

Characteristics of Trails in Relation to Blowouts in Hoffmaster State Park

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Abstract

Hoffmaster State Park contains a large number of unmanaged trails and blowouts. Our study investigated the relationship between the characteristics of unmanaged trails and blowout location on the dune ridge. Trail segments were mapped with GPS and categorized as leading into a blowout, near a blowout, and not near a blowout. Segment characteristics such as trail width and vegetation height on and off trail were recorded. A total of 85 trail segments were mapped. Results showed that the vegetation height was the shortest on the trails leading into blowouts and tallest on the trails not near the blowouts. This suggests that there is a greater amount of foot traffic on the trails leading into the blowouts. This information will be useful for state park officials in determining plans for future management.

Introduction

Studies have shown that an increase in demand for recreational use by the public has led to greater pressure on dune systems [1], which could lead to further damage and erosion on trails. We investigated the relationship between unmanaged trails and the presence of blowouts on some Michigan dunes.

Objectives

- 1) To map trails on a dune ridge.
- 2) To record the characteristics of these trails.
- 3) To compare trail data with blowout locations to see if there are patterns.

Study Area



Figure 1: The location of Hoffmaster State Park



Figure 2: Dune ridge in Hoffmaster State Park.

The study was focused on the dune ridges in P.J. Hoffmaster State Park (Fig. 1 and 2).

Methods

We used GPS to map each trail segment, and we recorded vegetation density and condition and trail location in relation to blowouts (Fig. 3). We also recorded trail width and the heights of vegetation located on and off-trail.

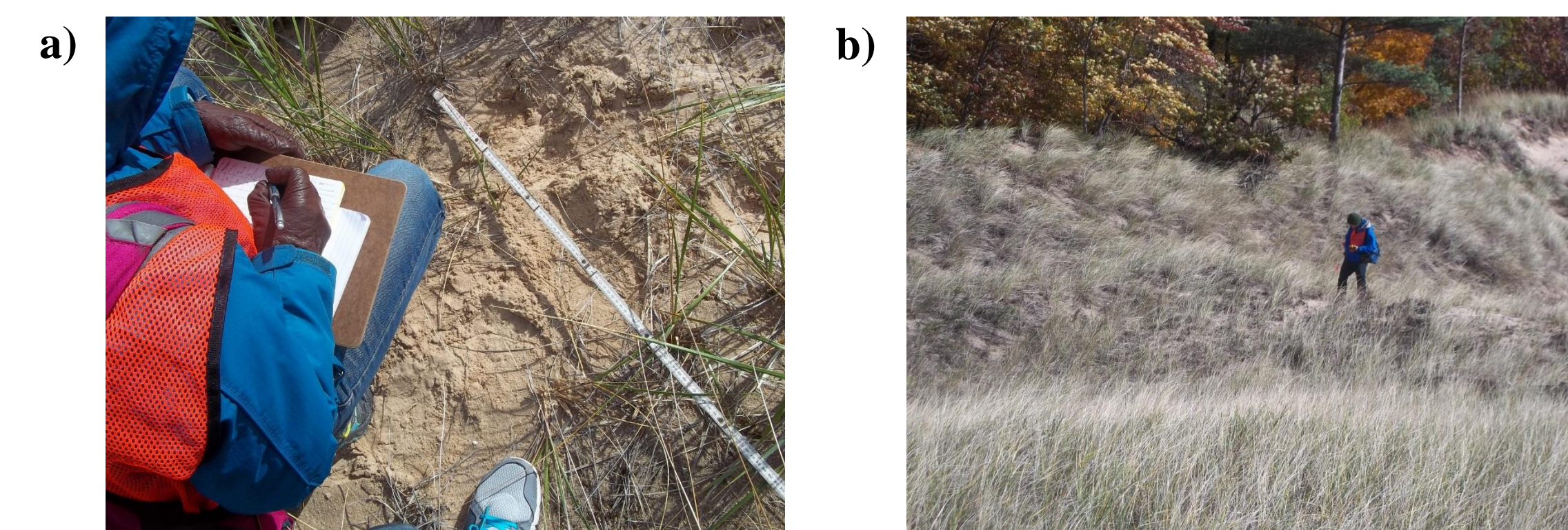


Figure 3 a) Measuring and recording trail width and b) mapping trail segments along the dune ridge.

Results

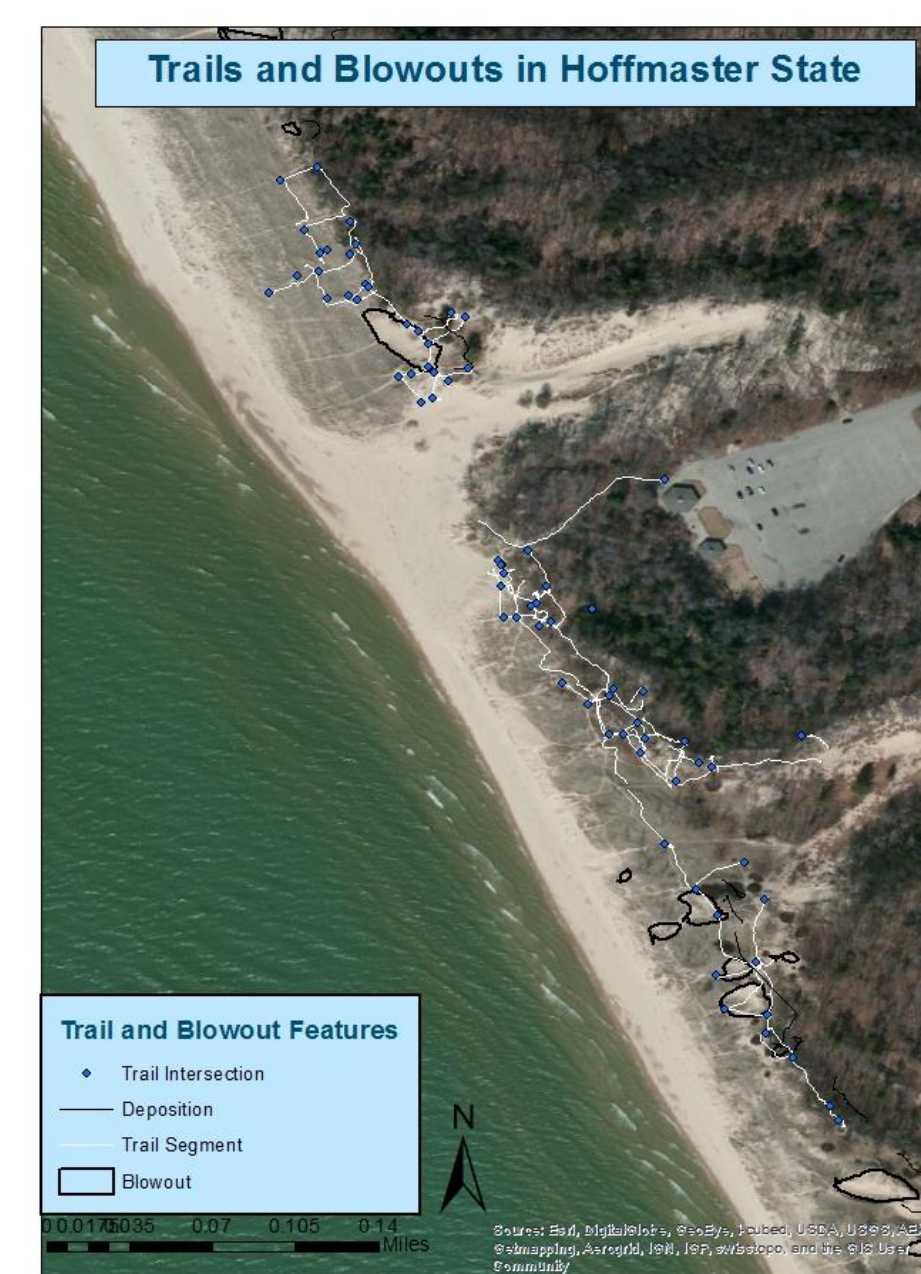


Figure 4: Mapped unmanaged trails and blowouts in the study area.

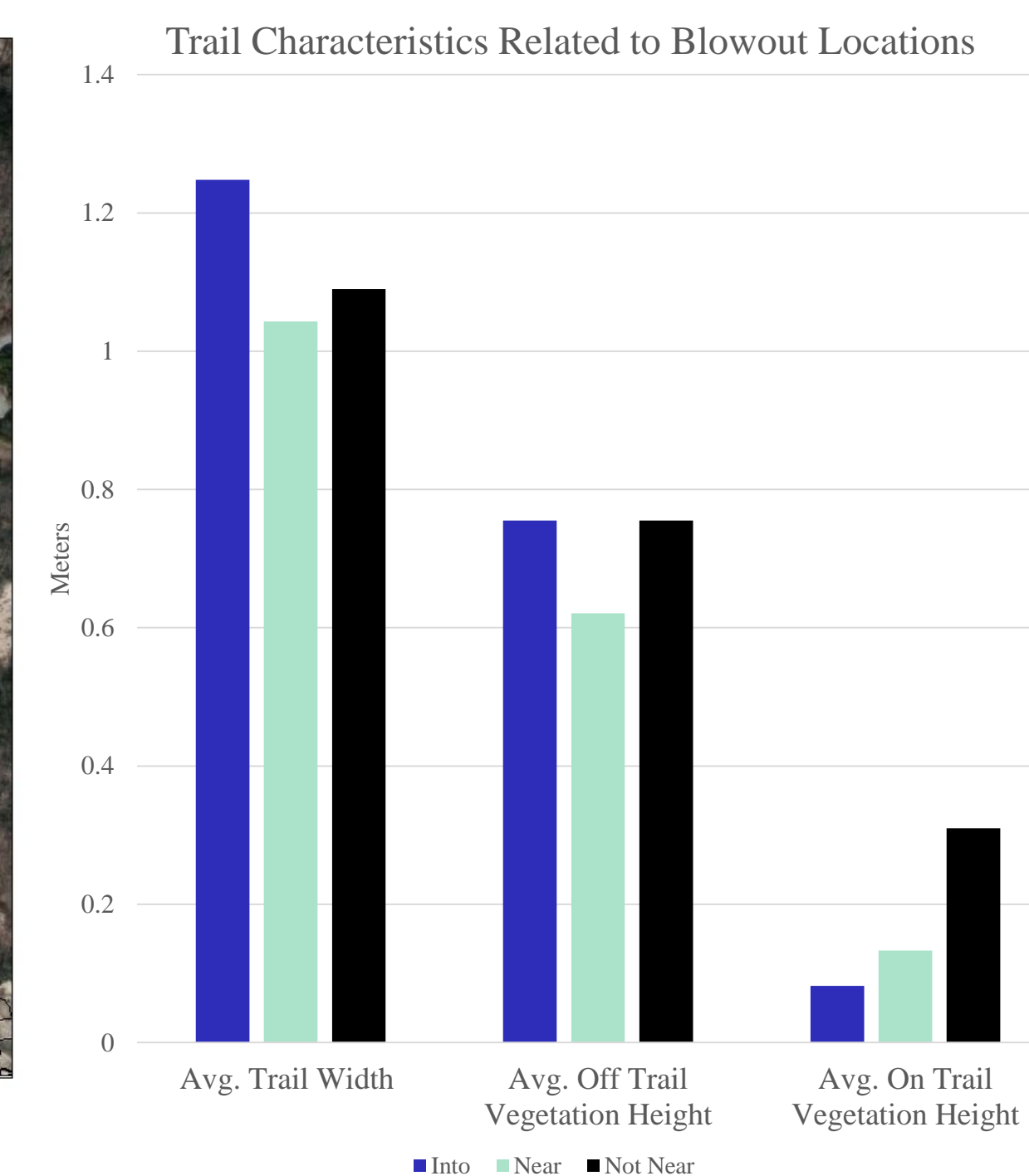


Figure 5: This graph shows the averages of three different trail characteristics.

Our study area contained 85 trail segments (Fig. 4); 15 led directly into blowouts, 17 were near blowouts, and 53 were not near blowouts. The on-trail vegetation height for trails not near blowouts was much greater than those near or leading into blowouts (Fig. 5).

Discussion

The unmanaged trail system on the dune ridge was both complex and interconnected. Our results suggest the greatest amount of traffic occurs on trails leading into blowouts (Fig. 6). This is supported by related past studies [2,3].



Figure 6: Bare sand trail leading into a blowout.

Conclusions

We mapped 85 trail segments along a section of the Hoffmaster dune ridge. Only 38% of the trails led directly into or were located near blowouts. On-trail vegetation height decreases as a trail's proximity to a blowout increases.

Acknowledgements

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References

- [1] Bowles, J.M. & Maun, M.A. 1982. "A Study of the Effects of Trampling on the Vegetation of Lake Huron Sand Dunes at Pinery Provincial Park." *Biological Conservation* 24:273-283.
- [2] Kutiel, P., Eden, E., and Zhevelev, Y. 2000. "Effect of experimental trampling and off-road motorcycle traffic on soil." *Environmental Conservation*. 27: 14-23.
- [3] Vallés, S.M., Gallego-Fernández, J.B., and Dellafiore, C.M. 2011. "Dune Vulnerability in Relation to Tourism Pressure in Central Gulf of Cádiz (SW Spain), a case study." *Journal of Coastal Research* 27 (2): 243-251.