



GREAT SALT LAKE SALINITY ADVISORY COMMITTEE MARCH 20, 2025

This meeting was held in person on March 20, 2025, at the Utah Department of Natural Resources with some members attending remotely via GoogleMeet. The following represents a summary of key points of discussion. It is not intended to represent meeting minutes. The meeting recording may be viewed at <https://www.youtube.com/watch?v=kGqp8hHNnAU>.

ATTENDEES

Leila Ahmadi/Division of Water Resources
Jake Alexander/ Division of Forestry, Fire & State Lands (FFSL)
Travis Anderson/Morton Salt
Bonnie Baxter/Westminster Univ*
Jennifer Biggs/FFSL
Thomas Bosteels/Great Salt Lake Brine Shrimp Cooperative (GSLBSC)*
Melissa Bowman
Phil Brown/GSLBSC**
Georgie Corkery/Westminster Univ**
Lynn DeFreitas/FRIENDS of Great Salt Lake
Jeff DenBleyker/Jacobs
Ryan Dougherty/Cargill**
Rob Dubuc/FRIENDS of Great Salt Lake
Angela Gong/FFSL**
Jim Harris/Division of Water Quality (DWQ)* (co-chair)
Joe Havasi/Compass Minerals*
Emily Hawley/FFSL

Tim Hawkes/GSLBSC
Justin Hipple/Morton Salt
Scott Hynek/USGS
Elliott Jagniecki/Utah Geological Survey (UGS)**
Bill Johnson/University of Utah (UofU)*
Aspen Johnston/Office of GSL Commissioner
Leanne Littler-Woolf/DWQ
John Luft/Division of Wildlife Resources (DWR)*
Craig Miller/Division of Water Resources (DWRe)*
Mark Reynolds/US Magnesium*
Ryan Rowland/US Geological Survey (USGS)*
Christine Rumsey/USGS**
Andrew Rupke/UGS*
Ben Stireman/FFSL* (co-chair)
Kyle Stone/DWR**

* Salinity Advisory Committee (SAC) member
** SAC member alternate

OBJECTIVES

A key objective of the Salinity Advisory Committee (SAC) is to advise the State of Utah regarding how the salinity of Great Salt Lake (GSL) can best be managed and, more specifically, how the new Union Pacific causeway bridge may influence lake salinity. The objective of this meeting was to discuss lake conditions, updates on various efforts, and next steps.

SUMMARY

A quorum was present for the meeting. Jeff DenBleyker opened the meeting with a review of the agenda for the meeting and facilitated introductions of people attending in person and online. Thomas Bosteels made a motion to approve the January 23 meeting summary; Andrew Rupke seconded the motion. The motion was passed unanimously.

UPDATE ON LAKE CONDITIONS

Ryan Rowland provided an overview of lake conditions. South Arm water levels have increased 1.4 ft from their low in November 2024 to 4193.5 on March 18, 2025. North Arm water levels have increased 1.2 ft from their low in November 2024 to 4192.6 on March 18, 2025. There is currently a 0.9 ft difference between the water level in the North Arm and South Arm.

Inflow volume water year to date (October 1, 2024, through today) from the Bear River has been tracking just below the median value. Cumulative inflows from the Weber River are below median and near the 25th percentile. Farmington Bay outflows have been well above median and near the 75th percentile. Goggin Drain inflows are near the 75th percentile.

The USGS had been reporting near real time flow through the new breach in the UP causeway at Station 10010025, however, backwater effects from the North Arm has prevented these flow measurements since last August. Monthly field measurements have continued. South to North flows through the new breach year to date have run at around 1,000-1,100 cfs and peaked at around 1,200 cubic feet per second (cfs) on March 19, 2025. North to south flows have ranged from 20-40 cfs. The Lakeside gage (10010020) observed no flow in December 2024, 4.8 cfs on January 17, and 107 cfs on March 19, 2025. These flows are from

North to South and likely drainage from the West Desert. Ryan noted that the USGS' North Arm water level sensor at 10010027 was lost due to collapsed piling. Ryan added that the USGS has installed 9 new flow gauges in the GSL basin; four more are in the works. Near real time data is available for each of the installed gauges.

Christine Rumsey provided an overview of the lake's salinity conditions. We have observed about 8 g/L drop at 3510 and 10 g/L drop at 2565 from November 2024 to February 2025. Salinities in the shallow layer ranged from 112-117 g/L at the USGS' four sites in the South Arm on February 27, 2025. Salinities are similar to wet years like 2011 and 2019.

Jeff DenBleyker added that the NRCS had forecast a peak water level of 4193.8 ft for the South Arm.

UPDATE ON DWQ RULEMAKING

Jim Harris thanked everyone who has been participating in the subcommittee meetings. The State is reviewing the final wording, the Board will review on March 26th. It will then go to public review and then approved in late May. Next steps are to develop guidelines for implementation. Jim will reach out to seek volunteers to help with this effort.

FFSL UPDATES

Ben Stireman announced that the Hot Topic grant proposal period is open now until April 4. FFSL has made some big changes to the program to allow for multi-year grants and has increased the available funding. They are seeking proposals that will help understand the lake in a manner that can help management of the lake. Ben confirmed that FFSL did receive the final flow control structure analysis and will pass that on to the SAC members. Funding may unfortunately not be available. FFSL is considering what we might need to do after this year's spring runoff to allow salt to return to the South Arm. This might include removing parts of or lowering the berm. We might also consider developing the means of better protecting the breach opening. Ben asked SAC members to reach out to him with their thoughts on the path forward. Discussion included: ongoing maintenance of the berm, continued cooperation from Union Pacific has been and will be critical to success at the breach, flexibility in being able to import, export or balance salt flow through the breach, the need for a long-term view on salinity management, continued modeling of the berm structure, the potential of a pump station, need to do geotechnical investigations at the breach, the possibility of bringing more water and salt back from the west desert, the possibility of bringing more salt back from evaporation ponds, and the need to plan and do long term water /salt mass balance modeling of the lake. Ben would like to consider building protective structures this year, develop the isomass curves, potentially investigate geotechnical conditions, and continue to model the water/salt balance of the lake.

Bill Johnson suggested completing a retrospective analysis of the modeling work completed to date. How has modeling been approached and how can we do it better? Craig Miller noted different tasks that Dr. Som Dutta is working on to better understand the flow configurations and dynamics through the breach. Past approaches have focused upon specific water levels and salinities; USU is looking at a more generalized approach. Modeling of the breach will help with controlling flow conditions at the breach; modeling of the lake will help inform how those changes are reflected in the lake.

John Luft asked if we should be investigating the water that is ponding up in the Newfoundland Basin (west desert). Ben said he has had some conversations. FFSL will need to sort out the available water and water and minerals rights for this to be a new source of salt to the South Arm.

GSL COMPREHENSIVE MANAGEMENT PLAN

Jeff DenBleyker introduced the idea of using salinity in combination with lake level as key metrics for managing GSL resources. The USGS isomass curves will likely be a very important part of that. The team is looking at how to make the lake level matrix easier to use; similar to what is on the GSL HydroMapper. One of the challenges has been how to identify what the current salinity is; salinity is currently determined for numerous locations in the lake. A method is needed to develop one salinity value that is representative of the South Arm for use in the CMP, by DWQ, for managing the berm. Ben Stireman added that it will be important to have a salinity value that can be used to communicate the condition of the lake but also a salt mass that can be used to manage the salinity.

SALINITY ESTIMATES FOR 2025

Christine Rumsey provided an overview of how the South Arm salt mass has changed since June 2023. We have seen a decrease in salt mass of approximately 216 million tonnes (Mt) from June 2023 – February 2025. The salt mass in February 2025 is estimated to be 894 Mt, up approximately 9 Mt since January.

Christine reviewed her assumptions in developing a forecasted salinity for spring 2025. Assuming no changes to the berm and using average climate and inflow data from 2003-2022 – average precipitation/evaporation/inflow results in an estimated salinity of 108 g/L, warm/dry conditions results in 120 g/L and wet/cool conditions results in 92 g/L. Her forecasts for the fall 2025 were 113 g/L for average conditions, 131 g/L for warm/dry conditions, and 92 g/L for cool/wet conditions. Raising the berm on August 1 could bring the salinity from 113 g/L to 112 g/L.

SALT MASS ISOCURVES

Christine reviewed her updates to the isomass curves and illustrated how the forecasted range for 2025 fits. These curves indicate the shallow salinity which is only one part of the full-depth volume weighted salt mass that is shown. The goal is to develop a set of curves that can inform the important decisions that need to be made such as a salinity management plan and comprehensive management plan. Christine asked for feedback. Ben Stireman would like to develop a tool that can be linked to the lake level matrix. Scott Hynek and Mark Reynolds pointed out how the curves can help anticipate how management changes could influence salinity. Science will keep improving; how do we create a document that can adapt with the science? How can we account for the different salinity of the DBL?

METHOD TO CALCULATE THE UPPER BRINE LAYER SALINITY

Christine revisited the goal – can we develop a consistent means of estimating and communicating one value of salinity that is representative of the upper brine layer of the South Arm? USGS measures salinity at four different locations at different depths. Christine illustrated the range of values from the different locations and depths and how they are impacted if we exclude some depths, only look at a maximum, or look at a UBL volume weighted value. The conclusion was that a volume weighted value that only includes the 0.5 and 3m depth samples may provide the best means of representing the upper brine layer across the South Arm. Christine reviewed the equations used to accomplish this.

There was discussion about the importance of being clear what the different values represent. We do not want to lose our understanding of how salinity is different at different locations and depths nor how mixing of the water column may influence salinity. Bill Johnson suggested that we should keep track of the salt mass and salinity of the upper brine layer and the salt mass of the deep brine layer. Salinity dynamics are significant. The goal is to have a method that could be automated and capture these dynamics and represent salinity as one value to observe and track trends. All of the data would still be available. One important consideration is how this method might be comparable to how salinity was characterized in the past.

Ben Stireman suggested forming a subcommittee to work with Christine to finalize this methodology.

The SAC discussed timing for the next meeting on June 26, 2025.

The meeting was adjourned.

ACTION ITEMS

- Contact Jeff DenBleyker if you would like to participate in the subcommittee.
- Christine Rumsey will continue to develop methods for reporting a single upper brine layer salinity.

Next meeting: June 26, 2025, 10:00am – 12:00pm

DRAFT