

**Utah Lake Water Quality Study
Science Panel Call #18
Call Summary
November 4, 2020**

This document includes a list of future meetings, action items, and a brief summary of the discussions. Please review the action item list for tasks assigned to you and/or the Science Panel in general. A list of attendees can be found at the end of the document.

Upcoming Meeting/Call	When & Where	Suggested Agenda Items
<ul style="list-style-type: none"> • SP Call #19 	TBD; Zoom	<ul style="list-style-type: none"> ○ Analysis Report; CNP mass balance; internal loading; model prioritization, model RFP development.

I. Action Items

Meeting Summaries	Who	Due Date	Date Completed
1. Share draft meeting summary	Facilitation Team	Nov. 13	Nov. 13
2. Review and share comments on summary	Science Panel	Nov. 20	
3. Finalize summary and post to Dropbox	Facilitation Team	Nov. 20	
Science Panel Responses to Steering Committee Management Goals Questions	Who	Due Date	Date Completed
4. Develop draft Science Panel Response Letter and send for Science Panel Review	Mitch Hogsett	Nov. 6	Nov. 6
5. Develop language regarding relationships between and cyanobacteria to include in the Science Panel Response letter	Theron Miller	Nov. 6	Nov. 9
6. Finalize Science Panel cover letter and transmit response package (including the approve response tables and HAB memo) to the Steering Committee	Science Panel	Nov. 13	Nov. 13

II. Decisions/Approvals

This section provides an overview of decisions made by the Science Panel during the call; related key discussion points can be found below in the document.

1. Approved Science Panel *Analysis of Cell Count, Nutrients, and Toxin Relationships* technical analysis memo, with the understanding that additional context will be included in the formal Science Panel response letter (under development) to the SC.

*Decision: Support of 8 of 8 (2 absent) SP members on the call – CONSENSUS APPROVAL.
Approval from the two absent panelists was received following the call.*

2. Approved Science Panel Response Table document for Steering Committee Questions 1, 2 (excluding 2e and f), 3, 4, and 5.

*Decision: Support of 8 of 8 (2 absent) SP members on the call – CONSENSUS APPROVAL.
Approval from the two absent panelists was received following the call.*

NOTE: conveyance of these materials to the Steering Committee was contingent on development, and approval, of a formal response letter (under development).

III. Meeting Recording

A recording of the meeting (also available on the DWQ website in the near future) can be found at the following link: <https://www.youtube.com/watch?v=PAV7RGdEdPg&feature=youtu.be>.

IV. Key Discussion Points

Review and Seek Science Panel Approval of HAB Memo and Management Goal Response Tables

- Dr. Kateri Salk, Tetra Tech, provided a review of the modifications made to the HAB *Analysis of Cell Count, Nutrients, and Toxin Relationships* technical memo in response to Science Panel comments received during SP Call #17. The memo was developed at the direction of the Science Panel to inform their development of answers to Steering Committee questions 2e and 2f. Several members of the Science Panel commented on the factors potentially influencing the variability overserved in the plots of nutrients and cyanobacteria including location, depth, season associated with the sample. The SP also offered suggestions for improved statistical techniques to evaluate the dataset in questions.
- Dr. Theron Miller was asked by one of the Steering Committee co-chairs to clarify the comments he made at the recent WFWQC meeting related to data omitted from the analysis documented in the technical memo. Dr. Salk noted that the analysis represents all available data where paired concentrations of toxins and cyanobacterial cell counts exist, which mostly occur from 2016 to present. Dr. Salk also clarified that data included in the analysis also includes all results processed by Rushforth Phycology where paired toxin data exist.
- The technical memo was approved by all Science Panel members present with the caveats that additional language be included in the Science Panel Response Document to explicitly

acknowledge the influence of covariates on the relationships between nutrients and cyanobacteria cell counts.

- Dr. Salk reviewed the results of the effort to provide responses to Steering Committee questions 1, 2 (excluding 2e and 2f), 3, 4, and 5. The Science Panel provided some guidance for improving the methods for assessing current conditions for the HAB extend, duration, and frequency measures.
- The response tables (to questions 1, 2 (excluding 2e and 2f), 3, 4, and 5) were approved by the Science Panel without suggested modifications.

Develop Science Panel Cover Letter to Convey Responses to the Steering Committee

- Due to the duration of the previous agenda item, little time was allocated to developing the Science Panel response letter. Dr. Mitch Hogsett, Science Panel Chair, volunteered to develop an initial draft following the meeting, incorporating language from Dr. Theron Miller, for Science Panel review and comment. The Science Panel decided to work offline to approve the response letter and transmit it to the Steering Committee ahead of their upcoming meeting in mid-November.

Public Involvement

- David Richards: Just for the record and not necessary to be read aloud today; and my comments were somewhat addressed by a few members of Science Panel but would like to reiterate: FYI: UVU and BYU researchers are collecting nutrient input data for most of all locations from Saratoga Springs to Provo Airport, including irrigation returns, etc. on a regular basis. Hopefully, ULSP has access to this data. One of the first steps in data analysis is to perform outlier analysis. The figure on right on page 10 has two influential outliers that needed to be examined. If those were removed the 'Composite' line in the cumulative distribution function would have been flat. Were they collected from marinas? Outlier analyses should be performed on all other regressions.
- There was no histogram graph(s) showing the distributions before and after log transformation. I would have run several different models specifically designed for count data including Poisson, negative binomial, and various forms of these, along with linear models on non-transformed, and transformed data. Statisticians prefer not to transform data, as it loses its meaning. Then I would have compared models and chosen the best fit model using several criteria such as AIC, BIC, LL, etc. Then use those models to predict outcomes. Quantile regression is also a very good option, as are logistic models. I also prefer to add confidence intervals to all regression lines.
- Rich Mickelsen: Mr. Mickelsen commented that he is not in favor of separating Aphanizomenon in the HAB analysis but understands from the conversation that it is indeed included. He is also interested in the Internal Cycling Mass Balance Tech Memo forthcoming from Dr. Michael Brett.

V. Participation

Members of the Science Panel:

- Michael Brett, University of Washington
- Soren Brothers, Utah State University
- Greg Carling, Brigham Young University
- Mitch Hogsett, Forsgren Associates, Science Panel Chair
- Ryan King, Baylor University
- James Martin, Mississippi State University
- Theron Miller, Wasatch Front Water Quality Council
- Michael Mills, June Sucker Recovery Program
- Hans Paerl, University of North Carolina

Members of the Steering Committee:

- Eric Ellis, Co-Chair, Utah Lake Commission
- Erica Gaddis, Co-Chair, Utah Division of Water Quality

Members of the Public:

- Renn Lambert, Limnotech
- David Richards, Oreo Helix Ecological

Utah Division of Water Quality Staff:

- Scott Daly
- Jodi Gardberg
- John Mackey

Technical Consultants to ULWQS Science Panel:

- Michael Paul, Tetra Tech
- Kateri Salk, Tetra Tech

Facilitation Team:

- Dave Epstein, SWCA