

Landslide Hazards Susceptibility Mapping in Homer, Alaska—Executive Summary

- In the 2017 Risk Report for the Kenai Peninsula Borough, the City of Homer identified slope failures as a concern with a Recommended Resilience Strategy of completing a comprehensive slope failure hazard assessment for the city.
- To support the City of Homer’s resilience to potential hazards, the Alaska Division of Geological & Geophysical Surveys (DGGs) received funding from the Federal Emergency Management Agency (FEMA) Cooperating Technical Partners (CTP) program to create a map and database of existing slope failures, maps of shallow and deep-seated landslide susceptibility, and a map of simulated debris flow runouts for the City of Homer and neighboring Kachemak City. (<https://doi.org/10.14509/31155>)
- The landslide inventory integrates existing maps of prehistorical landslides, those caused by the 1964 Great Alaska Earthquake, and newly mapped slope failures identified in sequences of aerial photographs since 1950 and high-resolution light detection and ranging (lidar) data collected for the project. (<https://doi.org/10.14509/30591>)
- DGGs created shallow and deep landslide susceptibility maps following protocols like those developed by the Oregon Department of Geology and Mineral Industries, which includes incorporating landslide inventory data, basic geotechnical soil properties, and lidar-derived slope steepness.
- Debris flow runout extents were generated using the model Laharz, which simulates runouts based on catchment-specific physical parameters (for example, hypothetical sediment volumes).
- Data from these analyses are collectively intended to depict locations where landslides are relatively more likely to occur and to model the extent of their potential impacts. The maps are not intended to predict slope failures, and site-specific, detailed geotechnical investigations should be conducted prior to development in vulnerable areas.
- The intended use of these overview maps is to help identify slopes with a relatively high slope failure hazard in and around Homer, to provide a basis for regional, long-term planning and increased resilience, and to help identify localities where more detailed mapping is warranted if areas are to be developed or improved. Maps are not intended to be used for legal, engineering, or surveying purposes.
- DGGs developed the landslide inventory, shallow landslide susceptibility, deep landslide susceptibility, and debris flow runout maps using the best available data at the time of the project; however, there are many inherent limitations. Conditions that lead to a landslide are complex. Some influencing factors like geologic and hydrologic conditions, vegetation, seasonal weather, and long-term climate all change at different rates while other landslide triggers, like earthquakes, are unpredictable. As such, there is potential for areas not depicted on these maps to be affected by future landslides.
- This report complements a 2022 Coastal Bluff Stability Assessment for Homer, also published at DGGs (<https://doi.org/10.14509/30908>).

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