

November 13, 2014
**Tahoe Climate Science
Symposium**
Incline Village, NV

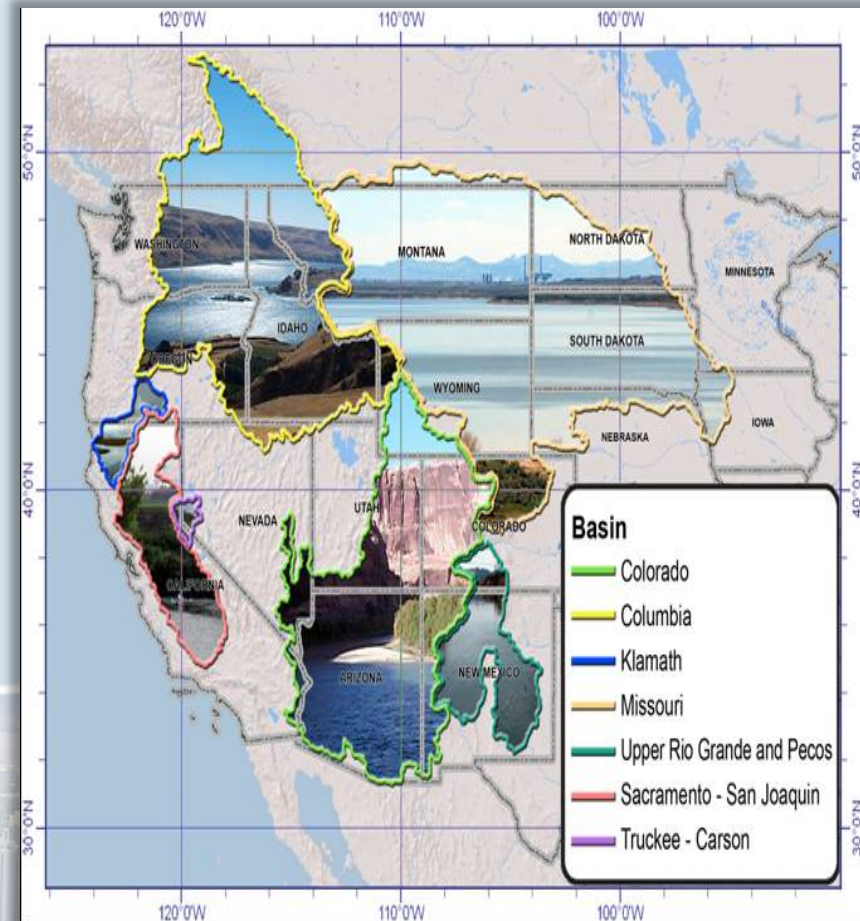
Truckee Basin Study: Planning for Water Supply Reliability with Climate Change

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on behalf of
Arlan Nickel - Reclamation

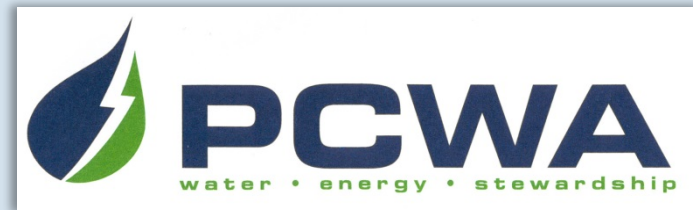


Basin Study Programs

- Implemented under SECURE Water Act, Public Law 111-11
- Basin Studies assist water agencies with incorporation of future risks caused by climate change into management and decision processes.



Basin Study Partners



50-50 cost share between Reclamation and partners



Quick Orientation



- 3,060 sq. miles
- 90% of flow originates in California
- 121 miles from Lake Tahoe to Pyramid Lake
- Derby Dam & Truckee Canal link the Truckee and Carson basins



Scenario Planning Approach

SCENARIO COMPONENTS	CONDITIONS		
	PAST	PRESENT	FUTURE
Supply	Historical Hydrology <i>(Recorded Data, Processed for Data Gaps)</i>	No Climate Change <i>(Simulated)</i>	Five Future Climate Ensembles <i>(Simulated)</i>
Demand	N/A	2012 Demand <i>(Recorded)</i>	Two Storylines <i>(Estimated)</i>
Infrastructure and Operations	N/A	Current <i>(Represented in Planning Model)</i>	Options & Strategies <i>(Designed by Study)</i>

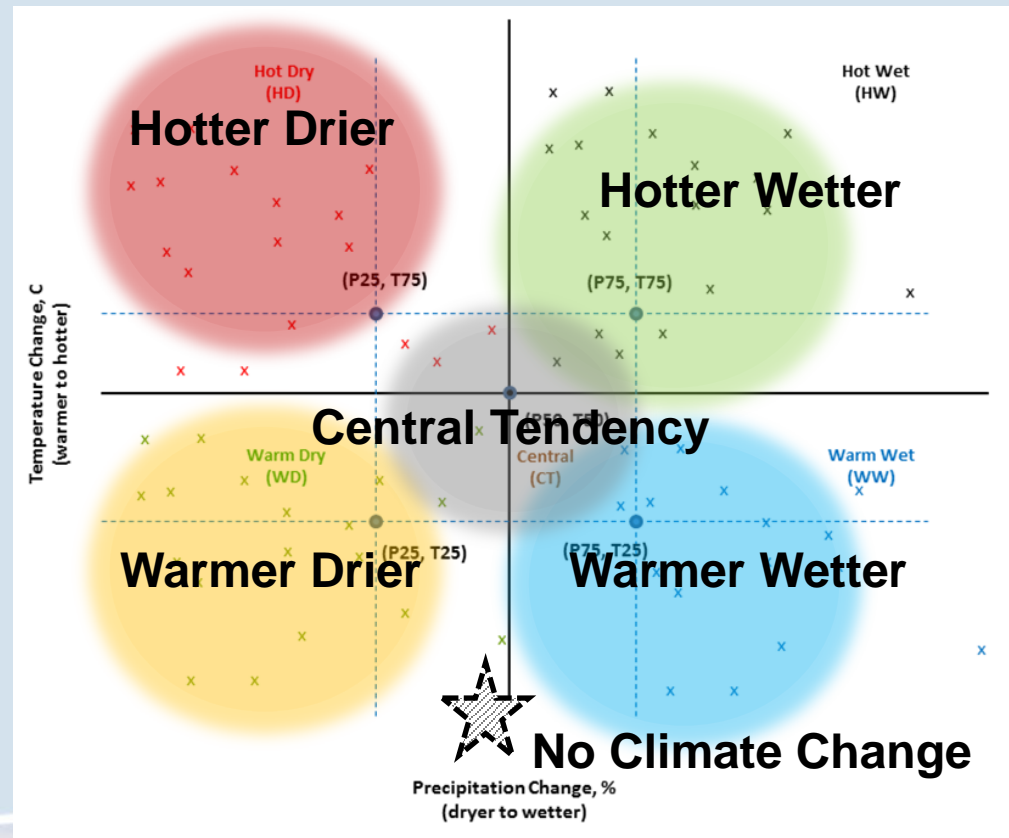
Baseline Scenario

Without Action Scenarios (10 of them)

Options & Strategies
(8 of them)

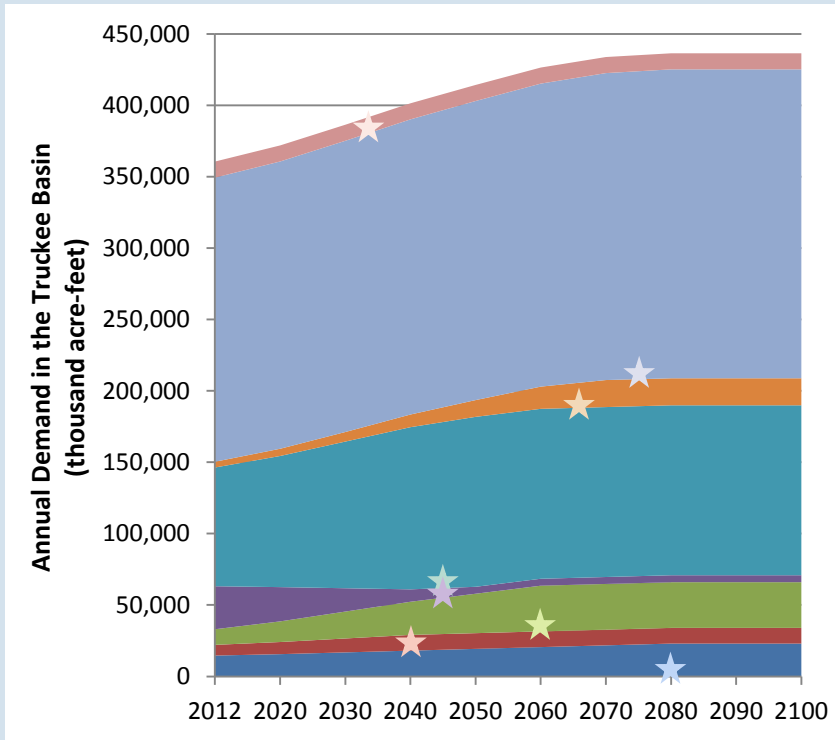
Future Supply Scenarios

- 5 Transient Hybrid-Delta Ensembles for 2012-2099, *Reclamation*
- Downscaled and applied to evaporation and hydrology models for Truckee River, *DRI*

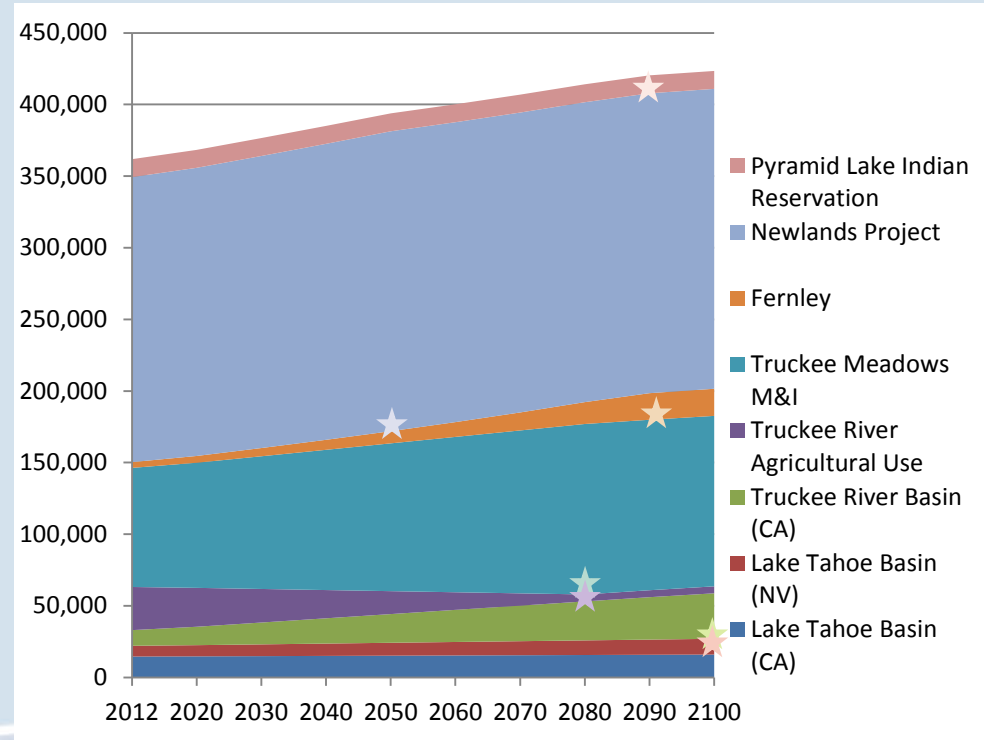


Consumptive Future Demands

Robust Economy



Existing Trends

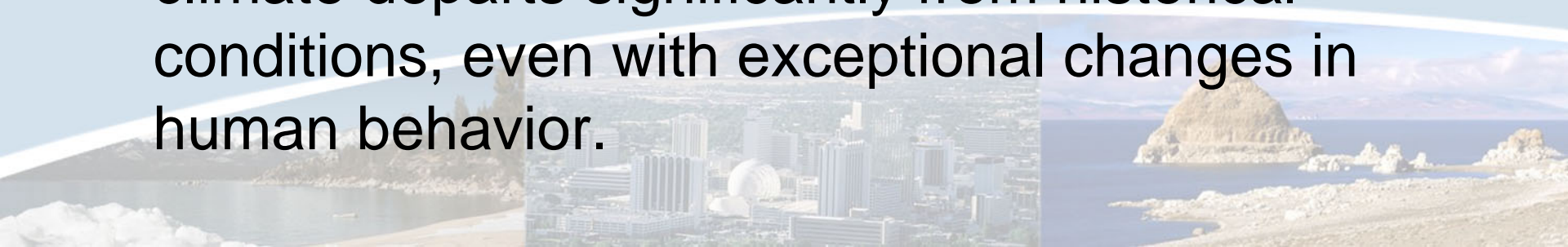


★ = Year in which maximum (or minimum) future demand is achieved

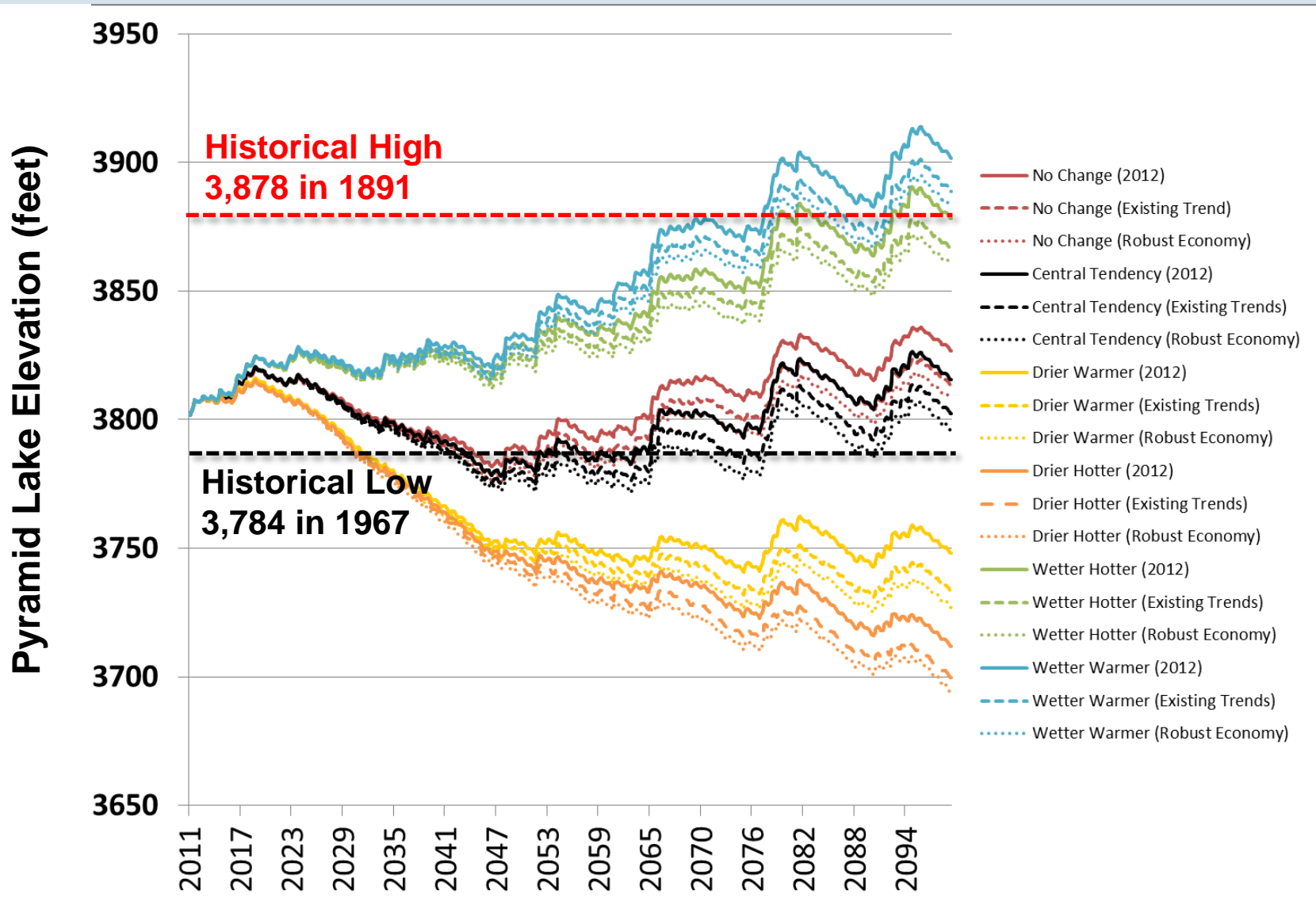


Key Basin-Wide Vulnerabilities

- A wide range of vulnerabilities exist, driven by uncertainty in future precipitation.
- Warmer temperatures will reduce water supplies, mostly through seasonality shifts.
- Uncertainty in water demands is insignificant in comparison to future climates.
- Maintaining the historical balance between supply and demand may not be possible if the climate departs significantly from historical conditions, even with exceptional changes in human behavior.

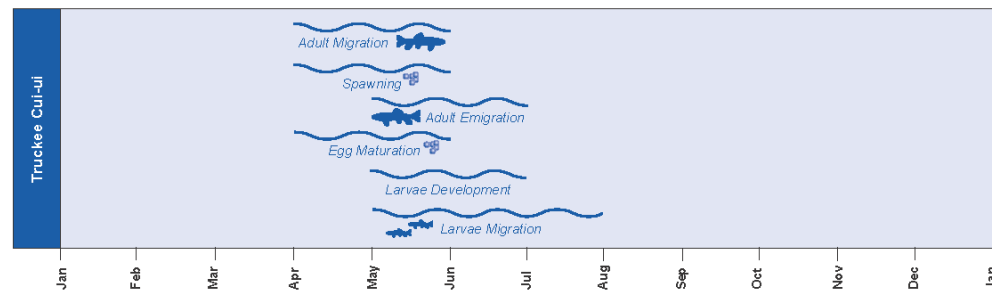
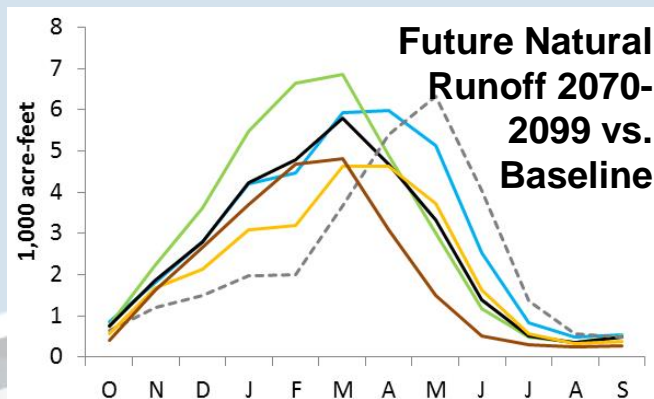
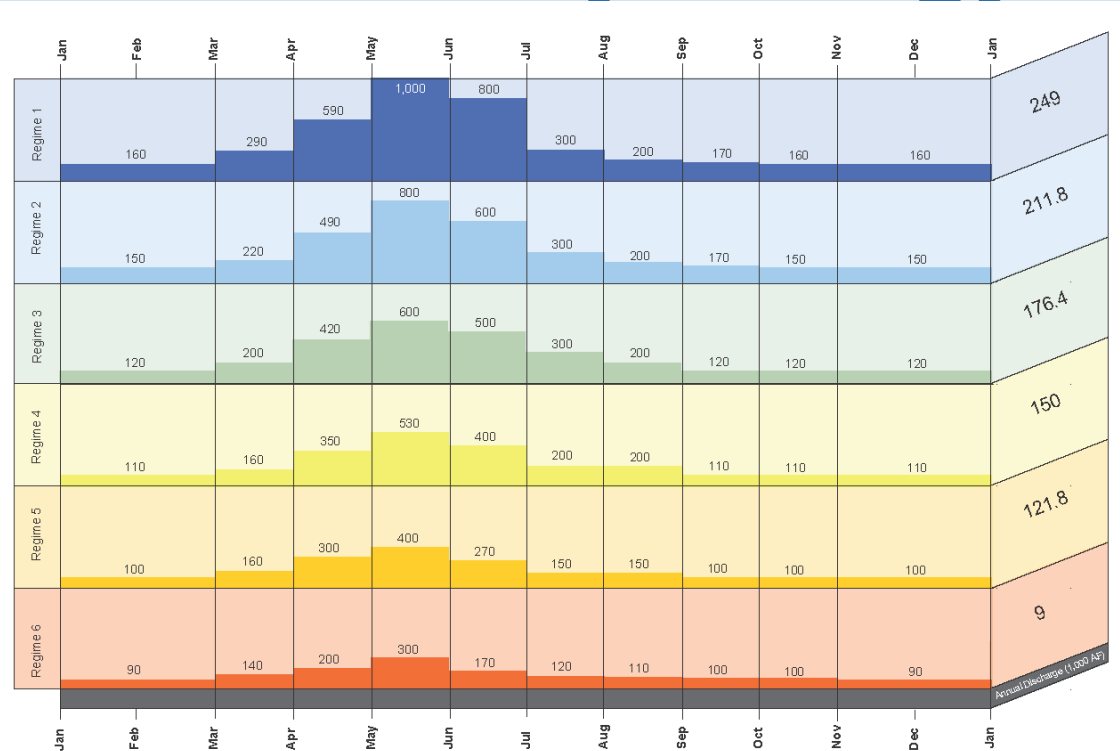


Pyramid Lake Reveals Relative Importance and Uncertainty in Future Conditions



Fish Life-Cycles *May* Follow Seasonality Shifts in Hydrology

Pyramid Lake fisheries may respond to cues in the natural hydrology, which will occur earlier because of seasonality shifts.



Thank you.

For further questions about the Reclamation, Basin Studies, or the Truckee Basin Study, please contact:

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Increases in Temperature also Reduce Supplies at Lake Tahoe

