

May 8, 2025

Improving Subseasonal to Seasonal (S2S) Precipitation
Forecasting

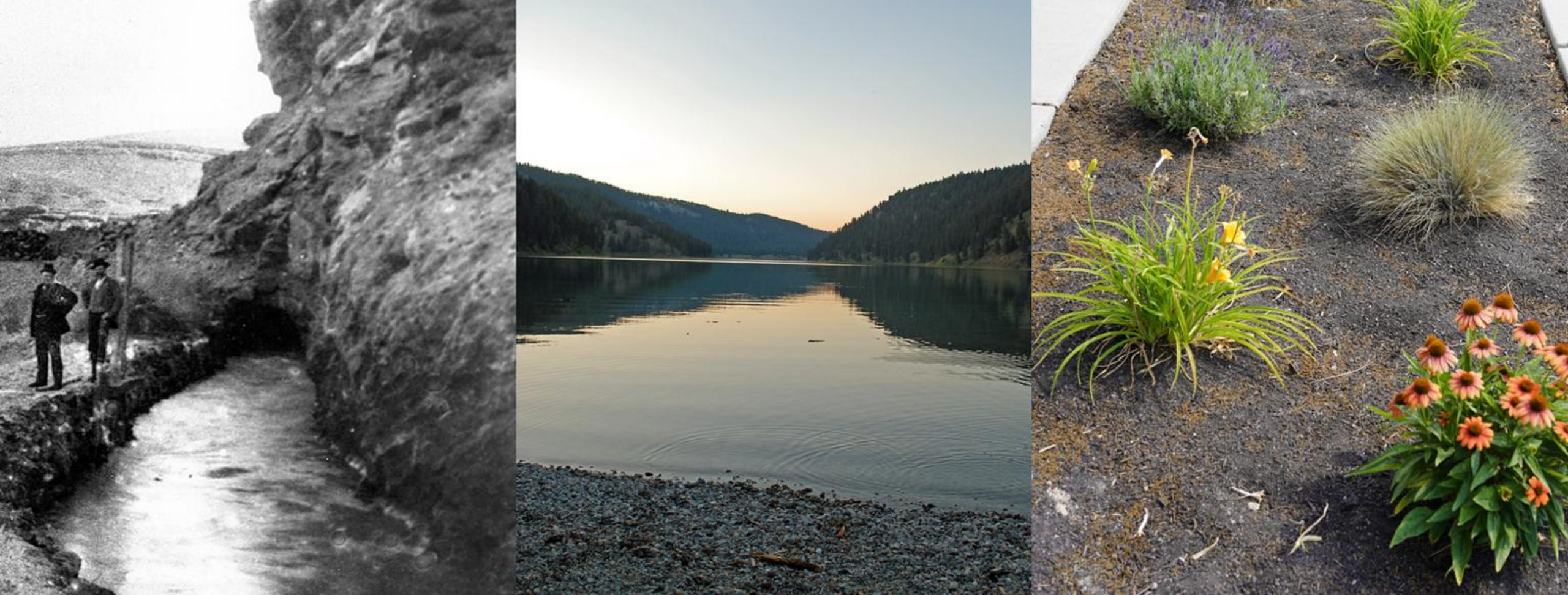
Utah's S2S Needs and Applications

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PLAN | CONSERVE | DEVELOP | PROTECT Utah's Water Resources



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Utah's Water Landscape

- 95% of Utah's water supply comes from snowpack
- Snowpack acts as a natural reservoir
- Snowmelt is key for streamflow, reservoirs and recharge
- Timing, quantity and quality critically impact supply
- Peak accumulation: March/April
- Drives water management and ecosystem health



Little Dell 2022





Soil Moisture Matters

Utah's Climate Context

- Semi-arid climate with variable precipitation
- Wet season: October-May
- Dry summers increase stored water reliance
- Rising temperatures add evapotranspiration stress



Great Salt Lake Marina 2022



Why S2S Forecasts Matter in Utah

- Anticipate snowpack melt/development
- Guide reservoir operations and diversions
- Inform agriculture and emergency planning



Application Example–Reservoir Management

- Forecast warm spells and anticipate snowmelt timing
- Adjust releases to avoid flood/missed capture
- Optimize storage and protect infrastructure



Red Pine 2024



Application Example–Agricultural Planning

- Forecasts support crop planning and irrigation
- Align water availability with farming needs



Application Example–Emergency Preparedness

- Warm spells or rain-on-snow events = flood risks
- Forecasts guide early action and coordination



SLC Flooding 2023



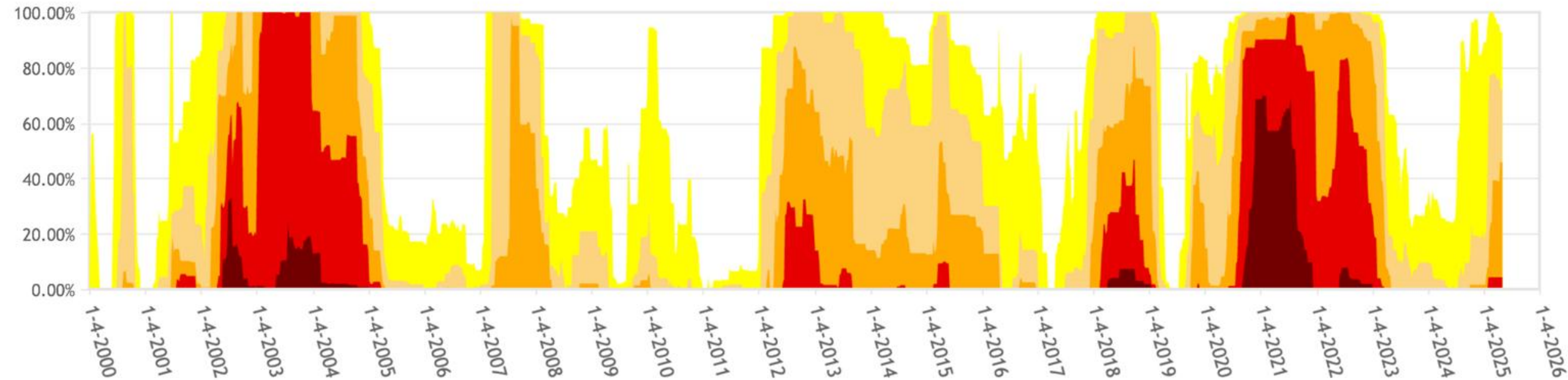
Application Example–Drought Monitoring

- Early dry signals aid conservation messaging
- Align drought response and wildfire planning



In Drought or Preparing for one...

Utah Percent Area in U.S. Drought Monitor Categories



From the U.S. Drought Monitor website, <https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx>, 5-8-2025



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Gaps and Challenges

- Data limitations across parts of the mountain west limit modeling abilities
- Forecast models do not account for dust-on-snow events (enhances early snowmelt)
- Forecast limited skill beyond the 14-day cycle
- Limited, or no El Nino Southern Oscillation signal (for northern Utah) creates challenges for long-term precipitation forecasting



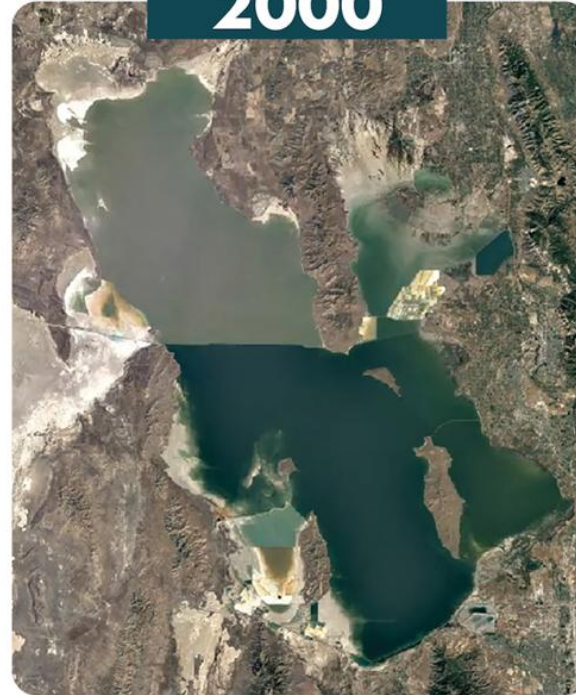


GREAT SALT LAKE ELEVATION

1986



2000



2022



RECORD HIGH

4211.65 FEET



AVERAGE

4202.2 FEET



RECORD LOW*

4188.5 FEET

*PROVISIONAL

Need to Inform Decision Making

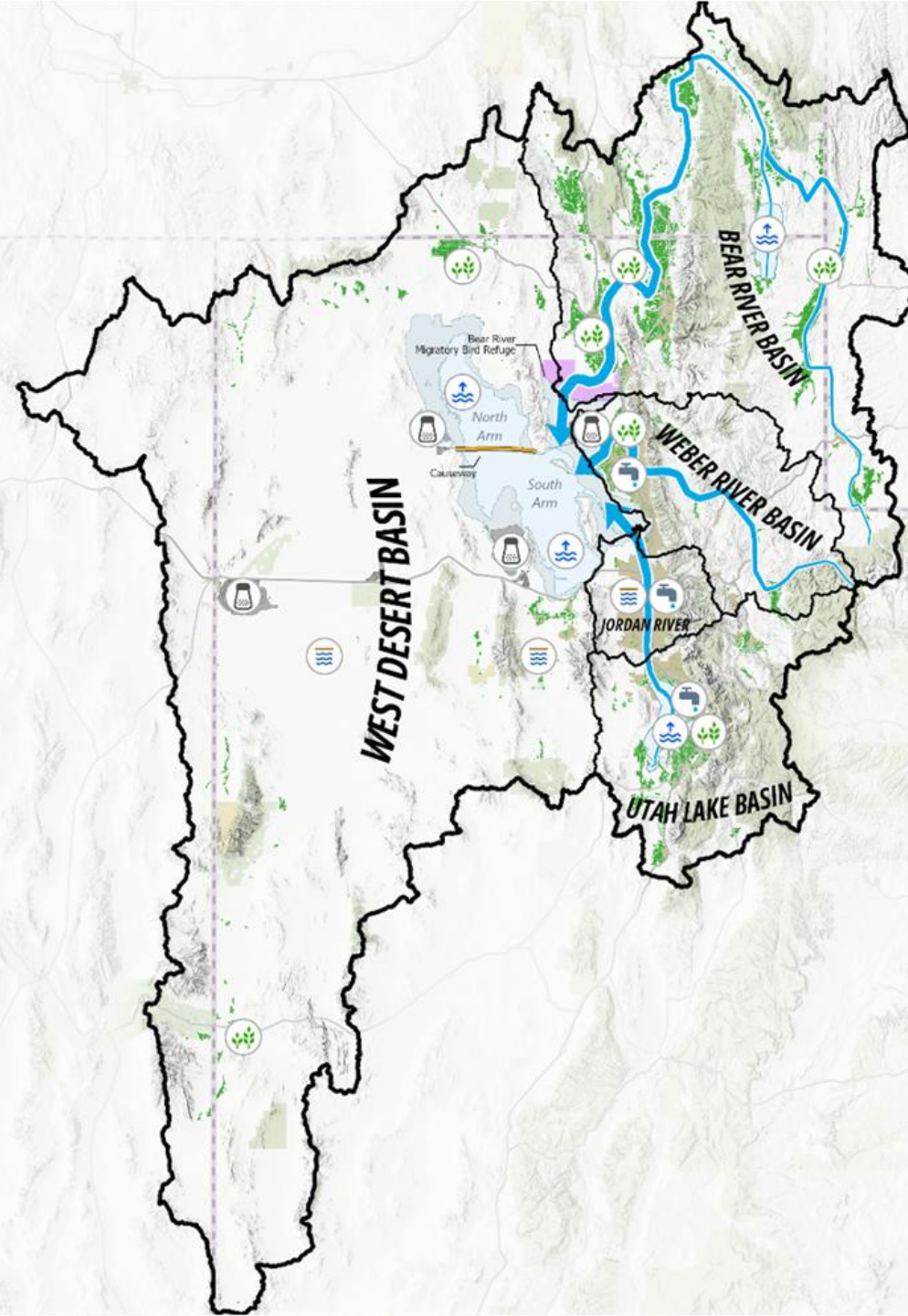


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Great Salt Lake Basin Processes

-  Agriculture Diversion
-  Evaporation
-  Groundwater
-  Municipal & Industrial Diversion
-  Mineral Extraction



Regional Collaboration Opportunities

- Similar snowpack reliance across the West
- Sub-seasonal forecasts improves basin-wide planning
- Shared tools boost regional resilience



THANK YOU



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