Blowouts and Wind Interactions
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Abstract
The blowout formations on Dune 3 in P.J. Hoffmaster State Park allowed a unique location to study blowouts and wind interactions. Our study looks specifically at a large trough blowout that is connected to two smaller saucer blowouts. The study methods utilized were hand-held anemometers, stadia rod measurements, GPS, and sand trap measurements. We used handheld anemometers to measure the wind speed and direction at the entrance and exit of the trough blowout. Additionally, we took sand trap measurements at the crest of each of the three blowouts. The results of the study show that wind speed and sand transport is greatest at the top of the trough blowout. With this research we can better understand how trough blowouts affect wind speed and sand movement.

Study Area
The study area was at P.J. Hoffmaster State Park in Muskegon, Michigan (Fig. 2). We studied three blowouts in a large parabolic dune known as Dune 3 (Fig. 3). The dune features two small saucer blowouts and one large trough blowout (Fig. 4). Wind data were also obtained from an instrument tower located south of our site.

Results

Discussion
Our results are consistent with other studies that show a correlation between wind speed and sand transport [2] and that an increase in wind speed causes increased deposition of sand on the slipface [3]. Our results showed that over the entire series of blowouts wind speed and sand transport increased. Wind speed increases as the wind moves through the blowout, and decreases again as it reaches the crest, causing deposition of sand on the slipface (Fig. 9). In each sequential blowout, the wind speed increases again, causing more sand to be picked up and greater sand deposition with each consecutive blowout.

Conclusions
Blowout topography causes an acceleration in wind. There was also found to be an overall increase in wind speed and sand transport over the entire blowout system. In November 2015, wind and sand transport were found to be greatest at the top of the trough blowout.

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References