Mount Baldy Wind & Sand Study
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Purpose:
The purpose of this study was to monitor the movement of the sand on Mount Baldy. Specifically, the project gathers data that will be used to build a layered map containing sediment distribution by particle size, wind direction and velocity, and elevation changes from surveying data.

Background:
Mount Baldy is an active parabolic dune located within the Indiana Dunes National Lakeshore. The landform has been declared as "impaired" by the National Park Service due to human activity on the dune and at the shoreline. Mount Baldy is the National Lakeshore’s tallest moving sand dune. As the slipface of Mount Baldy moves south (landward), it will eventually bury the existing parking lot and force it to be shifted downward. The Indiana Dunes National Park Service has made many efforts to slow its erosion such as, replenishing the sand, placing signs and fencing and planting marram grass to stabilize the dune.

SAND STUDY
This study focuses on how the different grain sizes are distributed across the dune.

Equipment and Techniques:
Whirl packs (to bag up sand), Sieve (shaker) machine, U.S. Standard Sieve columns consisting of different sizes, a scale, data sheets, brushes (to dust out pan) 1. Over 1100 bags of sand were collected and labeled at different GPS points that were recorded in 2012. 2. An initial weight for each sample was recorded then each sample was poured in a column of sieves with U.S. Standard Sieve opening size numbers of 4, 10, 20, 40, 60, 100, 140, 200, and the pan. 3. The column was shaken for 10 minutes then each sand fraction was weighed separately and totaled for a final weight. For each sample a QA check was performed with an error of less than 1%. The information on the data sheet was then entered into an excel document to be later analyzed.

WIND STUDY
The goal of this study is to capture the wind velocity and direction at different points along Mount Baldy.

Equipment and Techniques:
A Hobo (wind tower) and a portable tripod wind meter array, battery data logger box, compass, leveler, aerial photograph containing GPS points 1. The Hobo tower was placed on the beach to monitor the minimum, maximum and average wind speed and direction and also the average temperature at that point. 2. The tripod wind meter was assembled and then carried to 34 different points along Mount Baldy. This meter took the maximum, minimum and average wind speed and direction as well as, the average air temperature at 5 minute intervals at three different heights 0.5m, 1.0m, and 1.5m. 3. The information was collected was stored into a database and will be analyzed in the fall and be used to help build a 3D image of Mount Baldy containing areas of erosion and deposition.

ELEVATION STUDY
This portion of the study focuses on establishing transects across the dune that can be re-established and measured each year to determine areas of erosion and deposition.

Equipment and Techniques:
Leica Total Survey Station, Trimble GPS Station with hurricane tower, hand held survey rods with reflectors, hand levelers, measuring tapes.

1. Mount Baldy was divided into five N-S and five E-W sections measuring tapes.
2. The elevation points were returned on a regular basis to track the elevation change that occurs. Data was analyzed and graphs generated depicting profile change of the dune.

Data and Results:
Results from the wind and sand study will be analyzed later in the fall. When completed, the information obtained from these studies will help scientists understand exactly how the sand is moving and what needs to be done to help stabilize Mount Baldy so that it can be enjoyed for future generations.

Summary:
This study was the first of its kind, because the method we used has never been attempted. It is a very in depth and lengthy study and thus will need more time to be completed. This has been an incredibly rewarding experience. We have learned many new skills such as wind surveying, how to GPS points along the dune, how to operate a Leica Total Survey Station, how to set up transects, how to operate a sieve machine, and what each grain size represents for the dune’s profile. This study has also taught me that our local dune, Mount Baldy has history and continues to make history by its constant movement and how overtime it may consequently effect surrounding environments.

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