Surveying Michigan Dune Managers and Their Strategies

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Abstract

This study investigates what coastal dune management strategies are used in Michigan and their effectiveness. We created a survey about dune management strategies, their effectiveness, and manager satisfaction with those strategies. We sent the survey to dune managers at state and national parks located on the dune coasts of Michigan. The dune managers of specific parks were contacted and received the survey via email. Responses were kept anonymous due to the requirements of the Institutional Review Board. Responses that were received were then analyzed for commonalities. Our data concluded that vegetation planting or removal and boardwalks are the most used dune management strategies. Self-assessing management results showed a lack of specialized education for managers. These findings are important as they help guide dune managers in managing dunes.

Introduction

Dune management can be defined as “all measures aimed at the preservation and restoration of the natural values of a coastal sand dune area” [1]. Because Michigan has never had a comprehensive dune management strategy inventory, our study uses a survey to investigate what strategies dune managers are using and how effective the strategies are.

Study Objectives

- Create a survey about dune management strategies.
- Survey dune managers from Michigan.
- Receive and analyze data from survey responses.

Study Area

The study area of our survey focused on state parks and national parks around Michigan. Some private beaches were also surveyed (Fig. 1).

Fig. 1: Map of Michigan with coastal dune areas highlighted in black [2].

Methods

Methods for each of our research objectives are described in Table 1.

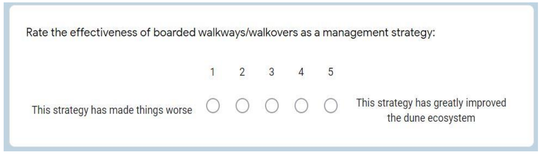
Objective	Methods
Creating an IRB approved survey	- Constructed survey questions about common dune management strategies. - Created questions asking about the experience of managers surveyed.
Surveying 19 Michigan dune managers	- Cold called Michigan parks to gather contact information. - Distributed the survey via email to Michigan dune managers.
Receiving and analyzing data	- Gathered survey responses in Microsoft Excel. - Drew conclusions from data and created visuals.

Table 1: Methods for each research objective.

Results

The survey included questions about the prevalence and effectiveness of certain dune management strategies. These strategies were sand fencing, vegetation, boardwalks, protective fencing, and sand netting (Fig. 2).

Fig. 2: Example of a survey question about boarded walkways.



The most common management strategies are boardwalk and vegetation, both with five surveyed uses (Fig. 3). However, sand fencing was rated as the most effective (Fig. 4).

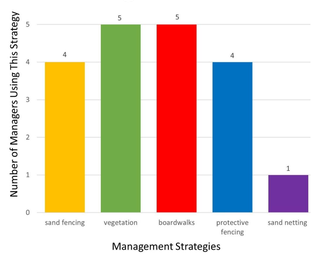


Fig. 3: Number of implementations of each dune management strategy by surveyed dune managers.

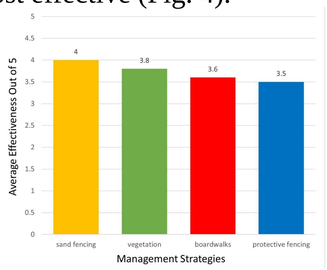


Fig. 4: Average effectiveness of dune management strategies rated by surveyed dune managers.

Our survey received six responses. Five out of six managers surveyed did not expect to be managing dunes. Three out of six have a four-year degree as their highest education level, while one has a high school diploma, and two have a masters or doctoral degree. The managers rated their own management effectiveness from a three to a seven out of ten.

Discussion

Michigan has never had an inventory of dune management strategies, making the results of the survey very important. The most popular and observably the easiest dune management strategy includes building infrastructure such as protective sand fencing, as well as boardwalks (Fig. 5).

Fig. 5: Sand fence and boardwalk at North Beach Park

Survey results suggest that there is limited specialized education for dune managers in their fields of work.

There was near unanimous responses of dune managers being reluctant to “over-manage” the dunes, thus supporting the fact that exacerbating the process of sand movement and dune erosion can be detrimental to the natural ecosystem [3].

Conclusions

Survey results show that boardwalks, vegetation planting and removal, and protective fencing were the most used strategies. Dune managers rated sand fencing and vegetation planting and removal as the most effective strategies. Most managers were not expecting to manage dunes as a part of their work.

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