

First-Year Research in Earth Sciences: Dunes

FYRES: Dunes Research Report: Reynolds, Charlotte O., Rachel M. Conover, Megumu Jansen and Nathan Mulder (2016) Investigation of Variables Affecting a Rare Plant Species, *Cirsium pitcheri*, FYRES: Dunes Research Report #18. Grand Rapids (MI): Department of Geology, Geography and Environmental Studies, Calvin College. 15 p.

Abstract: *Cirsium pitcheri*, an endangered plant found only in specialized dune conditions, serves as an exemplar of environment-vegetation interactions. We investigated these interactions by focusing on variables that might affect the survival and growth of *C. pitcheri* on Mt. Baldy in P.J. Hoffmaster State Park, Michigan. Our objectives were to document plant characteristics and investigate the optimal conditions for plant growth. Using GPS units and ArcGIS visualization, we mapped the locations of the plants and dune sub-environments. Measurements of leaf length, plant health, slope angle, and aspect were recorded for each located plant. In addition, vegetation density and diversity were measured and recorded in each dune sub-environment. Study results showed *C. pitcheri* was abundant in several dune sub-environments, including dune ridges and slipfaces, as well as deflation areas of blowouts. A majority were found on south-facing slopes and these were also the healthiest individuals. No significant relationship was found between slope angle and maximum leaf length or plant health, but results did show a majority of individuals growing on slopes of less than the angle of repose. This research offers a means to better understand the interactions of *C. pitcheri* with its dune environment and could assist restoration efforts by suggesting dune locations where *C. pitcheri* would most likely thrive.