GREAT SALT LAKE STRIKE TEAM

POLICY ASSESSMENT EXECUTIVE SUMMARY

Declining water levels of Great Salt Lake threaten economic activity, local public health, and ecosystems. The situation requires urgent action. Fortunately, science provides crucial perspective, understanding, and scenarios for policymakers to chart a path forward. Many policy levers can help return the lake to healthy levels.

Utah's research universities formed the Great Salt Lake Strike Team to provide a primary point of contact for policymakers as they address record-low elevations of Great Salt Lake. Together with state agency professionals, the Strike Team brings together experts in public policy, hydrology, water management, climatology, and dust to provide impartial, data-informed, and solution-oriented support for Utah decision-makers. The Strike Team does not advocate but rather functions in a scientific/ policy advisory role as a service to the state.

The Strike Team offers six major insights and recommendations

1 Explanation for record-low elevation

Human and natural consumptive water use explain over two-thirds of low lake levels. Other smaller contributing factors include natural precipitation variability and climate warming. Human use is a large contributing factor for Great Salt Lake's decline and the only factor that can be changed in the near term.

Estimated Contribution of Impacts on Current Record Low Elevation

Direct Evaporation from Climate Warming

Estimated Impact: 8–11%

Natural Variability (Precipitation and Runoff Efficiency)

Estimated Impact: 15–23%

Natural and Human Consumptive Use

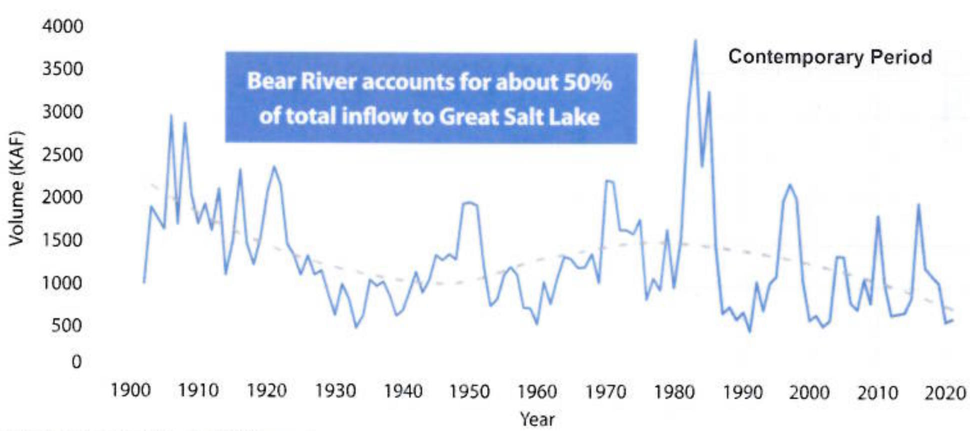
Estimated Impact: 67–73%

Source: Analysis from Great Salt Lake Strike Team, 2022; Mohammed, I., & Tarboton, D. (2012). An examination of the sensitivity of the Great Salt Lake to changes in inputs. Water Resources Research, Volume 48, Issue 11. https://doi.org/10.1029/2012WR011908

2 Decreasing inflow

Even though overall water supply from the mountains shows no long-term trend, inflow to the lake is decreasing. This decrease reflects greater depletion by natural and human systems at lower elevations.

Bear River Annual Streamflow, 1903-2022



Note: Trend line generated using LOESS regression.
Source: Data from USGS gage 10126000 Bear river Near Corrinne with missing data (1957-1963) and values prior to 1949 derived from USGS gage 10118000 Bear River near Collinston (Analysis by David Tarboton)

3 Policy options

A variety of policy options exist to increase water deliveries to Great Salt Lake. Interventions fall into three broad categories: conservation, new water, and engineering solutions. Policymakers will need to rapidly assess the benefits, costs, and speed of each policy lever to prioritize state actions. The Strike Team can help with more detailed analysis to support prioritization.

Conservation

- Commit conserved water to Great Salt Lake
- Optimize use of agricultural water
- Optimize municipal and industrial water pricing
- Limit municipal and industrial water use growth
- Utilize water banking and leasing
- Conduct active forest management in Great Salt Lake headwaters
- Optimize Great Salt Lake mineral extraction

New water

- Import water
- Increase winter precipitation with cloud seeding

Engineering solutions

- Raise the causeway berm
- Mitigate dust transmission hotspots

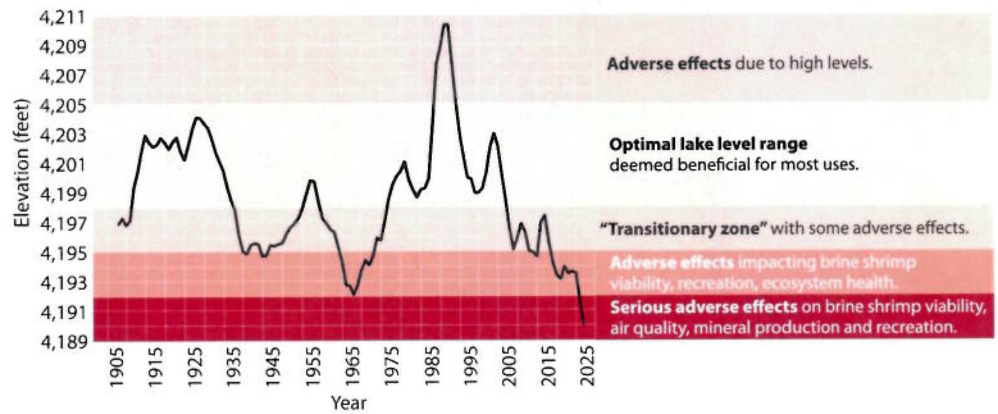
4 Commit conserved water

Commit conserved water Committing conserved water to the lake is a fundamental policy lever that is crucial for many other policies to function effectively. Upon approval of an appropriate change application, the state engineer can readily deliver conserved water to Great Salt Lake under a "distribution system."

5 Elevation range goal

Elevation range goal – The Strike Team recommends policymakers adopt a lake elevation target level range based on analysis prepared by the Utah Division of Forestry, Fire, and State Lands. Preliminary analysis suggests a transitionary elevation range of 4,195–4,197 feet and an optimal elevation range of 4,198–4,205 feet. Meeting this goal requires policymakers to focus on inflows that both fill and maintain targeted elevation ranges.

Average Annual Elevation of Great Salt Lake with Elevation Zones, 1903–2022



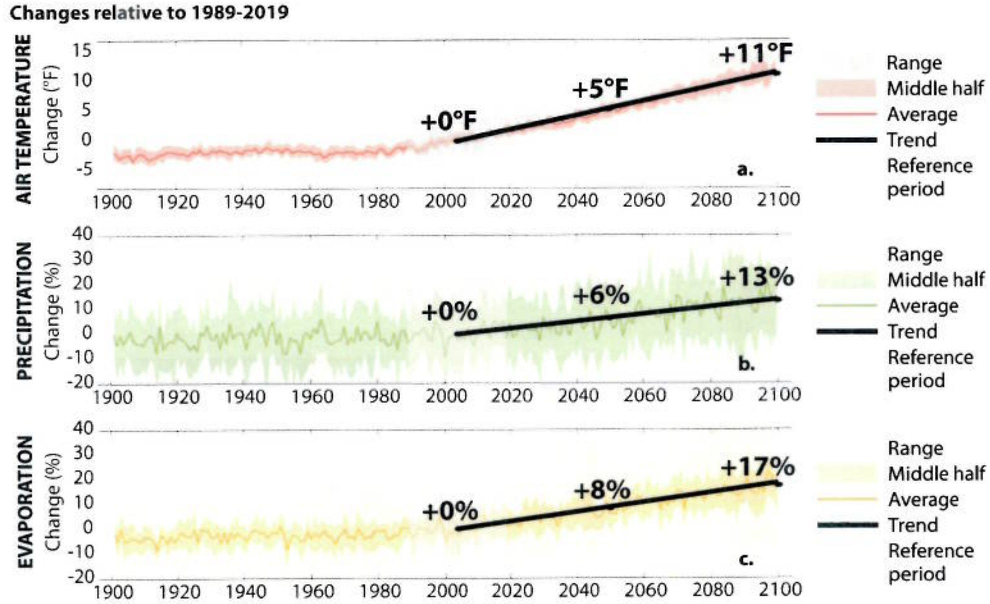
Sources: US Geological Survey Historical Elevation at Saltair Boat Harbor; Utah Division of Forestry, Fire and State Lands, GSL Lake Elevation Matrix, 2013

6 Future water availability

Future water availability – Over the long term, slight increases in expected precipitation will likely be overwhelmed by increases in temperature and evaporation, creating further challenges for the lake. These future challenges underscore the need to resolve torefill the lake quickly and create an adaptive process to monitor and maintain lake levels in coming decades.

Projected Trends in Temperature, Precipitation, and Evaporation in the Great Salt Lake Basin, 2004-2100

Changes relative to 1989-2019



Notes:

1. The analysis is based on a high greenhouse gas emission scenario referred to as Shared Socioeconomic Pathway (SSP) 585. Lower emission scenarios tend to produce similar changes but at smaller magnitudes.
2. There are 30 global climate models included in this analysis, developed by leading modeling centers in countries including the United States. The simulations were coordinated by the Coupled Model Intercomparison Project Phase 6 (CMIP6) and were analyzed by Courtenay Strong at the University of Utah.
3. Great Salt Lake is not explicitly represented at the grid spacings used in these global climate models. The analysis uses the grid point nearest the central latitude and longitude of the lake in each model.

Source: Data from CMIP6; Analysis by Courtenay Strong, 2022