

Utah Lake Water Quality Study

Science Panel Recommendations for the Wasatch Front Water Quality Council Atmospheric Deposition Sampling Program

May 22, 2020

The Science Panel's (SP) primary task for the ULWQS is to address the Initial Charge questions posed by the Steering Committee (SC) by synthesizing existing and relevant information, developing and directing a strategic research program, and collaborating with relevant research efforts. As a result, the SP has engaged with the Wasatch Front Water Quality Council (WFWQC) regarding their atmospheric deposition (AD) sampling program throughout the last year through conversations at SP meetings and several iterations of review and comment on the Council's draft monitoring plan

The recommendations provided below were developed in light of our previous interactions with the WFWQC regarding this topic, the products resulting from the external review (undertaken by Dr. David Gay) commissioned by the WFWQC (and which the SP was involved with), and, most recently, comments provided by the SP on the current sampling plan (v4, 3/12/2020). We acknowledge that the latest sampling plan, recognizing we did provide some specific comments on the plan including the need to expand the analysis approach envisioned, is a useful document to guide the atmospheric deposition work and reflects an effort to address a number of the relevant issues raised by the SP previously. However, a sampling plan is only one part of an overall research plan which is necessary to ensure a high level of confidence in the study results and to improve the value of the study results for development of any subsequent recommendations forwarded by the SP to the SC.

Recommendations

1. We recommend the WQFWQ develop a comprehensive comment/response document, a product that is customary to scientific studies of this nature, to demonstrate how comments were resolved, or not, and appropriate rationale for all past and future Science Panel comments.

Rationale: The WFWQC and SP have engaged in multiple rounds of reviews over the past year. The current sampling plan version (V4, 3/12/2020) is significantly different from the previous draft, making it difficult to directly compare the two documents and to identify the changes made in response to comments provided by the SP and the WFWQC external reviewers. While the current draft addresses some of these comments, many others appear to remain unresolved.

2. We recommend the WFWQC develop an overarching research plan that includes the following elements:
 - a. a Sampling Plan and a data Quality Assurance and Quality Control Plan (QAQC) to describe the collection process and detail how the data collected through this initiative

- will be validated (building on the current Sampling Plan pending any modifications to address recent SP comments);
- b. an Analysis Plan that details the analytical methods and calculations that will be employed for drawing the conclusions for each stated study objective and how the data collected will be utilized – additionally, all methods and calculations described should be supported by recent peer-reviewed studies; and
 - c. a Data Management Plan (DMP) to describe detailed procedures for sharing data with the SP as they become available and data should be readily available to the SP in an electronic format provided through a web-based file sharing system.

Rationale: Version 4 (3/12/2020) made significant improvements to the sample collection standard operating procedures including design of the sampling apparatuses, methods for addressing sample contamination, and the addition of QAQC sampling protocols. Detailing how data collected is validated is essential to building confidence in study results. For this effort, it will be important for the QAQC to describe, at a minimum, how WFWQC’s experimental sampling designs will be compared to the NADP design and designs from published literature, how the sampling data will be reviewed for contamination, and how you will ensure homogeneous subsampling of settleable solids for the TP and TN measurements.

It remains unclear how the WFWQC will utilize the data and information obtained through this effort to accomplish the stated study objectives, all of which should be described in an Analysis Plan. For this effort, ensuring the Analysis Plan specifically describes the calculations and methods for extrapolating on-shore deposition to whole-lake AD loading estimates and how local and regional sources will be differentiated and attenuated across the lake will be important.

Sharing of data in an organized manner has been a consistent request from the SP and will improve confidence in the study findings. A web-based file sharing system will enable the SP and others to allow members to more easily access and assess the information.

3. We recommend the WFWQC address the following recommendations building on Dr. Gay’s Task 1 Review and Task 2 Report and Recommendations documents, and any other unresolved recommendations provided by Dr. Gay, when developing the elements of the overarching research plan:
 - a. Install digital meteorological stations to collect hourly wind speed and wind direction to determine when significant wind events contribute AD to the lake. This approach would help validate when a southwest wind event occurs and also assist with determining delivery and attenuation of local and regional dust to the lake. [#12 – Task 2]
 - b. Implement an atmospheric monitoring and modeling program to validate dry deposition sampling results. Given that there is not a standardized method for sampling dry deposition, nor one that is accepted by the AD scientific community, this

recommendation would be very valuable as a second line of evidence to validate dry deposition results. [#14 – Task 2]

- c. Conduct a detailed source identification analysis to assist with attenuation and lake-deposition calculations. [#14 – Task 1]

Rationale: Dr. Gay, an external reviewer commissioned by the WFWQC to review a variety of documents and develop recommendations to inform the study design, provided several recommendations in his task 1 and task 2 products [[David Gay Reviews – Complete.pdf](#); [Task 2 Report and Recommendations \(WFWQC AD workplan\).pdf](#)] that will improve confidence in AD nutrient estimates. His recommendations for field SOPs and sampler design were included in Version 4 (3/12/2020), however several recommendations that would provide value to this study were not included.

The SP remains committed to providing guidance and feedback on this project with the objective of helping the WFWQC develop scientifically defensible results that inform the ULWQS.

Sincerely,

ULWQS Science Panel