



Dune Management and a Great Lakes Threatened Species

Carolina Angulo, Anna Camilleri, Ethan DeVries, and Anna Selles

Abstract

This study describes the investigation of the rare *Cirsium pitcheri*, or Pitcher's Thistle, on the dunes of Rosy Mound Natural Area. Our research focuses on how the *C. pitcheri* population is affected by managed and unmanaged trails (caused by deer and humans). We mapped managed and unmanaged trails with the GPS. We measured the longest leaf length and marked the location of *C. pitcheri* in our study site. Results show that there is an abundant amount of *C. pitcheri* at the study site. The *C. pitcheri* were larger on the dune ridge and smaller by the managed paths. Deer tracks and droppings show evidence of deer. Our study shows that *C. pitcheri* thrive both near managed and unmanaged paths, due to both the park's management strategies and sand disturbance created by the unmanaged trails.

Introduction

Cirsium pitcheri (Pitcher's Thistle) (fig. 1) is a threatened species susceptible to human and animal activity. Our study at the Rosy Mound Natural Area dune system focused on effects of managed and unmanaged trails [1] and deer impacts on the population of *C. pitcheri*.

Our research objectives were to map the *C. pitcheri* population, map managed and unmanaged trails, and to observe evidence of human and deer impacts.



Fig. 1: *Cirsium pitcheri* plant

Study Area

Our research took place at Rosy Mound Natural Area (fig. 2) just south of Grand Haven, Michigan.

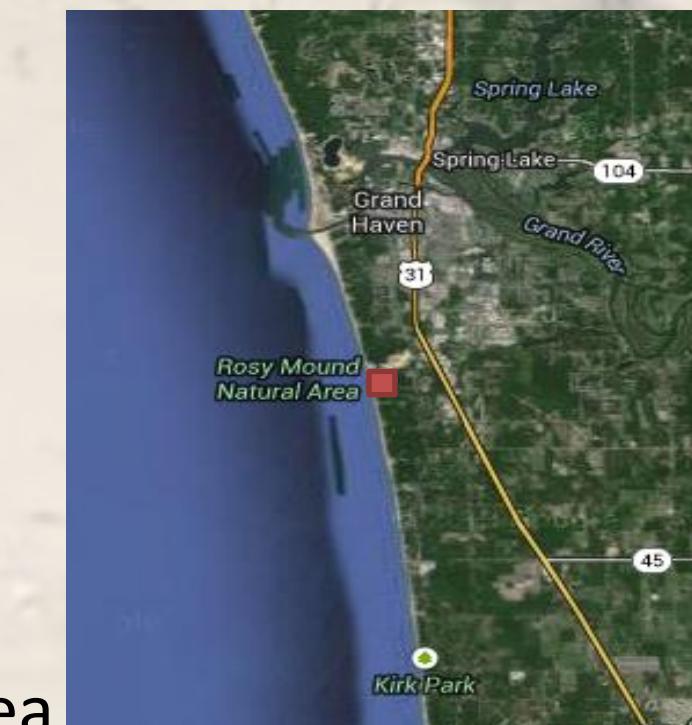


Fig. 2: Location of Rosy Mound Natural Area

Study Methods

Our team collected location data of *Cirsium pitcheri* (fig. 3) and mapped managed and unmanaged trails using the GPS Trimble units. We recorded the longest leaf length and used ArcGIS to aggregate our data and to analyze the relationship between the *C. pitcheri* and the trails.



Fig. 3: Flagging and measurement methods

Results

Population Characteristics

A total of 253 *C. pitcheri* was mapped and the average leaf length was 10-20cm long (fig. 4). Plants growing in groups had shorter leaf lengths while individual plants had longer leaf lengths [2].

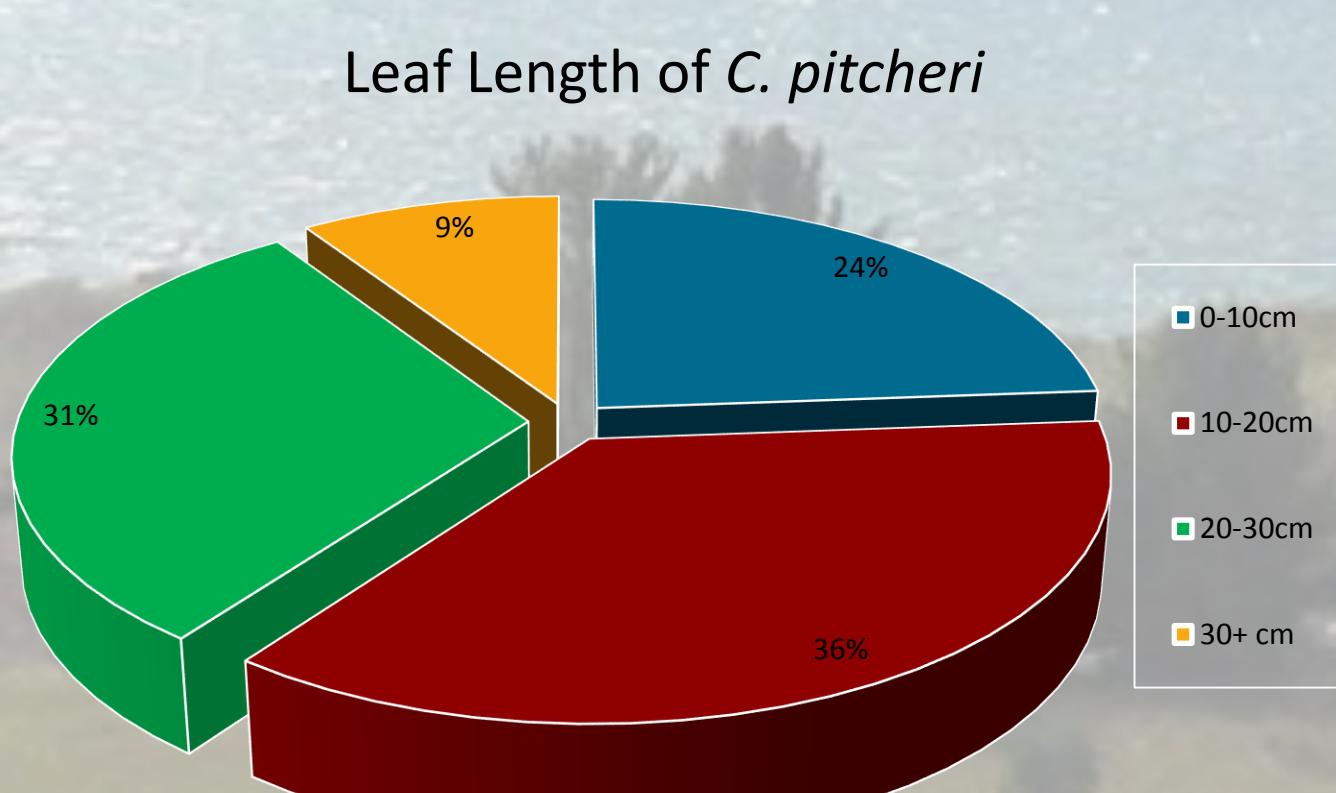


Fig. 4: Varying leaf lengths of *C. pitcheri* plants

Population Location

Research results indicated that *C. pitcheri* grew around areas of managed and unmanaged trails (fig. 5). Plants located by managed trails tended to have shorter leaf length and plants by unmanaged trails had longer leaf lengths.

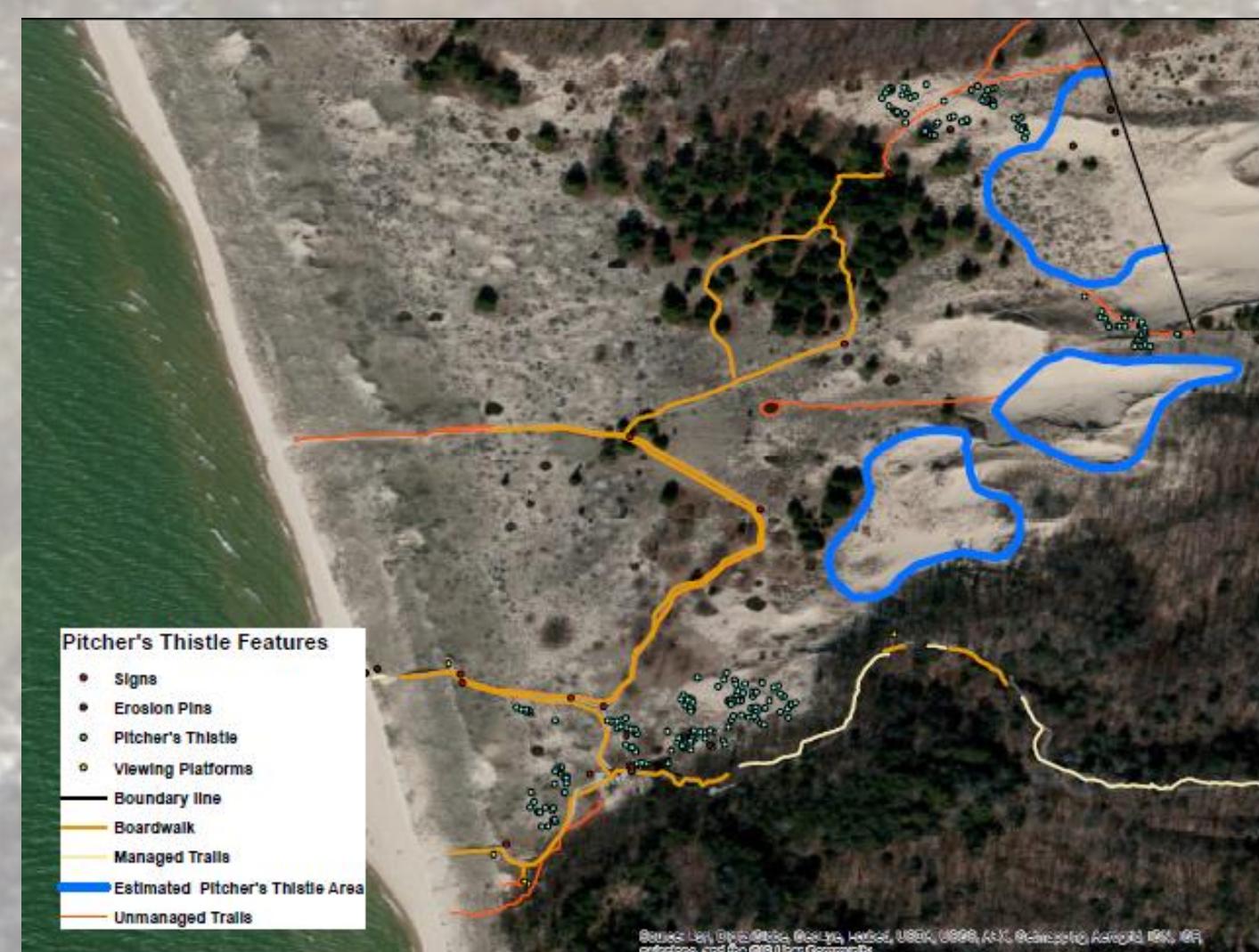


Fig. 5: Managed and unmanaged trails

Deer and Human Impact

Numerous trails, tracks (fig. 6), and droppings suggested significant deer impact in the Rosy Mound Area. Human traffic is effectively managed by boardwalks.



Fig. 6: Deer track

Discussion

Our results indicate that the *C. pitcheri* has grown around the unmanaged trails (fig. 7). These trails are created by deer and could be beneficial to *C. pitcheri* because the deer provide movement of sand around the plants.



Fig. 7: Unmanaged trail

These moderately disturbed areas could in fact promote the *C. pitcheri* population since "the existence of this species is dependent on natural disturbances in a sand dune" [3]. *C. pitcheri* plants tended to be larger further away from the managed trails (fig. 8) due to more room resulting from the lower density of vegetation.

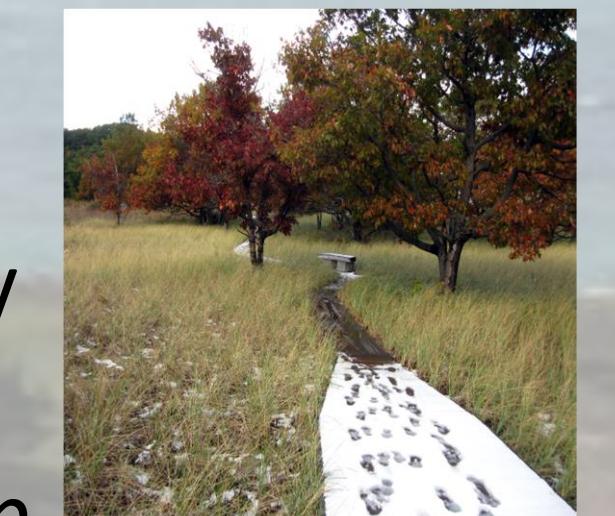


Fig. 8: Managed Trail

Conclusions

We mapped 253 *C. pitcheri* at the Rosy Mound Natural Area as well as managed and unmanaged trails. We observed deer trails and impacts, which are beneficial to *C. pitcheri*.

Acknowledgments and References

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References:

- [1] Gauthier, Martha, Emily Crowe, Lindsey Hawk, Neil Emery, Paul Wilson, and Joanna Freeland. 2010. "Conservation genetics of Pitcher's thistle (*Cirsium pitcheri*), an endangered Great Lakes endemic." *Botany* 88(3): 250-257.
- [2] D'Ulisse, Angelo and M.A. Maun. 1996. "Population ecology of *Cirsium pitcheri* on Lake Huron sand dunes: II. Survivorship of plants." *Canadian Journal of Botany* 74(11): 1701-1707.
- [3] Girdler, E. Binney and Theresia A. Radtke. 2006. "Conservation implications of individual scale spatial pattern in the threatened dune thistle, *Cirsium pitcheri*." *The American Midland Naturalist* 156: 213-228.