

First-Year Research in Earth Sciences: Dunes

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Abstract: High Great Lakes levels in 2019 caused large amounts of dune erosion, providing an opportunity to investigate dune impacts on coastal sediment budgets. Our study's focus was the Lake Michigan shoreline of Hoffmaster State Park. The goals were to map the beach-dune boundary along the shoreline, record and measure characteristics of sediment exchange, and collect baseline measurements to calculate dune erosion. We measured locations and heights of scarps, which are indicators that wave erosion added sand from the dune to the coastal sediment budget. We also mapped locations lacking scarp, where we looked for indicators that either there was no net movement of sand between beach and foredune, or that wave deposition was adding sand from beach to foredune. To measure scarp retreat, distances between reference points and the current scarp were measured. Results showed an abundance of high scarp, including scarp exceeding five meters in height where there was no foredune and wave erosion was cutting into higher dunes. Approximately 13 percent of the shoreline had no scarp. After a November storm, measurements showed significant scarp retreat. The high amount of dune erosion indicates a net positive input of dune sand to the coastal sediment budget.