Great Salt Lake Aquatic Life Uses Workshop
Tuesday, March 24, 2015

Workshop Objectives

1) Develop the resident species list of aquatic organisms for Farmington Bay, Bear River Bay and Gilbert Bay of Great Salt Lake to support the development of numeric criteria for these waterbodies. The lists for each bay will identify both the species that are known to occur, as well as the species that would be expected to occur given the range of environmental conditions that can occur in the Bay. Additional information that will be documented will include the salinity tolerance range and life cycle information when available.

2) Consensus of the Scientific Community. We would like the workgroup members to reach consensus on the species lists that are developed during the meeting. In the event consensus is not reached, the workshop white paper will identify areas of agreement and potential area of disagreement

Resident Species

As described in *A Great Salt Lake Water Quality Strategy* (UDWQ, 2014), the Utah Division of Water Quality (UDWQ) will develop numeric criteria for Great Salt Lake. The initial step in this process is the identification of all "resident" species. The purpose of this workshop is to identify for compilation all of the available data regarding resident species of Great Salt Lake. U.S. Environmental Protection Agency (EPA, 2013) defines resident species as:

a. are usually present at the site,
b. are present at the site only seasonally due to migration,
c. are present at the site intermittently because they periodically return to or extend their ranges into the site,
d. were present at the site in the past, are not currently present at the site due to degraded conditions, but are expected to return to the site when conditions improve, or
e. are present in nearby bodies of water, are not currently present at the site due to degraded conditions, but are expected to be present at the site when conditions improve.

The term "resident" does not include life stages and species that:

a. were once present at the site but cannot exist at the site now due to permanent alterations of the habitat or other conditions that are not likely to change within reasonable planning horizons, or,
b. are still-water life stages or species that are found in a flowing-water site solely and exclusively because they are washed through the site by stream flow from a still-water site.

For this workshop, the site is defined as the open waters of Great Salt Lake which are divided into Gilbert, Gunnison, Bear River, and Farmington Bays per Utah's water quality standards (UAC R317-2-6). Great Salt Lake waters that are not currently being considered as part of this effort include wetlands and Transitional Waters. Transitional Waters are defined as the waters between the open waters in the bays and an elevation of 4,208'.

The open waters of Great Salt Lake currently are expected to support different aquatic communities due to the salinity differences in each bay. Salinity in each bay varies temporally and is correlated with lake elevation which is why identifying the salinity tolerances of the aquatic organisms are an important part of this effort. As proposed in UDWQ (2014), the ultimate goal is to derive numeric criteria for different salinity ranges that will be protective of the corresponding aquatic life communities. The workshop is expected to elucidate data gaps in the current understanding of the Lake ecology which will be used to focus future research.

Specific Data Requested for Resident Species

The species of interest are aquatic species. Data for avian species, terrestrial species, prokaryotes (with the exception of cyanobacteria), and fungi are not requested at this time[1]. Submitted data will be ranked on the basis of scientific rigor using the criteria specified in Attachment 1.

A draft table summarizing the existing data that has already been compiled is available at http://www.deq.utah.gov/locations/G/greatsaltlake/gslnumericcriteria/docs/2014/06Jun/GSL_Species_and_Bibliographie.xlsx. The following list details the specific data requests for Great Salt Lake Species. Most studies are unlikely to be able to provide all of the requested information but all available information is requested, even if incomplete. The information must be submitted by **March 6, 2015** to be incorporated into the workshop.

1. Methods: Purpose of study and detailed collection and identification methods should be provided or referenced. This information will be used to evaluate the quality of the data provided.
2. Identification of the principal investigator(s) and study participants and contact information for primary contact.
3. Citation if the study, or portions of the study, were published.
4. Geographic Location: Identification of the specific bay where the organisms were observed. More detailed location such as coordinates may be requested at a later date.
5. Date: At minimum, the month and year of the observations or studies should be provided.

[1] U.S. EPA (2010) numeric criteria are based on toxicity data from eight different families plus one alga or macrophyte species: Salmonidae, Osteichthyes, an additional member of phylum Chordata, a planktonic crustacean, a benthic crustacean, an insect, another family member other than Arthropoda or Chordata (e.g., Rotifera, Annelida, Mollusca, etc.), a family from in any order of insect or any phylum not already represented. While these procedures will need to be modified for application to Great Salt Lake because portions of the Lake don't support this level of diversity, the methods will follow U.S. EPA's requirements to the extent possible. Therefore, although data on species outside the U.S. EPA list will be accepted and compiled, these species are not anticipated to be used for developing the numeric criteria.

6. Habitat Information: Any qualitative habitat information for the observed species such as pelagic, benthic, or ecotonal preferences should be noted.
7. Phylogeny: The phylogenies of the observed species from phylum to species level are desirable. Common names and identification of life stage should be provided.
8. Water Quality Requirements: Collocated water quality data such as water temperature, dissolved oxygen, pH, etc. Any studies where acceptable water quality parameters were determined experimentally are especially valuable. The purpose of this information is to determine the environmental conditions necessary for the survival, growth and reproduction of the observed species. Salinity information is requested separately.
9. Salinity: The salinity or total dissolved solids or conductivity if salinity or total dissolved solids are unavailable where the species were observed. The ranges and endpoints should be provided if salinity tolerances were experimentally determined.
10. Life Cycle: Information regarding life cycles such as juvenile and adult stages, especially when different life stages require different environmental conditions, is desirable.

Submittal of the data in the provided editable electronic template is most desirable to facilitate compilation into a database. This database, when created, will be available for download from UDWQ's website. Data can also be submitted as hard copies. Any data presented orally at the workshop will be transcribed.

REFERENCES

Utah Division of Water Quality (UDWQ), 2014. *A Great Salt Lake Water Quality Strategy, Core Component 1: Developing Aquatic Life Criteria for Priority Pollutants*. September

U.S. Environmental Protection Agency (USEPA), 2010. Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses. PB85-227049

U.S. Environmental Protection Agency (USEPA), 2013. *Revised Deletion Process for the Site-Specific Recalculation Procedure for Aquatic Life Criteria.* EPA-823-R-13-001. April

Attachment 1
Proposed Grading Criteria for Evaluating Submitted Data

Proposed Grading Criteria for Study Rigor for Identifying Resident Species of Great Salt Lake

Minimum Requirements:

1. The taxonomic identification is reliable based on the methods used and qualifications of investigators
2. The locations of identified species is documented and reliable.

Additional Recommended Requirements:

3. The taxonomy is verifiable (e.g., photos, preserved specimens).
4. The work was peer reviewed.
5. The presence is corroborated
6. by an independent researcher.

Proposed Grading Criteria for Study Rigor for Experimental Studies

Experimental studies will be evaluated against the applicable criteria in Sections I. and II. of U.S. EPA (2010).