

Summary of LSC meeting with Geologist, Tom Horning, on site, March 3, 2020

A brief history, Cape to Cape:

This area of the Oregon coast, as we know it between Cape Lookout and Cape Meares, began its existing geologic formation approximately 24,000 years ago. The inlet to Netarts Bay was first at its southern end. Over time, movement of deposited sand created Netarts spit, reorienting the opening to the bay at its northern end, while also creating the dune immediately across the bay opening further north, upon which The Capes is built. The age of this dune is approximately 5,000 years old, and has been through approximately 3 Cascadia subduction eruptions during that time. The *angle of repose** of this dune can be considered stabilized, though specific areas are more prone to erosion and sliding. Over a vast period of time (thousands of years ahead), as with the time it took for the creation of the dune, the sea will continue to change it; however in its current state, it will continue to be mostly stable for centuries. A significant threat to the coast, and specifically this dune, is sea rise. As the base of the dune may become subject to eroding away by much higher tides on a regular basis, the likely result will be sliding from the top edge of the dune.

Specific to The Capes community:

Tom created and presented an updated topographical map of The Capes. He is completing a summary of his visit, which will be posted to The Capes website when it's available. Generally speaking, he expressed confidence with the condition of the dune as being stable. Specific to the historic slide, which he was here when it occurred, he states the the area where the slide occurred had previously been a natural cove, which had become covered by sand (dating back centuries). As further studies after the slide event occurred indicate, it was at least partially the result from excess water runoff, allowed to spill off the side of the dune, rather than (as now is the case) be diverted away through pipe. The event was more conditionally related than a naturally occurring force (though nature was involved in an underground erosion process).

Related to angle of repose and concern of landscape, the dune is mostly stable; it's not going anywhere anytime soon. In a few areas of very steep slope (70% or more) slumping may naturally occur. Trees are mostly ornamental, and do not prevent slumping, sliding, or movement in those or any case. In cases of 70% and greater slope, trees can help prevent sand being blown away causing erosion. Trees on these steep slopes can be topped, and while their root systems provide minimal stabilization, there's nothing that will prevent the slope from moving when it wants to move. In cases of slopes less than 70%, trees do not provide stabilization (or maintain angle of repose). The greater concern is sand being blown away leading to erosion. On slopes less than 70%, grasses and shrubs are well suited to prevent sand from being blown away.

Specific to lot visit on Fall Creek Drive with ground slumping area and clump of trees on the slump, Tom suggests that removal of trees may eventually cause further slumping, though slumping may still occur with trees in place. It depends on what's under the slumped area, and how deep it is. The trees can be trimmed and/or topped to help restore views without affect to condition of the ground or movement.

Horning background/resources/links:

Tom Horning grew up in Seaside and earned his master's degree in geology at Oregon State University. He returned to Seaside in 1994 and opened Horning Geosciences, a geological consulting service.

Tom is very familiar with this area of the coast, being respected as an expert in the field of geo-science. He was present during the slide that occurred at The Capes in 1997.

He is actively involved with the North Coast Land Conservancy since 1996.

OPB interview, The Next Tsunami: <https://www.opb.org/radio/programs/thinkoutloud/segment/the-next-tsunami/>

CRSR blog interview: <http://shipreport.net/2019/09/10/interview-geologist-tom-horning/>

CB Gazette article: https://www.cannonbeachgazette.com/news/local-news/geology-of-the-nehalem-alps/article_e21d05ce-0785-11e9-8775-0f83277e35ee.html

NBC interview: <https://www.kgw.com/article/weather/earthquakes/tsunami-could-put-seaside-underwater/283-83190a3e-afd7-4714-a362-d09d54c35abe>

*Repose or (geographic) angle of repose, of a granular material is the steepest angle of descent relative to the horizontal plane to which a material can be piled without slumping.

