

First-Year Research in Earth Sciences: Dunes

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Abstract: While there have been many studies of Michigan coastal dunes, few studies have focused on the interactions between dune management and human impacts. This project investigates how management actions affect the unmanaged trails on the North Beach Dune, a large parabolic dune in Ottawa County, MI. In 2004, the dune was advancing towards an important access road at 0.67 m/year; subsequently the managers implemented a combination of stabilization strategies including installing sand fences, extending the elevated boardwalk, planting vegetation, and constructing signs limiting access to the dune. In Fall 2012, we examined the characteristics of the unmanaged trails to evaluate whether the management efforts were successful, leading to a more stabilized dune. We mapped all of the unmanaged trails on the dune using GPS. We also measured the width of the unmanaged trails and the density of vegetation near the trails. We compared photographs from 2007, 2009, and 2011 to look for changes. Our results showed an increase in the number of unmanaged trails, but a decrease in trail widths. This stabilization of the unmanaged trails contributes to the stabilization of the entire dune. The highest trail density occurred in the area of the dune where the pre-2007 boardwalk ended; this suggests that visitors climbed over the railing at the end of the boardwalk. We conclude that the severity of the unmanaged trails has lessened since the management efforts have been implemented on the dune. Our study shows that management can successfully reduce human impacts in the form of unmanaged trails on a coastal dune.