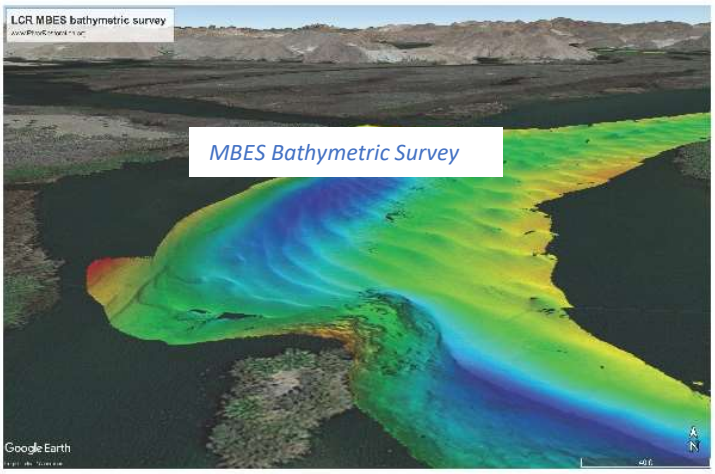
Lower Colorado River Assessment, Bathymetric and Sediment Data - 2021-2022

Client: U.S. Bureau of Reclamation
Owner: U.S. Bureau of Reclamation

Project Location: Lower Colorado River, AZ, CA, NV
Name of Project Manager/Engineer: Jason Carey, PE



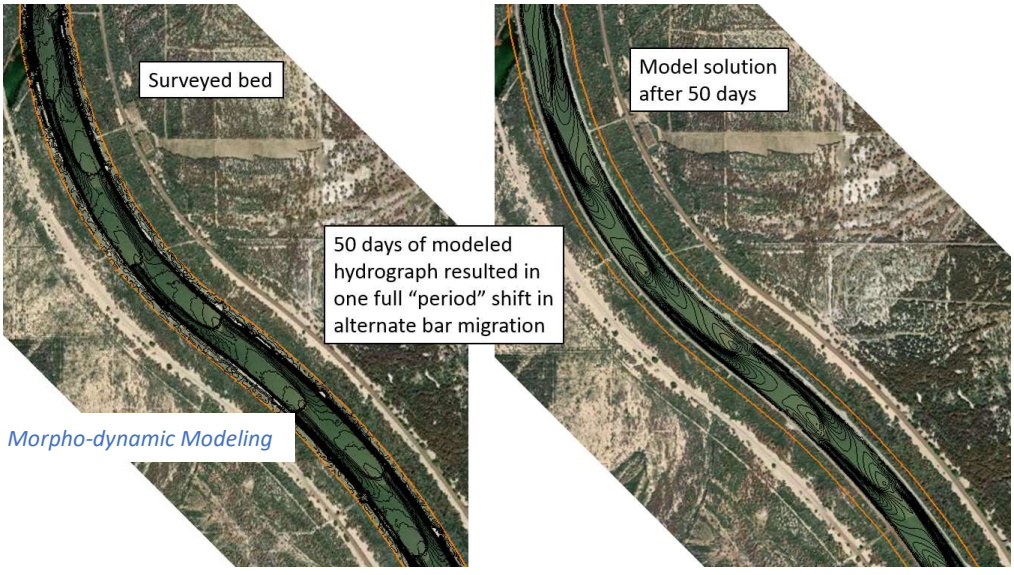
Description of Project: The Lower Colorado River Assessment (Project) is a significant effort to perform bathymetric survey and assess sedimentation of the Colorado River (River) between Hoover Dam south to the Southerly International Boundary (SIB) with Mexico. The Project area is 90 square miles of riverbed over more than 342 miles of river channel. Much of the area is extremely remote in the Mohave and Sonoran Desert wildernesses.

Survey ground control was established in October 2021, which could be accessed for survey check in, aerial ground control, and for RTK base set up. The control network was established with static methods and post processing on the precise ephemeris. Aerial lidar was acquired in November 2021 and included "green" lidar that has the ability to aerially acquire bathymetric data. Vessel-based bathymetric surveys were conducted in February 2022 to focus on the limited areas where lidar data were unable to penetrate to the riverbed. In order to survey the lidar void areas, and avoid shoals, real time corrections were required to safely and efficiently accomplish the vessel-based surveys. A new and novel correction service from Trimble was employed for the project. Final bathymetric accuracies of the mapping data were 10 cm RMSE vertical.

Sediment sampling of 339 bed sediments were collected throughout the Project area. Sediments samples were gathered using various techniques. The main sampling method was composed of using a Ponar, we also used the BM54, grab sample when shallow enough as well as field sieve and Wolman pebble count when more appropriate.

Coordination with Tribal entities was required for access to lands. QAQC and Safety Plans were prepared in accordance with USBR standards. No significant injuries occurred during the effort.

Sedimentation for the reservoirs Lake Havasu and Lake Mohave was assessed and Stage-Capacity and Stage-Area curves were created for the reservoirs.



Using the comprehensive lidar, bathymetric, and sediment sampling data, a detailed mobile bed morpho-dynamic model was created using SRH-2D version 13.2 for a three-mile section of the overall project reach. Gaged inflow and stage data near Cibola, AZ were used as boundary conditions. The formation and propagation of alternating sand bars observed and surveyed in the field were able to be re-created in the model. This modeling effort was able to validate of the ability of SRH-2D 13.2 to model the morpho-dynamic response of a sand bed channel to specific hydrologic input.