

First-Year Research in Earth Sciences: Dunes

FYRES: Dunes Research Report: Bleeker, Tyler, Cassandra Miceli, Josh Nieuwsma and Eleighna Prather (2013). "Efficacy of Sand Fences in Stabilizing a Steep Active Dune Blowout, Castle Park Reserve, Michigan." FYRES: Dunes Research Report #4. Grand Rapids (MI): Department of Geology, Geography and Environmental Studies, Calvin College. 20 p.

Abstract: Sand fences are a common management technique used to mitigate wind erosion and stabilize sand dunes. This project investigates the efficacy of sand fences in stabilizing an active dune blowout on the eastern shore of Lake Michigan. Research was conducted on a 50-meter high active dune at the Castle Park Reserve south of Holland, Michigan. In the spring of 2012, two sand fences were placed on the steep windward face of the dune in an attempt to stabilize the dune surface. In the fall of 2011 and 2012, erosion pins were used to measure rates of sand erosion and deposition along the axis of the dune. In the fall of 2012, Leatherman sand traps and grids of erosion pins were used to assess sand movement in proximity to the new sand fences. Along the axis of the dune, rates of sand erosion and deposition showed a decrease from 2011 to 2012, although there was little visual evidence of sand accumulation around the sand fences. Sand trap measurements demonstrated greater aeolian sand movement on the windward side of sand fences than the leeward side. However, rates of erosion and deposition near the sand fences were variable, showing areas of both erosion and deposition. Visual observations noted the tendency of deposited sand to slide down the steep face of the blowout. This study demonstrates that sand fences appear to be effective at reducing aeolian sand movement at this site, but they appear to be having a more limited effect on reducing the overall movement of sand on the active blowout face. When stabilizing steep slopes, dune managers should consider using sand fences in conjunction with another technique that reduces the downslope mass movements of sand.