UtahView 2023 - 2024

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UtahView 2023 - 2024 Activities

Great Salt Lake Ecological Function

The purpose of this work was to map the distribution and temporal variation of shore bird tactile foraging habitat as levels of the Great Salt Lake, Utah fluctuate over a given year. Lake level fluctuations can significantly affect the availability of available forage for shorebirds since they forage in shallow water (<1' in depth). As lake levels wax and wane, variations in submerged topography alter available foraging habitat.

Our progress to date has been to develop Google Earth Engine scripts to analyze Landsat, merged with Sentinel-2 imagery to map lake levels for each month of a given year. Coupled Landsat and Sentinel-2 images provided a complete view of the lake 16 days per month (~1 view every 2 days) not accounting for cloud cover. Monthly cloud-masked image collections resulted in a cloud-free image for each month. Surface water was mapped for each month using a normalized difference water body index that utilized the green and NIR spectral bands ((green – NIR) / (Green + NIR)). An index threshold of > 0.1 was used to separate open water from the surrounding non-water area. This resulted in a binary (0,1) output where open water was identified as 1. The summation of the binary water image across all 12 months resulted in the image presented in Figure 1 which the number of months any given area across the Great Salt Lake is covered in water.

Figure 2 shows the Bear River Bay area inundation frequency along with sample points along transects to record forage availability and water depth. Figure 3 shows the temporal inundation profile for a selected pixel. Figure 4 shows water depth within the inundated area derived from USGS 3DEP 1m elevation data.

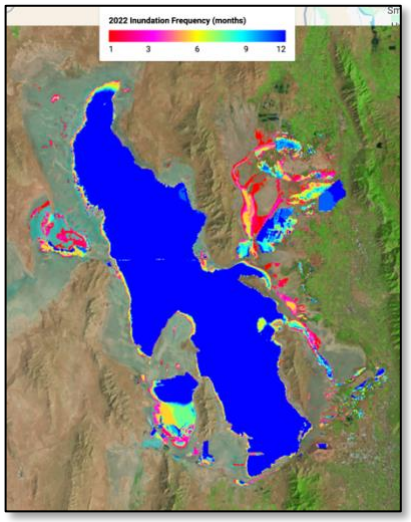

Figure 1. Great Salt Lake Inundation frequency for 2022. Colors refer to the number of months water covered an area indicating habitat changes for foraging shorebirds.

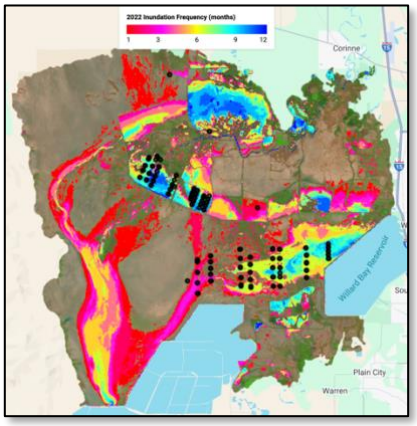

Figure 2. Bear River Bay, the northeast arm of the Great Salt Lake and home to the Bear River migratory bird refuge. Colors refer to the number of months an area was inundated and black dots identify sample areas that measured forage availability.

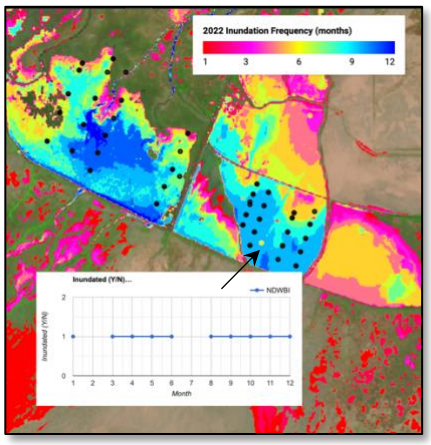

Figure 3. Temporal inundation profile for a selected pixel (yellow point)

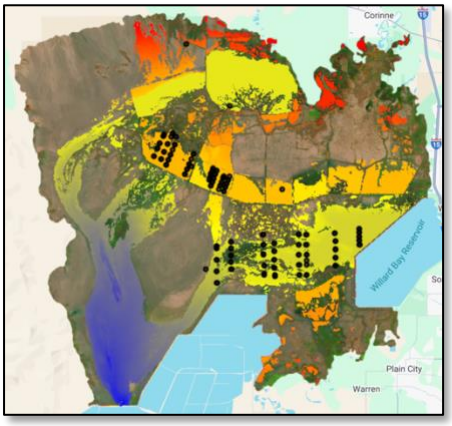

Figure 4. Water depth within the 2022 inundated area for Bear River Bay derived from USGS 3DEP 1m elevation data. Maximum depth (blue) is ~ 5m

UtahView is a member of the AmericaView Consortium, a nationally coordinated network of academic, agency, non-profit, and industry partners and cooperators that share the vision of promoting and supporting the use of remote sensing data and technology within each state. AmericaView is funded by USGS grant agreement G23AP00683.

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Benefits to Utah

The Great Salt Lake provides a major stop-over for migrating waterfowl making the lake a critical resource for birds as well as other wildlife. This project can provide managers with an additional tool to help manage habitat.

Other UtahView activities includes outreach to citizens and students to increase awareness of Utah's beautiful landscape as well as promote the use of remote sensing instruments to help in the management of the state's resources. This year we visited "Posters on the Hill", a yearly event for geospatial professionals to showcase their work. This venue also hosts elementary school kids who took full advantage of the giant AmericaView puzzle of the Four Corners area in SE Utah. Once the kids left, the adults attending the event had their chance at the puzzle as well.

Posters on the Hill – a yearly event where geospatial professionals gather at the state capitol building to show their stuff

Students exercise their prowess at putting together a satellite puzzle of the Four Corners area.

Once the kids left, the adults had a go.

Posters on the Hill provided a venue for us to show off our Utah as art series

UtahView Consortium Membership

The UtahView consortium membership consists of Dr. R. Douglas Ramsey, Professor in the Quinney College of Natural Resources and Director of the Remote Sensing/GIS Laboratory at Utah State University; Dr. Phoebe McNeally, Research Associate Professor and Director of the DIGIT Laboratory at the University of Utah; Dr. Sowmya Selvarajan, Assistant Professor of Geomatics at Utah Valley University; and the Utah Geographic Information Council (UGIC). Collectively, these consortium members bring a wealth of scientific, outreach, and technical experience to the urban, rural, and wildland regions of Utah.

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The University of Utah

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