The Draft 2018/2020 Document contained a fairly restrictive set of categories for data considered "credible" and sufficient to be included in 303(d) assessments. The Draft 2022 Document has modified these criteria in a way that seems to be more permissive of datasets without such onerous adherence to DWQ QAPP procedures. According to our interpretation of the Draft 2022 Document credible data from external entities is now defined, on page 30, as being under no obligation to follow precisely the DWQ or EPA quality assurance protocols. However, the data collection and QA process must still be evaluated by DWQ to ensure credibility. This means that outside entities will need to develop a QAPP, SAPs, and SOPs, collect their data under its guidance, and the documents will need to be furnished to the DWQ at their request. DWQ will then make a judgement about whether the QAPP is sufficient for the data to be considered in 303(d) decisions. This is required in order for the data to receive a Quality Grade of A or B and be considered in 303(d). The lack of QAPP, SAP, and SOP for DWQ review will result in a C grade, and exclusion from 303(d) consideration. We want to ensure that DWQ will dedicate the time to review submitted QAPP, SAP, and SOP documents from participating stakeholders and that there is an open and interactive process that supports a stakeholder's ability to collect and submit data that meets the definition of "credible". In this process of working with DWQ to develop and implement QAPP, SAPs, and SOPs stakeholders want to ensure that such guidance from DWQ combines the goal of ensuring the reliable acquisition and documentation of data with a realistic understanding of the constraints that time, personnel and money can impose on the collection of data. Ultimately we strongly encourage the DWQ to proceed in an unbiased and open-minded manner when considering the merits of an outside entity's QAPP.

Regarding the temperature and dissolved oxygen, we have concerns about the instrument calibration requirements for accuracy and range in Tables 5 and 6. First, we believe the term "range" should be changed to "resolution" in the table footnotes, as the units provided for R in the tables suggests that resolution is being specified. Second, the calibration accuracy requirement for dissolved oxygen exceeds the manufacturer's instrument specifications for the YSI 556 sonde we currently use, which is a standard handheld device routinely used in limnological studies. YSI 556 oxygen sensors are rated for an accuracy of 0.2 mg/L. The minimum criteria for dissolved oxygen accuracy is 0.1 mg/L for Quality Grade B, which would downgrade data collected by a YSI 556 to Quality Grade C, excluding it from consideration in 303(d) assessments. We believe this would be a mistake, because the YSI 556 service life extended throughout the 2015-2020 period of record DWQ is considering and therefore any data collected with this common instrument by other entities would also be at risk of dismissal. While the YSI 556 has recently been discontinued, the contemporary YSI ProPlus replacing it has the same dissolved oxygen accuracy and resolution specifications as the YSI 556, yet is approved by the EPA for wastewater and drinking water analysis (https://www.ysi.com/File%20Library/Documents/News%20Briefs/NB13-0116-01-EPA-Approved-Methods.pdf). Similarly, the DWQ water temperature minimum resolution of 0.05 degrees Celsius excludes data from the YSI 556 and the contemporary ProPlus and ProDSS, which are rated to 0.1 degree Celsius resolution. We recommend the dissolved oxygen accuracy requirement for Data Quality Grade B be raised to 0.2 mg/L and temperature resolution to 0.1 degree Celsius to accommodate valid data collected from commonly used water quality sondes over the period of record. To be clear, these comments pertain to GSL and the various subclassifications therein, and we are not trying to recommend alternative instrument standards for fresh water streams, rivers or lakes. The other requirements—metadata, flow data, field documentation, laboratory comments, detection limits, and lab certifications—appear reasonable. With respect to lab certification we expect that labs outside the State of Utah that have specific national or state level certificates meet the requirements of DWQ.

In the Draft 2018 Document, it was somewhat unclear how data that does not fully meet the criteria for inclusion into the Integrated Report program for EPA 303(d) actions might be used for state DWQ Watershed Plans, TMDLs, and development of water quality standards. However, in the Draft 2022 Document it is evident that data which are not sufficiently credible according to acceptance criteria may still have merit and can be used in a capacity outside of the specific 303(d) assessment. We feel that at least this level of inclusion is an important process. DWQ's statement that they will no longer require outside entities to conform specifically to their QA/QC reduces the risk of highly restrictive practices such as the "clean hands/dirty hands" nutrient sampling protocol and instrument washing that are applicable under certain circumstances and data quality objectives yet are excessive or not specifically warranted for other sample types or alternative data quality objectives.

Specific Comment and Concerns Regarding Beneficial Use Subclassification and Bays of GSL

Subclassifications 5A through 5E are all GSL-specific, recognizing the individual bays as separate water bodies with unique characteristics and unique criteria. Whereas the recognition of GSL as a unique waterbody continues to be a positive and scientifically defensible designation the Cooperative strongly urges DWQ to include the interconnection of bays of GSL within the framework of assessing beneficial uses. It is abundantly clear from years of research on the bays of GSL that there is substantial biological and limnological connectivity between the GSL subclassifications such that changes in one bay can have significant and long-lasting impacts on other bays. Regulatory solutions designed to alleviate nonsupport of beneficial uses of a particular GSL bay must take into account potential impacts on beneficial uses in other bays before being implemented.

Specific Comment and Concerns Regarding Potential Conflicts Generated Among Beneficial Uses

One of the concerns we have is that the implementation of regulatory measures to mitigate or resolve perceived impairment of a particular beneficial use may then create harm to other beneficial uses for a particular waterbody. Based on this concern we examined the Draft 2022 Document for the procedural process to remedy conflicts that arise between beneficial uses of a particular waterbody. Specifically we are most concerned with those conflicts that develop out of *implementation* of measures to correct impairment of one of the beneficial uses yet causes demonstrable or highly probable harm to other beneficial uses. As it is unclear how such conflicts are resolved we urge DWQ to inform stakeholders if such potential conflicts are anticipated and if so, then what is the process to resolve such conflicts. As it may result in setting priorities of one beneficial use over another, then how are the beneficial uses prioritized?

Specific Comment and Concerns Regarding Sampling Bias

The Draft 2022 Document does include recognition that there can be both spatial and temporal bias in sampling and that this could influence the interpretation of water quality within an AU. DWQ has presented details on the possibility to "split" or "re-segment" an AU given information on the spatial specifics and how this influences the perceived compliance and support of beneficial uses. However,

with respect to the bays of GSL it is unclear how the potential for a temporal bias may influence the interpretation of attainment or impairment. It has been thoroughly documented that there are demonstrable temporal differences in algal and aquatic invertebrate community structure and population dynamics in the various bays of GSL. Sampling at a particular time versus another time for the same location can lead to nearly opposite conclusions regarding water quality. For example, chlorophyll-a assessments in Gilbert Bay in January vs July can lead to conclusions of highly eutrophic (i.e., a high Carlson's TSI) vs oligotrophic (i.e., low Carlson's TSI). Yet both conditions are a "normal" situation for Gilbert Bay and constitute a healthy system. Similarly, in Farmington Bay there typically is both a profound temporal and spatial pattern of algal and aquatic invertebrate community structure and population size throughout the year. Sampling must take into account these spatial and temporal differences and understand whether or not it represents "healthy" ecological dynamics or risk and impairment to the system. In short, the Cooperative would like to see more details in the final version of the Draft 2022 Document that more clearly addresses the potential for spatial and temporal bias and how such biases are managed.

Specific Comment and Concerns Regarding use of the term Harmful Algal Bloom (HAB)

We support the conclusion by DWQ that "For this IR cycle, harmful algal bloom (HAB) assessments are currently on hold while DWQ develops and review implementation guidance and assessment methods based on recent EPA recommendations for water quality criteria for cyanotoxins". The Cooperative believes that cyanobacteria cell counts alone are not sufficient to define an algal bloom as harmful, or a waterbody as impaired, or as an impact on beneficial use without further assessments of impact. There needs to be more specific accounting of the species of cyanobacteria, the type and concentration of toxin produced, and the impact on other aquatic biota, community structure or the ecosystem that a cyanobacteria bloom has on the bays of GSL. In particular the Cooperative opines that nitrogen fixation by cyanobacteria is an essential and typical event that captures nitrogen and introduces it into the GSL ecosystem and therefore has value. Repeated studies have demonstrated that GSL is predominantly a nitrogen limited system and that sufficient nitrogen is essential to maintain the massive demand on energy, nutrients, and carbon transfer required for the aquatic and aquatic-dependent biota of GSL. It is yet unclear the full extent of the role that nitrogen fixation has on the nutrient balance of the GSL ecosystem, but there is accumulating evidence that it plays and important and beneficial role.

Conclusion

The Cooperative remains concerned about the inclusion of valuable data from stakeholders that can inform DWQ and that offers an historical perspective as well as insight into complex ecological, toxicological, biological and hydrochemical conditions or interactions that influence the integrity of the GSL ecosystem. While we understand the guidelines and steps required to meet data credibility standards we still urge the DWQ to recognize the realistic constraints on data acquisition and the limitations of time, personnel and money that constrain the scope and frequency of sample collection and analysis. We understand the designation of the bays of GSL as separate beneficial use subclassifications, yet we still adhere to the opinion that the GSL is an integrated system and that all bays interact, contribute to, and influence water quality and biotic composition of other bays. We

therefore urge consideration of impacts on other bays if, and when, management decisions are made for a particular bay. We support the on-going effort to truly understand the role that nitrogen-fixing cyanobacteria have on nutrient loading and balance in GSL and the need to understand when an algal bloom becomes problematic rather than beneficial. We worry about potential conflicts between beneficial uses and we would prefer to see more definitive information on how such conflicts are resolved. Overall, we applaud the effort DWQ has made to listen to stakeholders and to incorporate their valid contributions to the process of completing the Draft 2022 Document. We strongly believe such cooperation and interaction helps to propel the document in a manner that enhances the likelihood of positive outcomes for waterbodies in Utah and especially for the GSL ecosystem. If there is further information, clarification, or services that we can provide for the DWQ's 303(d) listing process, please let us know and we will respond.

Respectfully submitted,

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Great Salt Lake Brine Shrimp Cooperative

Thomas Bosteels