Raise and Lower the Causeway Berm

February 8, 2023

Raising the adaptive management berm at the Union Pacific Railroad causeway breach between the North and South Arms of Great Salt Lake would effectively act as a dam. This would keep freshwater inflows of the major tributaries in the South Arm where salinity levels are reaching a critical threshold.

Summary

The Union Pacific Railroad causeway bisects GSL into the North and South arms. A breach in the causeway allows water interchange between the two arms and can be altered by the adaptive management berm that slows flows between the arms. Raising the elevation of the adaptive management berm above the current surface elevation of GSL will effectively act as a dam between the two arms. By restricting flows between the two arms, the elevation of the South Arm rise and salinity will be reduced. This solution will amplify the benefits of conservation efforts, water purchases, and other methods for the South Arm.

Key Facts and Insights

- **Modifying the Berm** – Current work is underway to develop a decision-tree to assess the timing of raising and lowering the berm. Raising the berm addresses critical salinity concerns in the South Arm and is intended to be a short-term solution.
- **Funding** – An appropriation made in 2021 allows immediate implementation of the project.
- **Salinity Advisory Committee** – On January 19th, 2023, the Salinity Advisory Committee recommended adaptive action, including raising the top level of the control berm, be taken to reduce the trajectory of salinity in the South Arm while lake levels are low (below 4,192 feet). It was recommended that this action is taken as soon as practicable with consideration of lake dynamics.
- **All major inflows are in the South Arm** – Freshwater inflows from major tributaries flow into the South Arm, creating a major salinity difference between the two arms.
- **North Arm considerations** – The North Arm of GSL does not support an ecosystem dependent on specific salinity levels. The North Arm also has a thick salt crust that is not as prone to erosion and is less likely to contribute to poor air quality than exposed lakebed in the South Arm.

Expert Assessment Scorecard Results

	Low				High
Benefits					
Water brought to the lake	**1**	2	3	4	5
Air quality improvements	1	2	**3**	4	5
Biological health	1	2	**3**	4	5
Costs, Challenges, and Adaptations	Low				High
Financial cost	**1**	2	3	4	5
Agriculture changes	**1**	2	3	4	5
Extractive industry changes	1	2	3	**4**	5
Cultural shift	**1**	2	3	4	5
Feasibility	Low				High
Speed of implementation	1	2	3	4	**5**
Legal/regulatory feasibility	1	2	3	4	**5**

Source: Great Salt Lake Strike Team

Lake Level Modelling

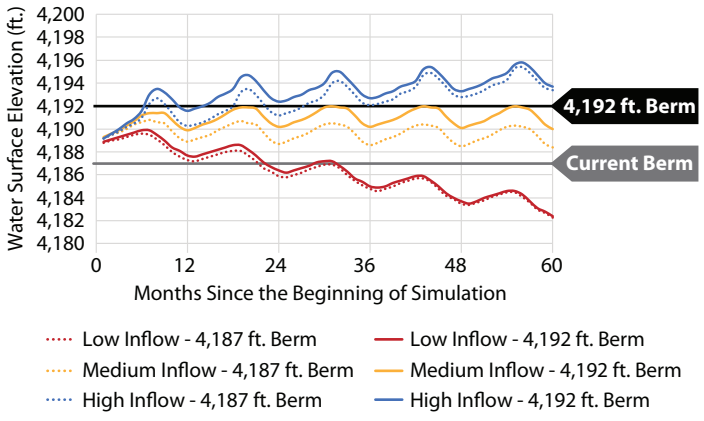
The Great Salt Lake Integrated Model used by the Utah Division of Water Resources allows for simulation of berm scenarios. Different berm elevations (4,187 ft. and 4,192 ft.) were analyzed along with three different lake inflow scenarios (low, medium, and high). For the lowest inflows simulated, the impacts of berm closure are minimal, indicating the importance of other options for increasing inflows to the lake in conjunction with raising the berm.

Table 5: Lake Elevation (ft.) Given Different Inflow and Berm Elevation Scenarios

Water Surface Elevation (ft.)		Berm Elevation 4,187 ft.		Berm Elevation 4,192 ft.	
		South Arm	North Arm	South Arm	North Arm
1 Year	High Inflow	4,190.3	4,189.7	4,191.6	4,187.5
	Medium Inflow	4,188.9	4,188.3	4,189.9	4,186.7
	Low Inflow	4,187.3	4,186.8	4,187.7	4,186.1
3 Years	High Inflow	4,191.2	4,190.8	4,192.4	4,188.9
	Medium Inflow	4,188.7	4,188.0	4,190.2	4,185.7
	Low Inflow	4,185.9	4,184.7	4,186.4	4,184.0
5 Years	High Inflow	4,192.1	4,191.6	4,192.7	4,190.7
	Medium Inflow	4,188.6	4,187.8	4,190.2	4,185.2
	Low Inflow	4,184.8	4,182.5	4,185.0	4,182.2

Note: Inflow scenarios in this table are different from the Lake Elevation Target section.
Low Inflow = 800 KAF, Medium Inflow = 1,800 KAF, and High Inflow = 2,700 KAF.
Source: Great Salt Lake Integrated Model simulations, Utah Division of Water Resources, 2023

Figure 19: South Arm Water Surface Elevation with Berm Raised to 4,192 ft.



Source: Great Salt Lake Integrated Model simulations, Utah Division of Water Resources, 2023