



Effectiveness of Management Efforts on Mt. Pisgah

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Abstract

Mt. Pisgah is a large parabolic dune that is located near Holland State Park in Holland, Michigan. In 2005, Deanna van Dijk and student Robert Vink did a study to measure the condition of the dune as well as the amount of human impact. The study called for a comprehensive management strategy and since then, different management techniques have been implemented to maintain the stabilization of the dune. Such as; boardwalks, sand fences, warning and informational signs that were placed all over the dune to limit human impacts and restore the dune.

During our study, we mapped, used erosion pins to measure wind movement and used sand traps to analyze how much wind was moving. We also gave a questionnaire to visitors and took pictures of many areas around the dune. The results show that Mt. Pisgah has been stabilizing due to the management techniques.

Methods

Mapping - Use GPS to map all management techniques and assess their quality, map surface characteristics of the dune including bare sand - active slipface, bare sand - blowout area, vegetation, forested areas, dune crest and edge of dune, map human impacts on the dune including unmanaged trails and litter, and to map locations of sand traps and deposition pins. Data will be analyzed by importing collected points, lines, and polygons and creating map in ArcGIS.

Deposition pins - 11 deposition pins were placed in locations on the dune where erosion or deposition was suspected to have occurred. The height of the exposed pin was measured weekly for 3 weeks total.

Questionnaire - A questionnaire was given to a random sample of dune visitors asking about their adherence to controlled access management techniques and their general perception of dune management techniques.

Discussion

Fig 1 shows that fences implemented for dune stabilization are effective, however those for limiting human access effectiveness are questionable due to low maintenance quality. Boardwalk, informational and warning signs are placed strategically for visitors to enjoy; however they do not stop the formation of unmanaged trails fully. Vegetation areas appear to be the most effective dune management technique and are placed on what initially were bare-sand areas. Results of Fig 2 from the survey shows that 87% of the people who filled out a questionnaire said that they agreed that the management techniques that were implemented on Mt. Pisgah were effective. Results of Figure 3 shows that the sand levels rose significantly when we measured them on the week of November one; during the time of Hurricane Sandy. The week after that, the sand levels were lower due to the dune readjusting itself.

Introduction

In 2005, a study was done on Mt. Pisgah regarding human impacts on the dune. Since then, management techniques have been put into place to help stabilize the dune. Our study was to research the effectiveness of the dune management techniques.

Objectives

The study objectives are

- i. To map and assess the presence and quality of dune management techniques implemented.
- ii. To measure erosion on the dune.
- iii. To understand visitors perception of dune management in Mt. Pisgah.

Results

Fig 1 shows our biggest data collection of the management techniques and human impacts types around the dune.

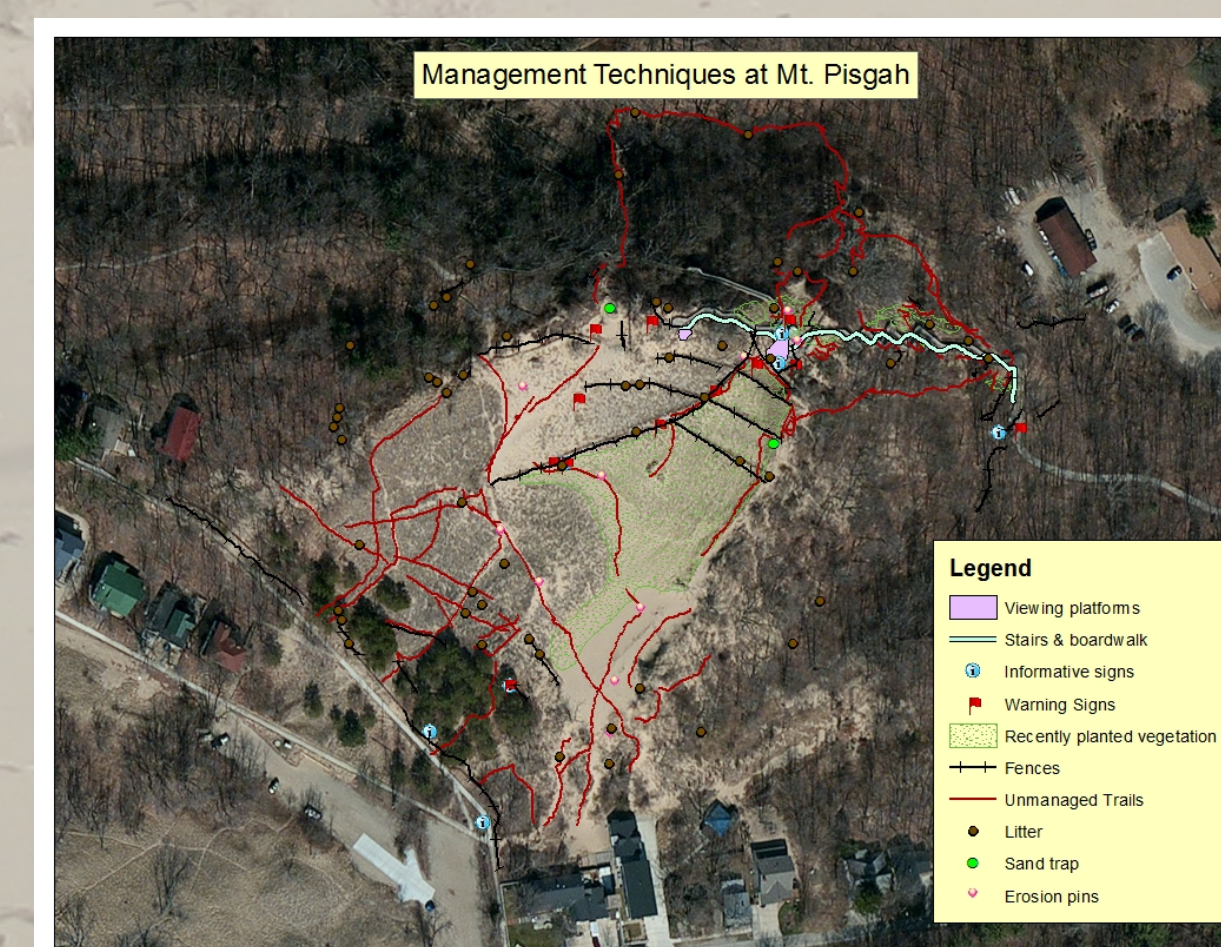


Figure 1. Map of Management Techniques & Human Impacts

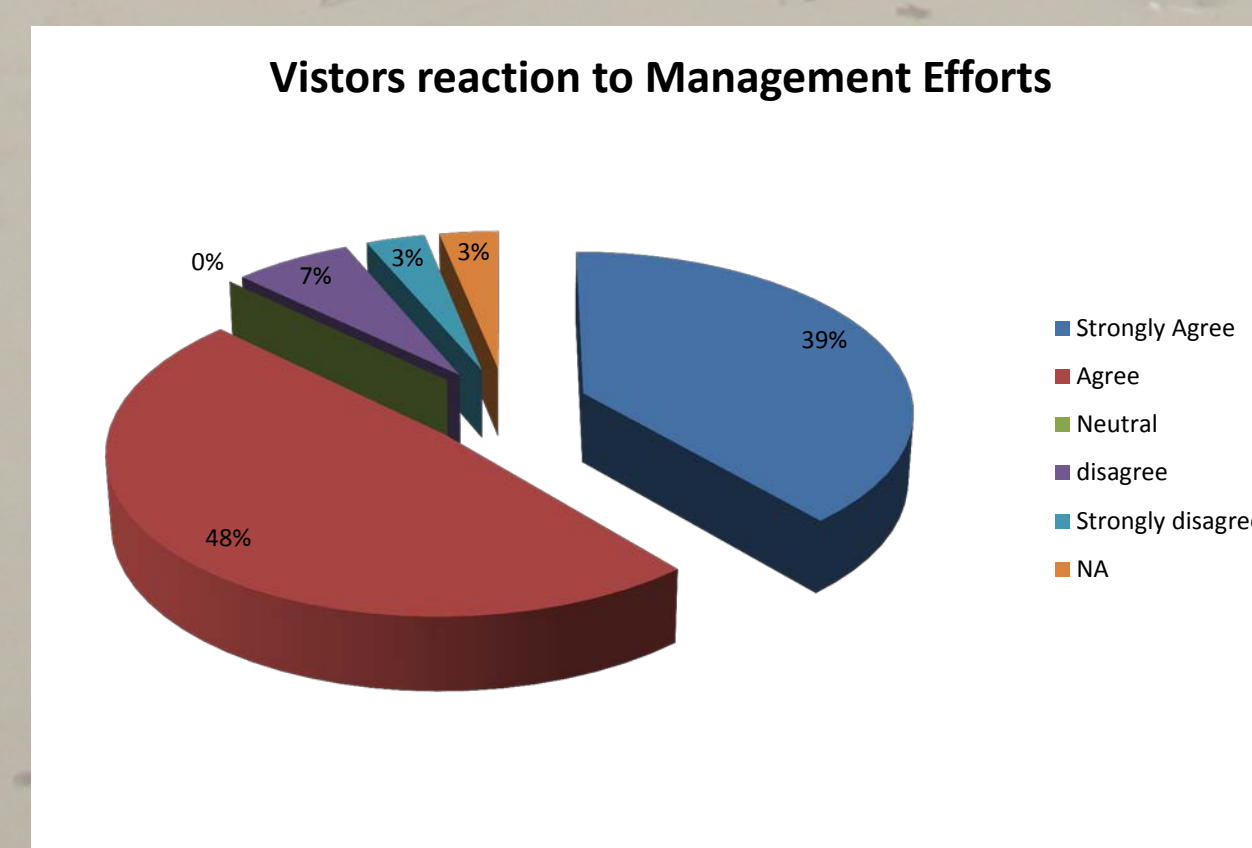


Figure 2. Questionnaire Responses

Fig 2 shows the visitor reaction of dune management.

Conclusion

In this study we were able to successfully assess the presence and quality of dune management techniques that were implemented. We were able to measure the amount of the erosion on the dune and we were able to better understand visitors' perception of dune management on Mt. Pisgah. With this in mind, we found that the management techniques are effective in most part - stabilizing and limiting human impacts. The quality of the management techniques is durable to a degree and the unmanaged trails show signs of recovery from the growth of vegetation. However, seeing the amount of active unmanaged trails, fence trampling, and litters all over Mt. Pisgah dune, there is still room for improvements.

References

van Dijk, Deanna, and Robert D. Vink. [2005] "Visiting A Great Lake Sand Dunes: The Example of Mt. Pisgah in Holland, Michigan." *The Great Lakes Geographer* 12, no. 2.

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Study Area

The study focused on a coastal dune system located on the southeastern shore of Lake Michigan of the U.S. It is near the east area of Holland State Park at Park Township, Ottawa County, four miles (6 km) west of the city of Holland, Michigan.



Fig 3 shows the differences in erosion pin measurements week to week.

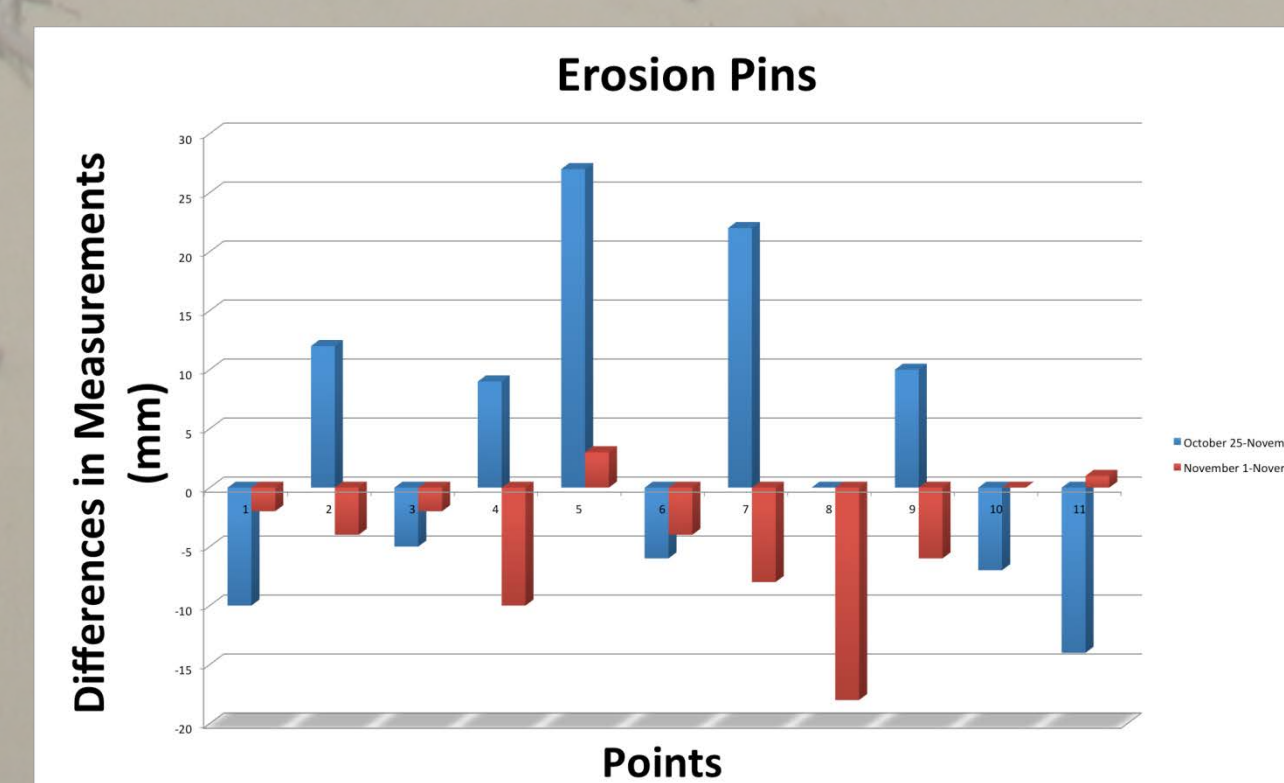


Figure 3. Amount of Erosion in 3 weeks duration