

Tillamook County Comprehensive Plan – Goal 7 Element

Suggest deleting the current findings under 2.1 and 2.2 and replacing with this text.

2. Findings and Policies

2.1 Landslides

Findings (Description of the Hazard)

The following findings are sourced from Open-File Report O-20-13, Landslide hazard and risk study of Tillamook County, Oregon by Nancy C. Calhoun, William J. Burns, and Jon J. Franczyk, Oregon Department of Geology and Mineral Industries (DOGAMI).

Tillamook County has experienced many landslides in the last 150 years. DOGAMI OFR O-20-13 mapped existing landslide deposits (landslide inventory), modeled deep and shallow landslide susceptibility to demonstrate where landslides may occur in the future, and assessed landslide risk through an exposure analysis. The study area is ~325 square miles (841 square kilometers), spans the length of the county, and includes numerous incorporated and unincorporated communities and transportation corridors. Results from DOGAMI's mapping and risk assessment indicate the following:

- There are 4,091 mapped landslides, and 605 located historic landslide points, covering 13% of the total study area.
- Of the 4,091 identified landslides, ~650 are shallow, while ~2,470 are deep seated landslides. The other 971 landslides are mostly debris flow fans (957) and rock fall talus.
- Almost 5,000 people live in the shallow landslide high susceptibility zone and approximately 1,650 live in the deep landslide high susceptibility zone.
- More than 1,700 residents live on existing debris flow fans; and more than 1,500 residents live on deep-seated landslides. Debris flows can be a life-threatening hazard, due to the rapid and destructive nature of their movement.
- Buildings with a value of approximately \$207 million are located on existing deep landslides.

This report indicates that the study area experiences moderate to high landslide hazard, which tends to be concentrated in several discrete communities and along certain key road corridors, notably along U.S. Highway 101. The primary landslide hazard in the study area is exposure of existing structures and roadways to deep landslides and debris flow fans. Substantive risk reduction activities for this type of landslide hazard include controlling the input of water onto slopes within the moderate and deep landslide susceptibility zones and on existing deep landslides and avoiding adding material (weight) to the tops of susceptible slopes or, conversely, removing material from the bottoms of slopes (by excavation or grading).

Damages and losses due to landslides can be high. In the past 20 years, on average there have been approximately 30 landslides per year. The range of losses from landslides in a typical year is expected to be ~\$2.5M to \$4M (using the range in estimates from \$89,300 to \$144,000 per landslide). Stormy, wet, or otherwise extreme landslide years, such as the 1996 winter, can cause hundreds of landslides and millions of dollars' worth of damage.

Tillamook County is characterized by a diverse array of landforms and geomorphology, including resistant coastal headlands, active and inactive sand dunes, estuaries, deltas, river valleys, marine

terraces, coastal foothills and very steep highlands. Tillamook County has high average annual precipitation as well as high 24-hour-duration precipitation related to storm events. Both factors are extremely important in triggering landslides, especially when combined with the local geology and geomorphology. The area also has a relatively moderate to high seismic hazard potential. Both high precipitation and large earthquakes are primary triggers for new landslides and the reactivation of existing landslides. Human activities may also trigger landslides.

Additional Findings:

- **Massive land failure is caused primarily by the high winter rainfall which saturates the weathered and soft sedimentary rocks underlying much of Tillamook County.**
- **One of the major causes of slope failure along the coast is wave erosion on the headlands and terraces. Sea stacks adjacent to the larger headlands testify to the former position of the coastline and to the erosive force of the sea.**
- **Many areas along the coast from Tillamook Head to Cascade Head exhibit active landslide movement.**
- **Active slides can be generated by acts of man which alter the balance of nature.**
- **Excavations, cuts, fills, and drainage modifications may decrease the stability of an area and initiate sliding. Water introduced into the subsurface by drainfields, septic tanks, and improper handling of runoff may also initiate slides.**