



Managing Trails on a Dune to Protect Pitcher's Thistle

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Abstract

Our study was conducted in a new dune preserve located 0.5 km north of Meinert Park. The property (hereafter referred to as Dune A) was recently purchased by the West Michigan Land Conservancy, which was concerned with the protection of the local Pitcher's Thistle (*Cirsium Pitcheri*) population. The ultimate goal of this study was to analyze human impacts (particularly unmanaged trails) in relation to this population and to suggest a management strategy to reduce and/or eliminate those that had a negative effect. Trimble GPS units were used to collect data points identifying the location of each plant (206 total), while leaf lengths were measured and recorded. These data points were compared to the location of various unmanaged trails in the system, which were also mapped via GPS. The study results indicated that the Thistle population was adversely influenced by the presence of these unmanaged trails, especially where they are the most condensed (see figure 3: area around the largest trail). In other, similar case studies, human impacts such as these are noted to further threaten this delicate species (Santoro et al., 2012). While our study was conducted with the intent of developing a sustainable management plan specifically for this area, its results may have more universal relevance for later studies and protection initiatives.

Introduction

Prior research indicates that Pitcher's Thistle (*Cirsium Pitcheri*) is negatively influenced by excessive human activity in its habitat (Santoro et al., 2012). Our study focused on finding an effective management plan to reduce and/or control some of these human factors (such as unmanaged trails) that expose the species to harmful influences. Our research was intended to propose a suitable management scheme to protect this vulnerable species on Dune A.

Objectives:

- Assess the health of the Pitcher's Thistles
- Produce a map of Pitcher's Thistle and unmanaged trail locations for analysis and comparison.



Figure 1. Pitchers Thistle is pictured here on Dune A.

Study Area and Methods

Our research took place in a recently purchased dune ecosystem. A general survey of Dune A was conducted over three weeks from October to November, 2012 with one observation period each week.

Our team took quantitative measurements including GPS mapping of Pitcher's Thistle locations in the area and the routes taken by the unmanaged trails throughout the dune area (figure 3).

The measurements were compared to analyze the impacts of human influence on the sensitive Pitcher's Thistle population. A leaf length measurement was taken for each plant, and a sample of them were evaluated based on relative health.

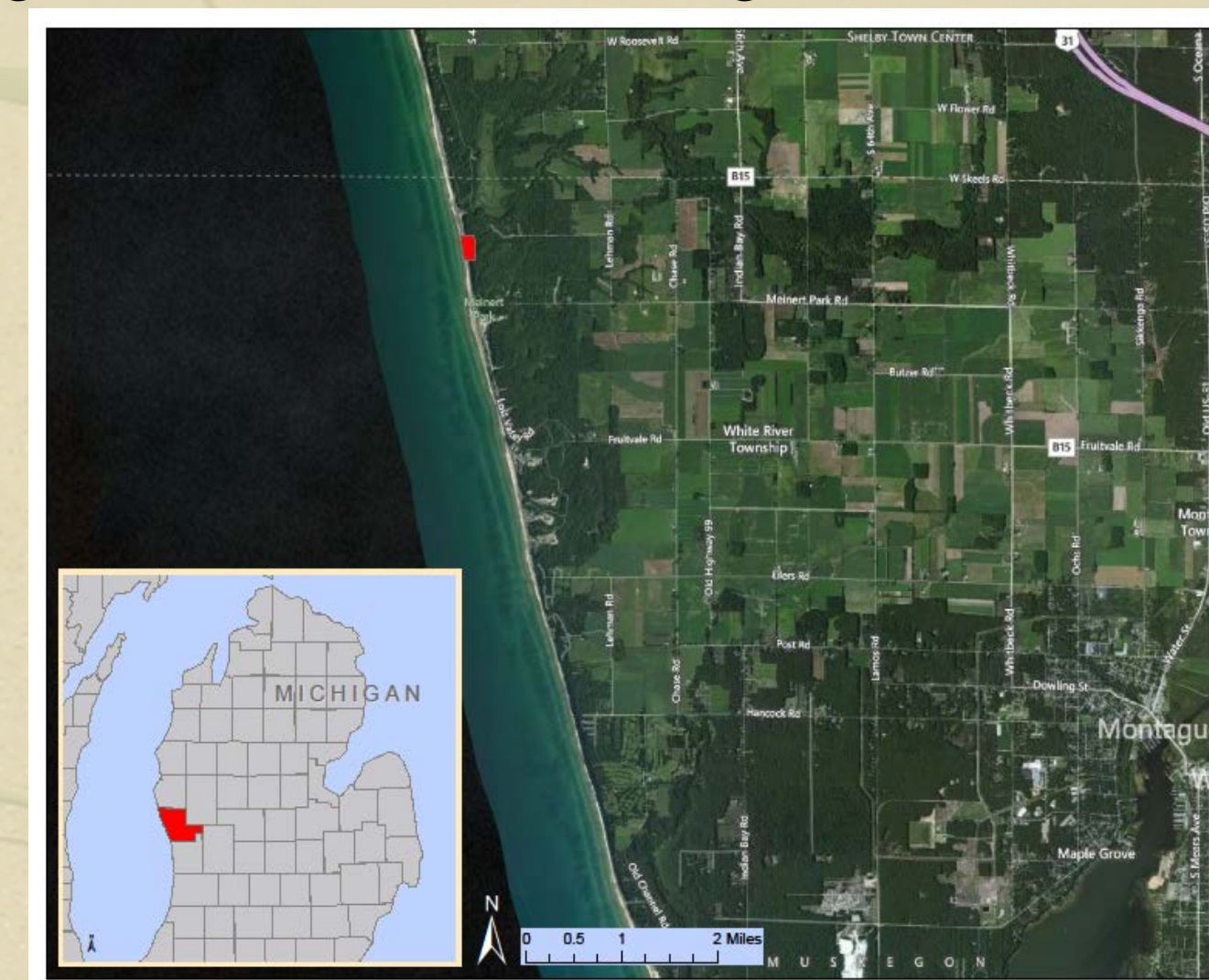


Figure 2. Study Location.

Discussion

Since our results indicated a relationship between unmanaged trails and a decreased density of Pitcher's Thistle, a management plan is necessary. The Land Conservancy is considering constructing a single managed trail to help minimize use of unmanaged pathways. The results of our study imply that this strategy would be effective: it could limit the impacts of unmanaged trails on the Pitcher's Thistle population, and has proven effective in a similar context (Carlson and Godfrey, 1989). We would also recommend educational signage to inform dune visitors about the threatened nature of the Pitcher's Thistle. The predominant range of leaf lengths, coupled with the vicinity of unmanaged trails, suggests that the intensity of human impact in the area has little correlation to plant size, despite the relationship indicated between species density and these same trails.

Conclusion

206 Pitcher's Thistle plants were observed in the study site (figure 3). Of these, the vast majority were located on the foredune, with a smaller number present in the blowout of the parabolic dune. The results indicate a probable correlation between trail density and decreased Pitcher's Thistle density. These results compare favorably with others in similar contexts (Seeliger, 2003). The area in which the plants were observed in the lowest densities was that in which the least sand movement occurred (the dense forest foliage on the parabolic dune). We found that the size (Girdler and Radke, 2006) of the thistles was not impacted by the proximity of the trails.

Results

The research results indicated a relationship between the density of unmanaged trails and the comparative density of Pitcher's Thistles (figure 3). Where the trails were widest and most numerous, the plants were fewer and further between. We also noted that this area was where the pioneering species were replaced by later succession forest plants.

A significant portion of the plants fell into the 20.1-30cm range of leaf lengths (figure 4). Of 206 total plants, it is significant to note that none were located in the near vicinity of the main trail (figure 3).

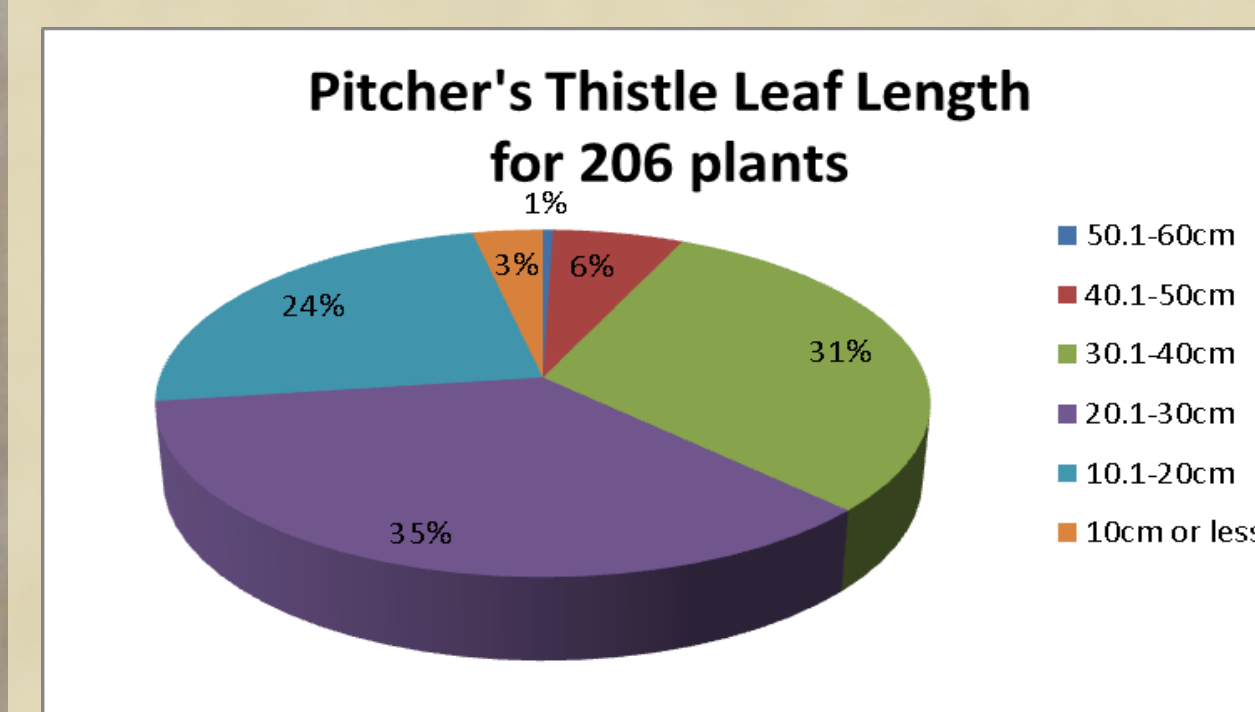


Figure 4. Pitcher's Thistle leaf length.



Figure 3. GPS Data map.

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