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VIA EMAIL TO jgardberg@utah.gov

Jodi Gardberg
Great Salt Lake Watershed Coordinator
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P.O. Box 144870
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Subject: Comments on “A Great Salt Lake Water Quality Strategy”

Dear Ms. Gardberg:

Kennecott Utah Copper LLC (KUC) appreciates the opportunity to comment on the Utah Division of Water Quality's (DWQ) Great Salt Lake (GSL) Water Quality Strategy (referred to as the Draft Strategy). KUC commends DWQ for the laudable goals identified in the Draft Strategy. Specifically, DWQ has indicated it is designing the Draft Strategy to “fill critical knowledge gaps, improve the precision and clarity of UDWQ's water quality management decisions, reduce regulatory uncertainty for regulated entities, and improve all partners' capacity to be stewards of lake water quality.” Draft Strategy, Overview at 3. Kennecott concurs with DWQ's goals and believes efforts to work towards those goals can both enhance water quality protections of GSL and promote a balanced regulatory regime.

As you are aware, the Science Panel assembled by DWQ to develop the protective GSL selenium standard expended nearly four years and more than \$2 million to develop a selenium criterion for a portion of Great Salt Lake. In turn, EPA reviewed the extensive work supporting criterion development and affirmed the conclusions of the Science Panel and Steering Committee in its recent approval of the selenium criterion. KUC believes the work identified in the Draft Strategy should not promote shortcuts to the rigor exhibited as part of the selenium standard development. KUC concurs, however, with DWQ's efforts to develop a streamlined process that can withstand scrutiny and be characterized as a predictable, thoughtful approach to GSL regulation. In support of those goals, the following comments on the Draft Strategy are intended to “issue spot” and hopefully assist DWQ with further refinement of the strategy. Below, we provide comments that apply broadly to the Draft Strategy; specific technical comments and editorial suggestions are provided as an attachment using the comment format developed by DWQ.

Citations to regulatory language should be clarified

KUC recognizes DWQ's efforts (and agrees conceptually with the need) to provide an appropriate level of regulatory background as a framework for the Draft Strategy. In some places, however, the attempt to streamline that information may be misconstrued. For example, DWQ identifies the “fishable/swimmable” goals established by Section 101(a) of the federal Clean Water Act (CWA). See, e.g., Draft Strategy, Overview at 10; Core Component 1 at 2. Those goals are fundamental to understanding the foundation for CWA regulation but the Draft Strategy fails to identify the provision's qualifying language. Specifically, the CWA

provides that “it is the national goal that *wherever attainable*, [there is] an interim goal of water quality which provides the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water. . . .” 33 U.S.C. § 1251(a)(2) (emphasis added). The CWA language qualifying the cited goals is important and provides further context to understand the regulation of unique water bodies such as GSL, i.e., those waters which may not support all the goals identified in the CWA. The Draft Strategy should be revised to clarify the reference to the cited statutory language.

Regulation of GSL water quality is more robust than suggested by the Draft Strategy

Many ongoing uses of GSL, such as for receiving point source discharges, have been closely regulated, e.g., through mandatory coverage under Utah Pollutant Discharge Elimination System (“UPDES”) permits. Those discharges have not, according to the Science Panel’s assessment (as part of selenium standard development and with respect to selenium), compromised the lake’s beneficial uses. In contrast, portions of the Draft Strategy suggest that the lake has been notably under-regulated. “The lack of numeric criteria does not mean that [GSL] is *entirely* without water quality protections.” Core Component 1 at 3 (emphasis added). Use of the word “entirely” wrongly suggests that there have been few water quality constraints relevant to GSL. In fact, many UPDES permits include end-of pipe limitations founded on technology-based criteria, are subject to Whole Effluent Toxicity (WET) testing and incorporate numerous other protective permit-related conditions to ensure compliance with the lake’s narrative standards. Accordingly, language in the Draft Strategy suggesting that GSL has been under-regulated, including the above-referenced use of the term “entirely,” should be stricken and due weight given in the narrative to the level of protectiveness already applied through the UPDES program.

Uncertainty must be meet objectively

The Draft Strategy describes uncertainties that arise due to the application of narrative standards to Great Salt Lake and conflicting interpretations over whether the lake is meeting beneficial uses. Core Component 1 at 4. KUC notes that the Draft Strategy recognizes these uncertainties and presents a plan for filling identified data gaps. When a regulatory agency is met with such uncertainty, it may feel pressured to adopt a highly precautionary approach (sometimes referred to as the ‘precautionary principle’). We encourage DWQ to continue the generally objective course presented in the Draft Strategy, especially in the face of potential calls to apply very conservative interim water quality criteria until final criteria are developed and formally adopted. We specifically endorse DWQ’s observation that “overprotective water quality regulations are needlessly costly for industry and municipalities”. Core Component 1 at 2. We encourage DWQ to also acknowledge and discuss the potential antibacksliding constraints of application of an overprotective standard.

The Draft Strategy acknowledges that limited toxicity data are anticipated for the hypersaline class, and given such a paucity of information, DWQ proposes to “derive interim criteria if at least one technically sound toxicology study is available and by *applying uncertainty factors...*” Core Component 1 at 22, emphasis added. Although DWQ is deferring the development of a specific methodology for deriving interim and final criteria in this scenario, the notion that uncertainty factors will be applied has troubling antibacksliding and undue cost implications. KUC urges caution and prudence in developing this methodology and specifically requests public involvement and opportunity for comment in the development of such a methodology.

DWQ must describe the protectiveness policy it will utilize in criteria development

The Draft Strategy provides the public and regulated community with a strategy and plan for approaching the technical aspects of criteria development (e.g. species composition, lake geochemistry, toxicity), but omits an imperative element of the process. Division staff is keenly aware of the statistical analysis of dose-response data to determine protectiveness

levels such as NOAEL, LOAEL, EC10, EC20, etc. The choice of protectiveness level for criteria development is a matter of policy rather than science. Indeed, this notion was the subject of extended discussion by the Science Panel, Steering Committee, and the Water Quality Board when recommending and adopting a selenium criterion for Gilbert Bay. Ultimately the Board adopted a selenium criterion based on the EC10. Recognizing that the Division can only recommend water quality standards for consideration by the Board, the Division's policy toward standard setting nevertheless carries weight with the Board. Thus, it is necessary to fully disclose the Division's policy approach to protectiveness level at this juncture and provide an opportunity for the public and regulated community to review and comment on the approach before finalizing the Great Salt Lake Water Quality Strategy.

Further, this protectiveness policy should be the basis for determining "high priority pollutants" as described in the Draft Strategy. Core Component 1 at 15-17. In this process, DWQ proposes to utilize "toxicity benchmarks", which are described as being "estimates of the no-effects concentration", as the basis for making this determination. That DWQ proposes a threshold of one tenth of the no-effects concentration seems to establish the no-effects concentration as a de facto protectiveness target, which is contrary to precedent. Further, the way that the Division describes "toxicity benchmarks" suggests that these values are also what are commonly known as "screening levels". In ecological risk assessment, screening levels are highly conservative and designed to screen out parameters from further risk analysis; to use such a small fraction of a screening level has the potential of placing many more parameters on the list of "high priority pollutants" than is warranted, potentially diverting resources to and raising unnecessary alarm about parameters that are truly of little concern.

Acknowledgement of economic drivers and impacts of water quality regulation should be balanced

Throughout the Draft Strategy, there are references to the benefits to Utah's economy with a particular focus on the brine shrimp industry and a corresponding reference to an Economics Significance Study (January 2012) prepared by Bioeconomics, Inc. for the Great Salt Lake Advisory Council. See, e.g., Overview at 2 (general statement related to the contributions of the lake to Utah's economy). In particular, the draft references the fact that "overprotective water quality regulations are needlessly costly for industry and municipalities [and that] underprotective regulations are potentially illegal and would be detrimental to the lake's ecosystem, which supports millions of birds, not to mention a multimillion dollar brine shrimp industry." Core Component 1 at 2. See also Core Component 1 at 11 (referencing the need to ensure the long term vitality of the commercial brine shrimp harvests in the lake that generates \$56.7 million to Utah's economy, again referencing the Bioeconomics study); Core Component 2 at 39 (again referencing the economic effect of the lake's brine shrimp industry as "almost \$56 million"). While the importance of the brine shrimp industry to the economy is undeniable, the strategy's failure to correspondingly reference the economic contribution of dischargers to GSL is potentially unclear and unbalanced. Indeed, the Bioeconomics study doesn't fully assess the annual net economic value associated with industrial and municipal discharges to GSL; that value can't be underestimated and is an important component of the assessment of these issues as related to the lake. The Utah Artemia Association has reportedly specifically identified its interests in having brine shrimp characterized as a "key stone species in the lake." See Comments of Utah Artemia Association at <http://www.waterquality.utah.gov/greatsaltlake/index.htm>. KUC concurs that potential water quality needs to support the brine shrimp industry are central to assessing the adequacy of the lake's protections. That being said, the ecosystem services provided by the lake are critical to the economic vitality of numerous other industrial and discharge interests; those

issues are potentially diminished by highlighting the economic dollar value for one industry and not others¹.

The description of KUC-related permit issues and appeals is misplaced

The Draft Strategy provides background on permitting issues associated with GSL. For example, it specifies that the “KUC discharge was appealed and the facility continues to operate under their existing permit.” Overview at 14. In fact, the petition appealing the KUC permit in 2007 has, to KUC’s knowledge, no bearing on the agency’s administrative continuance of the existing UPDES permit terms and conditions; those two issues should not be connected. KUC suggests that the Draft Strategy be amended to avoid characterizations of permit appeals and the import of standards’ developments on those appeals.

Challenges of selenium criterion implementation need clarification

The Draft Strategy includes statements that characterize implications stemming from the lack of data on the relationship between selenium in water and selenium in bird eggs. Specifically, it provides that the data gap has “hampered” full implementation of the criterion. Overview at A-2. In fact, it would be more accurate to indicate that the lack of that data has limited DWQ’s ability to develop corresponding concentration-based selenium limits in UPDES permits. Presumably, the ongoing DWQ-initiated monitoring program (as supplemented by other monitoring data) is tracking GSL’s water quality as compared to the tissue-based selenium criterion. The following suggestions to the section describing GSL Selenium Criterion implementation (Overview at A-2) address these issues and are intended for clarification:

However, the lack of data regarding the relationship between selenium concentrations in water and eggs has limited DWQ’s ability to develop concentration-based numbers in UPDES permits hampered the full implementation of the selenium criterion. For instance, the water concentration that would result in eggs exceeding 12.5 mg/kg is unknown and the significance of this data gap was not fully understood until implementation of the criterion for the UPDES program. Until this relationship is better characterized (and to offset risks associated with its implementation), the triggers standard includes implementation triggers at identified tissue concentrations of selenium and that are intended to ensure that appropriate action can be taken before the criterion is exceeded. The egg tissue criterion has other technical challenges in implementation such as: the difficulty in ensuring data are based on representative sampling, the fact that the sampling time period is typically limited to the nesting season only, and that the sampling requirements can negatively impacting the very resource it was intended to protect (destroying bird eggs to analyze for selenium).

¹ The Draft Strategy also suggests that standards derived to protect GSL’s commercial fishery could need to take into account “commercial water quality and contaminant residue standards for aquaculture [that] have been established by organizations such as the World Health Organization and the European Union.” Core Component 1 at 11. This would be a wholesale departure from the long-standing approach to setting water quality criteria in the US, and those residue standards are separate from any water quality protections promulgated consistent with the requirements of the CWA. The distinct nature of these issues should be further clarified.

Application of EPA methylmercury guidance needs elaboration

The Draft Strategy reflects DWQ's reaction to its characterization of the selenium standard implementation challenges. Specifically, it indicates that "prior to the adoption of a tissue-based criterion, UDWQ will follow the EPA's Guidance for Implementing the 2001 Methylmercury Water Quality Criterion to develop a detailed plan that describes how the criterion will be applied to decision making in key water quality programs." Core Component 1 at 21. The multi-faceted, 200-page, EPA Guidance addresses some of the issues associated with establishing and implementing a viable water quality standard for methylmercury. Of note, it offers guidance on implementing a tissue criterion in UPDES permits and this portion of the guidance may be helpful as a procedural model for GSL criteria depending on the specifics of the procedures and their relevance to GSL. The guidance includes a number of other sections. For example it includes provisions suggesting that States can rely directly on a fish tissue criterion to develop TMDLs and permit requirements without the need to translate fish tissue levels into water column levels. It also indicates that data for listing, e.g., based on fish advisories, need to be based on sound science and local fish consumption information rather than isolated instances of fish tissue concentrations. Additionally, the implementation guidance looks to rely on pollutant minimization programs ("PMPs") rather than end of pipe water quality limits for point sources. While PMPs could potentially provide an iterative, more flexible implementation process for the fish tissue criterion, the Gilbert Bay bird egg tissue-based standard for selenium consists of, as described above, more than a numeric criterion, i.e., it also includes specific implementation milestones (as part of rule and that went through public notice and comment). If egg-based selenium concentrations exceed enumerated values, the rule triggers certain specific data gathering and evaluation steps. The PMP concept is not included in those specific implementation milestones. As such, DWQ's broad based reference to following the EPA guidance on methylmercury needs elaboration; broad sections of that guidance may not always be appropriate or reflective of the particulars of the criteria implementation for Great Salt Lake. The Draft Strategy must provide elaboration on what aspects from the EPA guidance would be utilized and provide a level of detail about how those components would be modified to the particular circumstances of Great Salt Lake.

Implementation details should not be predetermined

The Draft Strategy indicates that DWQ would propose delayed implementation for any newly adopted numeric criteria for GSL. Core Component 1 at 19. While that may be appropriate, any details on implementation should not be predetermined but are appropriately included as part of a rulemaking package. It is fine to reference the need for implementation time; that reference should, in this sort of strategy document, be general in nature.

DWQ should encourage a broader collaborative approach

The Draft Strategy describes the desire for and benefits of collaborating with "partner agencies". Core Component 2 at 17 and 20. KUC believes that DWQ would benefit from broader collaboration including with industry, municipal stakeholders, and NGOs to best leverage limited resources and benefit from shared expertise.

Great Salt Lake Sampling locations should be reviewed

DWQ's proposed sampling locations should be reviewed. The Draft Strategy notes that the locations were selected to align with locations used in routine sample collection and research completed by UDWR and USGS. Core Component 2 at 27. Review of Figure 2-1 in Core Component 2 shows six locations in Gilbert Bay north of Antelope Island and south of the UPRR causeway, with only two locations south of the northern end of Antelope Island. DWQ should review these locations to assure that they meet DWQ's specific study objectives rather than simply settling for locations selected by other agencies in the past. Specifically, KUC would note that with the amount of scrutiny that the KUC discharge receives, it may be prudent to locate one or more stations on the eastern side of southern Gilbert Bay.

Trigger Levels for brine shrimp should be revisited

In Table 2-5 of Core Component 2, DWQ lists trigger levels for brine shrimp that are purportedly modeled to correspond to bird egg trigger levels in UAC R317-2-14. These levels are reportedly derived from the Bioaccumulation Model (Version 5.0) developed by CH2M Hill. KUC struggles to understand the derivation of these values, and they are not consistent with our understanding of trophic transfer between diet and bird egg in the Great Salt Lake environment. Our understanding is that the Bioaccumulation Model accepts an input of water column selenium concentration in order to model brine shrimp and bird egg concentrations. However, DWQ model input, options selection, and assumptions are not described. KUC believes that a brine shrimp trigger level should be lower than indicated in Table 2-5; specifically we note:

- Table 7-5 of the DWQ document *Development of a Selenium Standard for the Open Waters of the Great Salt Lake: Final Report* presents water and diet concentrations modeled from assumed egg concentrations in bird eggs using Version 4.3 of the Bioaccumulation Model. Modeled brine shrimp selenium concentrations reported here are markedly lower than reported in Table 2-5 of Core Component 2; for instance for an egg concentration of 12.5 mg Se/kg, Table 7-5 reports a brine shrimp concentration of 6.0 mg Se/Kg, while Table 2-5 reports a corresponding value of 13.7 mg Se/kg.
- It is our understanding based on personal communication with CH2M Hill that the trophic transfer factor from diet to bird egg used in the model is 1.6. What this means is that for an egg concentration of 12.5 mg Se/kg, the brine shrimp would be 7.8 mg Se/kg.

Thank you for your consideration of these suggestions. If you have any questions, please do not hesitate to contact me.

Regards,

s/Kelly Payne

Kelly L. Payne, P.G.
Manager - Environment

Enclosure

Core Component	Page	Lines	Comment
1	6	161	The description “dozens of potentially toxic compounds” is conclusory and alarmist. A more objective tone in this sentence is suggested.
1	13	353	Suggest not providing an upper limit for the range of salinities in the definition of hypersaline.
1	17	Figure 2	In the second square box, the question “Is the pollutant present in the lake...” might be better stated “Is the pollutant reliably detectable in the lake...” A constituent may be present but not detectable.
1	18	442-444	The sentence beginning in line 442 is not accurate. National water quality criteria are not based on the ‘several of the most sensitive species’. Rather the criteria are set to protect 95% of the taxa present in an ecosystem. See <i>Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses</i> , EPA Publication PB85-227049. Request that narrative correctly summarize this process.
1	21	494	A reference for the EPA guidance document should be provided and be listed in the References section.
2	2	3	Establishing water quality standards for Great Salt Lake is among the important responsibilities of the DWQ but it does not appear correct that it the single “primary” responsibility as suggested in this sentence.
2	8	125	Insert “a portion of” before “Great Salt Lake”
2	8	135	This statement should be attributed.
2	8	137	This statement should be attributed.
2	9	153	Use of word “however” here implies the opposite of the previous statement when the reference is not to an opposite condition, but to a condition that is not assessable due to lack of information; suggest reviewing word choice.
2	9	158	Suggest replacing “established” with “highlighted”.
2	10	186	Suggest adding “over time,” after “seasonally,”
2	13	250	Implementation of the sampling plan is an important priority, but is it properly characterized as DWQ’s “highest priority”?
2	16	306	Insert “a portion of” before “the lake”
2	20	Table 2-1	In the second sentence of the second paragraph under “Problem”, the word “comply” seems to be a poor word choice.
2	21-22	Table 2-1	The first bullet under “Inputs to the Decision” notes that water and brine shrimp will be collected biannually while the first bullet under “Study Boundaries” indicates semiannually. Figure 2-2 on Page 27 also indicates biannually, while the text in line 424 indicates twice per year. Biannually means every two years so is likely used incorrectly in the table and figures, if KUC is reading the narrative correctly that the Division intends to sample every year.
2	24	355	Insert “a portion of” before “Great Salt Lake”

2	24	360	KUC would like to see DWQ adopt the objective of and include plans for reducing and eventually eliminating bird egg collection once sufficient work is to completed to allow water and brine shrimp sampling to demonstrate compliance with the egg-tissue standard.
2	25	378	Here and in many places after the term “trace metals” is used following the listing of selenium and mercury. Suggest that this term be replaced with “Other metals and metalloids” as both selenium and mercury, listed under separate headings, are found in trace quantities in lake water, and both selenium and arsenic are metalloids rather than metals.
2	27	Figure 2-2	The bottom left box on this figure indicates that bird eggs will be sampled for selenium only when water and brine shrimp reach trigger levels. This is inconsistent with the description in Table 2-1 and the narrative which indicate sampling and analysis for selenium at least every two years.
2	29	449	Narrative notes that avocets and stilts forage “in” the open water. These are shorebirds and forage along the shore of the lake rather than in the lake.
2	29	459	The narrative notes that eggs will be collected at Bridger Bay and Antelope Island at a minimum. Text in Table 2-1 also lists Saltair as a regular monitoring location.
2	29	479	This suggests that brine shrimp results will be statistically summarized on an annual basis; recommend summarizing separately for each sampling event (i.e. June and October)
2	31	Table 2-5	The notes section of this table indicates that water values were backcalculated from the bioaccumulation model; however, water values are not shown.
2	32	527	Is the QAPP prepared and available for review?
2	32	533	Recommend retaining sampling records for longer than 5 years.
2	36	624, 636	Why would selenium be part of the round-robin study when a previous round-robin has been successfully completed?
2	38	684	Request that other interested parties be invited to participate in or observe the proposed discussion of current sampling practices.
2	41	766-770	Use of words “contaminants” and “contamination” is poor word choice; selenium, copper and other parameters to be measured in tissue are important micronutrients and should not be indiscriminately characterized as contaminants. Suggest using term “trace elements”.
2	42	812	Here it notes that sampling will be “monthly or bimonthly”; line 843 says “every month”.
2	43	828-831	Calcium, magnesium, potassium, and sodium are considered major in water rather than trace elements. What is driver for sampling for gold and palladium?
2	43	836	Suggest that the complete list of variable and characteristics be reviewed by expert committee rather than just emerging contaminants.

2	43	837	Suggest that DWQ also consider include synoptic sampling locations at the major riverine inflow location to better understand inputs.
2	52	1064	It is unclear how the hydrologic model will help DWQ understand sources and loads. Is this correct?
2	52	1076	This approach describes gathering information on surface water inflows for the hydrodynamic model. Groundwater inflows may also be a significant contributor to the hydrologic balance, but there is no description of how these inflows will be assessed or accounted for in the model.
2	57	1211	"biannual" should probably be replaced with "semiannual"