

Utah Lake Water Quality
Study
Science Panel Meeting
March 11-12, 2019
Salt Lake City, UT

Prioritization of Near-Term Research Topics

Utah Lake Nutrient Criteria
Development Technical
Support



Objective

- Explain approach to prioritization of near-term research opportunities

Review

- February SP meeting: Identified components from “Initial Charge” that could be feasible to address in near-term
 - can be initiated quickly to capitalize on this field season
 - can be initiated quickly to use time sensitive funding sources
 - may be a prerequisite for longer-term, more complicated studies
 - can be developed with the information we currently have on hand (without having to do a lot of work to support it)
- DWQ to release RFPs this spring

Prioritization

Science Panel Survey

Near-term Research Topics Identified at February 2019 Science Panel Meeting

Science Panel Member Name:

Charge Question	Subquestions	Prioritization	Potential Near-Term Research Topic/Question
1: <u>Historical condition of Utah Lake</u>	1.1. What does the diatom community and macrophyte community in the paleo record tell us about the historical trophic state and nutrient regime of the lake?		i. Can diatom (benthic and planktonic) and/or macrophyte extent or presence be detected in sediment cores? And if so, what are they?
			ii. What were the environmental requirements for diatoms and extant macrophyte species?
			iii. How have environmental conditions changed over time?
		1.2. What were the historic phosphorus, nitrogen, and silicon concentrations as depicted by sediment cores? (add calcium, iron, and potentially N and P isotopes)	
2: Current condition of Utah Lake	2.1. What are the impacts of carp on the biology/ecology and nutrient cycling of the lake and how are those impacts changing with ongoing carp removal efforts?		i. What contribution do carp make to the total nutrient budget of the lake via excretion rates and bioturbation? How much nutrient cycling can be attributed to carp?
			ii. What is the effect of carp removal efforts on macrophytes, nutrients, secchi depth, turbidity, and primary productivity?
			iii. How much non-algal turbidity and nutrient cycling is due to wind action versus carp foraging? How much does sediment resuspension contribute to light limitation, and does wind resuspension contribute substantially in the absence of
	2.3. What are the linkages between changes in nutrient regime and HABs? (recommendation to move sub-items v and vi to 2.4)		ii. Which nutrients are actually controlling primary production and HABs and when?
			v. What is the role of calcite "scavenging" in the phosphorus cycle?
			vi. What is the relationship between light extinction and other factors (e.g. algae

Prioritization

- Sum of scores, number of #1 votes, total number of votes
- Top 6 topics:
 - **Historical P, N, and Si concentrations in sediment cores** (SP charge 1.2)
 - What are the current **sediment equilibrium P concentrations** throughout the lake? What effect will reducing inputs have on water column concentrations? If so, what is the expected lag time for lake recovery after nutrient inputs have been reduced? (SP charge 2.4.i)
 - What is the **role of calcite “scavenging” in the P cycle?** (SP charge 2.3.v)
 - What does the **diatom community and macrophyte community in the paleo record tell us about the historical trophic state and nutrient regime of the lake?** (SP charge 1.1.i, ii, iii)
 - What is the **sediment oxygen demand of, and nutrient release from, sediments** in Utah Lake under current conditions? (SP charge 2.4.ii)
 - What do **photopigments and DNA in the paleo record tell us about the historical water quality, trophic state, and nutrient regime** of the lake? (SP charge 1.4)

Further develop content

- Problem statement
- Existing data and information
- Study objectives
- Expected outputs and outcomes
- Project tasks

F9/31



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Scope of Work: Historic Phosphorus, Nitrogen, and Silicon Concentrations in Utah Lake as Depicted by Sediment Cores

Highlighted items are those for which we would like SP input; there will be a session at the SP meeting to work on the RFPs.

Red bold items are notes for consideration.

1. Introduction