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Old Orchard Beach Is not losing sand

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ABSTRACT

We are trying to find out how much the beach is eroding on West Grand Beach OOB ME. This is important because our beach protects us from flooding, it is the main reason that we have tourists, and it provides habitat for animals. To investigate we measure the sand levels on the beach every month. Our data shows that the sand levels on West Grand Beach have stayed about the same over the past nine years. Our claim is that the beach is not eroding.

INTRODUCTION

Select students of Loranger Memorial School (LMS) in Old Orchard Beach (OOB) are investigating changes in the level of sand on our beach. In order to investigate this we are beach profiling at least once a month. For this project we will be focusing on our data from one profile line, West Grand Beach Profile Line 2 (WGO2). We are trying to find out if the beach is eroding. In order to understand this topic, it is important to know that beach profiling is when we measure the slope of the sand from the dunes to the surf's edge (where the water starts).

Beach profiling is important to our community because eroding sand could possibly lead to flooding, and people rely on tourists that come to OOB for the beach. Beach profiling is important to scientists because it shows what happens to the beach overtime. Scientists already know that some beaches are eroding (Maine Public), and that sea levels are rising (Maine.gov). Our investigation will add to scientists' knowledge by collecting more data about our beach.

METHODS

To collect the data that will show how the beach changes, our group does beach profiling once every month from September through June. Then in July and August our teachers do it. The date depends on when low tide is in the early afternoon on a school day. We need to check the weather and tide because we can only go if we can see the

horizon and if it is low tide. Then we gather the equipment: 2 (1.5) meter poles connected by a 3 meter long piece of rope, a white marker pole with red stripes at the top, and our beach profiling log sheet.

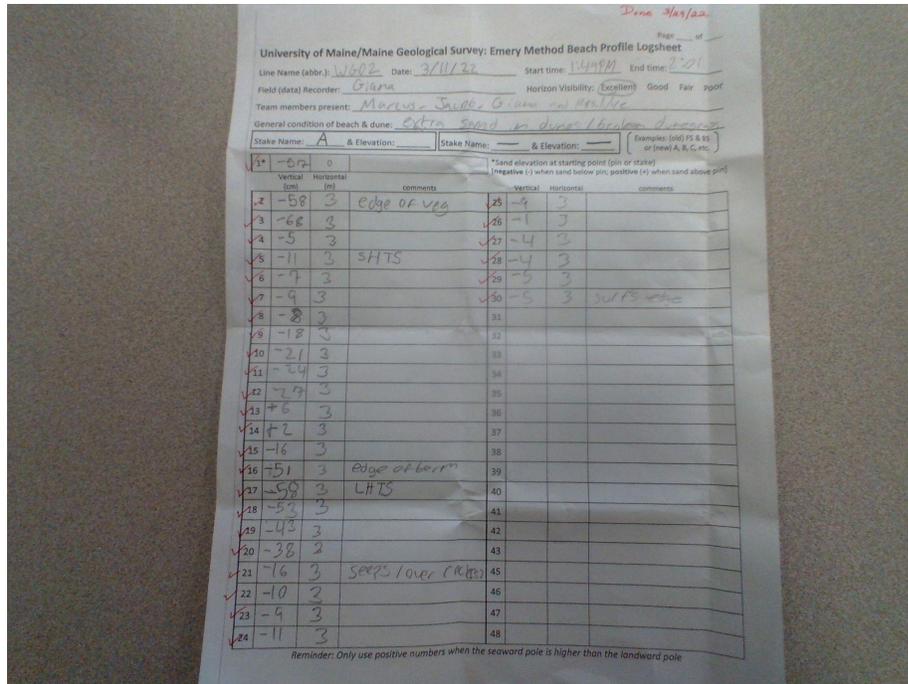
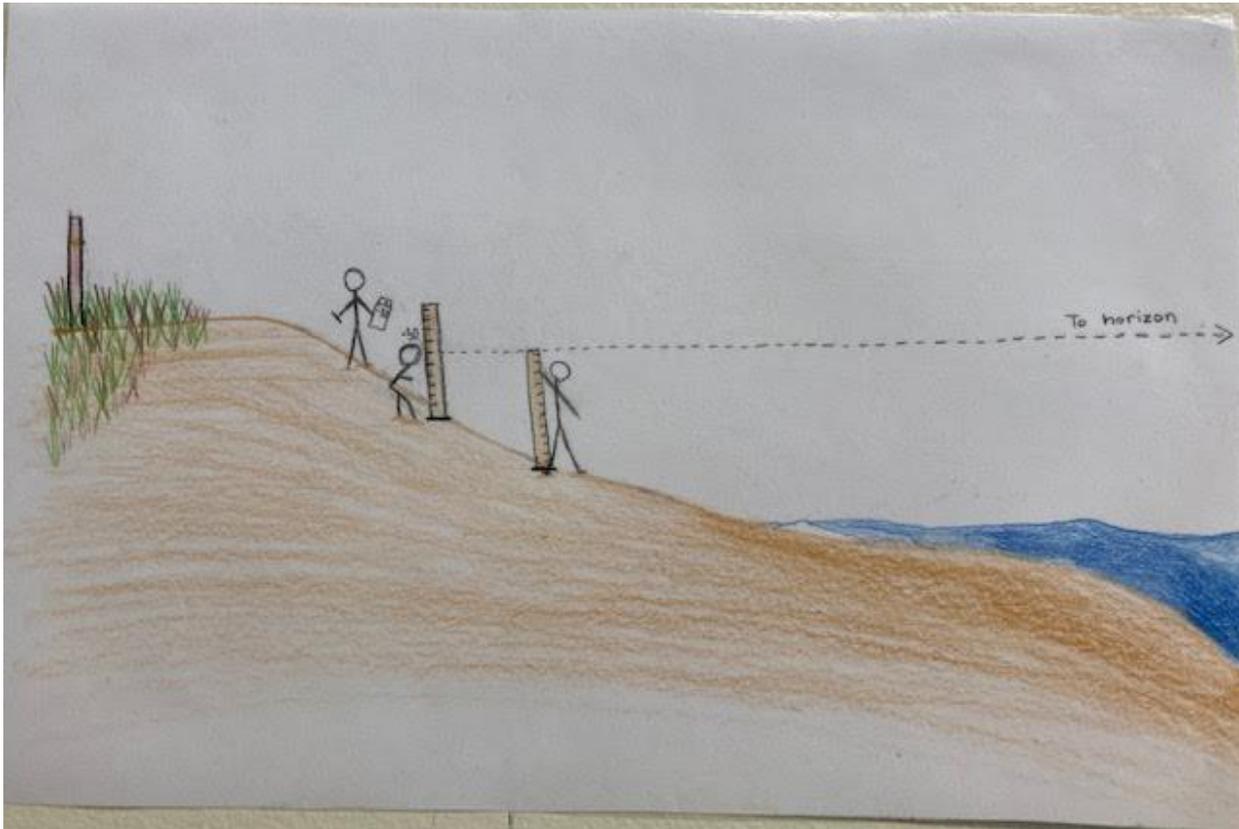


Photo: data log sheet for WGO2 date 3/11/2022

Next we walk or take a van to West Grand beach, at the end of Union Ave. We have to find the metal pole (rebar) sticking out of the sand in the dunes and measure how far it sticks out of the sand. We next put the white marker pole on the metal rebar. Then person A puts pole A up against the white marker pole. Person B walks pole B 3 meters towards the water, then turns and lines up with pole A, the white marker pole, and a marked spot. We do this because we need to gather data in the same straight line every month. Person A crouches behind pole A and looks at what number on Pole A lines up with the top of pole B and the horizon. Then we record that number in the vertical column, 3 meters in the horizontal column, and any comments in the third column of our log sheet. For example, the vertical might be -10 (a drop of 10 cm.) and horizontal 3 meters (the length of the rope) and the comment might be “edge of veg,” meaning the edge of the dune vegetation.

We continue taking measurements every 3 meters until we get to the surf’s edge, where we record “surf’s edge” in the third column and end data collection for that profile. When we have enough time, we take profiles starting at 4 points of the beach near each other. Usually we take data from two profiles if we have time when we go. A few things that may affect our data are: a few data collection errors like a misheard number or storms moving the sand around.

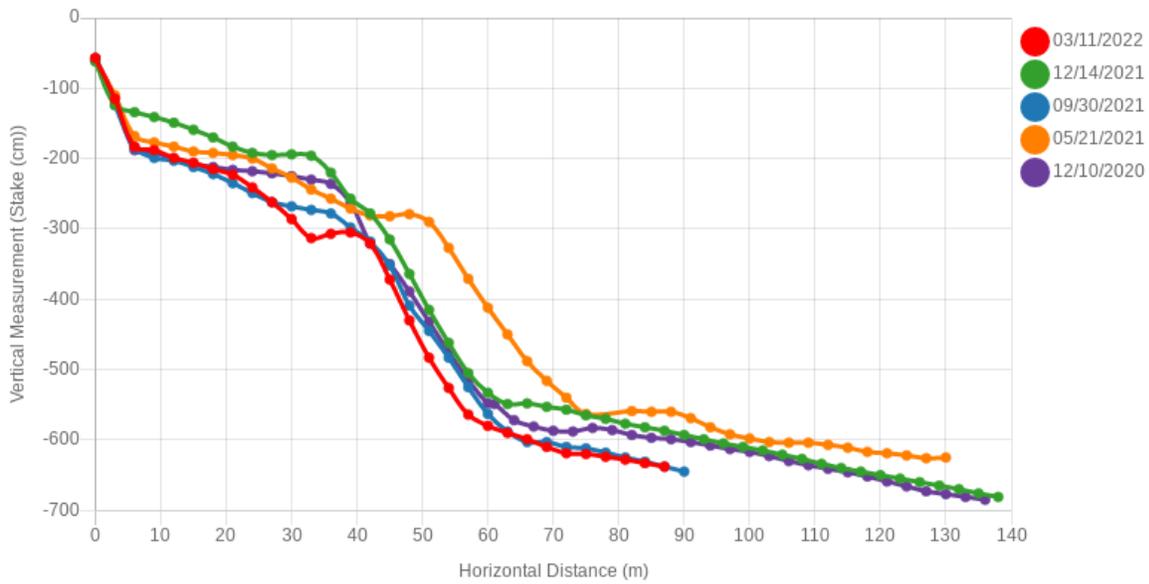
Then we come back to school and enter our data into MGS (Maine Geological Survey) . Scientists use the data that we and everyone else have collected to see how the beach is eroding overtime.



Drawing by Maddy 2020. Used with permission

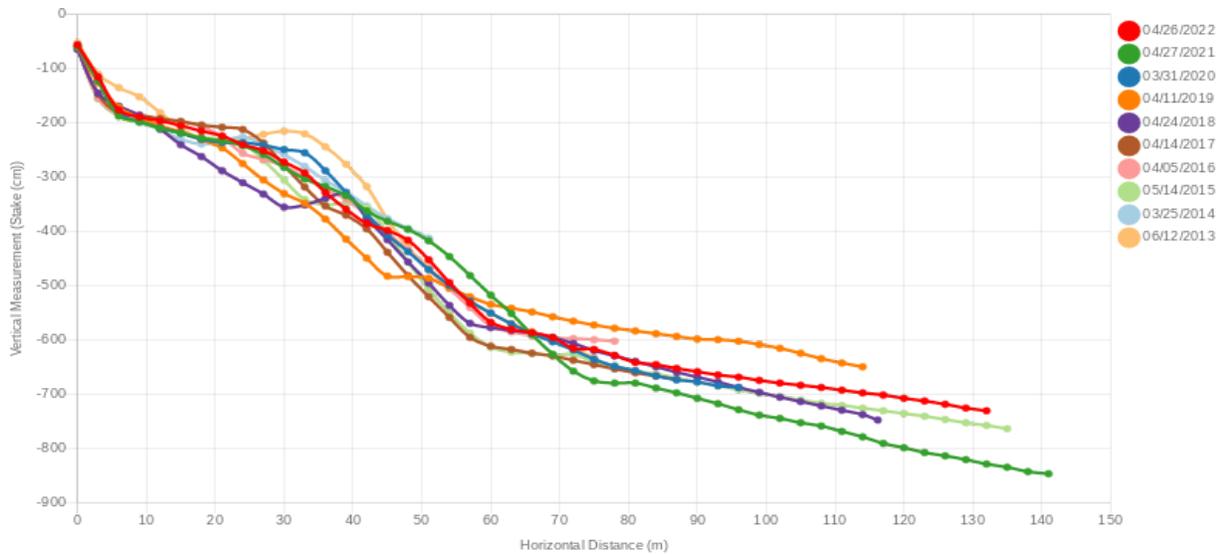
RESULTS

Beach Profiling at West Grand Beach OOB from 3/11/2022-12/10/2020



This graph shows profiles from all four seasons, from winter 2020 to spring 2022. The lines show the sand level. The stake in the dunes is at 0m. The longest profile goes to 140m, while the shortest ends at 87m. That's because the tide was higher on 3/11/2022, and lowest on 12/14/2021. The spread is widest at the edge of the berm, where the high tide comes and goes. The pattern shows the edge of the berm has the steepest drop. The least sand at the berm was in March 2022. The most sand was in May 2021. The tide brings in sand and takes it away.

Beach Profiling at West Grand OOB from 4/26/2022-6/12/2013



This graph shows the changes in the level of sand from 6/12/2013 to 4/26/2022. All the lines start at the stake that is planted in the dunes and show how the sand

changes as we measure to the water. We chose all profiles in the spring because we want to compare the same season for more reliable data. In winter storms take away sand and more sand comes onto the beach in the summer. The oldest line is pale orange and the newest line is red. The oldest line is higher near the stake showing more sand then it drops below the newer line showing less sand then they come together pretty evenly. The dark orange line from 2019 shows more sand close to the water and less sand at the top of the beach. The lowest (dark green) line is from 4/27/2021 showing the beach lost sand but the line from 2022 is higher showing the beach gained the sand back.

CONCLUSION

The level of sand on the beach of West Grand Old Orchard Beach has remained about the same over the past nine years. Our data supports our claim. The first graph is seasonal. It shows that the sand level changes depending on the season. In early summer, 5/21/21, the profile shows the sand level is higher than the other dates: 3/11/22 spring, 12/14/21 winter, 9/30/21 fall, and the oldest date 12/10/20 winter. We know that storms take away sand in the winter and the sand returns in the summer. The second graph shows spring profiles from all nine years we have been collecting data and the profiles have not changed a lot. The biggest spread in the berm (the top of the beach) is about 125 cm. It was highest in late spring 2013, lowest in late spring 2018, and in late spring 2022 it was in between. This graph shows the sand erodes and comes back over time. We are confident in the claim we have made because this is what the data shows that we have collected from the past nine years.

Some possible sources of error would be the horizon visibility, the data taker could not know how to line up the pole or how to read the measurement. The weather could also affect the measurements by changing the level of the tide or it could affect the horizon visibility. Climate change could also affect the sea level because of melting glaciers, so we take data to know how our beach is changing. What could the beach look like if sea levels keep rising? So far we are still beach profiling into the future.

Resources

- [MGS Collect - Maine Geological Survey](#)
- [Beach Profiling article written by students in 2017](#)
- [Maine climate plan](#)
- [New Efforts Underway To Modify 150-Year-Old Jetty In Saco Bay Blamed For Eroding Camp Ellis Waterfront | Maine Public](#)