

First-Year Research in Earth Sciences: Dunes

FYRES: Dunes Research Report: Praamsma, Stephanie A., Olivia J. den Dulk, Kyle R. Post, Hudson R. Siegers, and Ben J. VanderWindt. 2017. “Wrack’s Influence on the Foredunes of Lake Michigan.” FYRES: Dunes Research Report #29. Grand Rapids (MI): Department of Geology, Geography and Environmental Studies, Calvin College. 19 p.

Abstract: Natural and anthropogenic debris on beaches influences sand transport and consequently the formation of the critical buffer against high energy waves—foredunes. When this debris is deposited by waves, it is known as wrack. Our study investigated the locations and characteristics of wrack relative to the rate of sand transport and deposition near the foredune at P.J. Hoffmaster State Park, Michigan. We utilized GPS units to map the areas of wrack along the beach and we used photos to document the appearance of wrack and the sand activity around it. We removed wrack from half of a designated study area and comparatively measured sand movement with sand traps and erosion pins over two weeks in fall of 2016. Observations revealed abundant wrack along the beach in varying amounts, containing organic as well as inorganic debris. The presence of wrack decreased the sand transport across the beach. Wrack also increased sand deposition on the lakeward side of the wrack and within the wrack compared to the area of beach where wrack was cleared. With this research we can better understand wrack’s relationship to sand transport and the foredune, which aids in effective management of the foredune as a natural barrier to wave erosion.