

New bathymetric data and DEM of the Cache Slough Complex, Sacramento-San Joaquin Delta, California



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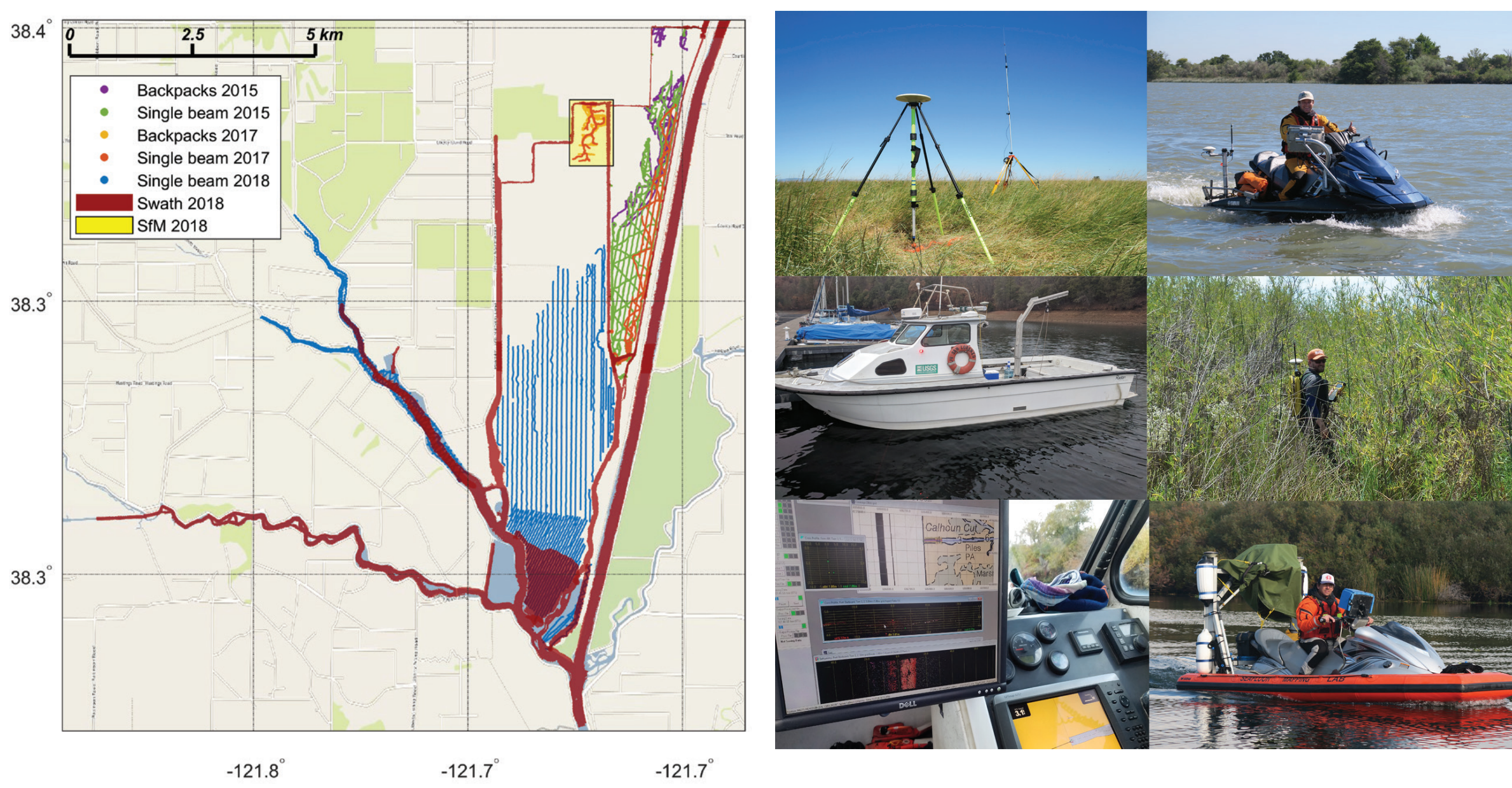
Introduction

This poster presents a Digital Elevation Model (DEM) of bathymetric and topographic data collected between 2017 and 2019 in the Cache Slough Complex (CSC), northern Sacramento-San Joaquin Delta, California. CSC is ecologically important because of the diversity of its habitats and the continued presence of native fishes, and is the site of multiple habitat restoration actions.

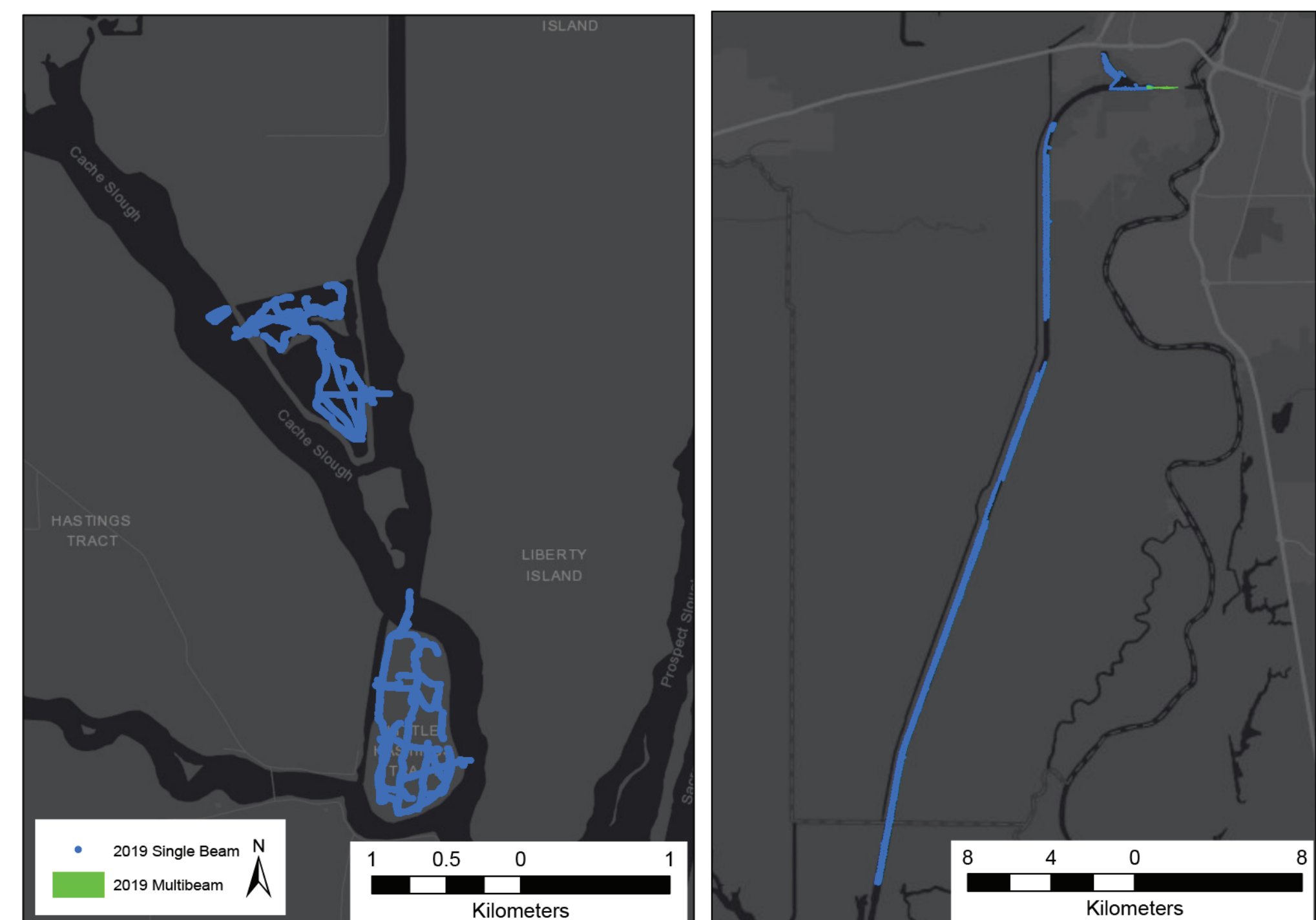
Project Specific Data Collection

The shallow, highly vegetated aquatic habitats of CSC necessitated a variety of survey platforms and techniques to capture the best hydrographic survey data.

In the deeper channels, USGS collected swath bathymetry data using a 234.5 kHz interferometric sidescan sonar system mounted to the 26-ft R/V San Lorenzo. In smaller channels and shallow areas not accessible with the San Lorenzo, we acquired swath bathymetry data with Kelpfly, a personal watercraft (PWC) equipped with a 468 kHz interferometric sidescan sonar. Two PWCs equipped with 200 kHz single-beam sonars were primarily used to survey the large, gently sloping flooded agricultural tracts and areas with dense submerged vegetation. The combination of these techniques resulted in good coverage of both the main channels and shallow embayments. Topographic data were collected by hiking over the land surface, with global satellite navigation system receivers (GNSS) mounted on backpacks.

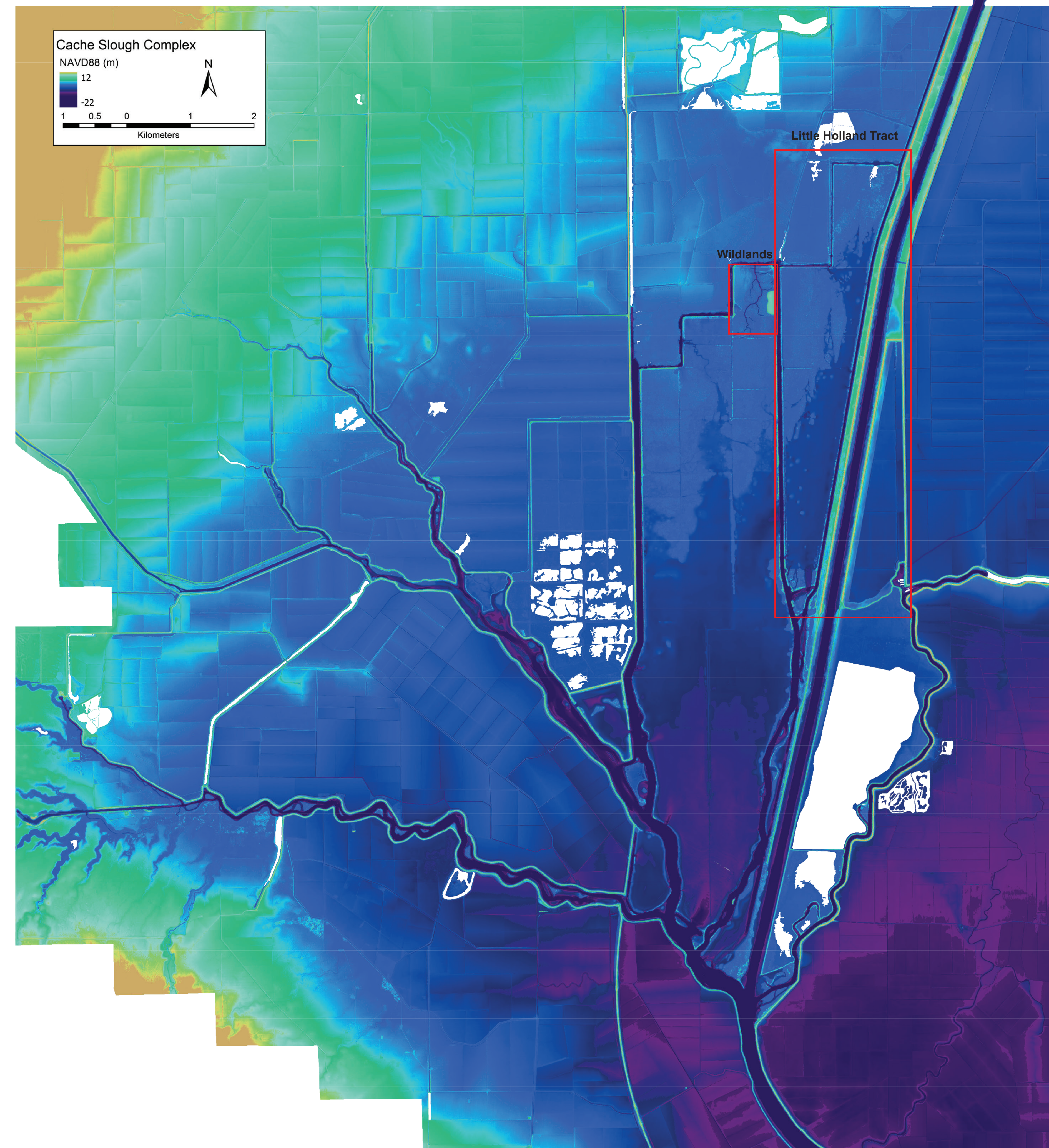


DWR collected additional bathymetric surveys of the Little Hastings Tract, Fong's Island, and the Sacramento Deep Water Ship Channel. Multibeam bathymetry was collected with a 5.5 ft EchoBot-ASV equipped with a Norbit iWBMS sonar system. Single beam data was collected with a 14 ft Equinox Eddyline Kayak equipped with CEE Hydrosystems CEE ECHO for receiver and transducer, and with an 18 ft Kingfisher 1825 Falcon XL equipped with Odom EchoTrac CV100 receiver and Odom SMSW200-4a 200 kHz transducer.



DEM Generation

Using methodologies previously developed in creation of 2017 SF Bay Delta DEM, USGS created continuous DEM surfaces for large areas with single beam data prior to merging with multibeam and topographic surveys (Fregoso and others, 2017). DWR built on techniques that they developed to seamlessly combine topographic lidar, with bathymetric surveys in channels Wang and others, 2018). We merged the new bathymetric and topographic data with existing datasets acquired from 2004 – 2019, to produce a seamless digital elevation model of the Cache Slough Complex with a grid resolution of 1 m.

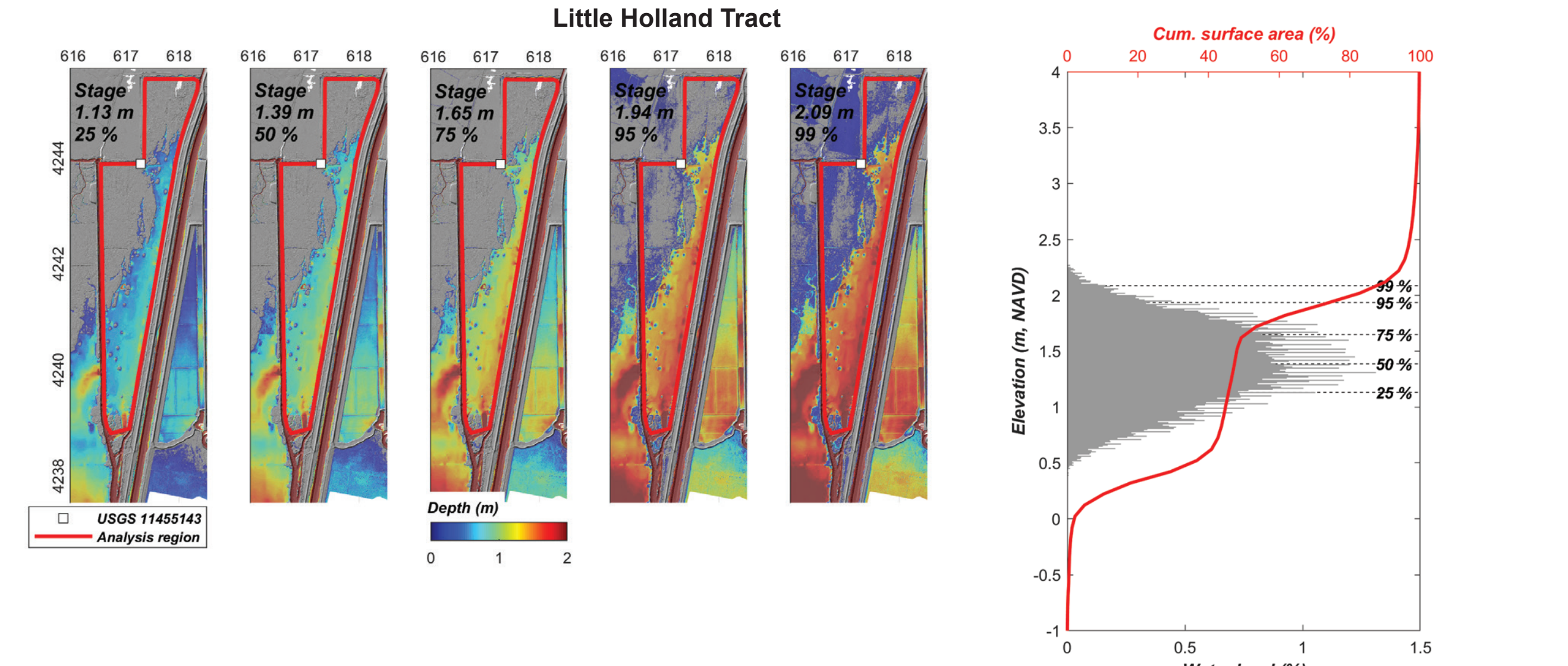


DEM and USGS Data Portal

Purpose

This creation of this DEM directly supports modeling and field studies in the region of the CSC. This work is part of a larger project funded by the U.S. Bureau of Reclamation to improve understanding of habitat quality in the CSC and the effects of restoration actions in the Sacramento – San Joaquin Delta.

Application



The map series show water depths at the measured tidal height at the gauge for stages in the tidal prism. The percentiles represent the distribution of tide heights in a time series.

The tide histogram plots show the distribution of tide heights as bars on the x-axis and stage on the y-axis. This shows how frequently a given stage was observed during the instrument deployment. The second x-axis shows the cumulative surface area for each site. This is the amount of pixels found at each elevation in the DEM.

References

Fregoso, T.A., Wang, R.F., Alteljevich, E., and Jaffe, B.E. (2018). San Francisco Bay-Delta bathymetric/topographic digital elevation model (DEM): U.S. Geological Survey data release, <https://doi.org/10.5066/F7GH9G27>.



Wang, R. & Alteljevich, E., Fregoso, T. A. & Jaffe, B. E. (2018). A Revised Continuous Surface Elevation Model for Modeling (Chapter 5). In Methodology for Flow and Salinity Estimates in the Sacramento-San Joaquin Delta and Suisun Marsh, 38th Annual Progress Report to the State Water Resources Control Board. California Department of Water Resources, Bay-Delta Office, Delta Modeling Section.

