Comments on the GSL Water Quality Strategy
By Leland Myers

The following comments are provided on the GSL Water Quality Strategy. These comments have been provided verbally in the past and are now being provided by letter to formalize the process.

General Comments

1. Because the method for numeric criteria (NC) is not specific to the Great Salt Lake ecosystem as was the selenium standard, it is strongly recommended that there be a phased implementation of any NC. Specifically, this would mean that once a proximate NC is chosen, the standard would first be implemented for a three to five year period as an indicator. This approach is shown on lines 470 – 475 but only a six month period is suggested. This longer time would allow anyone who may be harmed by the implementation of such a standard to perform site specific work to see if the standard is appropriate. It is unlikely that the State DWQ would be able to generate sufficient funds to perform such studies, but an affected party may be able to generate the needed money.
2. Once a proximate NC is selected, DWQ should evaluate if a water effects ratio (WER) study first needs to be performed to determine site specific appropriateness. The WER is defined as the ratio of the toxicity of a metal in site water to the toxicity of the same metal in standard laboratory water. Water effect ratios may be used to derive site-specific limits for certain metals from national and state aquatic life criteria that were originally developed using laboratory toxicity data. The water effect ratio has been developed to compensate for site-specific biogeochemical factors such as hardness, alkalinity, organic carbon, etc. which can influence the bioavailability and toxicity of metals (EPA, 1994). As an example, copper

is toxic at a reasonably low concentration when tested with lab water. However, there are numerous examples where a WER study has shown the actual toxic level in the ecosystem to be multiple times higher. In the Los Angeles River the WEF for copper ranged from 3.958 to 5.871 times the NC established in lab water (City of Los Angeles Regulatory Affairs Division, 2008). Even more dramatic, the city of San Diego found the WER for copper in Chollas Creek to be 25.54 (city of San Diego Report to Stake Holders, 2010). Because GSL has significant hardness, alkalinity, organic carbon, etc. it is necessary to address this issue prior to NC implementation.

3. As an alternative to specific site specific work, an offramp to compliance with proximate NC could be the establishment of site specific biomonitoring. Lines 540 – 544 in the report discusses the use of biomonitoring in the absence of NC, I suggest it may be more appropriate than NC in some instances. As mentioned in the Strategy, for years the Lake has been protected from toxic discharges through the use of biomonitoring. Through the use of fathead minnows and ceriodaphnia dubia, all discharges have been tested to monitor for any toxicity that may be present. Once appropriate sensitive species have been chosen, a biomonitoring program could be implemented to test for toxicity in discharges using those or similar organisms. For pollutants that biomagnifies through the food chain, as mentioned in the Strategy, more direct measurements may be needed.
4. Any development of NC must include a rational discussion of mixing zones. Because of varying lake levels, a point source discharge may follow for an extended distance across mud flats before reaching the lake shore. If the traditional approach to mixing zones is used, all point source discharges may be required to meet NC end of pipe. Hence, an appropriate mixing zone policy must be established for the proposed proximate approach to be acceptable.

5. Component 1 discusses the delineation of aquatic life beneficial uses. There are several confounding issues that need to be addressed in this section. First, many of the wetland area are extensively sprayed for mosquitoes. Identification of specific indicator species should be accomplished with this spraying in mind. Any review of aquatic life in situ will be affected. In addition, varying salinity gradients in areas being evaluated will need to be addressed. For example, the south end of Farmington Bay on one day was less than 0.75% salt. Two days later, after a major wind storm the salt level was above 2.5%. Because of the high variability even in shallow areas, it is probably inappropriate to pick fresh water standards without considering water effects because the conditions can change so quickly. Species that can withstand variability should only be considered. Impounded areas which are protected from bidirectional flow may be the exception to this, since the diking protects for mixing with the main waters of the bays.
6. Any tiered aquatic life uses should be specific to the GSL system.
7. The document references three ranges or classes of salinity for use in NC development. These should be used as starting points but should not be considered without specific application to the entire lake system. The primary beneficial uses of the lake are birds and their aquatic food chain. Numerous studies reviewed and discussions with GSL avian experts, by this commenter, have indicated that a healthy bird population depends primarily on the quantity of food available and not on one specific species. As such, salinity gradients should reflect the primary food sources and what protects those food sources not transient species which are sensitive to minor salinity changes.
8. Again, referencing the three salinity classes above, consideration should be given to sediment interaction with the water column. A freshwater fringe wetland may not support freshwater species because the sediment

returns salts and heavy metals to the water column. As an example, the discharge from Central Davis Sewer District either directly enters the lake at higher water levels or travels miles before it reached the wetted edge of the lake. Also, at low lake levels, the flow never reaches the main body of Farmington Bay. A study conducted for Central Davis by Dr. William Johnson in 2011 showed many metals in the sediment and pore water had significantly higher concentrations of metals than either the overlying water or sediments from impounded wetlands. Hence, the evaporation of water in the sheet flow areas concentrate metals in the sediments. Also, it is assumed that when brine for the main stem inundates the sheet flow areas, additional deposition into the sediment occurs.

9. Lines 653 and 654 reference the application of the most conservative criteria. Again, because of transient ecosystem conditions, this approach may be too restrictive.

Thanks for the opportunity to comment. I look forward to the beginning the process.

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