Using MODIS Environmental Science Data Records (ESDRs) to study desiccation of terminal lakes in the Great Basin of the western United States, 2001 - 2021*

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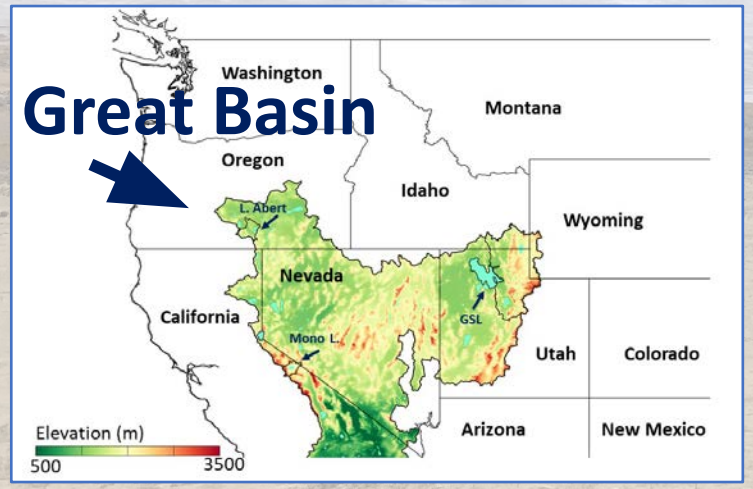
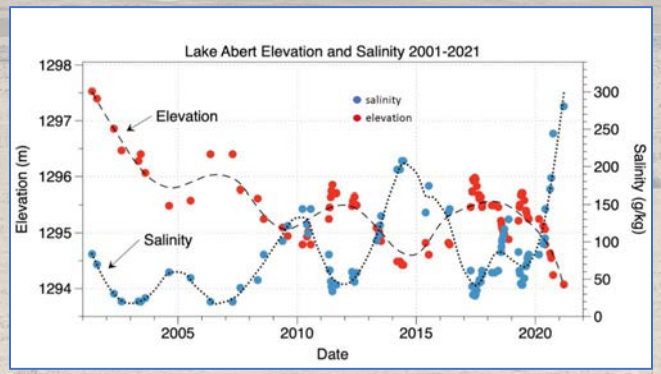
Terminal lakes

Worldwide, terminal lakes are shrinking as water demands increase and drought conditions intensify



Why does it matter that terminal lakes are drying up in the Great Basin?

Food and habitat for migrating waterbirds is abundant in saline lakes

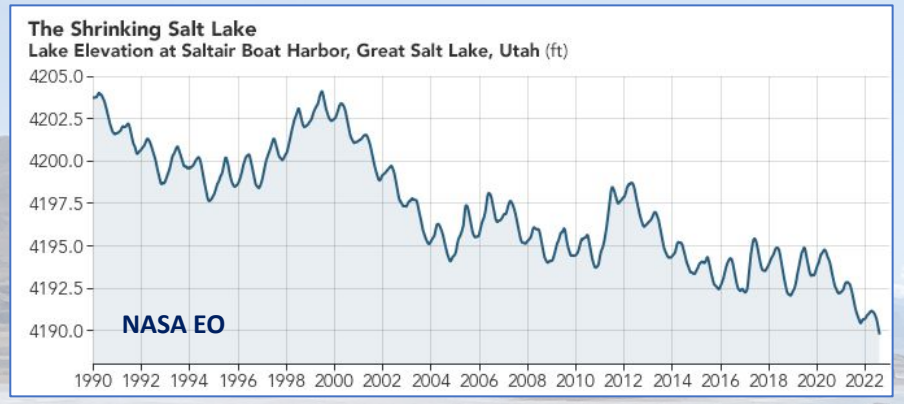


Toxic "dust" from dried lakebeds can become airborne, contributing to air pollution; Owens Lake was once the largest source of PM10 dust in the U.S.

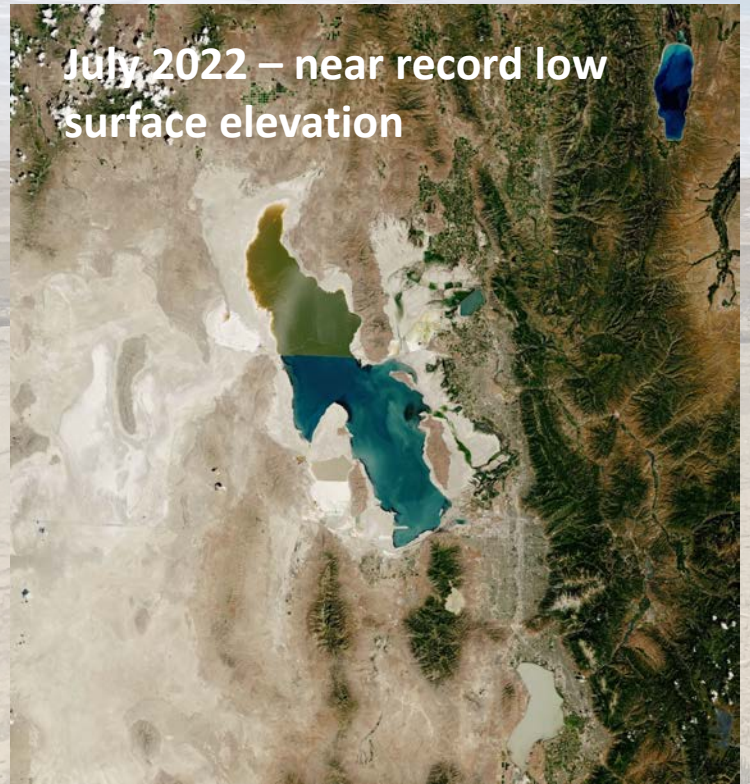
* Hall, D.K., J.S. Kimball, R. Larson, N.E. DiGirolamo, K.A. Casey & G. Hulley, 2023: Intensified warming and aridity accelerate terminal lake desiccation in the Great Basin of the western United States, *JGR-Earth and Space Science*, 10(1).

A decades-long drought in the southwestern U.S. intensified desiccation of saline lakes

Example: Great Salt Lake



Example: Lake Abert, Oregon

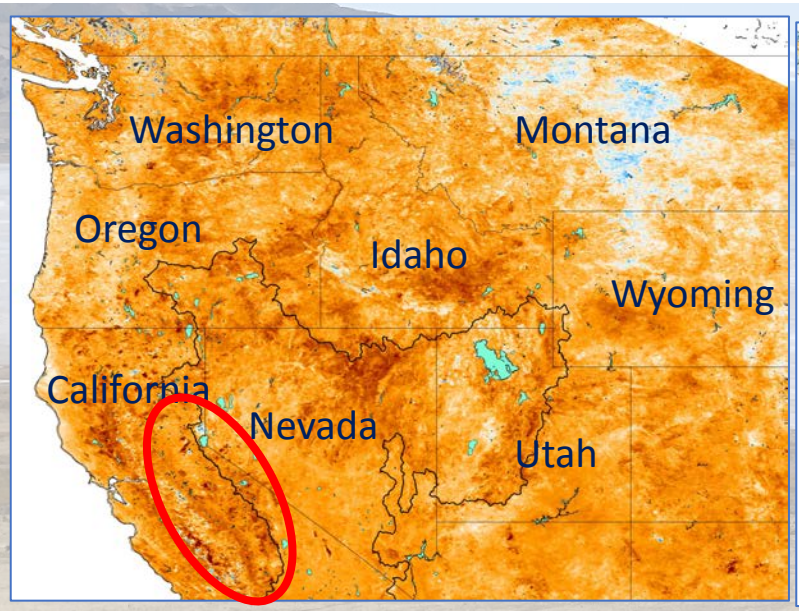


Below: water in saline lakes can turn orange and red from *Halobacteria* when salinity gets too high; ultrasaline water can be toxic to brine shrimp

Credit: NASA Earth Observatory 11 Aug 2022
https://earthobservatory.nasa.gov/images/150187/the-great-shrinking-lake

Changes in Land Surface Temperature (LST), snow cover and evapotranspiration (ET) from MODIS ESDRs, WY 2001 - 2021

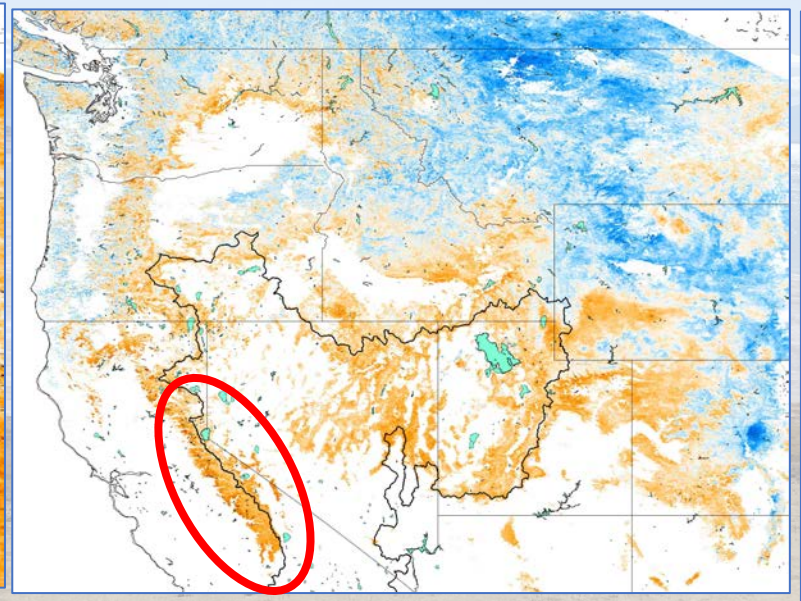
MODIS ESDRs can identify "hotspots" of change when used together



LST (°C)

-5.0 0 +5.0

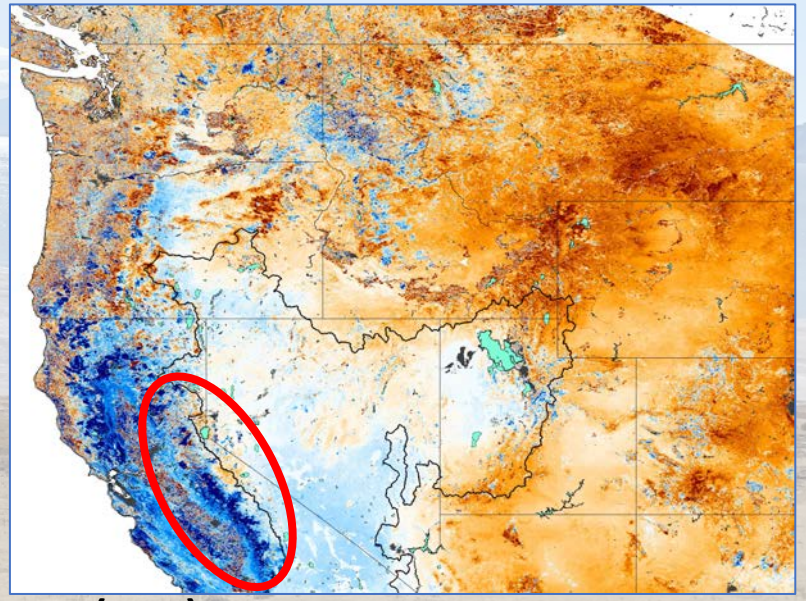
*MOD21A1d and MOD21A1n (Hulley & Hook, 2021)



#days of persistent snow cover

-90 0 +90

*MOD10A1F (Hall and Riggs, 2020)



ET (mm)

-100 0 +100

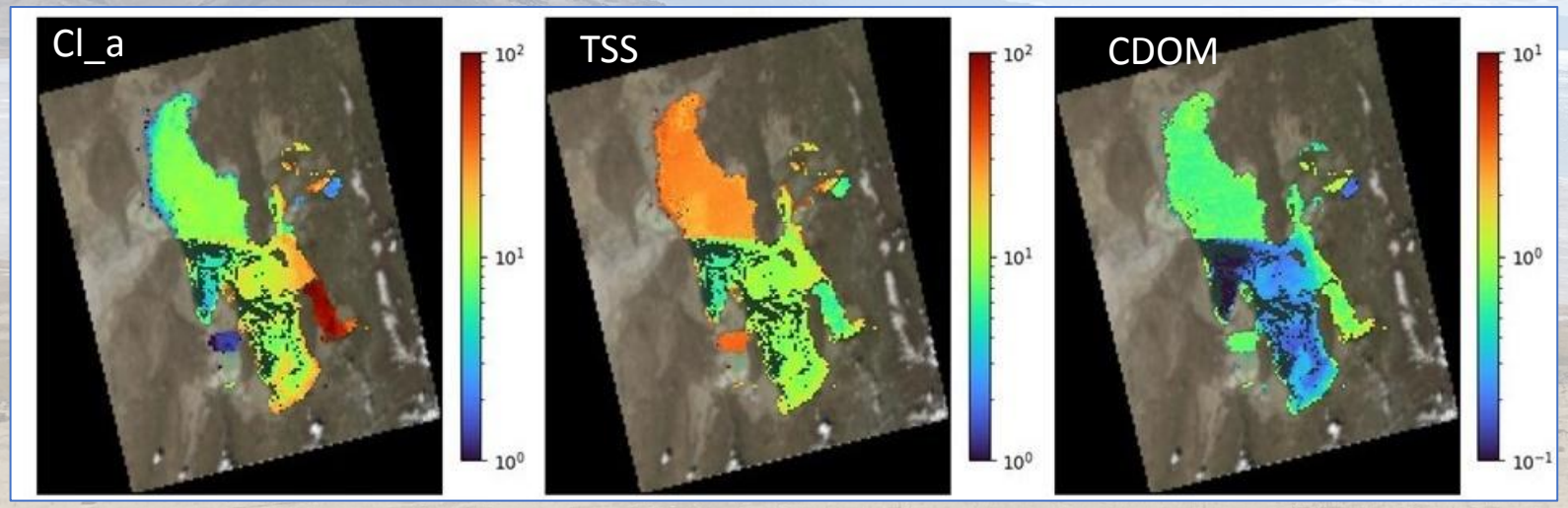
*MOD16GF (Running et al., 2021)

Status and Fate of Great Basin Terminal Lakes

A. 33 The Science of Terra, Aqua, and Suomi-NPP

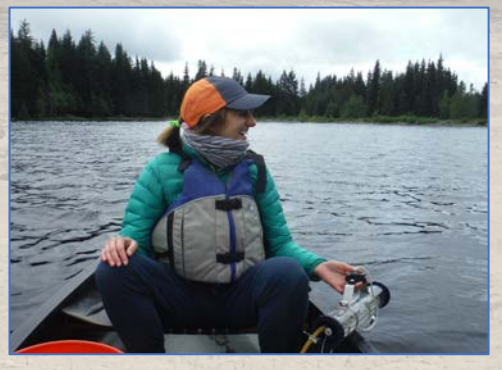
PI: Dorothy Hall/UMD; **Co-Is**: Kimberly Casey/USGS; Kelly Gleason, PSU; Bryant Loomis/GSFC; Nima Pahlevan/SSAI**; Student**: Lara Jansen/PSU; **Collaborators**: Ron Larson/OLA & Crystal Schaaf/UMB

To assess the "health" of these lakes, products have been developed to measure Chlorophyll_a, Total Suspended Solids and Colored Dissolved Organic Matter using VIIRS & MODIS data: VIIRS example from 4/22/2012



Nima Pahlevan/SSAI

Water samples are being obtained at GSL to validate the new products



An interdisciplinary team is needed to understand and monitor the **impacts** of changing climate and upstream water diversions on the GB terminal lakes