

# The Evolution of the Kitchel-Lindquist Blowouts

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## Abstract

The Kitchel-Lindquist Dune Preserve is a largely unstudied area near Grand Haven, MI. To begin to understand how the dunes are changing and their history, we studied the sand movement and the vegetation on two large blowouts near the parking lot. We used two perpendicular transects of erosion pins to measure sand movement. We mapped general vegetation areas and the blowout shape with a GPS and completed DFIs. Our results indicate that the blowouts are growing overall with spots of deposition. The vegetation is all in early successional stages. We found that the dunes are young, used to be stable, and influence each other. More research is needed to ascertain how these blowouts will continue to evolve.

## Introduction

In this study, we looked at sand transport and general vegetation patterns in order to explore how two blowouts on the Kitchel-Lindquist Dune Preserve are changing. We hoped to see successive patterns in the vegetation that suggest the dune's history and evolution and to see sand movement patterns that give an idea of the general activity.

## Study Area

The study area is comprised of the two largest blowouts in the Kitchel-Lindquist Dune Preserve. The preserve is located on a small peninsula between Lake Michigan and the mouth of Grand River near Grand Haven, MI (Fig 1). It is a dune complex whose foredune has been replaced by a road and a row of lakefront houses. A parking lot and a picnic area are directly to the south of the study area.

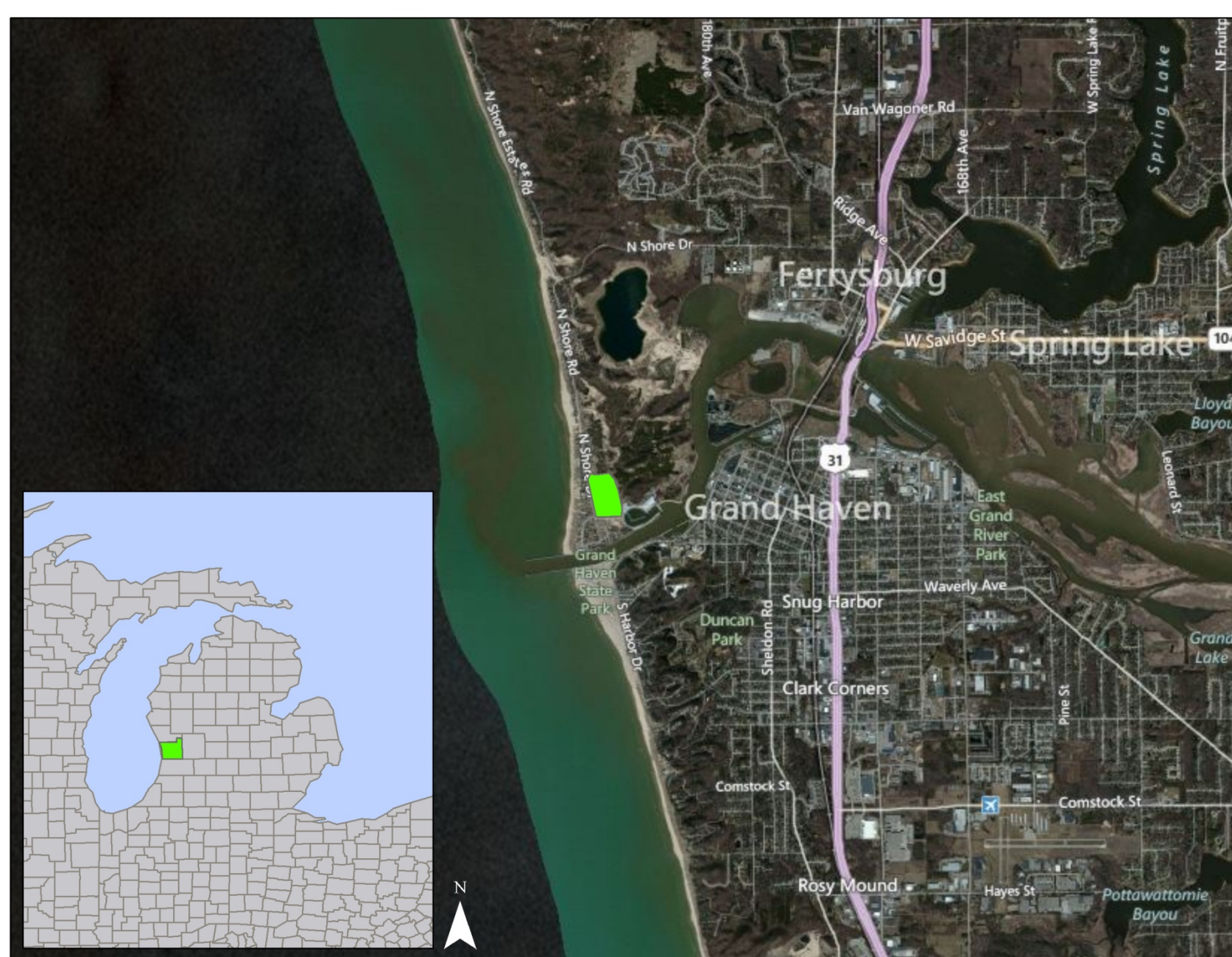


Figure 1- Map showing the location of study area.

## Methods

To study the sand transport patterns, we used erosion pins (Fig. 2). To study the vegetation, we used a GPS to map distinct areas of species (Fig. 2) and compared our observations with the vegetation successional patterns on Lake Michigan Coastal Dunes suggested by Cowles (1899) and Olson (1958). We completed Dune Features Inventories (DFIs) for both Dune 1 and 2.

## Results and Discussion

Generally, the blowouts are eroding, but with several exceptions (Fig. 3). Deposition occurred at the base of Dune 2 and at the upper northern slope of Dune 1 (Fig 4). We observed sand blowing over the crest from Dune 2 into Dune 1, possibly explaining the deposition in Dune 1 (Fig. 5). Pins 12-16 on Dune 1 were on a path way causing irregular results. Due to vandals removing erosion pins on Dune 1, the results on Dune 2 are much more comprehensive.

The vegetation around these blowouts is all in the pioneering and dune building successional stages (Fig. 2) presented by Cowles (1899) and Olson (1958). Little Bluestem and dune building shrubs are found on the crests of both blowouts, suggesting that these areas used to be stable but are now eroding. Both blowouts have a southern bulge of mixed grasses, possibly due to complex wind patterns depositing sand in these areas (Fraser et al. 1998). The same area of Dune 2 that has deposition is populated with marram grass, the first pioneering species, suggesting stabilization. According to the rates of succession put forth by Olson, these blowouts are not older than 200 years.

Both blowouts are very active according to the DFIs.

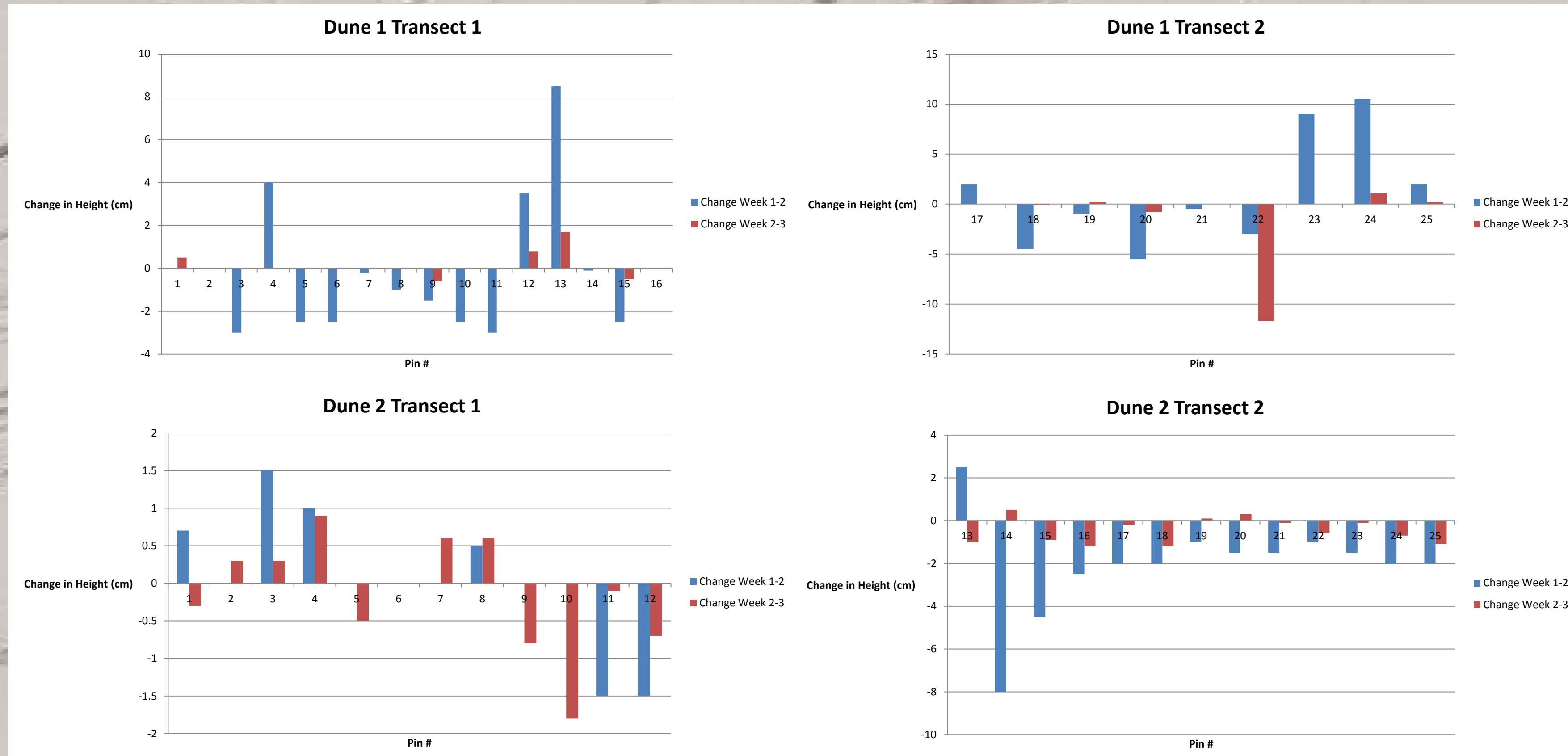


Figure 3- Graph depicting erosion pin data



Figure 4- Research mentor James Karsten in Dune 1



Figure 5- Picture showing Dune 1

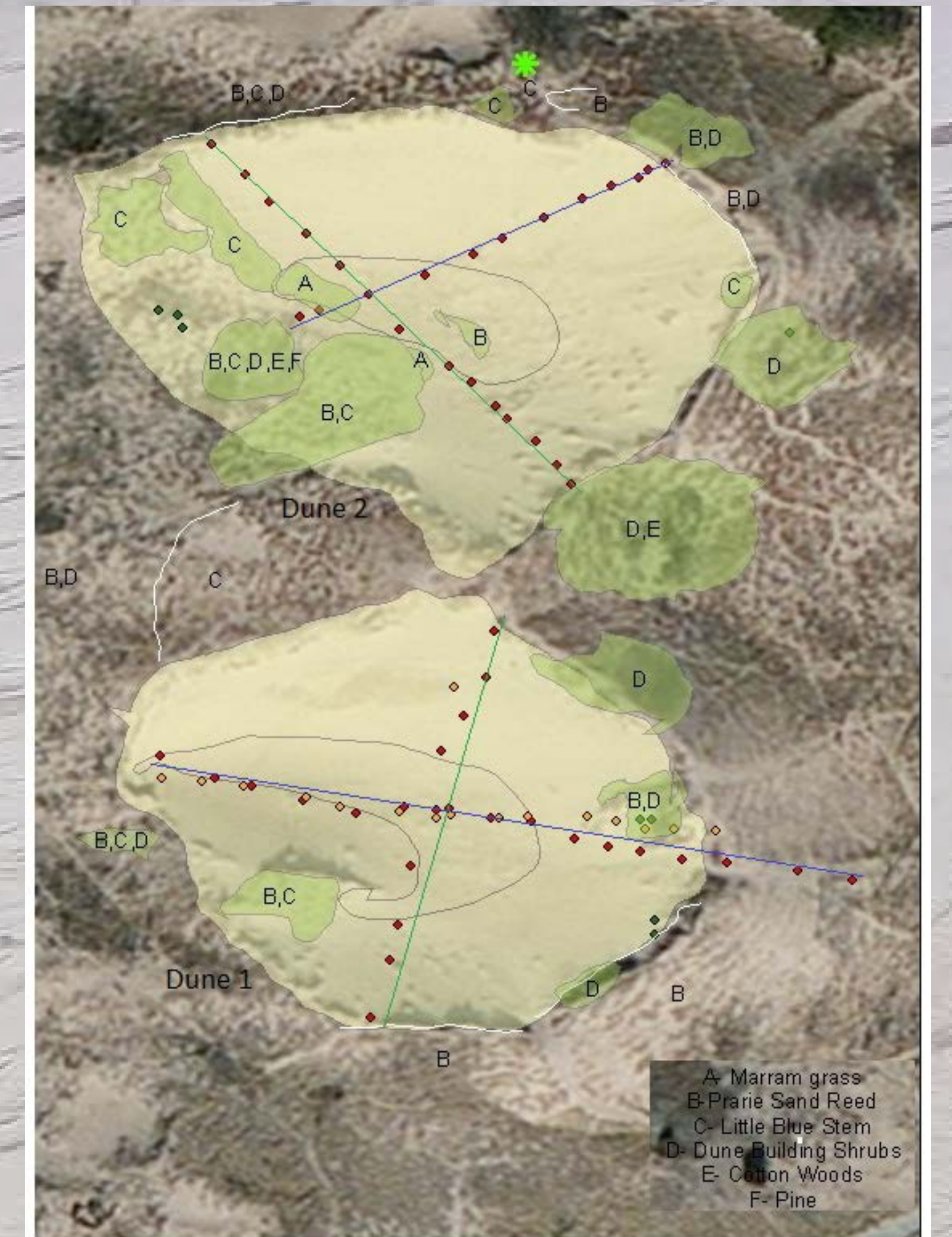


Figure 2- Map of blowouts, study techniques, and vegetation. The blue lines mark erosion pins of lower numbers with pin 1 at the left. The green lines mark the higher numbers with the highest number pin at the top.

## Conclusions

The successive patterns in the vegetation and the sand movement point to once stable dunes, which have formed large active and dynamic blowouts. They are growing and interacting and less than 200 years old. Being the first study on the Kitchel-Lindquist Dune Preserve, more research needs to be done to understand exactly how the dune will continue to change.

## Acknowledgements

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## References

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