

First-Year Research in Earth Sciences: Dunes

FYRES: Dunes Research Report: King, Rebecca L., Edward R. Lambert, Benjamin W. Steenwyk, Jaimie E. Van De Burg, Jonathan D. Walt, Matt Wierenga, Elizabeth Wiley. 2017. "Oak Wilt and Dune Stability in North Ottawa Dunes." FYRES: Dunes Research Report #26. Grand Rapids (MI): Department of Geology, Geography and Environmental Studies, Calvin College. 16 p.

Abstract: Slope stability in coastal dune environments is threatened when surface stabilizers are removed. In North Ottawa Dunes, located in western Michigan, an infectious fungal disease requires the removal of hundreds of oak trees, which have extensive root systems used to maintain slopes. Our study investigated the vulnerability of the slope in areas marked for treatment. Using Trimble GPS devices, we mapped tree cover in two areas marked for tree removal and imported the data into ArcGIS to create a map showing the impact removal will have on these two areas. We analyzed DEM data to predict future slope instabilities based on slope angles, dune environment, and tree density. Surprisingly, a flat area may be more vulnerable to erosion following treatment as compared to a steeply sloped area where there are lower concentrations of oak trees. Our analysis also shows that new methods of mitigation are able to decrease tree mortality significantly, minimizing the impact of removal.