Metadata Report

Project Name: Measuring and modelling nearshore change in Lake Michigan- ***Survey of Point Beach, Wisconsin, July 2020***

Summary: Lake Michigan experiences quasi-decadal fluctuations between high and low water levels, resulting in variable impacts to navigation and tourism, as well as changes in shoreline position and coastal habitat extent. Recent high water levels are a concern for homeowners and policy-makers due to significant shoreline recession. Nearshore waves, currents and bathymetry are major factors influencing local sediment transport and shoreline behavior, but rigorous models of these processes are largely absent for Lake Michigan and frequent "real-time" surveying can be cost prohibitive for small communities. As such, there have been few attempts to quantitatively estimate potential rates and extents of wave-driven erosion and nearshore sediment transport at sandy coastal systems in the Great Lakes, particularly related to fluctuations in lake level. In this study we numerically model nearshore sediment transport and resulting changes in sandy beach and nearshore morphology in order to estimate future coastal geomorphic change in response to storms and varying lake levels.

This dataset is part of a series of repeat surveys documenting temporal changes to a 0.5 km extent of a sandy beach on Lake Michigan.

Personnel

- **PI:** LK Zoet, *UW Madison* & JE Rawling III, *UW Extension*
- **Additional team members:** C Volpano

Site Information

- Survey area is approximately 0.5 km of actively eroding sandy beach.
- **Site objective:** Use of aerial imagery and SfM to construct accurate, high resolution DEMs on multiple occasions for use in coastal morphodynamic modeling.
- **Site conditions:** Sunny, Calm weather
- **Date/time:** 08/12/2020, morning

Survey Results

- **Equipment used:** DJI Phantom 4 RTK, Emlid Reach RS2 Base+Rover
- **Errors:** Control points RMSE: [X (cm) 24.17] [Y (cm) 13.75] [Z (cm) 77] [Total (cm) 77.18]
- *For additional model parameters see attached Photoscan Processing Report
- **Collection methods:** Flight path created using DJI app for iPad with 80% image overlap with nadir angle and a ground resolution of 2.06 cm/pix. Additional oblique images were taken manually.

Products

- **Coordinate system of datasets:** WGS 84 UTM Zone 16N (ESPG:32616)/ NAVD88
- **Spatial resolution:** 2.06 cm/pix
- **Data formats:** LAZ point cloud, Raster DEM tiff

Misc Notes

- This project funded by the Wisconsin Geologic Survey and UW Madison Geosciences.
- This dataset included in a thesis for partial completion of a Master's degree from University Wisconsin, Madison WI (Volpano 2021)