

First-Year Research in Earth Sciences: Dunes

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Abstract: As Lake Michigan levels fall after peaking in 2020, changing conditions along the eastern shore allow for real-time study of dune system evolution, especially at the transition zone from beach to dune. This study investigates the development of sand ramps at the beach-dune boundary including observations of sand ramp characteristics and whether sand is moving up the ramps into the dune system. At P.J. Hoffmaster State Park, we measured the characteristics of sand ramps with GPS mapping, profile measurements, and recording vegetation presence. To measure sand movement into the dune system, we set up sand traps and erosion pins at the bottom and top of selected sand ramps. We also looked for visual evidence of sand deposition on dune surfaces above the ramps. Sand ramps along the beach-dune boundary were common. Their heights were measured up to two meters tall, with little vegetation observed on the ramps themselves. Some of the sand ramps were incomplete, ending prior to connecting with the original dune surface. We found evidence of newly deposited sand on dune surfaces above most of the sand ramps. Deposits occurred near both complete and incomplete ramps, suggesting that any remaining scarps did not hinder sand movement into the dune system. The sand ramps are likely to change as lake levels fall, leading to a new foredune and cutting off the sand supply to the existing sand ramps.