

Boardwalk Effectiveness: Enjoyment vs. Preservation

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ABSTRACT

Boardwalks are a popular management technique for trails in sandy environments. Our study investigated how the boardwalk at Hoffmaster State Park on Lake Michigan impacted the dune. We used our data to see what changes occurred over time at the site. Our methods included vegetation transects near the boardwalk, GPS mapping of the boardwalk and unmanaged trails, and erosion pins across the dune. There are unmanaged trails running predominantly towards the beach. We also found that beneath the boardwalk, the surface is roughly 70% bare sand. We found that the design of the boardwalk encourages scenic viewing yet also allows access to the unmanaged trails.

STUDY AREA

We studied the Dune Climb at P.J. Hoffmaster State Park. We limited the study area to the parabolic dune that the managed boardwalk covered. The park and dune lies south of Muskegon on the western coast of Michigan.

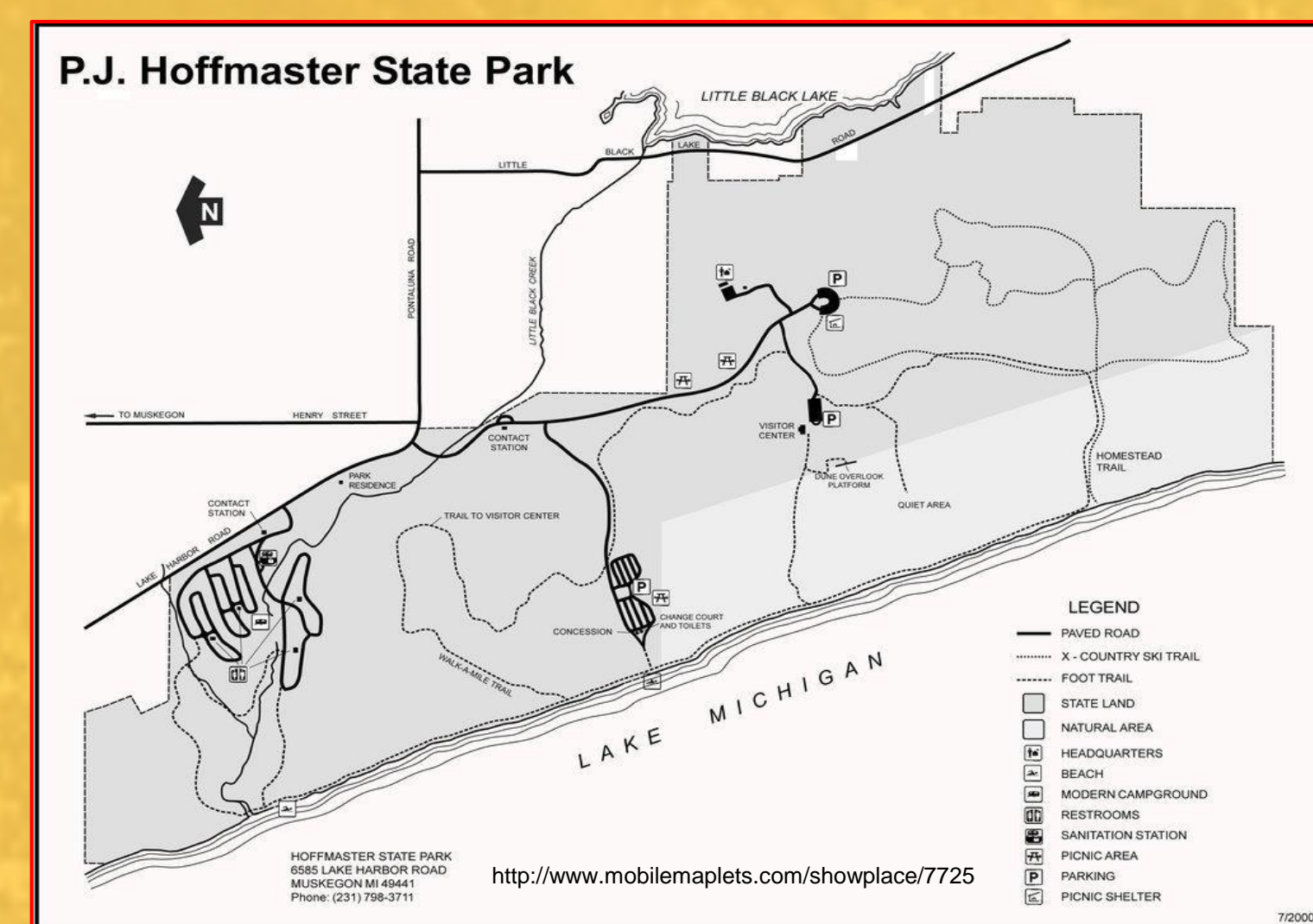


Figure #1 Park map of P.J. Hoffmaster State Park^[1]. The boardwalk and study area can be seen to the west of the visitor center

METHODS

- We used a GPS to map out the unmanaged trails and the boardwalk
- We interviewed park naturalist, Elizabeth Brockwell-Tillman specifically about the Dune Climbs^[2].
- We administered questionnaires regarding boardwalk activities and experiences to park visitors and left more in the visitor center for use.
- We took seven vegetation transects over the unmanaged trails to measure density, height, and species.
- We placed erosion pins along the unmanaged trails.
- We performed an assessment of boardwalk features.

DISCUSSION

The construction of the boardwalk on the Dune Climb was such that, while there was a railing, the spacing between the boards provided many access points onto the dune surface. According to the park ranger, the dune regulars have developed a culture of “Dune Walking”^[2] which has helped create the unmanaged trails and may do more damage to the dune than seasonal visitors. The unmanaged trails had significantly less vegetative cover than the surrounding areas; similarly, the boardwalk had mostly bare sand underneath it. We found that there was more sand movement along these bare sand areas than there was in vegetated areas. With a reduction in trampling from less unmanaged trails, studies show diversity increases also.^[3]

INTRODUCTION

The Dune Climb Boardwalk is up for replacement in the near future. This undertaking has necessitated a study of the boardwalk’s effectiveness at protecting the dune and encouraging people to experience the dune environment. Our study incorporates the assessment technique used by Randall and Newsome (2008)^[1], adds an examination of erosion along unmanaged trails, and looks at vegetation transects along the boardwalk and unmanaged trails.

STUDY OBJECTIVES:

- To better understand the relationship between the boardwalk and unmanaged trails
- To examine how and why the boardwalk is used
- To look at how the human impacts are affecting the dune
- To assess boardwalk conditions

RESULTS

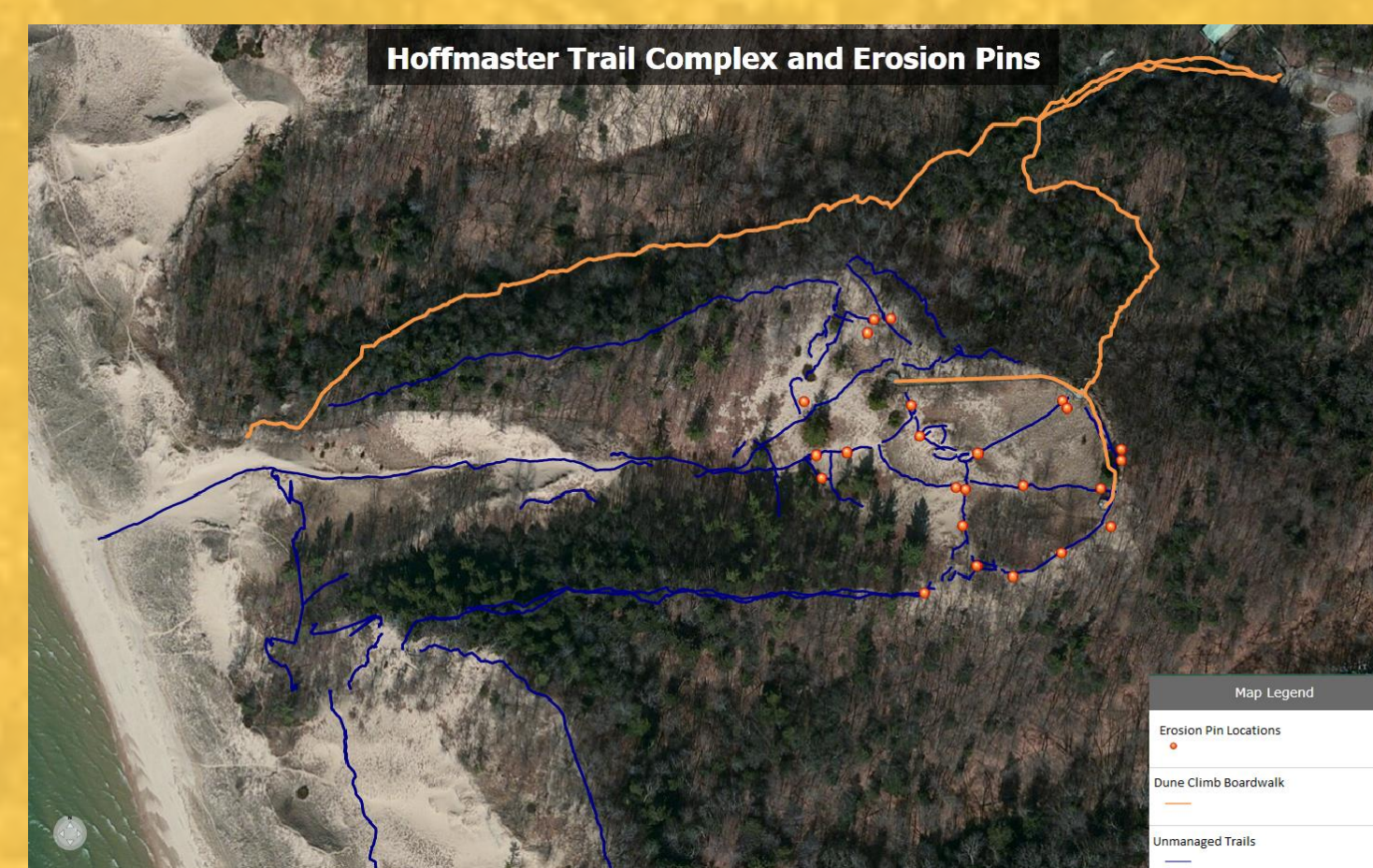


Figure #2 Map of Unmanaged Trails in the Dune Climb Boardwalk Area. This map shows unmanaged trails starting at many points along the crest of the dune and funneling into three pathways running towards the beach, one along each wing of the dune and one down the center. The map also has points where erosion pins were placed. The map also shows the location of the boardwalk making a semi-circle along the crest of the dune.

A network of unmanaged trails were found traversing the dune which primarily led to other dunes and the beach. The majority of these trails contained primarily bare sand in the main pathway.

We received five completed questionnaires over a period of two weeks. 100% of those surveyed use the boardwalks and managed trails to enjoy the scenery at the dunes while 40% wrote that they go to the dune to run down it.

The vegetation transects showed mostly a dense monoculture of *Ammophila breviligulata* primarily in the trough of the windward side. The crest had a notably less amount of *Ammophila* and the boardwalk had large patches of bare sand underneath it too.

The stairs leading up to the boardwalk were in poor quality with warped boards and sand pushing against areas. The main walkway was more solid, but contained a few signs of poor quality.

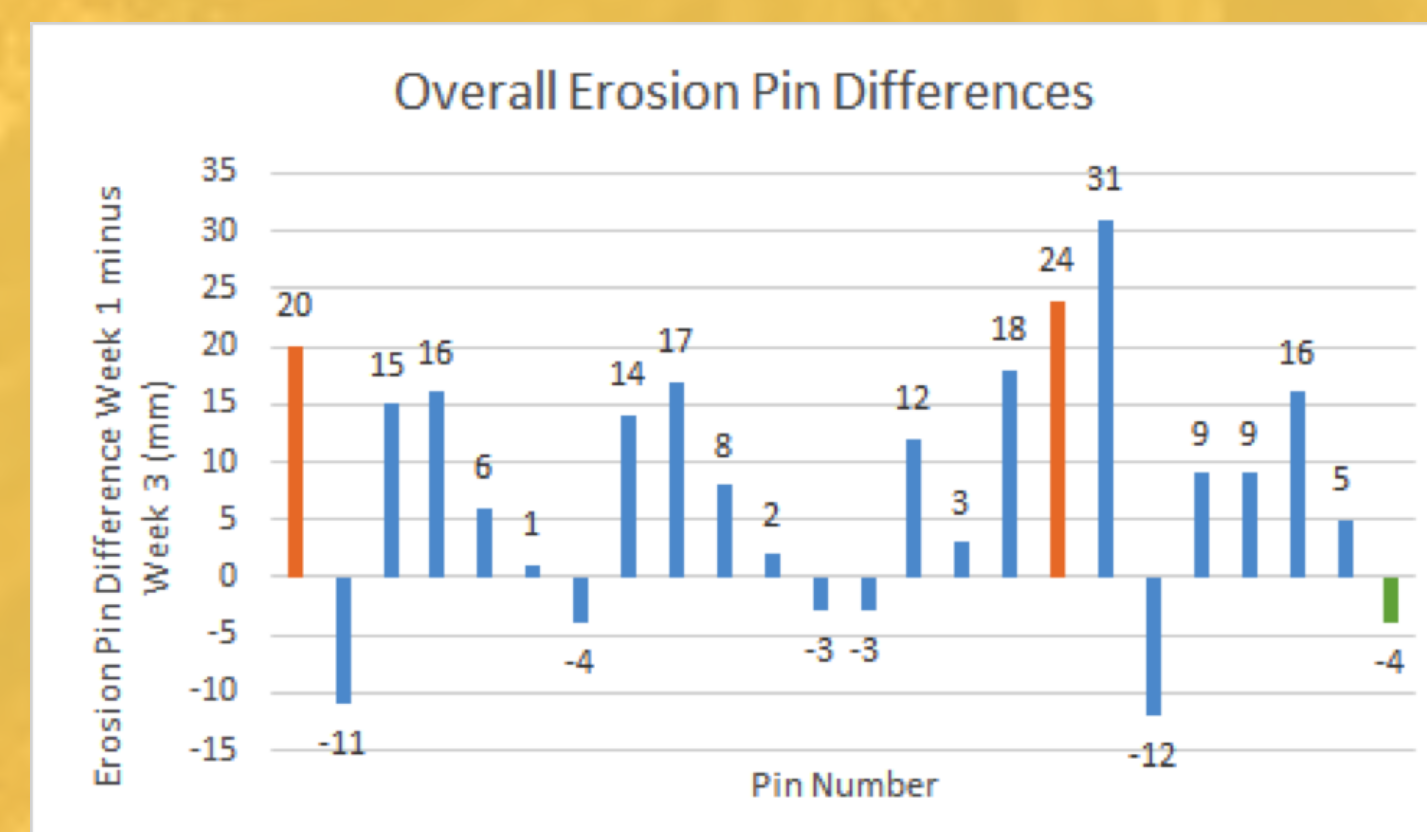


Figure #3: Overall Erosion Pin Differences
The bars marked with orange fill represent data where the third measurement was not recorded due to vandalism, the change from the second week was recorded instead. The bar marked with green represents our control pin which was not placed on an unmanaged trail, but was instead placed inside of a heavily vegetated area. The graph shows overall deposition at most erosion pin sites.

CONCLUSION

In our assessment, we concluded that while the current boardwalk design is effective at bringing people out to the dune, there could be more ways it can be effective in keeping visitors on managed trails. This could be achieved by building railings with less convenient ways to get off of boardwalk.



Figure #4: Photo of Dune Climb Boardwalk. This picture shows the study area for this project. It can be noted the weathered look of the majority of the boardwalk. A noticeable gap in the railings can also be seen, big enough to allow someone to pass through.

ACKNOWLEDGEMENTS

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Works Cited

- [1] Randall, M., and David Newsome. 2008. "Assessment, evaluation and comparison of planned and unplanned walk trails in coastal south-western Australia." *Conservation Science West Australia* 7(1): 19-34.
- [2] Elizabeth Brockwell-Tilman. Informal interview. Hoffmaster State Park, 10/30/14.
- [3] Santoro, R., Tommaso Jucker, Irene Prisco, Maria Carboni, Corrado Battisti, and Alicia T. R. Acosta. 2012. "Effects of Trampling Limitation on Coastal Dune Plant Communities." *Environmental Management*. 49: 534-42.