

# FACT SHEET

## Climate Change Impacts and Coastal Erosion in Oregon



### Hazard Overview

ODOT Regions 2 and 3 have large stretches of highway running along the Pacific coast, primarily Highway 101. Sections of these roads are at-risk to coastal erosion processes, include wave erosion, weathering of rock, groundwater seepage, and surface runoff. Coastal erosion can undermine the integrity of the roadways, resulting in frequent and costly repairs. Climate change will likely increase risks from coastal erosion due to rising sea levels, more intense winter storms, more intense rainfall events, and increased wave height.

### Quick Facts: Beverly Beach Section of US-101



#### One Meter

Average annual rate of coastal erosion since 1960s



#### \$200,000

Average annual costs to maintain Beverly Beach portion of US-101 in years without a major erosion event

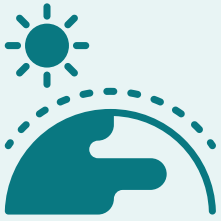


#### \$41 Million

2016 estimate to make Beverly Beach and similar areas more resilient to coastal erosion

### Impacts and Consequences on Transportation

- Damage to roadway often gradual, but requires frequent repairs
- Sudden and large-scale slides are less common, but do occur
- Travel delays and disruptions while repairs are made
- Traffic delays can be particularly problematic for emergency services, and can also impact tourism economies
- Ongoing nature of repairs in problem spots creates a costly drain on annual budgets



## How will climate change affect coastal erosion in Oregon?

Climate factors that contribute to coastal erosion are expected to increase in frequency or severity in the future.

Rising sea levels can increase erosion of the bluffs on which highways are built. So, even if the highway is not flooded by sea level rise, the associated erosion could compromise the integrity of the highways. Sea level rise also affects flooding and erosion in estuaries that feed into the ocean, so even highways not immediately adjacent to the coast could be affected.

Climate change will bring more intense rainfall events, whose runoff can contribute to loosening soils. More intense storms, particularly winter storms, can bring greater wave action that erodes coastal cliffs.

Moreover, El Niño events are expected to increase in intensity and frequency, which may bring larger waves, storm surge, and temporarily raised sea levels of 4-12 inches, which will also increase erosion along coastal areas.

A spatial analysis conducted by ODOT indicates that by the end of the century, nearly 90 miles of highways could be within the flood zones during a 1-in-100 coastal flood event. However, many more miles of coastal highway are potentially at risk from coastal erosion that will be exacerbated by sea level rise. Thus, while stretches of coastal highways may not be actually flooded because of sea level rise—due in part to higher elevation along cliffs—they are still at-risk due to erosion processes. Thus, it will be important to understand not just how sea level will rise, but also how erosion will increase.

## Making Oregon's Highway System More Resilient to Coastal Erosion

### Strategies to Minimize Impacts

- Engineering and nature-based solutions focused on protecting and reinforcing the beach area, including cobble beaches, jetties, piles, riprap, and Mechanically Stabilized Earth (MSE) with planted terraces or structural features.
- Improve water runoff control.
- Realignment may be appropriate in some areas, although it is often difficult and costly.

### Strategies to Minimize Consequences

- Ensuring robust event-response to quickly repair problem areas with minimal disruption to passenger and freight travel.
- Proactive repair/maintenance to be conducted at times that minimize impacts on tourism or community access.
- More robust study of erosion processes. Sea level rise tells only part of the risk story.





## Adaptation Barriers to Overcome

- Limited detour options in many areas along coast.
- Extensiveness of coastal erosion risk. While it may be possible to achieve longer-term stabilization for a given area, the high cost to fix just one location can make it difficult to make similar fixes to all problem areas.
- High capital costs may provide long-term cost benefits through avoided annual repairs, but are often too expensive for a given budget cycle and single location.



## Sources Cited

The information in this fact sheet was primarily drawn from:

FHWA and ODOT. Green Infrastructure Techniques for Resilience of the Oregon Coast Highway. Green-Infrastructure-Study.pdf (oregon.gov)

Mote, P.W., J. Abatzoglou, K.D. Dello, K. Hegewisch, and D.E. Rupp, editors. 2019. Fourth Oregon climate assessment report. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon.

ODOT-sponsored analysis of climate change projections and interviews with ODOT staff