

## First-Year Research in Earth Sciences: Dunes

**FYRES: Dunes Research Report:** Musch, Steven, Elaine Hilverda, Evan Legge, Natasha Strydhorst and Lucas Vander Bilt (2013). “Interactions Between Dune Trails and *Cirsium Pitcheri* Habitat.” FYRES: Dunes Research Report #5. Grand Rapids (MI): Department of Geology, Geography and Environmental Studies, Calvin College. 17 p.

**Abstract:** This study looks closely at the conditions of a threatened species habitat when it exists among unmanaged dune trails. A fourteen-acre plot of land on the eastern coast of Lake Michigan was recently purchased for conversion from private land into a dune preserve. This property includes hummocky foredunes, blowouts, and two stabilized parabolic dunes, and it serves as critical habitat for the threatened species *Cirsium pitcheri* (Pitcher’s Thistle). To determine the condition of the habitat, a study was done to locate all specimens, gauge the condition of the population, and explore the effects of anthropogenic disturbance. GPS mapping was used to create an inventory of all specimen locations and all observed trails through the property. Measurements were taken of each plant to gauge the age of the population and the GPS results were assembled in a map to observe the density. Our results showed 206 *C. pitcheri* specimens, most of which appeared to range from three to six years of age. Spatial analysis of the GPS data showed two distinct groupings of plants along with numerous unmanaged trails. The largest trail, which divided the two groups of plants, extended from the low point between two large parabolic dunes out to the beach. We observed that the heavy use of this trail combined with an extension of the stabilized portion of the dunes produced unfavorable conditions for *C. pitcheri*. With these results we were able to provide the new property owners with important information regarding critical habitat of *C. pitcheri*.