

August 18, 2008

Submitted to William Moellmer – UDEQ: Comments on proposed Numeric Standard for Selenium for the Great Salt Lake; and, Comment/ Concerns on the Proposed Classification of 5E Transitional Wetlands.

To: Water Quality Board

Regarding: Request for Public Comments on Proposed Rule Changes (Dar File No. 31650) to R317-2

Submitted by : Bruce Waddell, Retired Supervisor USFWS Environmental Contaminants, Utah  
Jason Kershaw, President Lake Front Gun, Fur & Reclamation Club (Duck Club)

First, we appreciate the opportunity to comment on the proposed changes. The comments are meant to be constructive and hope they provide some additional insight in the complexity and uncertainties in setting a numeric standard for a truly unique, ecologically invaluable ecosystem. We recommend a cautious approach that allows for foreseeable growth, continued learning of how the system works, and proceeds at a rate that avoids major mistakes.

Specific comments to be addressed here: Unclassified waters; segregation of the Great Salt Lake and adjacent wetlands into 5 subareas; and, related standards.

**R317-2-13.14:** Apparently deleted is the presumptive classification of all waters not specifically described. The current Rule classified these as 2B and 3D.

The proposed rule seemingly covers some of the wetlands associated with the Great Salt Lake as 5E, Transitional Wetlands where they occur at elevation of 4208 or less. This proposed rule appears to take away the protection previously afforded when protected under numeric standards 2B and 3D and affords only protection under Narrative. **We believe that most of these waters are usually fresh and that the numeric standards should be retained. These areas include both public and private land. It is our belief that the Narrative standard is functionally weak, lends to different interpretations of injury, and reclassification degrades the protection that is warranted. These wetlands are extremely valuable ecologically, both locally and international, and have had a high monetary investment to acquire, maintain and enhance for these ecological values. This reclassification threatens these wetlands through paralysis of action when forced to individually interpret impairment, when commonly agreed standards for protection exist.**

**We are not aware of a survey designating the actual affected lands but do believe that a significant portion of the Lake Front duck club and adjacent Crystal Unit of the Farmington bay WMA would be affected. We are concerned for all Private, State WMA's, State Trust Lands and a National Wildlife Refuge that may lay at 4208 or below and be affected.**

In addition to the reclassification proposed above, we note that there are wetlands and waters at elevation 4208 and higher around the Great Salt Lake that are currently protected by the proposed deleted standard and seemingly not protected elsewhere in the new rule. We note that lakes down to 10 acres in size will be proposed to be covered by the classification of the stream they are associated with. How are privately held wetlands at elevation of 4208 and above such as the remainder of the Lake Front duck club, the Ambassador and all of the others going to be protected in the future? As slow moving or terminal bodies of water they are particularly sensitive to contaminants from upstream sources.

There appears to be a reduction of protection for small bodies of water Statewide if this language is adopted.



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**R317-2-13.12:** For areas such as proposed 5B, 5C and 5D, the proposal is to continue using the Narrative Standard. Accepting this classification likely will leave them with the lack of functional protection stated above. It would be better to cluster them with 5A and include monitoring. It is unlikely the time, and cost will be invested in these in the future to develop site specific criteria without some catastrophic ecological event occurs. At that time, the ability to recover these areas would be huge, possibly unrecoverable.

5A: Attached are comments presented to UDEQ as requested as part of the decision process by the Steering Committee to formulate recommendations to the Utah Water Quality Board regarding establishing a numeric standard for selenium for the Great Salt Lake.

Please include them as part of our official comments.

We request that our comments be forwarded to the Utah Water Quality Board as written and not just as a synthesized summary of comments.

Additional comments and observations to our May 20, 2008 letter:

- Four members of the Water Quality Board were also on/or represented on the Steering Committee and previously supported the 12.5 mg/kg dry weight selenium in bird eggs standard. Only the recommendation for 12.5 moved forward for public comments. I would hope that further discussion by the board is highlighted by attempting to get a full picture of the uncertainties, risks and benefits if any, and what motivates supporters of the different levels. I would recommend that those Board members who have NOT already cast their vote for 12.5 review the minutes of the May 29 Steering Committee and recognize that there was no majority initially [http://www.deq.utah.gov/Issues/GSL\\_WQSC/docs/Summary\\_GSL\\_Steering\\_Committee\\_052908.pdf](http://www.deq.utah.gov/Issues/GSL_WQSC/docs/Summary_GSL_Steering_Committee_052908.pdf) and read the reasons why positions other than the 12.5 were selected by 9 of the 16 Steering Committee members. There was concern by several, probably most, members that a consensus opinion needed to be presented to the Board. Clearly there was desire to reach consensus, within limits to a more middle ground, but in the end, only some of those in the middle actually moved and the extreme was too high to reach compromise.
- Seemingly no one believes that, or admits to planning to increase concentrations significantly. So perhaps the standard set is more symbolic of our values than reality. Have we just set the foundation for the next element, mercury? The goal of the process was to protect the Great Salt Lake Ecosystem. Why set standards that are 90 percent protective? How many 10 percent losses will add up to too much? Let's find out the real reasons why we should take an Ecosystem of such Local and International biological importance and be willing to [at the very least, symbolically] sacrifice its' quality. This makes absolutely no sense. The assessment methodology is essential to be retained for any standard that exceeds the no effect level. Periodic monitoring needs to be done even at the no effect level to verify that there are no effects occurring. Bird egg hatchability monitoring was selected because it typically is the most sensitive indicator. For the GSL this may be the best but is still NOT robust as the nesting birds are not obligatory feeders on brine shrimp. Brine shrimp in the open waters are not the same as brine flies along shorelines where the data clearly show that brine flies do not have as much selenium as brine shrimp. Bird egg data 1996-7 compared to 2006 for the South Shore suggest the bird eggs are less sensitive than brine shrimp. The overwhelming majority of bird use on the lake involves feeding on brine shrimp.
- Additionally, bird egg concentrations are not equal for every area of the Lake. De-emphasized is that the birds nesting on the South Shore already have about twice the selenium on the average as those on the more northern and eastern part of the Lake. Concentrations in 25 percent of shorebird eggs collected in 1996/97 and 2000 already exceeded 6.4 mg/kg dw with the highest egg having 9.2 mg/kg dw. The sources of selenium are about 60 percent from the south end. Where will new sources come in? The South? Currently these higher egg concentrations are just rolled into the mean for Gilbert Bay. Will the State be legally responsible for the potential 10 percent mortality (if realized) by accepting this criterion and approving discharges? Why waste money and time by

setting standards higher than is acceptable and having to deal with additional monitoring, rule changes, conflicts with dischargers, etc.

- We strongly recommend a trigger be added to the assessment for brine shrimp. It is undeniable that the brine shrimp health is the foundation for the brine shrimp industry. They are also the foundation for the health and welfare of millions of birds that pass through, rest, molt, spend the winter, and nest both here and throughout the west.

Additional detail is enclosed in the following letter provided to the Steering Committee in May. We strongly recommend that a lower standard be considered. **Our personal recommendation is for the no effect concentration of 5 mg/kg in bird eggs, and, probably about 5 or less mg/kg in brine shrimp**, a value associated with an EC 10 using the mallard model, and mid-range in level of concern for birds reported by the National Irrigation Water Quality Program for birds.

Attachment:

Submitted UDEQ – Comments on proposed Numeric Standard for Selenium for the Great Salt Lake

To: Steering Committee

Submitted by: Bruce Waddell

I'm not sure that you all know me so let me introduce myself:

My name is Bruce Waddell.

I retired from the U.S. Fish and Wildlife Service, 1981 – 2005

Supervisor Environmental Contaminants – Utah

Studies of Selenium since 1986

Represented USFWS on Steering Committee from start until I retired in 2005

Sat in for Duck club representative on occasion

Currently Alternate to Maunsel Pearce on Steering Committee

I have attended most of the Steering Committee meetings, Science Panel meetings and Science Panel conference calls

I represent Duck Clubs on the UDEQ Statewide Mercury Work Group

I am a member of a Duck Club

I have seen and sampled selenium contaminated waterbird eggs with dead and deformed embryos

I have seen highly contaminated ponds have local areas with low levels of selenium

I have sampled birds (2?) in spring migration in uncontaminated areas with well formed embryos with high levels of selenium

I supervised a contaminant baseline assessment of the open waters of the South Arm of the Great Salt Lake and adjacent saline and freshwater wetlands 1994-2000.

Member of The Nature Conservancy of Utah, Board of Trustees

**Tonight I represent myself and the Lake Front Gun, Fur & Reclamation Club (Duck Club), and would like you to know what we think needs to be done.**

- **I support the recommendation of Joe Skorupa of the Science Panel at 5 ug/g dw as a sample mean of avian eggs.**

This is close to the low range (EC3: 6.4 ug/g dw) of the EC10 (12.5 ug/g dw) that represents low or no hatchability effects would be likely. It is below the EC10 of 7.7 ug/g dw recalculated in Skorupa's recommendation incorporating new data and controls on data analysis.

- Purpose of the GSL Water Quality Steering Committee: "is to recommend site-specific Numeric Water Quality Standards, beginning with Selenium for the open waters of Great Salt Lake that will

**prevent impairment of beneficial uses and sustain the natural resources of the lake and associated wetlands". (emphasis added)**

**It does not say prevent impairment of 90 (to as low as 60-70, mallard model ) percent of the beneficial uses.** Why are we even thinking about setting a standard that protects, if accurate, only 90 percent of the highest trophic level organisms. What is the motivation?

- **The public spoke 4 years ago** and told UDWQ that they did not want to damage the ecosystem. **They did not want selenium going into the wetlands and accumulating in the birds and the ecosystem.** They told you they wanted it protected. I don't think any of them told you they wanted it 90 percent to possibly as low as 60-70 percent protected.

It's a terminal lake with considerable uncertainties associated with innate processes. Much was learned in the past 4 years. The final reports were put on the website just this last few days. The model calculator is still not there nor is the Implementation Plan. Much remains to be learned.

- The official record for data in this study covers about 15 months. Is it worse than will occur in the future, is it better?
- Will population pressures grow on precious water resources?
- Will better control be for wastewater treatment be needed?
- Where is the line?

I think the public would tell you that you have crossed the line at EC10: 12.5 ug/g dw under today's level of knowledge. The public also deserves to know the basis for this decision.

- You have not provided a balanced discussion of the pros and cons of a tolerably toxic standard versus a non-toxic standard.
- How conservative is the shorebird model?

Use of the mallard model was considered conservative because they are more sensitive to selenium than shorebirds? Is the shorebird model still sensitive or has the sensitivity been lost. Consider that the adult brine shrimp currently were found to have 4.2 ppm dw selenium in them. The mallard model using brine shrimp as the food found an estimated 3 percent hatchability loss at 3.6 ppm dw, and an EC10 of about 4.9 ppm dw in brine shrimp and water concentration of about 0.66 ppb.. Using these data we are almost there at the EC10. Using the shorebird model and brine fly larvae, I believe the estimates of the level that would be in the water could be 1.5 – 2.8 ppb selenium. At the current concentrations of 0.6-0.75 ppb and brine shrimp at 4.2 ppm dw, does this mean that brine shrimp will be allowed to rise to 1.5-2.8/.6 (2.5-4.7 times) or about 12-20 ppm dw (the Grosell Kinetics model would suggest that brine shrimp would be about 6 - >10 ppm dw) at the EC10 of the shorebirds? Is this correct? Is this conservative?

The USFWS has the responsibility to assess and protect Migratory Birds (and Endangered Species) and their habitats. The guidelines used by most USFWS staff for selenium in avian foods is 3-8 ppm dw as the reproductive toxicity threshold. Unlike the water concentrations which are unique for the GSL, the analysis of food is straight forward and applicable without translation. The GSL is already well into this for level of concern for this criterion, and likely headed toward the threshold where toxic effects will begin to occur in some species if the GSL water increases in selenium minimally

Are standards for Mercury and Selenium concentrations linked in the sense they seem to be exhibiting parallel increases in concentration? USFWS data from 1996-2000 and FWS/USGS data from 2006 (Darnall and Miles 2008) indicate this is occurring. Both elements show increasing concentrations in eared grebe livers from Aug/Sept to December. Selenium in early-December in 2007 was nearly twice the concentration found in mid-November/early-December 1997-98. Brine shrimp samples collected in September/October 1996 had a geometric mean selenium concentration of 2.4 ug/g dw compared to 2.85 in 1999. Samples collected August 31, 2007 under this program (Marden 2008) had a bulk concentration of

about 3.9 ug/g dw and 4.2 for adult brine shrimp. Mercury increased 3 times between 1996-98 and 2006 (Darnall and Miles 2008). **The conclusion USFWS and USGS data, combined with data from this program, is that selenium (and mercury) increased dramatically in the past 10 years in brine shrimp and eared grebes independent of the increase in selenium in the water observed in 2007 under this Selenium Standard setting program.**

Other concerns include:

- Is there a good correlation between concentration of selenium in brine shrimp and brine flies? E.g. is the shorebird model a reliable indicator of biota using open water? Shorebird eggs collected on the south shore of the South Arm of the GSL in 1996/7 had a geometric mean selenium concentration of just under 5 ug/g dw (n=8) compared to the 8 eggs collected in this program of 5.1 ug/g dw in eggs. Additionally, cumulatively, 8 of 16 eggs exceeded 5 ug/g dw and 4 of 16 eggs exceeded 6.4 ug/g dw. Since about 2/3 of the selenium enters the Great Salt Lake at the south end from the combined discharges of the Goggin Drain and Kennecott Utah Copper, **there may be reason to look more closely at this area rather than combining the entire lake as an average.**
- Perhaps the eared grebe might be more tolerant of loads of selenium and mercury than other species. What about the Wilson's phalarope, northern shovelers, and teal?
- What about shovelers, teal and mallards and goldeneye that have had consumption advisories established on them for mercury? **Will authorizing additional discharges to the Great Salt Lake such as could occur under the shorebird EC10, worsen this situation?**
- What about goldeneye and other species that leave the GSL in the spring to nest other places? Is there a 10 percent loss of their nesting capacity? Are these losses greater than 10 percent using the Shorebird EC?
- If the State can change the Selenium standard downward when the EC10 is reached, why not change it higher as time and more monitoring indicate that the standard is safe and that the goals of the ecology of the Lake can tolerate additional loading beyond that standard? **A moratorium on new loading should be established until monitoring indicates the standard could be higher.**
- **I don't believe there have been any large areas successfully restored to pre-damage conditions after significant selenium contamination has occurred.**

**Our recommendation is to put a moratorium on new loading to the Great Salt Lake until it is determined through monitoring of water and brine shrimp similar to a Tier 1 trigger that selenium concentrations are stable or declining. At this time the best approach would be to adopt a 5 ug/g dw concentration in bird eggs and establish a concentration no higher than 4.9 ug/g dw in brine shrimp, and, no higher in water than indicated by the Grosell model for the concentration of selenium associated with 4.9 ug/g dw in brine shrimp.**

The recommendation is also to initiate studies for bird species using primarily brine shrimp:

- **Whole-life-cycle study of the eared grebe**
- **Nesting of selenium and mercury contaminated northern shoveler and goldeneye.**

This accomplishes several objectives:

- **Initiates monitoring (Tier 1 level trigger in Implementation Plan) under the most stable conditions and positions changes in Selenium standard as looking forward, rather than**

**damage control. Once discharges are authorized it will take years to terminate or reduce loading.**

- **Reduces liability under the Migratory Bird Treaty Act.** Standards are not usually set on the highest trophic level using species that are protected against “take” under international treaty. I don’t know that EPA can even accept the EC10 recommendation since if realized and potentially as implemented, “take” would likely be occurring before all triggers are reached.
- **This is the only standard that clearly meets the goal of: “will prevent impairment of beneficial uses and sustain the natural resources of the lake and associated wetlands”.**

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Darnall and Miles, 2008, Dynamic of Mercury in Eared Grebes on the Great Salt Lake, 10<sup>th</sup> Int Conf Salt Lake Research & FOGSL Issues Forum.

**From:** <bruce-kathy@att.net>  
**To:** <wmoellmer@utah.gov>  
**Date:** 8/18/2008 4:54 PM  
**Subject:** Public Comments Triennial Review WQ Standards  
**Attachments:** Se Std Pub Com bw 081808.doc

Bill - Attached are comments on the proposed changes to water quality standards.