LANDSLIDE INVENTORY FOR THE WASHINGTON SIDE OF THE COLUMBIA RIVER GORGE: CLARK, SKAMANIA, AND KLICKITAT COUNTIES

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[] County Boundary

Study Area Boundary

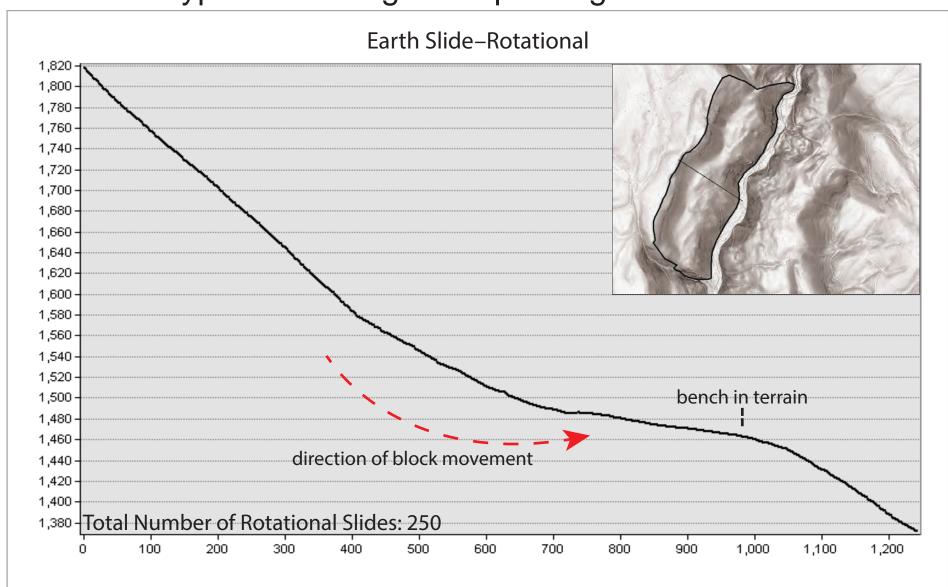
Major Highways

ABSTRACT

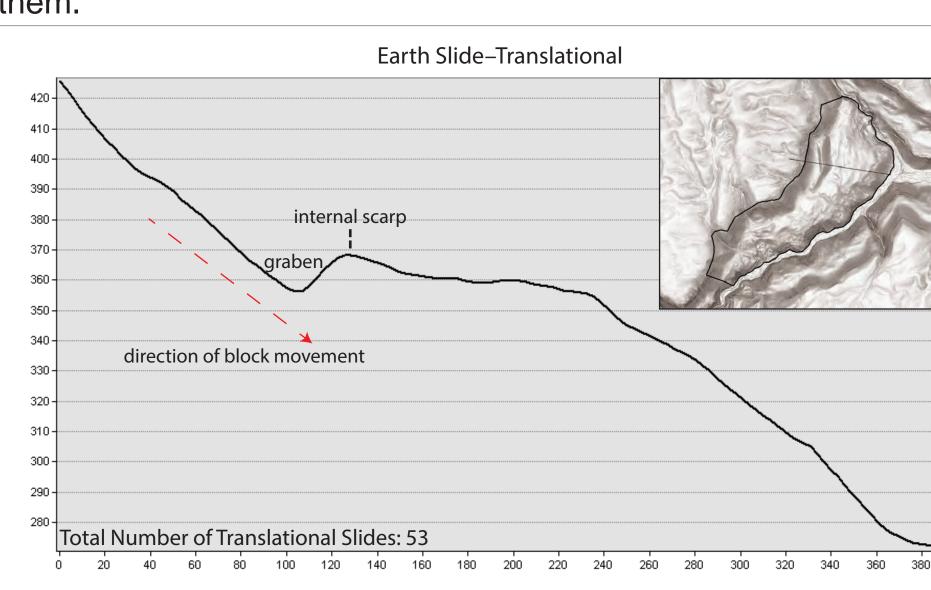
The Washington Geological Survey produced a lidar-based landslide inventory for the Washington side of the Columbia River Gorge, using a newly developed landslide inventory protocol. The inventory was based on 1-meter high-resolution lidar and contains detailed landslide mapping in portions of three counties: Clark, Skamania, and Klickitat. The landslides were given 17 attributes, including a movement azimuth, estimated failure depth, and movement type, as well as a unique ID number. The landslide inventory for the gorge includes over 2100 landslide polygons, expanding upon previous mapping in the area. Landslide polygons cover 16 percent or 147 out of 897 square miles of the project area, with the largest landslide totaling nearly nine square miles. Over half of the mapped landslides are of a complex movement type. A major state highway, six cities, and many popular recreation sites including a national scenic area lie within the study area boundary. With a landslide inventory, municipalities can make more informed planning decisions.

Landslide Movement Types

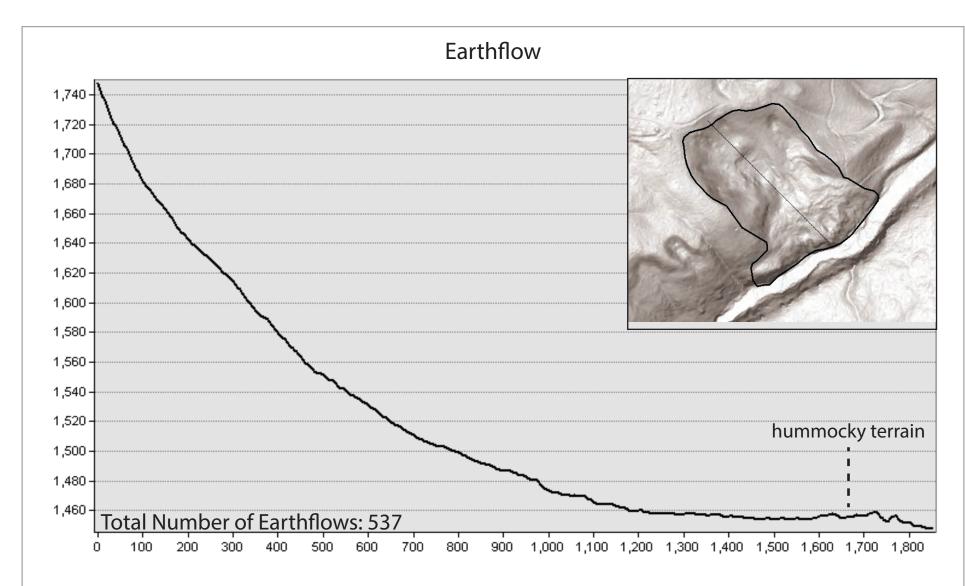
The Washington Geological Survey divides landslide movement types into four major categories: rotational slide, translational slide, earthflow, and complex landslide. The mapper digitizes the polygon and uses a combination of the slope shade as well as a surface profile drawn with the 3D analyst tool in order to determine the movement type. Shown below are profiles of the four major movement types and the geomorphic signatures associated with them.

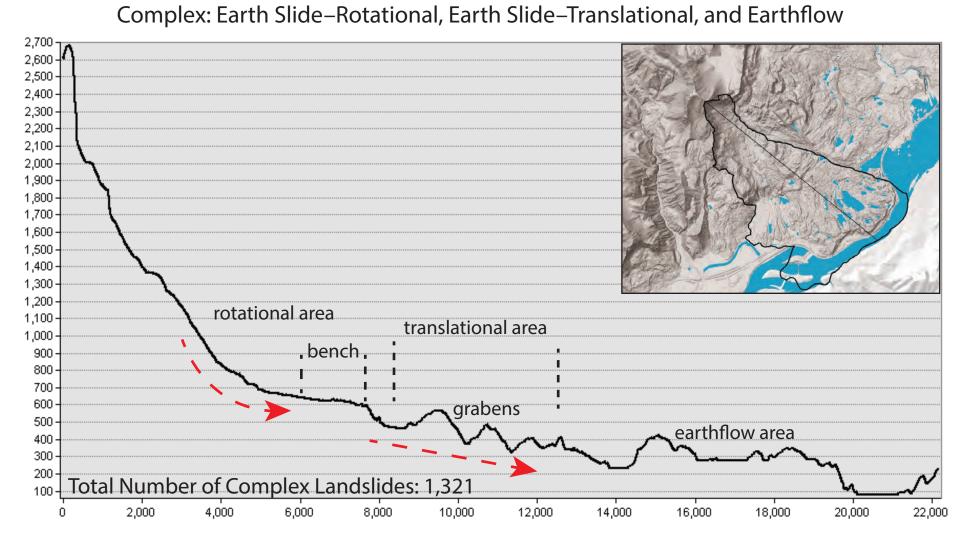


headscarp and moves downhill while simultanenously rotating backwards towards the slope face. Landslides of this movement type often have cohesive blocks that form benches in



separate blocks of material. The landslide mass detaches from the headscarp and moves





Earthflows often have concave surface profiles. The landslide mass moves downslope in a flow Complex landslides exhibit two or more movement types. They are most often rotational and like motion with little to no cohesion. These deposits often resemble 'melting' hillsides and have earthflow combinations or translational and earth flow combinations. Some landslides can exhibit three unique types of movement. Often, complex landslides will turn into earth flows hummocky terrain near the toe. near the toe as the landslide mass begins to break up during transport.

Axes in feet, 0ft on the x axis corresponds to the beginning of the slide headscarp

REFERENCES Pierson, T. C.; Evarts, R. C.; Bard, J. A., 2016, Landslides in the western Columbia Gorge, Skamania County, Washington: U.S. Geological Survey Scientific Investigations Map 3358, scale 1:12,000, 22 p., [http://dx.doi.org/10.3133/sim3358]. Slaughter, S. L.; Burns, W. J.; Mickelson, K. A.; Jacobacci, K. E.; Biel, Alyssa; Contreras, T. A., 2017, Protocol for landslide_inventory_mapping_protocol.zip]

Complex landslide

Translational landslide

Rotational landslide

Scarp and Flank

All landslide polygons are in DRAFT status

