

First-Year Research in Earth Sciences: Dunes

Conference Presentation: Wong, Kei-Wing, Andrew Crago, Caroline Komodore, and Ty J. Nguyen (2018). “Humans Alter the Sediment Budget for Beach-Dune Environments in West Michigan.” Annual Meeting of the Michigan Academy of Science, Arts, and Letters, Central Michigan University (Mount Pleasant, MI), 9 March 2018; poster.

Abstract: Foredunes and beaches provide recreational opportunities and facilitate sediment storage and transport, but human activities also affect the sediment budget. Human influences on beach-dune sediment budgets are investigated at foredunes in Hoffmaster State Park and North Beach Park in Michigan. At each study area, we compared a human-impacted area with a nearby less-impacted area by measuring physical attributes (dune topography along a transect) and vegetation characteristics (plant height and density measured in random quadrats). Morphological and vegetation characteristics were obtained from field data and aerial photography. Foredunes in heavy-impacted areas had steep slopes flattened out and a reduction in vegetation density and height compared to the more natural areas. The impacted areas also had more litter and more management structures interrupting sand movement (sand fences). Our results suggest that human trampling leads to vegetation loss and amplifies the erosion in the foredune, while temporary physical structures increase the deposition on the beach. Sediment storage amounts in foredunes are significant because the dune is a buffer for extreme events (flooding and storms) and protects nearby physical properties from damage.