Metadata Report

Project Name: *A comprehensive analyses of sediment delivery to Lake Michigan from coastal bluffs in South Eastern Wisconsin- **Warnimont Park, WI (11/23/2019)***

Summary: High lake levels are reducing beach area along the Lake Michigan coastline and allowing wave action to erode the bases of coastal bluffs at the highest rate of the past 30 years. Sediment budget calculations have shown that bluff erosion is the dominant source of sand and gravel-sized particles that are mobilized into beaches and the nearshore system. Researchers have found that the leading cause of bluff erosion is shallow to intermediate depth translational landslides. Therefore, estimating lake sediment budgets depends on an understanding of the mechanisms that lead to landslide failure. This study will provide a comprehensive analysis of bluff stability for bluffs affected by landslide failure coupled with an analysis of bluff composition to determine the composition of sediment contributions of coastal bluffs to the southeast Lake Michigan sediment budget.

This dataset is part of a series of repeat surveys documenting temporal changes to a ~100 m long extent of unconsolidated coastal bluffs on Lake Michigan.

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

Site Information
- **Site description:** Survey area is approximately 100 m of actively eroding bluffs composed of unconsolidated glacial sediments. Bluff height is approximately 35m from beach level. Beach composition is sand and cobbles (1-10cm).
- **Site objective:** Use of aerial imagery and SfM to construct accurate, high resolution DEMs on multiple occasions for use in sediment volume and shoreline change analysis.
- **Site conditions:** Partly cloudy, high winds
- **Date/time:** 11/23/2019, early afternoon

Last Edited: 2/27/19

Survey Results

- **Equipment used:** DJI Phantom 4 Advanced, EMLID Reach RS2 Base+Rover
- **Errors:** Control points RMSE: [X (cm) 2.4372] [Y (cm) 1.5561] [Z (cm) 1.6929] [Total (cm) 3.3507]
- *For additional model parameters see attached Photoscan Processing Report
- **Collection methods:** Flight path created using Maps Made Easy app for iPad with 80% image overlap with nadir angle and a ground resolution of 1.22 cm/pix. Additional oblique images were taken manually. Nine GCP coordinates were acquired using EMLID Reach RS2 Base+Rover and post-processed using RTKLIB tools and concurrent data from WISCORS station Franklin 2.

Products

- **Date of collection:** 11/23/2019
- **Coordinate system of datasets:** WGS 84 UTM Zone 16N (ESPG:32616)/ NAVD88
- **Spatial resolution:** 1.22 cm/pix SfM; 0.011 m average point spacing LAZ; 10 cm DEM;
- **Horizontal Accuracy:** XY RMSE (cm) 2.8917
- **Vertical Accuracy:** Z RMSE (cm) 1.6929
- **Data formats:** LAZ point clouds, Raster DEM Tiff

Misc Notes

- This project funded by Wisconsin Sea Grant Award Number R/RCE-08
- This dataset will be included in a thesis for partial completion of a Master's degree from University Wisconsin, Madison WI (Roland 2020)

Last Edited: 2/27/19