

## COASTAL GEOLOGY – BEACH PROFILING AND CHARACTERIZATION

*Professor: Teresa Greely, Ph.D*

Hi. I'm Paul Aunspaugh. I work with USF Sea Oceanography Educational Outreach. And part of what we've been looking at is all about the beach. And one of things we want to find out on a beach is, are there any changes taking place to it?

You're going to build a home or you're going to build a complex or anything at all, you might want to know, is the beach changing any? How will the storms affect it? Is the beach going to stay there, or am I going to have to worry about replacing the sediment that's there?

So this is part of where we use some equipment for beach profiling. It's just like a profile of your face. Only we're doing a profile of the beach itself. We do it quite often just to see the changes that take place. So we know what's happening there.

And one of the things we start with and want to know is the part out here in the water, the near shore that we're looking at. And that's just basically where the water comes up to the low tide mark. And that's out where you'll find your sandbar out in the water, different parts coming up. And it's just looking at that action. And we measure part of that. We want to know what the elevation is out there. How is it changing over time?

Then as we move up, we come up to what we call the fore shore. And that's from the low tide mark all way up you go off on the beach here where you'll see a rise up on the beach. So as this comes up, you'll notice the shell action behind me on the beach. You'll see a little rise here. This is just a little-- it could be considered a berm-- if we were talking a high tide-- and it is currently-- but the berm changes. It doesn't always stay in the same location.

You'll notice behind me, there are some grasses all dying off. This is called a rack line. And this is what helps us look a little bit as to where the berm is located for different times. It can be a spring tide. It can be a high tide. Typically, our berm is the highest point on the beach.

Now we're still going up a little bit, so we really haven't reached the real high parts for the berm that would be the normal average berm. I'm coming up on a right now. If you'll look, it's right here. I'm standing up on it at this point. Still got some grasses behind me. And again, it's just simply the dead part, shells washed up. And you'll notice the sand is a little finer up in this area.

Also if you look, and you started seeing some of the plants behind me, they're starting to grow. One of things is over time that berm can start building as the sand can start building a dune. Now we've got some out here on this area where the grass is building, and it could create another dune, or it could actually wash it away at some point. It all depends on storms, what the wave action, what's going on.

So as we move on up further, we're going to get up into that area that looks like a new dune. Now once we cross the berm, we're now on part of what they call a back shore. This back shore, the sand is a little finer as we move on up towards the dune itself. And on the backside, drops down, it's a swash zone. And then there's a secondary dune behind it.

So you could actually have more than one dune area. You could have two, three, four of them. And over time, this one may build up another one right through here. Now equipment that we used basically to find out about the beach and the profile of it. I have up here a transit. It's the piece of equipment up on top.

I guess the best way to think of a transit is a telescope. That's about what it amounts to. It's on a tripod. And one of things, we're going to do is we have a rod, and we want to find out elevation. I need to know the elevation of where we are, because the elevation is what's changing. We base everything off of sea level.

We set our starting point for that sea level. But now, we actually, when it comes to measuring, we start on the back dune, out in the swash zone on the back side. And we start measuring from there coming out. That's our zero point. We measure in meters for a distance coming out.

My elevation, of course, with the transit being up on top of a tripod, this is not the actual elevation where everything as far as the beach. So this is one of the things that we have to always know the height of this particular transit. I've got to know just how high it is, because I'm going to do some math later on. Part of it is subtracting the height of that transit from all the data that we collect.

So what I'm going to use is the stadia rod, piece of equipment we need to figure out the elevation. I happen to have it right down here. As you'll notice, it's a little bit on the long side. It actually goes one more in length. And there is a reason for that. Because as we start measuring, we start on the backside. And that's fine.

And looking at it and seeing it, it's the fact that once you get on the water, it gets a little deeper out there. So when you're going out further in the water, you've got to get it higher so somebody can see it, otherwise, you've got a problem.

Again, I'm going to figure a height on this, I'm going to look at the center of it. And I can measure and get the actual elevation of my transit. This one is sitting at about-- it's 143. So that would be my measurements. I would record that, so I've got it in my data.

And then we would walk this to the back of the dune. Someone will hold that and then actually look through this end of it and try to read the numbers on it. And if you'll notice, I'm looking through and the measurements on here are in centimeters. And that's important, because centimeters here. Now when I look down there, that's meters. We go to draw it on a piece of paper and graph it in some way, it's two different measurement.

So again, if I was going to use it all in centimeters and centimeters down here, you'd have a piece of paper roughly 60, 70 meters long in order to do it. And of course, we don't want to have a piece of paper that long. So again this one is 143 centimeters. And the numbers help us find that. We've got two colors on this one that help us to split them apart between one meter and the next meter.

All right. As you've noticed, we have someone in the back there holding up-- actually, it's Doc Greeley-- holding up the stadia rod. And I'm going to look through here to see if I can spot the stadia rod. Trying to get it in focus and locate it. And it's one of the little skills that you have to learn in reading these.

And there is my rod, got it spotted, and I am reading that it is 169 centimeters. So that would be my reading in the back there, 169. So when she's got that, then we could keep on coming down and read it at different locations as we're doing right here.

Second reading, this one is at 56 centimeters for my elevation. And it's the top of the dune. So we want to write down where these different locations are as we're doing it. And then we just would keep on coming out all the way out into the water, and go out a certain distance out in the water, to the point waste high.

We might even go to the point, if you had a boat, that we could actually measure out in that area by using the equipment on board the boat. Again, getting a good profile the beach and what's going on, the changes. We do it one time. Maybe a month later, do it again. And just continually checking all the time and recording the data.