State of Oregon
Oregon Department of Geology and Mineral Industries
Brad Avy, State Geologist

OPEN-FILE REPORT O-16-02

LANDSLIDE SUSCEPTIBILITY OVERVIEW MAP OF OREGON

By
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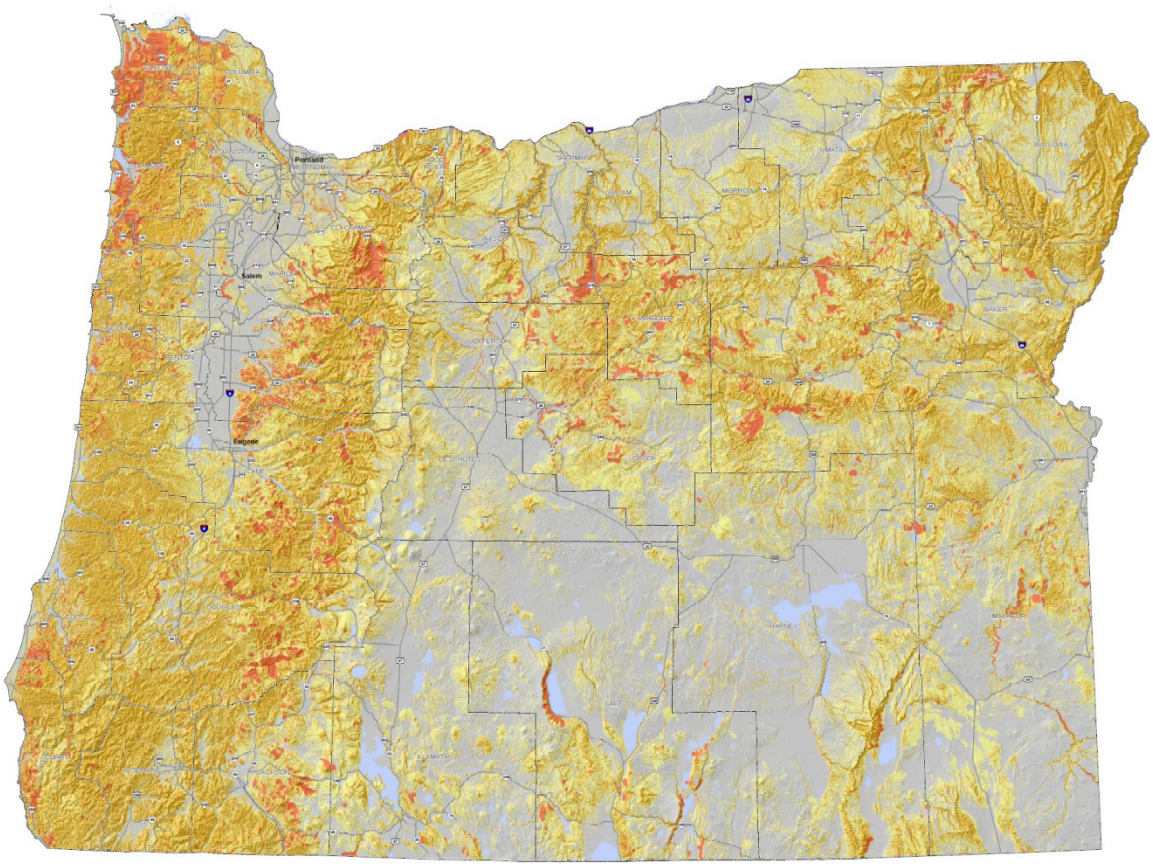

2016

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Oregon Department of Geology and Mineral Industries Open-File Report O-16-02
Published in conformance with ORS 516.030

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GEOGRAPHIC INFORMATION SYSTEM (GIS) DATA *See the digital publication folder for file.*

GIS data consist of one georeferenced raster file in .tif format. The data in this raster depict statewide landslide susceptibility at 10-m^2 (32.8 ft^2) resolution. We created the data by using Oregon Lidar Consortium (OLC) data and USGS NED data where OLC data were not present. We then converted elevation data into slopes and used a multi-pronged analysis process on the slopes, geology, and mapped existing landslides to create the 10-m^2 raster. There are four classes of landslide susceptibility: Low, Moderate, High, and Very High. These data correspond to the zones shown on Plate 1.

NAD_1983_HARN_Oregon_Statewide_Lambert_Feet_Intl
Projection: Lambert_Conformal_Conic
Geographic Coordinate System: GCS_North_American_1983_HARN
Datum: D_North_American_1983_HARN

1.0 REPORT SUMMARY

This project provides a generalized (1:500,000 data scale; ~32 ft^2 grid) landslide susceptibility overview map of the entire state. The intended use of this overview map is to help identify regions (cities, counties, communities, portions of lifelines, watersheds, etc.) that may be at risk for future landslides. The map is designed to provide landslide hazard information for regional planning and specifically to identify areas where more detailed landslide mapping is needed.

The landslide susceptibility overview map of Oregon uses three statewide data sets: 1) geologic map (a pre-release version of the Oregon Geologic Data Compilation, release 6), 2) landslide inventory (Statewide Landslide Information Layer for Oregon [SLIDO], release 3.2), and 3) slope map (lidar-derived data and U.S. Geological Survey national elevation data). We combined generalized geology and landslide inventory to determine landslide area per geologic unit area and to establish classes of low, moderate, and high landslide density. Then we calculated spatial statistics of the slope map to determine classes of low, moderate, and high slopes prone to landsliding within each geologic unit. Using a hazard matrix, we combined these two data sets, landslide density and slopes prone to landsliding, with the original landslide inventory to establish final landslide susceptibility overview map zones.

The statewide overview map zones classify Oregon into the following susceptibility zones: 37% low, 28% moderate, 30% high, and 5% very high (the very high zone by definition consists of mapped landslides). Most areas classified as moderate or higher landslide susceptibility are located in the Cascade Mountains, the Coast Range, and the Klamath Mountains and portions of central and northeastern Oregon.

We used the SLIDO-3.2 historic landslide point data set (9,997 points) to test the landslide susceptibility overview map. We found approximately 80% of the landslide points in the high and very high classes. We examined correspondence between landslide susceptibility and the 242 cities, 36 counties, and 536 watersheds (average watershed size of 170 mi^2) in Oregon (Appendix C). In the counties, high and very high susceptibility percentages range from less than 10% in Deschutes County to greater than 80% in Tillamook County. Note, however, that a high percentage of landslide susceptibility for county, city, or watershed does not mean there is an equivalent high risk, because risk is the intersection of hazard *and assets.* For example, Tillamook County has greater than 80% high and very high landslide susceptibility, but if the majority of assets (people, buildings, infrastructure, etc.) are located in the other 20%, which is ranked moderate to low susceptibility, this indicates a relatively high overall *susceptibility* for the county, but a relative low *risk* for the county.

2.0 INTRODUCTION

Climate, geology, and topography combine to make portions of Oregon landslide-prone. Precipitation, earthquakes, and human activity are the main triggers of landslides. The growing Oregon population has pushed development into landslide-prone areas, putting people and infrastructure at risk. Detailed (large scale, e.g., 1:8,000 or better) landslide hazards maps provide the public and local officials one of the tools to reduce this risk. However, there is as yet neither the data nor the capacity to create detailed landslide hazards maps across the entire state of Oregon.

The purpose of this project is to create a generalized data (coarse grid: ~32 ft^2; small scale: 1:500,000) landslide susceptibility overview map of the entire state. The intended use of this overview map is to help identify regions (cities, counties, communities, portions of lifelines) that maybe more or less at risk for future landslides. This information facilitates regional planning by providing an understanding of relative vulnerability to slides and identifying areas where more detailed mapping is needed. The Oregon Department of Administrative Services, Geospatial Enterprise Office, partially funded this study (Interagency Agreement No. 55019).

3.0 SOURCE DATA, METHODS, AND RESULTS

Several other state geological surveys have completed similar statewide landslide susceptibility maps: California (Willis and others, 2011), Utah (Giraud and Shaw, 2007), and Alabama (Ebersole and others, 2011). The method described in this paper was developed on the basis of these existing methods and is described in detail in the sections below.

3.1 Overview

We used these statewide data sets to produce the landslide susceptibility overview map of Oregon:

- Generalized geologic map (148 generalized geologic unit polygons) created from a pre-release version of the Oregon Geologic Data Compilation [OGDC], release 6 (statewide) provided by I. P. Madin, 2014
- Landslide inventory (54,758 landslide polygons) from the Statewide Landslide Information Database for Oregon [SLIDO], release 3.2 (Burns, 2014)
- Slope map, in degrees, based on a 32.8 ft^2 grid derived from lidar-derived elevation data and U.S. Geological Survey National Elevation Data (NED) [Gesch, 2007]

The general steps to produce the overview map are:

1. Create a geology-landslide intersect map by combining the generalized geology (described in more detail in section 3.2.1) and landslide inventory (described in detail in section 3.2.2) to determine landslide area per geologic unit area. We then used the percent of landslide areas in each of 148 generalized geologic units to establish classes of low, moderate, and high **Landslide Density** (i.e., landslide area/geologic unit area).
2. Calculate spatial statistics between the geology-landslide intersect map and the slope map to determine the mean and standard deviation of slope angles within the landslides per geologic unit. We used the mean and standard deviation to establish classes of low, moderate, and high **Slopes Prone to Landsliding** within each geologic unit.
3. Use a hazard matrix to combine these two data sets, Landslide Density and Slopes Prone to Landsliding, along with the original landslide inventory to establish zones in the final landslide susceptibility overview map.

Each of these steps is described below and in more detail in Appendix A and on Plate 1.

3.2 Source data

Geological and geomorphic information from the Oregon Department of Geology and Mineral Industries (DOGAMI) and the U.S. Geological Survey (USGS) are the best available statewide data at the time of this publication.

3.2.1 Generalized geologic map

We created the generalized geologic map by starting with the same pre-release version of OGDC-6. The compilation has over 120,000 geologic unit polygons. This is too much detail for a statewide overview map. We generalized the geology polygons on the geology general unit (GEO_GENL_U; general rock type) and geologic rock type (G_ROCK_TYP; characteristic lithology type) fields, which resulted in 190 unique generalized geologic units.

This pre-release version of OGDC-6 contained landslides as a "unit." We needed to remove these so that landslide inventory polygons (see section 3.2.2) would correlate not to landslides in the geology but to geologic units. We removed the 11,373 landslide polygons from our pre-release version of OGDC-6 and stored these in a separate file. We tested several GIS tools and found that the Esri® Eliminate tool worked best at merging these separated landslides into the 190 generalized geologic units. The tool allowed us to determine which units had the most coincident boundaries with landslides (or in other words, correlated best) and then merge the landslides with those units. After we performed this process, several hundred landslide polygons remained. We manually merged these with adjacent and appropriate geology units.

We then examined the 190 generalized geology units for size and lack of attributes. If the generalized geologic unit had a small extent (for example 1,000 ft^2) and/or if the unit did not have information that distinguished it from other similar units, we merged these units with other similar units. The final generalized geology data set has 148 units.

See Appendix A.1 for GIS process details and Appendix B for a list of geologic units.

3.2.2 Landslide inventory

This project required two landslide inventory files. The first inventory was of landslide polygons (mapped deposits in SLIDO), which we used as a model input. The second inventory was of historic landslide points, which we used as a quality assurance test of the landslide susceptibility model output. We created both inventory data sets from the Statewide Landslide Information Database for Oregon (SLIDO) release 3.2 (Burns, 2014).

Landslide polygon inventory

We began by removing the debris fans and talus-colluvium polygons from the landslide polygon data set. We did this because the end product is a generalized overview landslide susceptibility map and is not intended to identify debris flows or similar generally long-runout landslide hazard areas or rock fall/topple hazard areas. We divided the remaining landslides into two sets: those mapped following general procedures of Special Paper 42 (SP-42; Burns and Madin, 2009), which is a method using light detection and ranging (lidar) data and a base map; and those mapped without a lidar base or mapped using a lidar base but that did not follow the SP-42 method completely. We then cleaned these two data sets to remove overlapping polygons and very small polygons (<35,000 ft^2) (see Appendix A). We did this because the end product is not intended to identify future very small shallow landslides that in any case would be inappropriate for the ~32-ft^2 grid. Finally, we intersected the landslide polygons with the 148 generalized geological units by running the Esri Intersect tool, because the statistics calculated later in this method must be for each generalized geologic unit. This resulted in 6,629 SP-42 landslides and 48,129 non-SP-42 landslide and portions of landslide polygons (Plate 1). Each landslide area was unique to each generalized geology unit.

See Appendix A.2 for GIS processing details.

Historic landslide point inventory

The second landslide data set is the historic landslide points. Like the other landslide data set, we first removed the debris flow fan and rock fall by determining where the points intersected debris fans and talus-colluvium polygons. We then removed points attributed as shallow debris flow runout deposits and points with areas or volumes too small for the grid resolution. This resulted in 9,997 historic landslide points.

See Appendix A.2 for GIS processing details.

3.2.3 Digital elevation models (DEMs)

We started with two DEMs. The first is from the USGS National Elevation Data set (NED, http://ned.usgs.gov/), which has a 10-m^2 grid resolution. The second is a compilation of available lidar derived bare-earth DEMs, which have a 3-ft^2 grid resolution (see Appendix A.3 for GIS process details).

We projected the NED data set into the NAD1983HARN Oregon Statewide Lambert projection, which is in feet and has a grid cell size of 32.8 ft^2 and elevation in feet. We resampled the lidar-derived DEM to a 32.8-ft^2 grid. We then merged these two data sets to create a statewide DEM by using lidar-derived data where available. We converted the DEM into a statewide slope map in degrees.

3.3 Analysis

We used the three generalized data sets—the geologic map, landslide inventory, and slope map—to create two susceptibility data sets: one focused on identification of slopes

more or less prone to landslides called **Slopes Prone to Landsliding**, and one focused on the density of existing mapped landslide areas called **Landslide Density**.

We combined the generalized geologic map and landslide inventory to establish zones of low, moderate, and high **Landslide Density**, which is the ratio of landslide area to geologic unit area. We also combined the generalized geologic map with the landslide inventory and the slope map to establish zones of low, moderate, and high classes of **Slopes Prone to Landsliding** within each geologic unit. We combined these two sub data sets with the landslide inventory to establish the final landslide susceptibility overview map zones. Details of this process are described in the following sections.

3.3.1 Landslide density

We intersected the 148 generalized geologic units with the landslide inventory polygons; 119 units contained landslides. Next, we calculated landslide area per area of each generalized geologic unit, referred to as the **Landslide Density** (Appendix B). The **Landslide Density** ranged from 0% to just over 45% across the state of Oregon.

We calculated the mean and standard deviation of the data set. We found a mean of 7.35 and a standard deviation of 8.92. The mean plus one standard deviation is 16.27. We plotted the generalized geologic units and the corresponding Landslide Density in percent as a histogram for visual examination of primary changes in frequency (Figure 1).

We examined several recent studies in Oregon and the generalized (overall) relative hazard classification concluded in those reports. Although these studies concluded that relative hazard classifications are largely subjective, the studies are still valuable for comparison. The percent of land covered by landslides and the concluded generally (overall) relative hazard are presented in Table 1.

Finally, we examined the thresholds used at the national scale established by the U.S. Geologic Survey in the Landslide Overview Map of the Conterminous United States (Radbruch-Hall and others, 1982). Radbruch-Hall and others selected >15% as high, 1.5–15% as medium, and <1.5% as low for landslide susceptibility and incidence across the entire United States. If we apply these relative hazard classes in Oregon, most of the state is classified as moderate or high with very little low (<1.5%; see Figure 1). This means Oregon is generally rated as having moderate

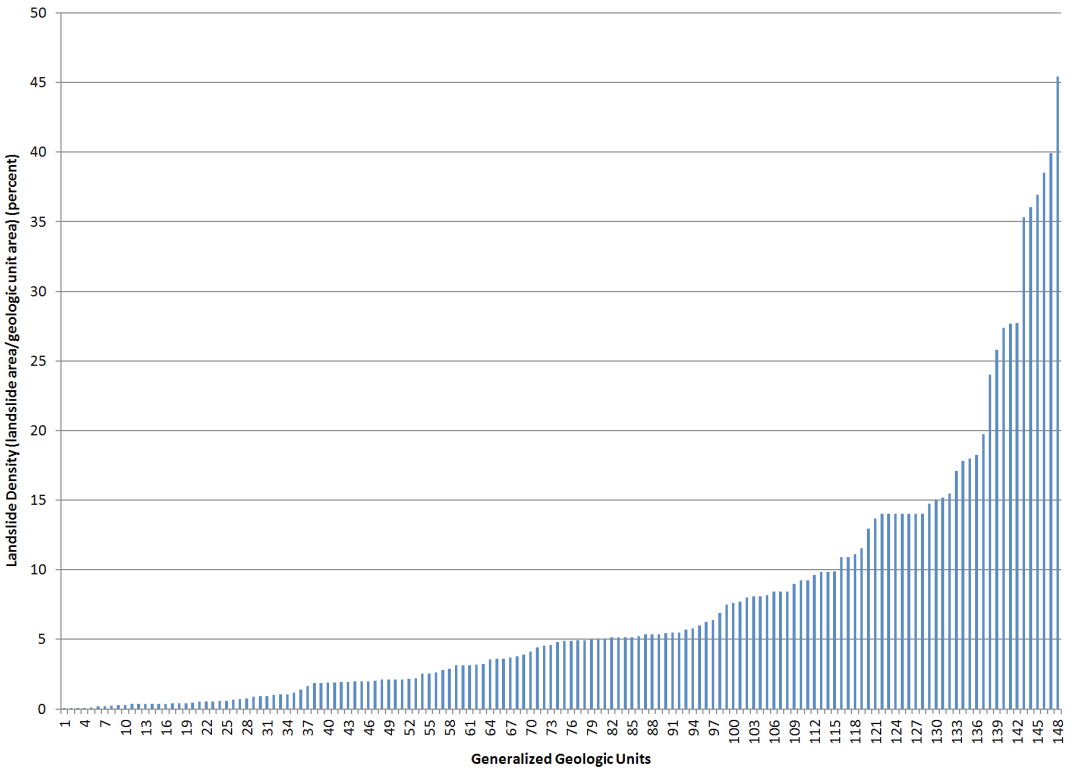

Figure 1. Histogram of landslide density per generalized geologic unit.

to high landslide susceptibility when compared to other states/areas across the United States.

While it is good to know where Oregon landslide hazards rank compared to other states, our goal with this study is to classify areas in Oregon relative to other areas in Oregon. We selected the following ranges to define generalized (overall) relative landslide classes:

Low Landslide Density	< 7%
Moderate Landslide Density	7% to 17%
High Landslide Density	> 17%

These ranges are consistent a) with the mean (~7%) and the mean plus one standard deviation (~16%) of our data set (Figure 1), b) with the classifications from recent studies in Oregon (Table 1), and c) generally with national thresholds (1.5% and 15%). The thresholds are displayed on the histogram (Figure 1) with the relative landslide classes (low, moderate, high) (Figure 2).

We then converted the generalized geologic map to a raster file with 32.8-ft^2 grid cell size to match the DEM resolution. We attributed each grid cell with a value of low, moderate, or high depending on the final landslide density percent (landslide area/geologic unit area; see Appendix B).

Table 1. Other Oregon landslide inventory studies, percent coverage of the mapped area, and relative landslide hazard.

Study	Percent Landslide Inventory Deposit Coverage	Relative Overall Hazard Classification Concluded in Report
Astoria (Burns and Mickelson, 2013)	27%	High
North Fork Siuslaw Watershed (Burns and others, 2012a)	37%	High
Coastal Curry County (Burns and others, 2014)	25%	High
Bull Run Watershed (Burns and others, 2015)	15%	Moderate to High

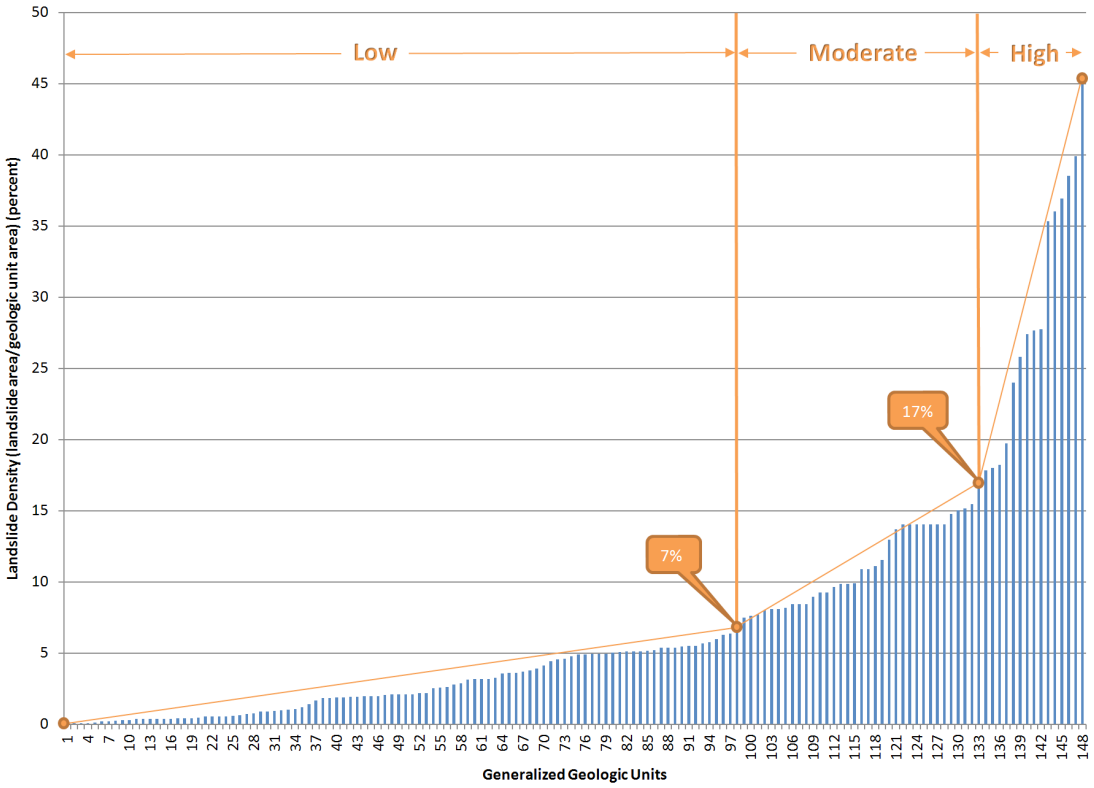

Figure 2. Histogram of landslide density with thresholds and relative landslide density classes.

3.3.2 Slopes prone to landsliding

To establish **Slopes Prone to Landsliding**, we used two data sets: a slope map and a map of generalized geologic units intersected with landslide polygons. We started by converting the statewide DEM into a slope map in degrees. We used the slope map grid and landslide polygons (attributed with associated generalized geology) to establish spatial statistics or slope statistics within the landslide polygons in each of the 148 generalized geologic units (Appendix B). The spatial statistics examine the slope grid cells within the landslide polygons attributed with the same generalized geologic unit. The output includes the mean and standard deviation of the slope within those landslide polygons (i.e., post-failure slope) per generalized geologic unit (Appendix B).

Following the Burns and Madin (2009) landslide inventory method results in an estimated overall pre-failure slope angle at each individual landslide. This slope angle is estimated through measurement, directly adjacent to each landslide, on the native 3-ft^2 cell size lidar-derived bare-earth slope map and is therefore considered to be as close to the pre-landslide slope angle as possible. We compared the results of the analysis done on the statewide best available DEM (post-failure) to the results of the landslides with the lidar data estimated slopes (pre-failure). There were 6,629 landslides with both measurements. We subtracted the mean from the estimated slope at each landslide and then examined statistics on the entire 6,629. We found that the mean slope of the pre-failure measurements was approximately 9 degrees higher than the post-failure. This makes sense, as we expect the slope to be steeper before failure and less steep on the landslide body after failure. On the basis of this analysis, we used the more conservative (less steep and thus more "safe"), post-failure slope angle to establish the **Slopes Prone to Landsliding** used in the final landslide susceptibility matrix. This also helps justify using the mean slope as a threshold for the high and moderate **Slopes Prone to Landsliding** classes, instead of the likely overly conservative one standard deviation less than the mean, which would capture the majority of slopes identified as associated with existing landslides.

Similarly to other statewide or regional landslide susceptibility methods (used in other U.S. state surveys), we used the following relative hazard thresholds to establish classes of slopes prone to landsliding:

- Highly Prone Slopes: slopes equal or greater than the mean slope found within the landslides per geologic unit.
- Moderately Prone Slopes: slopes less than the mean and greater than the mean minus one standard deviation slope found within the landslides per geologic unit.
- Least Prone Slopes: slopes less than the mean minus one standard deviation slope found within the landslides per geologic unit.

We then saved the Slopes Prone to Landsliding map as raster file with 32.8-ft^2 grid cell size to match the resolution of the landslide density map. We attributed each grid cell with a value of Low, Moderate, or High.

3.4 Landslide susceptibility categories

We combined the two final data sets, Landslide Density and Slopes Prone to Landsliding, with the existing landslides as shown graphically in Figure 3 and on Plate 1. We defined each susceptibility class on Plate 1 as:

- **Low: Landsliding unlikely.** Areas classified as Landslide Density = Low (less than 7%) and areas classified as Slopes Prone to Landsliding = Low. Note that landslide density and slopes prone to landsliding data were not considered in this category because existing slides are inherently prone to instability. Note also that the inventory quality of existing landslides varies highly across the state.
- **Moderate: Landsliding possible.** Areas classified as Landslide Density = Low to Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = Moderate OR areas classified as Landslide Density = Moderate (7%-17%) and areas classified as Slopes Prone to Landsliding = Low.
- **High: Landsliding likely.** Areas classified as Landslide Density = High (greater than 17%) and areas classified as Slopes Prone to Landsliding = Low and Moderate OR areas classified as Landslide Density = Low and Moderate (less than 17%) and areas classified as Slopes Prone to Landsliding = High.
- **Very High: Existing landslides.** Landslide Density and Slopes Prone to Landsliding data were not considered in this category. Note: the quality of landslide inventory (existing landslides) mapping varies across the state.

The statewide results for the classes are:

- 37% low
- 28% moderate
- 30% high
- 5% very high (mapped landslides)

Graphic display of how data sets are combined to create the final landslide susceptibility zones.		Landslide Density Combine: ❶ Generalized Geologic Map + ❷ Landslide Inventory			Landslides ❷ Landslide Inventory
	Class	Low (less than 7%)	Moderate (between 7% and 17%)	High (greater than 17%)	Existing Landslides
Slope Prone to Landsliding Combine: ❷ Landslide Inventory + ❸ Slope Map	Low (less than 1 STD)	Low	Moderate	High	Very High
	Moderate (between the mean and 1 STD)	Moderate	Moderate	High	Very High
	High (equal to or greater than mean)	High	High	High	Very High

Figure 3. Matrix to combine data sets into final landslide susceptibility classes.

3.5 Testing and comparison

To test the ability of the landslide susceptibility method described above to predict locations of future landslides, we compared the map to a landslide inventory (historic landslide points) not used as one of the input data sets. The historic landslide point data set had 9,997 points after processing as described in section 3.2.2 and Appendix A2. Some points (161) likely had spatial error issues indicated by location in water bodies or outside the state boundary and therefore were not compared to the landslide susceptibility map.

We found 508 historic landslide points in the Low landslide susceptibility category; 1,587 in Moderate; 6,373 in High; and 1,368 in Very High (Figure 4); approximately 80% of the landslide points are in the high and very high classes.

We visually compared the new landslide susceptibility overview map to recent, detailed (1:8,000 scale) mapping (compiled by Burns and others, 2013) completed for a small portion of Clackamas County (~15 mi^2, approximately one quarter of the county). The landslide inventory maps for Clackamas County were made by following the method of Burns and Madin (2009) (Figure 5). while the deep and shallow landslide susceptibility maps for the county were made by following the method of Burns and others (2012b, 2013).

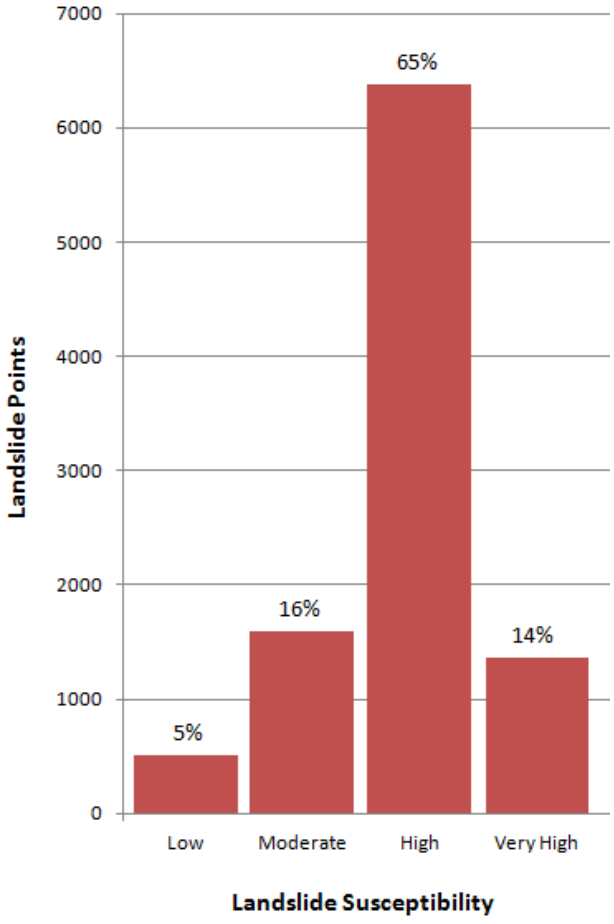

Figure 4. Number and percent of total landslides captured in each landslide susceptibility class.

On the basis of visual comparison, the new statewide landslide susceptibility overview map appears to reasonably capture the landslide inventory and the detailed moderate to high susceptibility for deep and shallow slides from previous studies performed for Clackamas County (Figure 5; Burns and others, 2013).

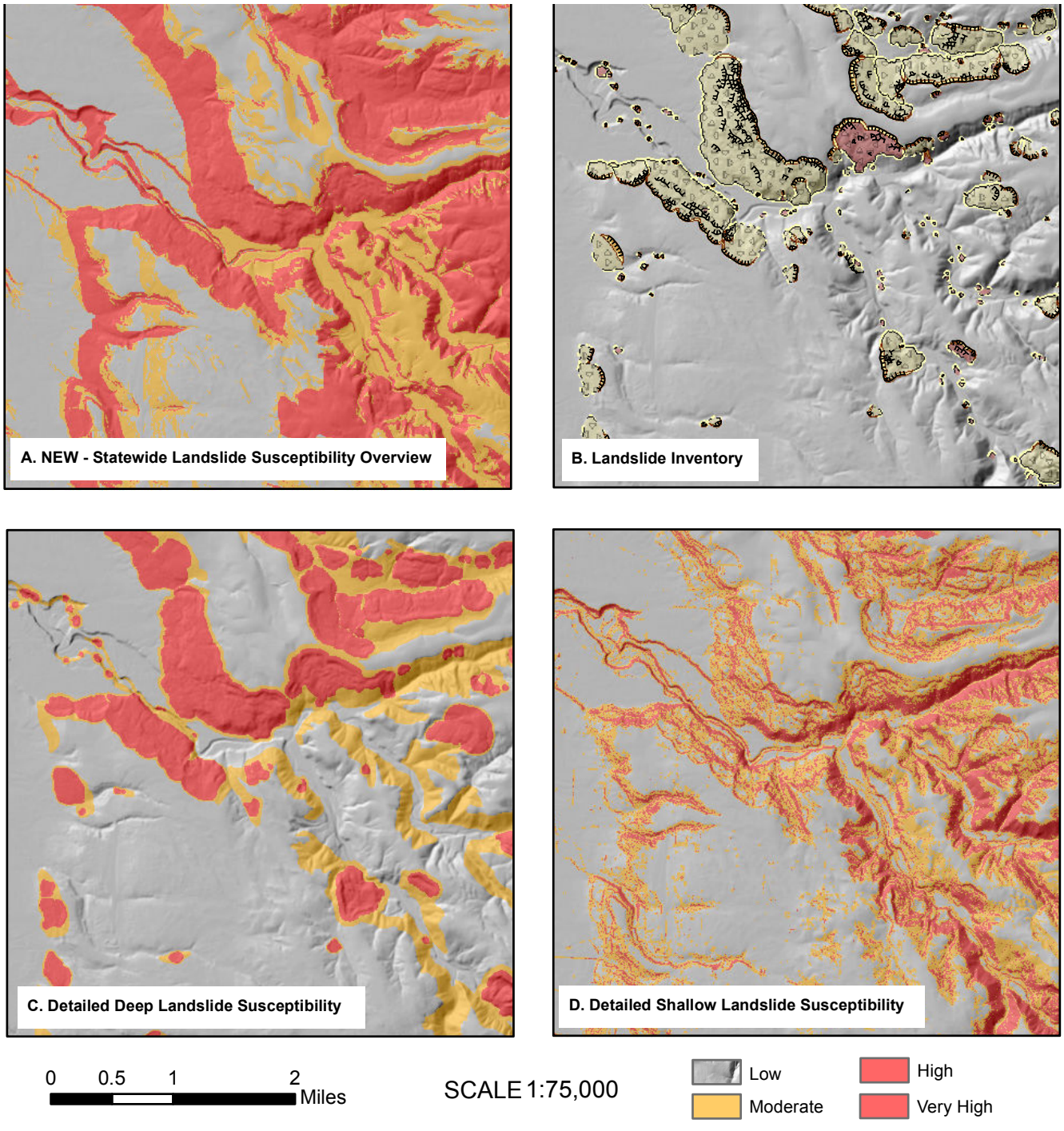

Figure 5. Comparison of (A) new statewide landslide susceptibility overview map to (B) landslide inventory and detailed (C) deep and (D) shallow landslide susceptibility maps (compiled by Burns and others, 2013).

However, the statewide map also appears to over predict in some areas; for example, in the southwest portion of the map (Figure 5A) there is almost entirely moderate and high/very high susceptibility, but far fewer landslides in the inventory and less deep landslide susceptibility in the detailed maps (Figure 5).This is likely caused by several factors. Lumping the geologic units into the generalized units can result in over and under classification of units. The **Landslide Density** portion of the susceptibility matrix (Figure 3) can override low slope angles in the density is high enough, which results in a likely over prediction, by classifying that entire unit as moderate or high. This is very likely what happened in the southeast corner (extensive moderate zone covering sloped and flat areas) of the new stateside landslide susceptibility overview map in Figure 5. Areas with little or no landslide inventory could have completely erroneous results.

3.6 Exposure analysis

We calculated landslide susceptibility for the 242 incorporated cities and the 36 counties in Oregon (Appendix C). High and very high susceptibility percentages range from less than 10% in Deschutes County to greater than 80% in Tillamook County (Figure 6).

Most cities have very low percentages of high and very high susceptibility. Only 14 of the 242 cities had more than 17% of the city area in high and very high landslide susceptibility zones. Note that even if a county or city has a high percentage of area in a high or very high hazard zone, this does not mean there is a high risk, because *risk* is the intersection of hazard and assets. For example, in Tillamook County more than 80% of the area is classes as having high and very high landslide susceptibility, but if most assets (people, buildings, infrastructure, etc.) are in the remaining 20% (moderate to low susceptibility), there is a relatively low risk of losses to landslides. Landslide risk analysis is beyond the scope of this study.

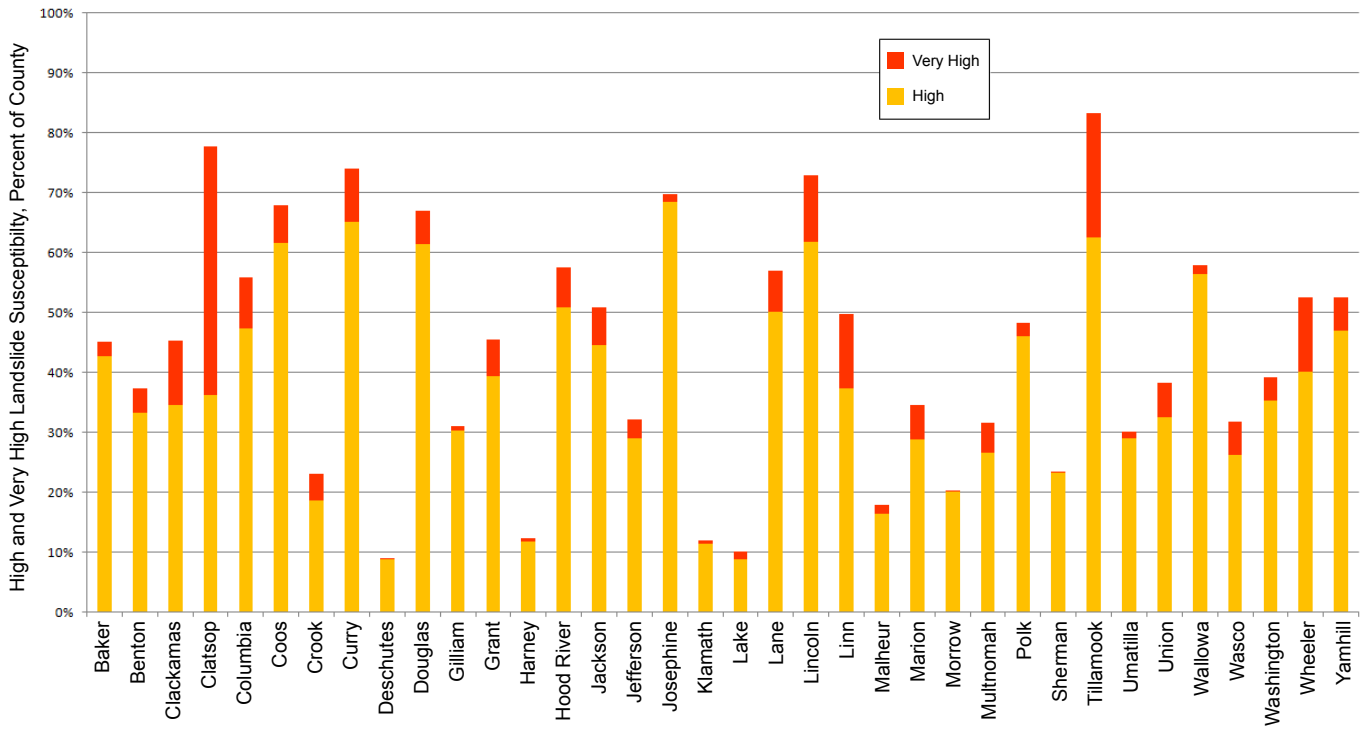

Figure 6. Percentages of Oregon county areas in high (yellow) and very high (red) landslide susceptibility zones as shown on the overview map (Plate 1).

Finally, we examined Oregon watersheds. It is beneficial to look at susceptibility by watershed because environmental issues are commonly confined within watersheds and because many communities get their drinking water from surface water within watersheds. We chose to examine HUC 10 watersheds, which range in size from 40 to 250,000 acres (62 to 390 mi^2) and are sometimes called fifth level watersheds (USGS, 2012). There are 536 HUC 10 watersheds within or mostly within the Oregon state boundary. We performed zonal statistics between the watershed boundaries and the statewide landslide susceptibility overview map zones (low, moderate, high, and very high) (Figure 7). This type of statistic results in a mean value for each watershed, where the input values were low = 1.0, moderate = 2.0, high = 3.0, and very high = 4.0.

We found that the mean per HUC 10 watershed ranged from 1.02, which is effectively all low, to 3.41, which is roughly 50% high and 50% very high (existing landslides) (Figure 8). There are very few watersheds with values between 3 and 4, which is mostly likely because of the lack of detailed mapping of existing landslides in those watersheds. Appendix C3 is a table listing watershed statistics.

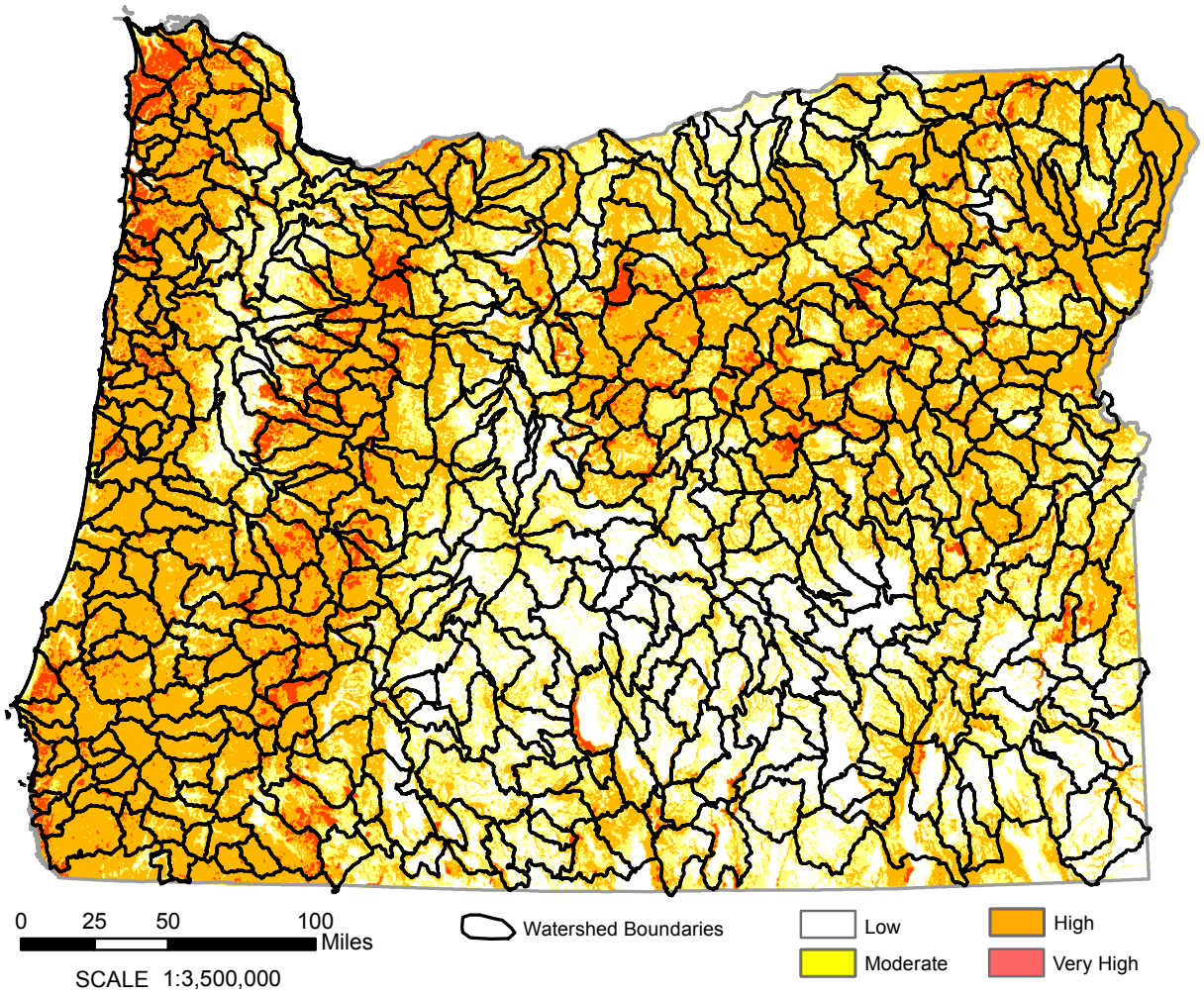

Figure 7. Map of HUC 10 watershed boundaries in Oregon overlain on the statewide landslide susceptibility overview map (white = Low, yellow = Moderate, orange = High, red = Very High landslide susceptibility).

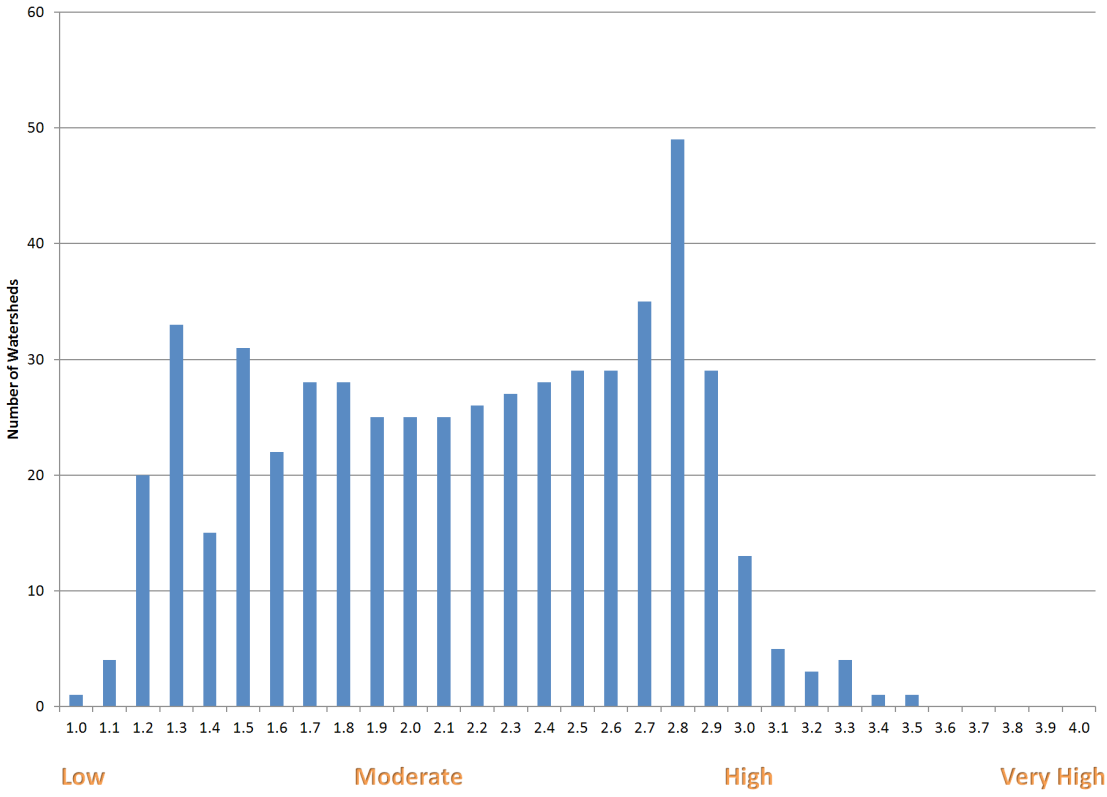

Figure 8. Histogram of mean landslide susceptibility overview score per Oregon HUC 10 watershed.

4.0 MAP USE AND LIMITATIONS

The new statewide overview map displays areas of low to very high landslide susceptibility throughout Oregon. The intended use of this overview map is to help identify the relative susceptibility to landsliding of each region of the state. This map is not intended for use at scales other than the published map data scale (1:500,000). The map is designed to provide a basis for regional planning and localities where more detailed landslide mapping is warranted.

Limitations of the input data and modeling methods we used to make the map are such that the map is not suitable to answer site-specific questions. The map should be used only for regional or community-scale purposes. The following is a list of specific limitations:

- Every effort has been made to ensure the accuracy of the GIS database, but it is not feasible to completely verify all of the original input data.
- The map is based on three primary sources: a) landslide inventory, b) generalized geology, and c) slope. Factors that can affect the level of detail and accuracy of the final susceptibility map include: 1) lack of detailed landslide inventory statewide, 2) too much or too little generalization of the geology, and 3) highly variable DEM resolution resulting in variable accuracy of the slope model.
- Future geologic, topographic, and landslide mapping may render this map locally inaccurate.
- The intent of landslide susceptibility overview map is to help identify regions (cities, counties, communities, portions of lifelines, etc.) that may be more or less at risk for future landslides. We did not consider runout areas from channelized debris flows or other types of landslides with runout deposits. We did not consider talus slopes from rock fall/topple areas and relatively small shallow landslides in this analysis.
- Some landslides areas on the map may have been mitigated, reducing their level of susceptibility. Because it is not feasible to collect detailed site-specific information on every landslide, existing mitigation has been ignored.

5.0 ACKNOWLEDGMENTS

Funding for this project was provided by the Oregon Department of Administrative Services, Geospatial Enterprise Office (Interagency Agreement No. 55019). We thank George Priest for his detailed review and comments, which helped make this product better.

We thank DOGAMI staff who helped with this project through additional technical and general assistance, especially Yumei Wang, Rudie Watzig, and Deb Schueller.

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7.0 APPENDICES

Appendix A: GIS processing details for input data sets

A.1 Geology

We used the following procedure to determine the final set of generalized geologic units.

1. Working with our pre-release copy of the OGDC-6 geodatabase provided by I. P. Madin, DOGAMI, 2014), in Esri ArcGIS v. 10.2 we determined the attributes that would be used during the merge in step #3: GEO_GENL_U (Geology Generalized Unit) and G_ROCK_TYP (Generalized Rock Type) fields.
2. Next, we removed landslide polygons from the data set. In our pre-release OGDC-6 data set, landslide polygons are attributed with GEO_GENL_U = Sediments and G_ROCK_TYP = mixed grained sediments. To remove the landslide polygons, we extracted the polygons from a copy our pre-release version of OGDC-6 to a single shapefile. We removed the landslide polygons by examining the MAP_UNIT_N field and extracting polygons with the following attributes:
    - Bedrock landslides
    - Bedrock landslides, Pleistocene
    - Debris avalanche deposits
    - Dutch Canyon Landslide Complex
    - Landslide
    - Landslide-Columbia River
    - Landslide-John Day
    - Landslide area
    - Landslide areas
    - Landslide debris
    - Landslide Debris
    - Landslide debris
    - Landslide deposit
    - Landslide deposits
    - Landslide Deposits
    - Landslide deposits (grades into Qg)
    - Landslide deposits and colluviums
    - Landslide material
    - landslides
    - Landslides
    - Landslides-blocky surfaces of andesite fragments and debris, some are older than last glaciations
    - Landslides and landslide deposits

    The landslides were selected by the following attributes: "MAP_UNIT_N" = 'Bedrock landslides' OR "MAP_UNIT_N" = 'Bedrock landslides, Pleistocene' OR "MAP_UNIT_N" = 'Debris avalanche deposits' OR "MAP_UNIT_N" = 'Dutch Canyon Landslide Complex' OR "MAP_UNIT_N" = 'Landslide' OR "MAP_UNIT_N" = 'Landslide-Columbia River' OR "MAP_UNIT_N" = 'Landslide-John Day' OR "MAP_UNIT_N" = 'Landslide area' OR "MAP_UNIT_N" = 'Landslide areas' OR "MAP_UNIT_N" = 'Landslide debris' OR "MAP_UNIT_N" = 'Landslide Debris' OR "MAP_UNIT_N" = 'Landslide deposit' OR "MAP_UNIT_N" = 'Landslide deposits' OR "MAP_UNIT_N" = 'Landslide Deposits' OR "MAP_UNIT_N" = 'Landslide deposits (grades into Qg)' OR "MAP_UNIT_N" = 'Landslide deposits and colluvium' OR "MAP_UNIT_N" = 'Landslide material' OR "MAP_UNIT_N" = 'landslides' OR "MAP_UNIT_N" = 'Landslides' OR "MAP_UNIT_N" = 'Landslides-blocky surfaces of andesite fragments and debris, some are older than the last glaciation' OR "MAP_UNIT_N" = 'Landslides and landslide deposits'

    This extraction resulted in 11,373 landslide polygons.

3. In parallel, we used the Esri Dissolve tool to join the 11,373 landslide polygons into a single multipart landslide polygon. Then we used the Esri Erase tool to remove these areas of landslide out of the generalized geology file. With the landslides temporarily out of the database, we merged the geology units into 190 unique generalized geologic units (determined in step 1). Finally, we used the Esri Merge tool to merge the individual landslide polygons back into the generalized geology dataset.
4. The next challenge was to merge the landslide polygons into the geology. We tested several methods including using the Esri tool Polygon Neighbors, which creates a table with statistics based on polygon contiguity (overlaps, coincident edges, or nodes). If the edges of a landslide touched only one geologic unit, the landslide was merged with that unit. However, this left thousands of landslides. After extensive testing, we determined that the Esri Eliminate tool selected and combined landslides with surrounding geology with the fewest capture errors.

    We then used the Eliminate tool to merge landslide polygons into geologic unit polygons. First we removed alluvium, so that none of the landslide polygons would merge into alluvium. In order to remove the alluvium, we examined the G_ROCK_TYP field and included the polygons with the following attributes, where the first

term is the GEO_GENL_U and the second term is the G_ROCK_TYP:

- Sediments-turbidite (two polygons on the bottom of Crater Lake)
- Sediments-tufa (a single polygon that appears to be fine grained Quaternary alluvium [Qal])
- Sediments-sinter deposit (a single polygon surrounded by volcaniclastic deposits)
- Sediments-no data (a single polygon surrounded by coarse grained sediment Qal)
- Sediments-mudflow breccias (a handful of polygons which make up one half of the Sandy River delta)
- Sediments-mixed lithologies (landslides from Wiley and others, 2014)
- Sediments-mixed grained sediments (landslides and alluvium)
- Sediments-metamorphic rocks
- Sediments-ice (glacial ice on the High Cascade Mountains)
- Sediments-fine grained sediments (Qal fine)
- Sediments-coarse grained sediments (Qal coarse)
- Sediments-ash (a single polygon)
- No data-nodata (recent Qal)
- No data-fine grained sediments (two polygons in northeast Oregon adjacent to Sediments-fine grained sediments)

We temporarily removed these 14 units. Then we selected the landslides and ran the Eliminate tool again. The result left 397 landslide polygons. We then merged the alluvium back into the geology. We visually examined the 397 landslides and merged them with the appropriate geology units.

5. Next, we examined the 190 generalized geologic units from step 1 for polygon size. Some units had very small total areas. For example, we established a minimal landslide size of 35,000 ft^2 (see Section 3.2). We found only one geology polygon that matched his criterion. We merged it into the appropriate adjacent geology polygon, giving the database 189 units.
6. Next, we looked at units with "no data" in the attribute fields GEO_GENL_U and/or G_ROCK_TYP. These included:
   - GEO_GENL_U=no data, G_ROCK_TYP=fine grained sediments. We merged this single polygon with adjacent unit sediments, fine grained sediments.
   - GEO_GENL_U=no data, G_ROCK_TYP=no data. This unit looked like the "water" polygon. We merged it with unit sediments, mixed grained sediments because that unit made up most of the surrounding polygons.
   - GEO_GENL_U=sediments, G_ROCK_TYP=no data. We merged this single polygon with adjacent unit sediments, coarse grained sediments.
   - GEO_GENL_U=volcaniclastic rocks, G_ROCK_TYP=no data. We merged several polygons with adjacent unit volcaniclastic rocks, mixed lithologies.
   - GEO_GENL_U=volcanic rocks, G_ROCK_TYP=no data (six polygons). We merged six polygons with adjacent unit volcanic rocks, basalt.
   - GEO_GENL_U=vent and pyroclastic rocks, G_ROCK_TYP=no data (one polygon). We merged one polygon with surrounding unit volcanic rocks, basaltic andesitic.
   - GEO_GENL_U=intrusive rocks, G_ROCK_TYP=no data (one polygon) (four polygons). We merged four polygons with adjacent unit intrusive rocks, intermediate composition lithologies.

   After this process, the database had 182 units.
7. Next, we merged those gelogic units covering only small areas and that had only 1–10 polygons into units on the basis of the following: 1) same GEO_GENL_U, 2) similar G_ROCK_TYP, and 3) spatial correlation; in other words, if individual small polygons were surrounded by like polygons, we merged them. These consisted of:
   - GEO_GENL_U=mélange rocks, G_ROCK_TYP=conglomerate. We merged two very small polygons with surrounding unit mélange rocks, mixed grained sediments.
   - GEO_GENL_U=mélange rocks, G_ROCK_TYP=dacite. We merged six very small polygons with the closest unit, mélange rocks, mixed lithologies.
   - GEO_GENL_U=mélange rocks, G_ROCK_TYP=limestone. We merged six very small polygons with the closest unit, mélange rocks, mudstone.
   - GEO_GENL_U=mélange rocks, G_ROCK_TYP=breccia. There was one very small polygon near Mount Hood where there are no other mélange rocks. This polygon was surrounded by mudflow breccias. The GEO_GENL_U was likely mislabeled, so we merged it with the closest unit, volcaniclasic, mudflow breccia.
   - GEO_GENL_U=mélange rocks, G_ROCK_TYP=ultramafic. We merged five very small polygons with surrounding unit mélange, serpentinite.
   - GEO_GENL_U=mélange rocks, G_ROCK_TYP=schist. We merged five very small polygons with surrounding unit mélange, serpentinite.
   - GEO_GENL_U=batholiths rocks, G_ROCK_TYP=lamprophyre. We merged one very small

polygon with surrounding unit batholiths rocks, intermediate composition lithologies.

- GEO_GENL_U=batholiths rocks, G_ROCK_TYP=mafic composition lithologies. We merged ~six very small polygons with surrounding unit batholiths rocks, intermediate composition lithologies.
- GEO_GENL_U=intrusive rocks, G_ROCK_TYP=trachydacite. We merged one very small polygon with surrounding unit intrusive rocks, intermediate composition lithologies.
- GEO_GENL_U=intrusive rocks, G_ROCK_TYP=marble. We merged one very small polygon with surrounding unit intrusvie rocks, mafic composition lithologies.
- GEO_GENL_U=marine sedimentary rocks, G_ROCK_TYP=marble. We merged one very small polygon with surrounding unit marine sedimentary rocks, quartzite.
- GEO_GENL_U=marine sedimentary rocks, G_ROCK_TYP=marine sedimentary rocks. We merged one very small polygon with nearby unit marine sedimentary rocks, sedimentary rocks.
- GEO_GENL_U=marine sedimentary rocks, G_ROCK_TYP=dolomite. We merged two small polygons with adjacent unit marine sedimentary rocks, fine grained sediments.
- GEO_GENL_U=metamorphic rocks, G_ROCK_TYP=limestone. We merged ~5 small polygons with adjacent unit metamorphic rocks, marine sedimentary rocks.
- GEO_GENL_U=metamorphic rocks, G_ROCK_TYP=gneiss. We merged one very small polygon with nearby unit metamorphic rocks, ultramafic composition lithologies.
- GEO_GENL_U=terrestrial sedimentary rocks, G_ROCK_TYP=limestone. We merged three very small polygons with adjacent unit terrestrial sedimentary rocks, fine grained sediments.
- GEO_GENL_U=terrestrial sedimentary rocks, G_ROCK_TYP=basaltic sandstone. We merged one small polygon with the similar unit terrestrial sedimentary rocks, sandstone.
- GEO_GENL_U=terrestrial sedimentary rocks, G_ROCK_TYP=mixed lithologies. We merged tens of small polygons with similar unit sediments, mixed grained sediments.
- GEO_GENL_U=sediments, G_ROCK_TYP=tufa. We merged three small polygons with the similar unit sediments, mixed grained sediments.
- GEO_GENL_U=sediments, G_ROCK_TYP=ash. We merged one small polygon with the adjacent unit sediments, mixed grained sediments.
- GEO_GENL_U=sediments, G_ROCK_TYP=sinter deposit. We merged one small polygon with the nearby unit sediments, mixed grained sediments.
- GEO_GENL_U=vent and pyroclastic rocks, G_ROCK_TYP=trachyandesite. We merged one small polygon with unit vent and pyroclastic rocks, andesite unit.
- GEO_GENL_U=vent and pyroclastic rocks, G_ROCK_TYP=dacite. We merged one small polygon with unit vent and pyroclastic rocks, basaltic andesite unit.
- GEO_GENL_U=vent and pyroclastic rocks, G_ROCK_TYP=brecciated rock. We merged one small polygon with surrounding unit vent and pyroclastic rocks, basaltic andesite.
- GEO_GENL_U=vent and pyroclastic rocks, G_ROCK_TYP=vitrophyre. We merged one small polygon with surrounding unit vent and pyroclastic rocks, mixed lithologies.
- GEO_GENL_U=volcaniclastic rocks, G_ROCK_TYP=pumice. We merged five small polygons with unit volcaniclastic rocks, mixed grained sediments.
- GEO_GENL_U=volcaniclastic rocks, G_ROCK_TYP=rhyolite. We merged two small polygons with unit volcaniclastic rocks, rhyodacite.
- GEO_GENL_U=volcaniclastic rocks, G_ROCK_TYP=breccia. We merged about a dozen small polygons with unit volcaniclastic rocks, mixed lithologies.
- GEO_GENL_U=volcaniclastic rocks, G_ROCK_TYP=tuffaceous sedimentary rocks. We merged one small polygon with unit volcaniclastic rocks, mixed lithologies.
- GEO_GENL_U=volcaniclastic rocks, G_ROCK_TYP=basaltic andesite. We merged about five small polygons with unit volcaniclastic rocks, andesite.
- GEO_GENL_U=volcaniclastic rocks, G_ROCK_TYP=rhyodacite. We merged about five small polygons with unit volcaniclastic rocks, dacite.

Performing these merges resulted in 150 units.

8. We combined marine sedimentary rocks_slope channel sandstone and marine sedimentary rocks_tuff with like marine sedimentary rocks.
9. This process resulted in 148 final generalized geologic units. See Table B.1

A.2 Landslide inventory

We used the following procedures to determine the final sets of landslide polygons and landslide points.

Landslide Polygons (Deposits)

1. We started with and landslide polygons from the SLIDO 3.2 database (Burns, 2014): 41,029 landslide polygons.
2. We deleted Fans and Talus-Colluvium (9,869 polygons).
3. We removed all landslides attributed as shallow (4,143 polygons) and saved the removed ploygons as a separate data set for use later in step #5.
4. We split the remaining landslide polygons into two files: lidar landslides (8,504 polygons) and non-lidar landslides (18,513 polygons)
5. From both data sets, we deleted all landslide polygons that had areas less than 35,000 ft^2. We chose 35,000 ft^2 as the cutoff because:
    1. 35,000 ft^2 is less than a 6 × 6 cell area, which means the polygon size is getting close to the resolution of the grid cell size used for the map.
    2. The intended use of the map is to predict future locations of relatively large landslides. Therefore we ran statistics on the areas of the shallow landslide polygons saved in step #3 and found the mean plus 2 standard deviations, or 95% of the shallow slides, was less than 32,000 ft^2.
6. This resulted in 6,738 lidar landslide polygons and 16,868 non-lidar landslides polygons.
7. For non-lidar landslides:
    a. We merged into one polygon.
    b. We clipped the polygon by geology.
    c. We deleted landslides that had areas less than 35,000 ft^2.

   The final number of non-lidar landslide polygons was 41,500.
8. For lidar landslides:
    a. We ran the Feature to Point tool on polygons.
    b. We ran the Feature to Line tool on polygons.
    c. We ran the Delete Identical on the Line file (step b result).
    d. We ran the Feature to Polygon tool with the Line file (step c result), using the Point file (step a result) in the Label Features option (see Figure A.2.1).
    e. We deleted all polygons with areas less than 9,000 ft^2.
    f. We hand merged the remaining polygons (see Figure A.2.2).
9. From the lidar landslide set, we removed landslide polygons situated in Washington:
    a. Vancouver quadrangle: 24 polygons
    b. Washougal quadrangle: 45 polygons
    c. Camas quadrangle: 13 polygons

   The final number of landslide polygons was 6,629.

Historic Points

1. We started with the Historic Landslide points data set from SLIDO 3.2 (Burns, 2014): 12,095 points.
2. We deleted all Movement class (MOVE_CLASS) points classed as:
    - Debris Flow (255 points)
    - Rockfall; all of these were from ODOT and along roads. (1,051 points).
    - Rock Fall, rock fall, and Rock fall (11 points).
    - debris/rock fall (1 point).
    - Fall (57 points).
    - fall/topple (14 points).
3. We deleted "Type_MTRL" = debris and "MOVE_CLASS" = flow (521 points).
4. We selected by location: point intersects fan polys, then deleted points where the comments field indicated a debris flow or location of point on a fan (37/65 points deleted).
5. We selected by location: point intersects talus/colluvium polys, then deleted points where the comments field indicated a debris flow or location of point on a fan (13/23 deleted).
6. We deleted points with attribute shallow (109 points).
7. We deleted points with areas less than 35,000 ft^2 (28 points).

   The final total of landslide points was 9,997.

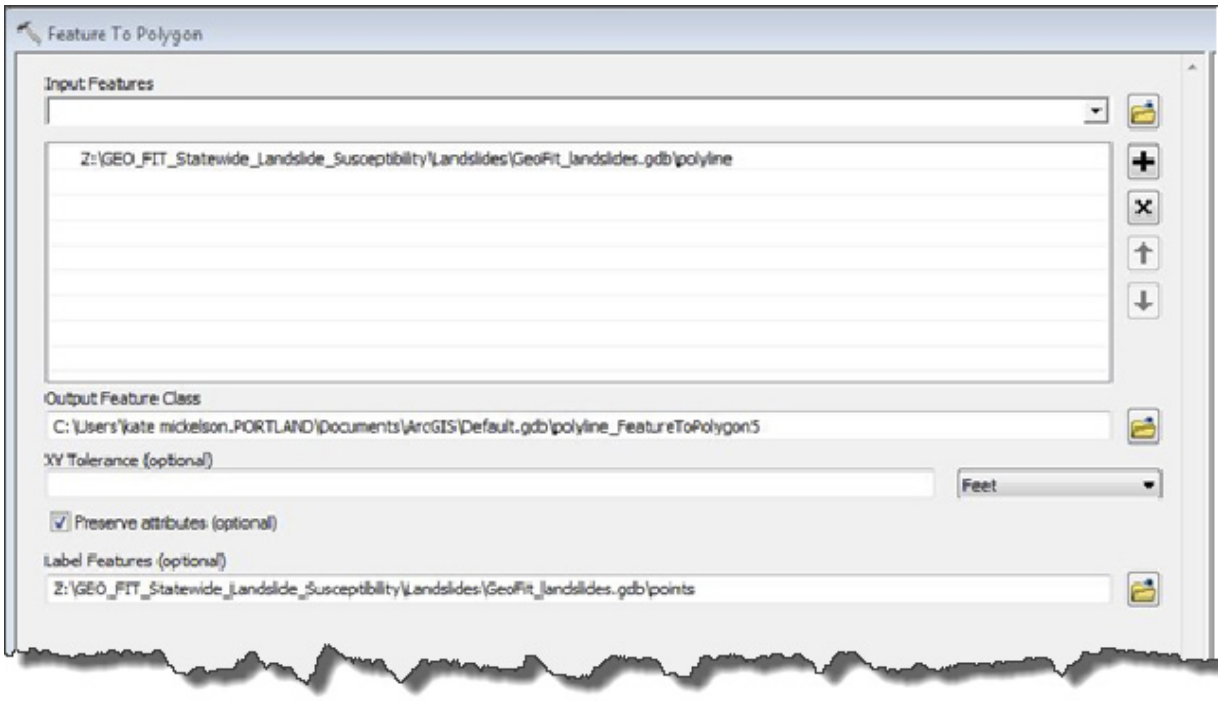

Figure A.2.1. The Esri Feature to Polygon tool is an automated way to remove overlaps in landslide polygons.

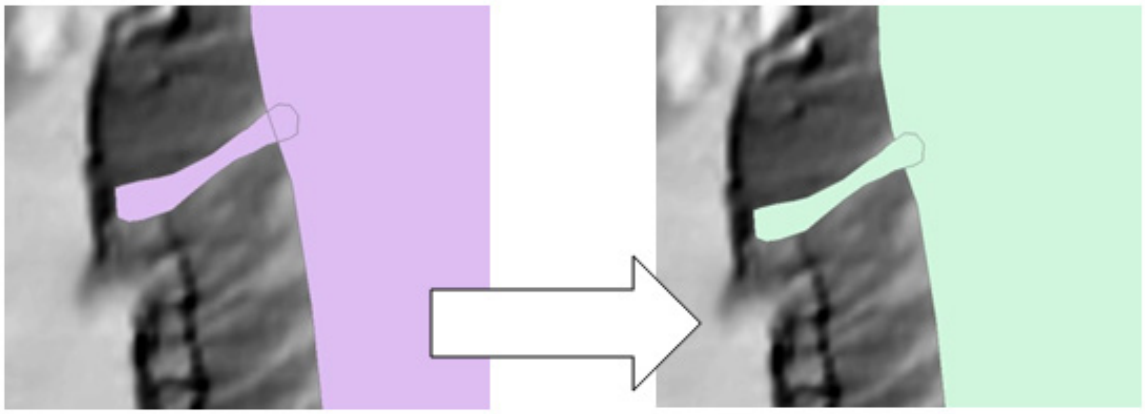

Figure A.2.2. Removing overlaps in landslide polygons.

A.3 Construction of 10-m² digital elevation model (DEM)

1. We gathered all existing lidar-derived bare-earth DEMs for the state of Oregon. The native resolution of most of these lidar data sets was 3-ft² cell size in the NAD1983 HARN Oregon Statewide Lambert projection.
2. We resampled the lidar data to a cell size of 32.8 ft² (10 m²) to match the data resolution available for the rest of the state. In the Environmental Settings, we set the Resample type to Bilinear, which gave us the best reprojection result.
3. We mosaicked the lidar data to a new raster file.
4. Some of the lidar data sets were in a different projection. We mosaicked these raster files with output at a 10-m² cell size, using the same methods as above.
5. We re-projected the raster files into the NAD1983 HARN Oregon Statewide Lambert projection, and we recalculated the elevation values from meters to feet by using the Times tool in Spatial Analyst.
6. We mosaicked data sets from #5 with the ones from #3 above to create a data set of all existing lidar-derived bare-earth DEMs for the state.
7. We acquired the statewide USGS 10-m DEM (NED) from DAS GEO and re-projected it into NAD1983 HARN Oregon Statewide Lambert, again converting elevation values from meters to feet.
8. We mosaicked the NED and lidar-derived DEM together with lidar grids on top of the mosaic.

   The result is a 32.8 ft² (10 m²) statewide elevation grid.

Appendix B. Generalized geologic unit details

These data are also available in Excel spreadsheet format (Appendix B_Generalized Geologic Unit Details.xlsx) in the digital appendix folder.

Table B.1. Generalized Geologic Unit Details. STD is standard deviation.

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
1	batholith rocks_felsic composition lithologies	180,794,000	0	0.1	Low	17.40	5.65	batholith rocks_intermediate composition litholog	17.40	17.40	11.75	11.75
2	batholith rocks_intermediate composition litholog	10,548,599,808	3	0.1	Low	17.40	5.65		17.40	17.40	11.75	11.75
3	batholith rocks_mafic composition lithologies	83,264,800	0	8.4	Moderate	17.40	5.65	batholith rocks_intermediate composition litholog	17.40	17.40	11.75	11.75
4	intrusive rocks_alkali basalt	4,157,400	0	8.4	Moderate	15.45	9.52	intrusive rocks_basalt	15.45	15.45	5.93	5.93
5	intrusive rocks_andesite	465,027,008	6	4.1	Low	22.58	12.76		22.58	22.58	9.81	9.81
6	intrusive rocks_basalt	10,563,900,416	286	8.4	Moderate	15.45	9.52		15.45	15.45	5.93	5.93
7	intrusive rocks_basaltic andesite	77,009,000	0	0.7	Low	12.52	3.49		12.52	12.52	9.03	9.03
8	intrusive rocks_basanite	111,681,000	1	2.6	Low	17.74	10.63		17.74	17.74	7.11	7.11
9	intrusive rocks_breccia	2,604,820	0	5.1	Low	15.21	9.44	intrusive rocks_mixed lithologies	15.21	15.21	5.77	5.77
10	intrusive rocks_brecciated rock	13,996,400	0	5.1	Low	15.21	9.44	intrusive rocks_mixed lithologies	15.21	15.21	5.77	5.77
11	intrusive rocks_dacite	276,081,984	2	1.9	Low	15.65	8.42		15.65	15.65	7.22	7.22
12	intrusive rocks_felsic composition lithologies	3,510,180,096	101	2.2	Low	18.63	7.82		18.63	18.63	10.81	10.81
13	intrusive rocks_gabbro	1,704,649,984	2	1.8	Low	19.10	9.86		19.10	19.10	9.24	9.24

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
14	intrusive rocks_intermediate composition lithology	15,081,799,680	242	3.6	Low	16.23	8.08		16.23	16.23	8.15	8.15
15	intrusive rocks_mafic composition lithologies	14,896,900,096	142	3.6	Low	15.78	8.33		15.78	15.78	7.46	7.46
16	intrusive rocks_mixed lithologies	3,582,259,968	47	5.1	Low	15.21	9.44		15.21	15.21	5.77	5.77
17	intrusive rocks_nepheline syenite	34,438,700	0	0.9	Low	12.55	6.32		12.55	12.55	6.23	6.23
18	intrusive rocks_rhyodacite	20,913,100	1	0.4	Low	10.89	4.21		10.89	10.89	6.67	6.67
19	intrusive rocks_rhyolite	758,097,024	18	6.9	Low	15.18	9.11		15.18	15.18	6.07	6.07
20	intrusive rocks_ultramafic composition lithologies	2,818,860,032	21	3.6	Low	19.98	8.51		19.98	19.98	11.48	11.48
21	invasive extrusive rocks_basalt	2,027,820,032	30	36.0	High	16.46	9.51		16.46	16.46	6.95	6.95
22	marine sedimentary rocks_basalt	179,880,992	0	8.1	Moderate	19.18	7.68		19.18	19.18	11.50	11.50
23	marine sedimentary rocks_basaltic sandstone	1,417,430,016	61	11.5	Moderate	17.88	9.70		17.88	17.88	8.17	8.17
24	marine sedimentary rocks_basin plain mudstone	2,666,289,920	51	3.9	Low	10.30	5.11		10.30	10.30	5.19	5.19
25	marine sedimentary rocks_chert	69,545,200	1	1.0	Low	20.62	5.32		20.62	20.62	15.30	15.30
26	marine sedimentary rocks_coarse grained sediments	5,656,909,824	225	4.6	Low	17.99	9.07		17.99	17.99	8.92	8.92
27	marine sedimentary rocks_conglomerate	2,446,579,968	108	3.2	Low	18.12	9.33		18.12	18.12	8.79	8.79

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
28	marine sedimentary rocks_deltaic sandstone	25,663,799,296	664	5.1	Low	16.69	9.39		16.69	16.69	7.30	7.30
29	marine sedimentary rocks_fine grained sediments	40,649,699,328	585	4.9	Low	15.24	7.74		15.24	15.24	7.50	7.50
30	marine sedimentary rocks_lime-stone	1,473,469,952	3	2.6	Low	17.76	9.71		17.76	17.76	8.05	8.05
31	marine sedimentary rocks_mixed grained sediments	39,723,798,528	760	9.3	Moderate	16.32	8.07		16.32	16.32	8.25	8.25
32	marine sedimentary rocks_mixed lithologies	1,980,429,952	48	15.5	Moderate	10.70	6.93		10.70	10.70	3.77	3.77
33	marine sedimentary rocks_mud-stone	981,353,024	201	18.0	High	14.80	7.73		14.80	14.80	7.06	7.06
34	marine sedimentary rocks_ quartzite	788,094,016	6	0.3	Low	21.07	9.31		21.07	21.07	11.76	11.76
35	marine sedimentary rocks_sand-stone	14,473,600,000	648	8.1	Moderate	14.02	7.89		14.02	14.02	6.13	6.13
36	marine sedimentary rocks_sedi-mentary rocks	136,055,008	0	9.3	Moderate	16.32	8.07	marine sedimentary rocks_mixed grained sediments	16.32	16.32	8.25	8.25
37	marine sedimentary rocks_shelf sandstone	8,189,259,776	469	24.0	High	13.86	8.59		13.86	13.86	5.27	5.27
38	marine sedimentary rocks_silt-stone	567,308,032	18	5.0	Low	17.80	8.66		17.80	17.80	9.13	9.13
39	marine sedimentary rocks_slope mudstone	34,879,901,696	1148	17.1	High	14.48	8.36		14.48	14.48	6.12	6.12

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
40	marine sedimentary rocks_tuffaceous sedimentary r	11,790,699,520	409	35.3	High	13.07	7.74		13.07	13.07	5.32	5.32
41	marine sedimentary rocks_turbidite	95,471,099,904	3696	7.6	Moderate	15.79	8.80		15.79	15.79	7.00	7.00
42	marine volcanic rocks_basalt	5,132,789,760	166	17.8	High	19.43	10.03		19.43	19.43	9.40	9.40
43	marine volcanic rocks_pillow lavas	2,096,269,952	386	9.0	Moderate	14.77	7.07		14.77	14.77	7.71	7.71
44	melange rocks_basalt	47,127,000	0	0.5	Low	25.19	5.95	melange rocks_volcanic rocks	25.19	25.19	19.25	19.25
45	melange rocks_blueschist	23,567,400	1	27.4	High	16.28	7.69		16.28	16.28	8.59	8.59
46	melange rocks_chert	10,110,600	0	19.7	High	15.69	6.11		15.69	15.69	9.58	9.58
47	melange rocks_gneiss	93,498,800	0	14.0	Moderate	14.04	6.93	melange rocks_mixed lithologies	14.04	14.04	7.11	7.11
48	melange rocks_greenstone	61,177,100	1	0.6	Low	23.41	11.56		23.41	23.41	11.84	11.84
49	melange rocks_hornfels	14,815,300	0	14.0	Moderate	14.04	6.93	melange rocks_mixed lithologies	14.04	14.04	7.11	7.11
50	melange rocks_intermediate composition lithologies	32,433,700	0	14.0	Moderate	14.04	6.93	melange rocks_mixed lithologies	14.04	14.04	7.11	7.11
51	melange rocks_mafic composition lithologies	309,947,008	1	0.5	Low	17.90	6.34		17.90	17.90	11.56	11.56
52	melange rocks_marine sedimentary rocks	16,558,600	0	0.0	Low	21.63	4.68	melange rocks_sedimentary rocks	21.63	21.63	16.95	16.95
53	melange rocks_metamorphic rocks	316,150,016	0	14.0	Moderate	14.04	6.93	melange rocks_mixed lithologies	14.04	14.04	7.11	7.11
54	melange rocks_mixed grained sediments	239,838,000	0	14.0	Moderate	14.04	6.93	melange rocks_mixed lithologies	14.04	14.04	7.11	7.11

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
55	melange rocks_mixed lithologies	3,089,100,032	113	14.0	Moderate	14.04	6.93		14.04	14.04	7.11	7.11
56	melange rocks_mud-stone	1,405,059,968	53	6.0	Low	14.50	6.09		14.50	14.50	8.40	8.40
57	melange rocks_sedi-mentary rocks	170,484,000	2	0.0	Low	21.63	4.68		21.63	21.63	16.95	16.95
58	melange rocks_ser-pentinite	4,301,579,776	182	9.9	Moderate	15.17	7.14		15.17	15.17	8.03	8.03
59	melange rocks_turbi-dite	6,029,810,176	625	18.2	High	16.21	7.08		16.21	16.21	9.13	9.13
60	melange rocks_ultra-mafic composition lithologies	479,552,992	1	2.0	Low	12.93	5.39		12.93	12.93	7.54	7.54
61	melange rocks_volca-nic rocks	354,894,016	1	0.5	Low	25.19	5.95		25.19	25.19	19.25	19.25
62	metamor-phic rocks_am-phibolite	3,817,609,984	40	3.2	Low	15.64	7.92		15.64	15.64	7.73	7.73
63	metamor-phic rocks_chert	1,679,410	0	1.9	Low	14.73	6.50	metamorphic rocks_marine sedimentary rocks	14.73	14.73	8.23	8.23
64	metamor-phic rocks_felsic composition lithologies	159,252,992	4	25.8	High	21.62	6.84		21.62	21.62	14.77	14.77
65	metamor-phic rocks_fine grained sediments	43,611,400	0	5.4	Low	19.23	8.20	metamorphic rocks_mixed lithologies	19.23	19.23	11.03	11.03
66	metamor-phic rocks_green-stone	4,737,339,904	10	4.8	Low	14.45	7.23		14.45	14.45	7.22	7.22
67	metamor-phic rocks_horn-fels	265,698,000	0	5.4	Low	19.23	8.20	metamorphic rocks_mixed lithologies	19.23	19.23	11.03	11.03
68	metamor-phic rocks_mafic composition lithologies	4,012,140,032	25	1.0	Low	20.31	8.09		20.31	20.31	12.22	12.22

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
69	metamorphic rocks_marble	350,920,992	4	0.5	Low	23.93	7.67		23.93	23.93	16.26	16.26
70	metamorphic rocks_marine sedimentary rocks	992,348,992	46	1.9	Low	14.73	6.50		14.73	14.73	8.23	8.23
71	metamorphic rocks_mixed lithologies	4,324,490,240	207	5.4	Low	19.23	8.20		19.23	19.23	11.03	11.03
72	metamorphic rocks_ quartzite	909,939,008	28	0.6	Low	19.91	7.60		19.91	19.91	12.31	12.31
73	metamorphic rocks_schist	9,031,879,680	316	6.4	Low	18.14	7.64		18.14	18.14	10.50	10.50
74	metamorphic rocks_sedimentary rocks	2,051,849,984	24	3.1	Low	18.75	7.89		18.75	18.75	10.86	10.86
75	metamorphic rocks_serpentinite	1,569,350,016	53	2.9	Low	16.03	8.39		16.03	16.03	7.63	7.63
76	metamorphic rocks_tuff	687,987,968	1	0.7	Low	23.80	6.11		23.80	23.80	17.69	17.69
77	metamorphic rocks_ultramafic composition litholog	6,439,499,776	83	5.7	Low	17.69	8.07		17.69	17.69	9.62	9.62
78	metamorphic rocks_volcanic rocks	14,677,200	1	3.2	Low	25.61	4.98		25.61	25.61	20.62	20.62
79	metamorphic rocks_volcaniclastic rocks	16,943,500	0	3.2	Low	25.61	4.98	metamorphic rocks_volcanic rocks	25.61	25.61	20.62	20.62
80	terrestrial sedimentary rocks_coarse grained sedi	13,842,299,904	62	4.5	Low	12.26	7.24		12.26	12.26	5.03	5.03
81	terrestrial sedimentary rocks_conglomerate	2,789,070,080	39	1.2	Low	10.56	6.81		10.56	10.56	3.75	3.75

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
82	terrestrial sedimentary rocks_fine grained sedime	33,139,200,000	79	2.0	Low	12.41	7.22		12.41	12.41	5.20	5.20
83	terrestrial sedimentary rocks_mixed grained sedim	55,252,398,080	168	2.0	Low	11.35	7.53		11.35	11.35	3.82	3.82
84	terrestrial sedimentary rocks_mixed lithologies	11,288,500,224	245	2.2	Low	12.05	7.57		12.05	12.05	4.47	4.47
85	terrestrial sedimentary rocks_mud-stone	650,190,976	345	27.7	High	13.36	8.24		13.36	13.36	5.12	5.12
86	terrestrial sedimentary rocks_sand-stone	3,235,010,048	279	14.8	Moderate	12.18	7.18		12.18	12.18	5.00	5.00
87	terrestrial sedimentary rocks_tuffa-ceous sediment	67,723,300,864	114	2.5	Low	12.49	8.03		12.49	12.49	4.45	4.45
88	terrestrial sedimentary rocks_turbi-dite	2,912,360	0	4.9	Low	12.41	7.22	marine sedimentary rocks_fine grained sediments	12.41	12.41	5.20	5.20
89	vent and pyroclastic rocks_andes-ite	245,724,000	2	0.9	Low	23.93	6.95		23.93	23.93	16.98	16.98
90	vent and pyroclastic rocks_basalt	6,930,509,824	4	0.2	Low	18.44	8.98		18.44	18.44	9.45	9.45
91	vent and pyroclastic rocks_basalt trachyandes-ite	27,678,500	0	9.8	Moderate	10.32	7.42	volcanic rocks_basalt trachyandes-ite	10.32	10.32	2.90	2.90
92	vent and pyroclastic rocks_basal-tic andesite	656,190,016	3	1.9	Low	12.27	8.10		12.27	12.27	4.17	4.17
93	vent and pyroclastic rocks_felsic composition lit	177,392,992	0	0.4	Low	13.06	7.87	vent and pyroclastic rocks_mixed lithologies	13.06	13.06	5.19	5.19

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
94	vent and pyroclastic rocks_intermediate compositi	101,398,000	3	9.6	Moderate	11.68	6.18		11.68	11.68	5.50	5.50
95	vent and pyroclastic rocks_mafic composition lith	10,948,800,512	2	0.3	Low	17.25	8.84		17.25	17.25	8.41	8.41
96	vent and pyroclastic rocks_mixed grained sediments	27,434,400	0	0.4	Low	13.06	7.87	vent and pyroclastic rocks_mixed lithologies	13.06	13.06	5.19	5.19
97	vent and pyroclastic rocks_mixed lithologies	4,759,139,840	1	0.4	Low	13.06	7.87		13.06	13.06	5.19	5.19
98	vent and pyroclastic rocks_palagonite tuff	1,173,180,032	0	0.4	Low	13.06	7.87	vent and pyroclastic rocks_mixed lithologies	13.06	13.06	5.19	5.19
99	vent and pyroclastic rocks_rhyodacite	347,207,008	3	15.2	Moderate	18.44	8.67		18.44	18.44	9.77	9.77
100	vent and pyroclastic rocks_rhyolite	2,785,619,968	0	0.4	Low	13.06	7.87	vent and pyroclastic rocks_mixed lithologies	13.06	13.06	5.19	5.19
101	vent and pyroclastic rocks_volcanic rocks	27,373,500	0	0.4	Low	13.06	7.87	vent and pyroclastic rocks_mixed lithologies	13.06	13.06	5.19	5.19
102	volcanic rocks_alkali basalt	161,908,992	2	5.0	Low	9.27	4.10		9.27	9.27	5.18	5.18
103	volcanic rocks_andesite	101,151,997,952	1158	7.7	Moderate	14.68	9.15		14.68	14.68	5.53	5.53
104	volcanic rocks_ash-flow tuff	475,484,992	43	27.7	High	11.30	6.28		11.30	11.30	5.03	5.03
105	volcanic rocks_basalt	799,083,986,944	3392	2.0	Low	14.06	9.36		14.06	14.06	4.70	4.70
106	volcanic rocks_basalt trachyandesite	11,272,800,256	58	9.8	Moderate	10.32	7.42		10.32	10.32	2.90	2.90
107	volcanic rocks_basaltic andesite	76,228,501,504	327	1.9	Low	13.24	8.06		13.24	13.24	5.18	5.18

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
108	volcanic rocks_basanite	363,599,008	6	11.1	Moderate	17.45	7.09		17.45	17.45	10.36	10.36
109	volcanic rocks_dacite	10,567,400,448	59	5.1	Low	14.35	8.09		14.35	14.35	6.26	6.26
110	volcanic rocks_felsic composition lithologies	5,362,160,128	62	5.2	Low	15.74	8.56		15.74	15.74	7.18	7.18
111	volcanic rocks_greenstone	5,540,669,952	15	4.9	Low	10.24	6.95		10.24	10.24	3.29	3.29
112	volcanic rocks_intermediate composition lithologi	6,223,240,192	126	13.7	Moderate	14.00	8.80		14.00	14.00	5.20	5.20
113	volcanic rocks_mafic composition lithologies	56,834,498,560	296	5.8	Low	14.31	8.74		14.31	14.31	5.57	5.57
114	volcanic rocks_mixed lithologies	115,082,002,432	746	5.4	Low	13.27	8.15		13.27	13.27	5.12	5.12
115	volcanic rocks_pillow lavas	15,229,400,064	471	3.7	Low	17.29	9.01		17.29	17.29	8.28	8.28
116	volcanic rocks_rhyodacite	9,860,119,552	11	0.4	Low	18.66	9.27		18.66	18.66	9.39	9.39
117	volcanic rocks_rhyolite	30,387,599,360	85	2.8	Low	13.95	8.45		13.95	13.95	5.50	5.50
118	volcanic rocks_trachyandesite	3,172,489,984	16	5.5	Low	9.60	5.70		9.60	9.60	3.90	3.90
119	volcanic rocks_trachyrhyodacite	753,340,032	0	5.5	Low	9.60	5.70	volcanic rocks_trachyandesite	9.60	9.60	3.90	3.90
120	volcanic rocks_tuff	515,476,992	3	6.3	Low	11.68	7.28		11.68	11.68	4.40	4.40
121	volcanic rocks_volcanic rocks	1,781,510,016	199	38.5	High	11.51	6.37		11.51	11.51	5.15	5.15
122	volcaniclastic rocks_airfall deposits	13,443,399,680	0	0.1	Low	12.02	6.62		12.02	12.02	5.41	5.41
123	volcaniclastic rocks_andesite	605,153,984	6	1.4	Low	18.34	9.10		18.34	18.34	9.24	9.24
124	volcaniclastic rocks_ash-flow tuff	122,157,998,080	183	0.9	Low	14.68	9.26		14.68	14.68	5.43	5.43

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Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
125	volcaniclastic rocks_basalt	606,001,024	57	45.4	High	16.20	10.15		16.20	16.20	6.05	6.05
126	volcaniclastic rocks_brecci-ated rock	1,614,680,064	1	0.2	Low	14.35	6.64		14.35	14.35	7.71	7.71
127	volcaniclastic rocks_coarse grained sediments	6,551,580,160	80	14.0	Moderate	14.03	7.82		14.03	14.03	6.20	6.20
128	volcaniclastic rocks_felsic composition lithologi	17,828,900,864	63	8.2	Moderate	13.56	8.58		13.56	13.56	4.98	4.98
129	volcaniclastic rocks_fine grained sediments	5,601,990,144	13	3.8	Low	10.76	6.72		10.76	10.76	4.03	4.03
130	volcaniclastic rocks_inter-mediate composition lit	1,384,550,016	9	1.1	Low	17.97	10.30		17.97	17.97	7.68	7.68
131	volcaniclastic rocks_mafic composition lithologies	584,782,016	0	10.9	Moderate	19.39	11.13	volcaniclastic rocks_mixed grained sediments	19.39	19.39	8.26	8.26
132	volcaniclastic rocks_mixed grained sediments	415,331,008	66	10.9	Moderate	19.39	11.13		19.39	19.39	8.26	8.26
133	volcaniclastic rocks_mixed lithologies	80,244,998,144	951	7.5	Moderate	14.31	9.00		14.31	14.31	5.31	5.31
134	volcaniclastic rocks_mud-flow breccia	6,151,810,048	298	15.0	Moderate	19.08	10.85		19.08	19.08	8.22	8.22
135	volcaniclastic rocks_palag-onite tuff	5,483,970,048	7	0.6	Low	16.42	8.59		16.42	16.42	7.83	7.83
136	volcaniclastic rocks_rhyo-dacite	388,414,016	5	4.4	Low	13.56	8.58	volcaniclastic rocks_felsic composition lithologi	13.56	13.56	4.98	4.98
137	volcaniclastic rocks_sand-stone	349,228,000	172	39.9	High	13.07	8.11		13.07	13.07	4.96	4.96
138	volcaniclastic rocks_sedi-mentary rocks	2,261,890,048	258	36.9	High	11.60	6.89		11.60	11.60	4.71	4.71
139	volcaniclastic rocks_tuff	51,977,400,320	586	13.0	Moderate	15.65	9.21		15.65	15.65	6.45	6.45

(table continued on next page)

Table B.1. Generalized Geologic Unit Details *(continued)*

	Generalized Geology	Unit Area, ft²	Landslide Frequency	Landslide Area/ Geologic Unit Area	Landslide Density Class	Slope Mean, deg	Slope STD, deg	Substitution Unit if No Landslides	Slope High => Mean, deg	Slope Moderate (Upper Bound) < Mean, deg	Slope Moderate (Lower Bound) => (Mean-STD), deg	Slope Low < (Mean-STD), deg
140	volcaniclastic rocks_volcaniclastic rocks	1,195,510,016	50	8.0	Moderate	12.35	6.78		12.35	12.35	5.57	5.57
141	volcaniclastic rocks_welded tuff	21,104,300,032	124	4.9	Low	13.70	8.11		13.70	13.70	5.59	5.59
142	sediments_ coarse grained sediments	15,792,900,096	14	0.4	Low	10.54	7.64	sediments_ mixed grained sediments	10.54	10.54	2.89	2.89
143	sediments_ fine grained sediments	82,409,603,072	196	0.3	Low	10.54	7.64	sediments_ mixed grained sediments	10.54	10.54	2.89	2.89
144	sediments_ ice	167,380,992	0	2.1	Low	10.54	7.64	sediments_ mixed grained sediments	10.54	10.54	2.89	2.89
145	sediments_ metamorphic rocks	69,495,000	9	1.7	Low	22.02	7.46		22.02	22.02	14.56	14.56
146	sediments_ mixed grained sediments	374,805,987,328	1192	2.1	Low	10.54	7.64		10.54	10.54	2.89	2.89
147	sediments_ mudflow breccia	83,508,000	0	2.1	Low	10.54	7.64	sediments_ mixed grained sediments	10.54	10.54	2.89	2.89
148	sediments_ turbidite	94,284,304	0	2.1	Low	10.54	7.64	sediments_ mixed grained sediments	10.54	10.54	2.89	2.89

Appendix C. Landslide susceptibility exposure details

C.1 Oregon cities

Table C.1 data are also available in Excel spreadsheet format (C_1_Cities_LS_Suscep.xlsx) in the digital appendix folder.

Table C.1. Landslide Susceptibility Exposure of Oregon Cities

			Landslide Susceptibility Exposure, ft²				Landslide Susceptibility Exposure, %			
	City	Area, ft²	Low	Moderate	High	Very High	Low	Moderate	High	Very High
1	Adair Village	6,502,473	4,831,914	1,650,107	20,451		74.3%	25.4%	0.3%	0.0%
2	Adams	10,047,074	8,647,766	1,331,496	67,813		86.1%	13.3%	0.7%	0.0%
3	Adrian	6,791,006	4,631,765	2,086,046	73,195		68.2%	30.7%	1.1%	0.0%
4	Albany	493,730,826	383,109,043	101,264,716	9,348,456	08,611	77.6%	20.5%	1.9%	0.0%
5	Amity	17,399,913	14,141,678	2,539,206	719,029		81.3%	14.6%	4.1%	0.0%
6	Antelope	12,855,262	715,724	12,119,087	20,451		5.6%	94.3%	0.2%	0.0%
7	Arlington	90,501,540	57,117,272	22,823,796	10,560,473		63.1%	25.2%	11.7%	0.0%
8	Ashland	182,893,560	72,236,256	77,903,802	32,590,968	162,535	39.5%	42.6%	17.8%	0.1%
9	Astoria	284,243,880	117,733,720	56,341,536	62,951,654	47,216,969	41.4%	19.8%	22.1%	16.6%
10	Athena	14,999,561	13,719,732	1,269,065	10,764		91.5%	8.5%	0.1%	0.0%
11	Aumsville	30,637,393	28,494,299	1,961,184	181,910		93.0%	6.4%	0.6%	0.0%
12	Aurora	13,534,706	7,537,055	4,836,225	1,161,426		55.7%	35.7%	8.6%	0.0%
13	Baker City	201,005,707	141,939,825	34,968,716	24,097,166		70.6%	17.4%	12.0%	0.0%
14	Bandon	88,960,027	65,511,924	15,382,704	7,015,917	1,049,481	73.6%	17.3%	7.9%	1.2%
15	Banks	10,375,465	8,733,969	1,523,093	118,403		84.2%	14.7%	1.1%	0.0%
16	Barlow	1,498,532	1,466,241	32,292			97.8%	2.2%	0.0%	0.0%
17	Bay City	53,898,193	26,126,228	7,203,209	2,084,969	18,483,787	48.5%	13.4%	3.9%	34.3%
18	Beaverton	523,956,667	313,957,080	188,689,197	19,146,844	2,163,546	59.9%	36.0%	3.7%	0.4%
19	Bend	929,767,080	712,058,381	181,520,432	36,188,267		76.6%	19.5%	3.9%	0.0%
20	Boardman	112,562,441	97,905,224	13,755,201	902,016		87.0%	12.2%	0.8%	0.0%
21	Bonanza	22,832,023	17,094,858	5,045,045	692,119		74.9%	22.1%	3.0%	0.0%
22	Brookings	116,049,956	37,070,839	49,439,717	26,259,636	3,279,764	31.9%	42.6%	22.6%	2.8%
23	Brownsville	35,575,433	23,386,381	4,919,107	6,893,208	376,737	65.7%	13.8%	19.4%	1.1%
24	Burns	99,648,808	92,356,258	5,944,908	1,347,642		92.7%	6.0%	1.4%	0.0%
25	Butte Falls	10,731,642	8,982,506	1,049,481	699,654		83.7%	9.8%	6.5%	0.0%
26	Canby	121,922,939	108,736,073	10,961,966	2,224,900		89.2%	9.0%	1.8%	0.0%
27	Cannon Beach	40,483,346	18,734,865	10,650,889	2,574,727	8,522,864	46.3%	26.3%	6.4%	21.1%
28	Canyon City	38,600,926	3,751,689	12,492,594	18,997,225	3,359,416	9.7%	32.4%	49.2%	8.7%
29	Canyonville	26,805,376	11,220,310	7,987,898	7,597,168		41.9%	29.8%	28.3%	0.0%
30	Carlton	24,865,027	15,604,835	8,143,975	1,116,218		62.8%	32.8%	4.5%	0.0%
31	Cascade Locks	82,944,979	42,818,197	12,134,156	7,203,209	20,789,417	51.6%	14.6%	8.7%	25.1%
32	Cave Junction	49,309,811	36,907,633	8,973,872	3,428,305		74.8%	18.2%	7.0%	0.0%
33	Central Point	107,071,293	98,437,560	7,992,203	641,529		91.9%	7.5%	0.6%	0.0%
34	Chiloquin	21,205,490	16,301,452	3,749,070	1,154,968		76.9%	17.7%	5.4%	0.0%
35	Clatskanie	33,986,115	6,262,588	3,929,904	16,162,011	7,631,612	18.4%	11.6%	47.6%	22.5%

(table continued on next page)

Table C.1. Landslide Susceptibility Exposure of Oregon Cities *(continued)*

			Landslide Susceptibility Exposure, ft²				Landslide Susceptibility Exposure, %			
	City	Area, ft²	Low	Moderate	High	Very High	Low	Moderate	High	Very High
36	Coburg	28,193,496	26,240,923	1,925,664	26,910		93.1%	6.8%	0.1%	0.0%
37	Columbia City	32,536,182	20,209,352	9,157,935	3,154,902	13,993	62.1%	28.1%	9.7%	0.0%
38	Condon	22,758,604	21,568,116	1,190,488			94.8%	5.2%	0.0%	0.0%
39	Coos Bay	449,002,677	279,589,491	90,908,758	71,927,679	6,576,749	62.3%	20.2%	16.0%	1.5%
40	Coquille	76,098,101	20,009,517	25,322,099	24,715,015	6,051,470	26.3%	33.3%	32.5%	8.0%
41	Cornelius	56,007,097	50,756,461	4,685,530	565,105		90.6%	8.4%	1.0%	0.0%
42	Corvallis	398,128,460	255,682,099	133,975,164	8,280,676	190,521	64.2%	33.7%	2.1%	0.0%
43	Cottage Grove	106,649,738	83,241,462	20,213,547	3,194,729		78.1%	19.0%	3.0%	0.0%
44	Cove	22,377,224	11,365,744	8,262,378	2,749,103		50.8%	36.9%	12.3%	0.0%
45	Creswell	47,917,456	42,869,182	4,819,003	229,271		89.5%	10.1%	0.5%	0.0%
46	Culver	19,219,963	19,141,386	78,577			99.6%	0.4%	0.0%	0.0%
47	Dallas	135,561,360	91,209,743	18,193,161	26,158,455		67.3%	13.4%	19.3%	0.0%
48	Damascus	430,099,603	197,582,992	155,394,269	62,580,299	14,542,043	45.9%	36.1%	14.6%	3.4%
49	Dayton	21,139,259	15,029,663	3,943,897	2,165,699		71.1%	18.7%	10.2%	0.0%
50	Dayville	13,395,202	6,827,064	2,836,290	1,656,566	2,075,282	51.0%	21.2%	12.4%	15.5%
51	Depoe Bay	50,271,265	9,850,628	13,071,693	21,282,404	6,066,540	19.6%	26.0%	42.3%	12.1%
52	Detroit	26,659,361	12,120,547	9,056,754	5,482,060		45.5%	34.0%	20.6%	0.0%
53	Donald	7,787,724	7,728,523	59,202			99.2%	0.8%	0.0%	0.0%
54	Drain	17,288,670	8,406,291	6,081,609	2,800,769		48.6%	35.2%	16.2%	0.0%
55	Dufur	16,272,333	10,249,926	5,557,407	465,001		63.0%	34.2%	2.9%	0.0%
56	Dundee	38,346,886	22,888,834	13,042,630	2,415,421		59.7%	34.0%	6.3%	0.0%
57	Dunes City	96,073,828	30,985,538	51,467,638	13,596,972	23,681	32.3%	53.6%	14.2%	0.0%
58	Durham	11,438,791	7,886,700	2,501,533	1,050,558		68.9%	21.9%	9.2%	0.0%
59	Eagle Point	81,613,814	26,516,585	50,718,469	4,378,759		32.5%	62.1%	5.4%	0.0%
60	Echo	16,039,344	11,166,521	4,365,842	506,980		69.6%	27.2%	3.2%	0.0%
61	Elgin	27,061,424	22,334,991	4,066,605	659,828		82.5%	15.0%	2.4%	0.0%
62	Elkton	5,644,785	-04,115	5,373,344	275,556		-0.1%	95.2%	4.9%	0.0%
63	Enterprise	39,805,554	26,642,368	8,791,962	2,017,157	2,354,067	66.9%	22.1%	5.1%	5.9%
64	Estacada	62,896,341	37,640,978	9,205,296	14,402,112	1,647,955	59.8%	14.6%	22.9%	2.6%
65	Eugene	1,225,382,361	800,412,413	335,475,567	66,663,050	22,831,330	65.3%	27.4%	5.4%	1.9%
66	Fairview	96,035,709	60,730,083	30,284,262	5,021,364		63.2%	31.5%	5.2%	0.0%
67	Falls City	33,481,019	8,242,879	5,393,796	19,844,345		24.6%	16.1%	59.3%	0.0%
68	Florence	164,025,566	108,460,108	42,242,966	13,322,492		66.1%	25.8%	8.1%	0.0%
69	Forest Grove	171,253,021	128,102,657	26,048,663	15,285,829	1,815,872	74.8%	15.2%	8.9%	1.1%
70	Fossil	21,837,713	-59,310	14,032,910	515,591	7,348,522	-0.3%	64.3%	2.4%	33.7%
71	Garibaldi	37,176,767	14,712,486	2,939,624	7,083,729	12,440,928	39.6%	7.9%	19.1%	33.5%
72	Gaston	9,598,220	1,911,711	6,466,957	1,219,551		19.9%	67.4%	12.7%	0.0%
73	Gates	17,683,876	8,875,768	5,712,407	3,095,701		50.2%	32.3%	17.5%	0.0%
74	Gearhart	50,545,983	32,413,099	15,587,219	2,439,102	106,563	64.1%	30.8%	4.8%	0.2%
75	Gervais	10,716,349	10,579,647	136,702			98.7%	1.3%	0.0%	0.0%
76	Gladstone	69,974,152	49,557,167	15,533,399	3,233,479	1,650,107	70.8%	22.2%	4.6%	2.4%
77	Glendale	10,965,472	5,556,607	3,793,202	1,615,663		50.7%	34.6%	14.7%	0.0%

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Table C.1. Landslide Susceptibility Exposure of Oregon Cities *(continued)*

			Landslide Susceptibility Exposure, ft²				Landslide Susceptibility Exposure, %			
	City	Area, ft²	Low	Moderate	High	Very High	Low	Moderate	High	Very High
78	Gold Beach	74,149,696	24,899,424	22,029,419	21,461,085	5,759,768	33.6%	29.7%	28.9%	7.8%
79	Gold Hill	20,166,729	10,304,835	5,621,990	4,239,904		51.1%	27.9%	21.0%	0.0%
80	Granite	10,569,031	3,658,600	4,277,578	2,632,852		34.6%	40.5%	24.9%	0.0%
81	Grants Pass	306,611,299	223,194,222	63,034,536	20,382,541		72.8%	20.6%	6.6%	0.0%
82	Grass Valley	14,217,570	12,226,247	1,913,823	77,500		86.0%	13.5%	0.5%	0.0%
83	Greenhorn	2,409,944	603,760	1,526,322	279,862		25.1%	63.3%	11.6%	0.0%
84	Gresham	655,176,345	436,098,476	153,111,244	63,947,315	2,019,310	66.6%	23.4%	9.8%	0.3%
85	Haines	21,065,791	20,419,956	645,835			96.9%	3.1%	0.0%	0.0%
86	Halfway	10,412,591	10,412,591				100.0%	0.0%	0.0%	0.0%
87	Halsey	15,747,777	15,446,387	301,389			98.1%	1.9%	0.0%	0.0%
88	Happy Valley	255,471,143	91,850,017	124,068,061	38,962,127	590,939	36.0%	48.6%	15.3%	0.2%
89	Harrisburg	40,248,157	37,536,728	2,121,567	589,862		93.3%	5.3%	1.5%	0.0%
90	Helix	3,550,496	3,281,398	269,098			92.4%	7.6%	0.0%	0.0%
91	Heppner	34,307,735	7,345,215	19,437,469	7,525,050		21.4%	56.7%	21.9%	0.0%
92	Hermiston	222,701,378	203,323,110	18,250,210	1,128,058		91.3%	8.2%	0.5%	0.0%
93	Hillsboro	665,310,594	542,574,029	108,698,273	14,038,292		81.6%	16.3%	2.1%	0.0%
94	Hines	58,915,900	48,665,428	9,288,178	962,294		82.6%	15.8%	1.6%	0.0%
95	Hood River	93,822,728	55,837,965	27,591,132	10,039,499	354,133	59.5%	29.4%	10.7%	0.4%
96	Hubbard	19,587,769	18,157,245	1,060,245	370,279		92.7%	5.4%	1.9%	0.0%
97	Huntington	20,476,011	8,591,578	7,243,035	4,641,398		42.0%	35.4%	22.7%	0.0%
98	Idanha	23,496,523	7,018,053	6,146,193	4,926,642	5,405,636	29.9%	26.2%	21.0%	23.0%
99	Imbler	6,013,929	5,460,664	553,265			90.8%	9.2%	0.0%	0.0%
100	Independence	82,442,831	72,845,729	8,106,301	1,490,802		88.4%	9.8%	1.8%	0.0%
101	Ione	18,907,066	9,120,518	6,418,520	3,368,028		48.2%	33.9%	17.8%	0.0%
102	Irrigon	44,926,107	39,249,220	5,601,539	75,347		87.4%	12.5%	0.2%	0.0%
103	Island City	27,315,950	25,841,294	1,404,690	69,965		94.6%	5.1%	0.3%	0.0%
104	Jacksonville	53,163,321	26,784,206	16,949,930	9,429,186		50.4%	31.9%	17.7%	0.0%
105	Jefferson	22,291,901	20,144,501	1,961,184	186,216		90.4%	8.8%	0.8%	0.0%
106	John Day	68,803,023	24,160,781	16,949,930	13,350,478	14,341,834	35.1%	24.6%	19.4%	20.8%
107	Johnson City	1,896,509	1,401,369	440,244	54,896		73.9%	23.2%	2.9%	0.0%
108	Jordan Valley	57,948,263	41,288,959	10,098,701	6,560,603		71.3%	17.4%	11.3%	0.0%
109	Joseph	25,011,507	21,558,445	3,081,708	371,355		86.2%	12.3%	1.5%	0.0%
110	Junction City	90,422,755	86,214,066	4,204,383	04,306		95.3%	4.6%	0.0%	0.0%
111	Keizer	202,393,226	179,024,776	19,774,380	3,594,070		88.5%	9.8%	1.8%	0.0%
112	King City	19,890,612	14,204,038	5,278,622	407,952		71.4%	26.5%	2.1%	0.0%
113	Klamath Falls	573,575,428	270,337,773	190,949,618	112,154,565	133,472	47.1%	33.3%	19.6%	0.0%
114	La Grande	128,160,058	102,209,347	15,551,698	2,723,269	7,675,745	79.8%	12.1%	2.1%	6.0%
115	La Pine	194,669,670	190,154,210	4,343,238	172,223		97.7%	2.2%	0.1%	0.0%
116	Lafayette	24,326,932	12,673,923	8,983,560	2,669,450		52.1%	36.9%	11.0%	0.0%
117	Lake Oswego	317,377,635	133,455,774	138,422,812	40,859,804	4,639,245	42.0%	43.6%	12.9%	1.5%
118	Lakeside	63,150,962	37,569,453	11,946,864	12,281,622	1,353,024	59.5%	18.9%	19.4%	2.1%

(table continued on next page)

Table C.1. Landslide Susceptibility Exposure of Oregon Cities *(continued)*

			Landslide Susceptibility Exposure, ft²				Landslide Susceptibility Exposure, %			
	City	Area, ft²	Low	Moderate	High	Very High	Low	Moderate	High	Very High
119	Lakeview	68,487,997	50,159,211	8,448,593	9,880,193		73.2%	12.3%	14.4%	0.0%
120	Lebanon	189,742,294	162,255,572	11,720,822	10,530,334	5,235,566	85.5%	6.2%	5.5%	2.8%
121	Lexington	12,483,669	7,088,797	4,929,871	465,001		56.8%	39.5%	3.7%	0.0%
122	Lincoln City	166,883,441	38,264,399	40,029,906	82,727,110	5,862,026	22.9%	24.0%	49.6%	3.5%
123	Lonerock	28,613,118	4,259,771	19,695,803	4,657,544		14.9%	68.8%	16.3%	0.0%
124	Long Creek	28,142,077	25,190,613	2,951,464			89.5%	10.5%	0.0%	0.0%
125	Lostine	7,979,980	7,166,228	512,362	301,389		89.8%	6.4%	3.8%	0.0%
126	Lowell	31,684,873	14,358,206	14,528,050	2,798,617		45.3%	45.9%	8.8%	0.0%
127	Lyons	24,374,762	20,979,825	2,835,214	559,723		86.1%	11.6%	2.3%	0.0%
128	Madras	138,729,533	103,485,262	31,199,194	4,045,078		74.6%	22.5%	2.9%	0.0%
129	Malin	13,940,913	12,676,154	1,139,898	124,861		90.9%	8.2%	0.9%	0.0%
130	Manzanita	22,951,252	9,161,606	9,516,373	3,205,493	1,067,780	39.9%	41.5%	14.0%	4.7%
131	Maupin	39,844,166	10,625,532	13,266,520	14,532,355	1,419,760	26.7%	33.3%	36.5%	3.6%
132	Maywood Park	4,659,279	3,089,901	1,213,093	356,285		66.3%	26.0%	7.6%	0.0%
133	McMinnville	293,827,529	235,497,898	36,205,489	22,124,141		80.1%	12.3%	7.5%	0.0%
134	Medford	715,933,475	420,235,939	233,209,807	44,206,304	18,281,425	58.7%	32.6%	6.2%	2.6%
135	Merrill	12,240,962	11,840,545	400,417			96.7%	3.3%	0.0%	0.0%
136	Metolius	13,310,280	12,884,029	389,654	36,597		96.8%	2.9%	0.3%	0.0%
137	Mill City	23,105,987	17,208,440	3,908,376	1,989,171		74.5%	16.9%	8.6%	0.0%
138	Millersburg	126,183,608	101,937,899	20,647,333	3,598,375		80.8%	16.4%	2.9%	0.0%
139	Milton-Freewater	54,481,595	46,566,892	5,627,372	2,287,331		85.5%	10.3%	4.2%	0.0%
140	Milwaukie	137,561,959	88,671,201	42,977,065	5,913,692		64.5%	31.2%	4.3%	0.0%
141	Mitchell	35,606,271	3,513,672	17,432,153	14,660,446		9.9%	49.0%	41.2%	0.0%
142	Molalla	65,771,550	62,954,635	2,742,644	74,271		95.7%	4.2%	0.1%	0.0%
143	Monmouth	58,577,531	53,363,493	5,096,712	117,327		91.1%	8.7%	0.2%	0.0%
144	Monroe	13,254,822	9,940,614	3,213,027	101,181		75.0%	24.2%	0.8%	0.0%
145	Monument	14,182,111	8,142,480	5,018,135	1,021,495		57.4%	35.4%	7.2%	0.0%
146	Moro	13,725,435	5,044,342	8,647,726	33,368		36.8%	63.0%	0.2%	0.0%
147	Mosier	17,517,333	5,163,593	1,751,288	1,362,711	9,239,741	29.5%	10.0%	7.8%	52.7%
148	Mt. Angel	29,486,393	26,246,456	3,094,624	145,313		89.0%	10.5%	0.5%	0.0%
149	Mt. Vernon	19,248,051	11,231,091	3,812,577	4,204,383		58.3%	19.8%	21.8%	0.0%
150	Myrtle Creek	68,324,272	28,436,449	25,831,232	13,122,283	934,307	41.6%	37.8%	19.2%	1.4%
151	Myrtle Point	44,648,927	15,969,564	18,379,377	6,276,436	4,023,550	35.8%	41.2%	14.1%	9.0%
152	Nehalem	7,452,353	286,818	122,709	1,337,954	5,704,873	3.8%	1.6%	18.0%	76.6%
153	Newberg	162,397,179	121,280,118	32,637,253	7,938,384	541,425	74.7%	20.1%	4.9%	0.3%
154	Newport	291,240,190	128,789,101	56,861,433	83,676,487	21,913,169	44.2%	19.5%	28.7%	7.5%
155	North Bend	141,780,912	98,812,458	31,691,105	11,277,349		69.7%	22.4%	8.0%	0.0%
156	North Plains	25,226,515	20,045,845	4,900,808	279,862		79.5%	19.4%	1.1%	0.0%
157	North Powder	17,417,513	16,018,205	1,182,954	216,355		92.0%	6.8%	1.2%	0.0%
158	Nyssa	43,306,926	37,732,296	4,272,196	1,302,433		87.1%	9.9%	3.0%	0.0%
159	Oakland	20,565,744	11,379,823	7,687,585	1,498,336		55.3%	37.4%	7.3%	0.0%

(table continued on next page)

Table C.1. Landslide Susceptibility Exposure of Oregon Cities *(continued)*

			Landslide Susceptibility Exposure, ft²				Landslide Susceptibility Exposure, %			
	City	Area, ft²	Low	Moderate	High	Very High	Low	Moderate	High	Very High
160	Oakridge	58,231,688	33,767,472	17,015,590	7,448,626		58.0%	29.2%	12.8%	0.0%
161	Ontario	147,310,728	134,593,168	11,133,113	1,584,448		91.4%	7.6%	1.1%	0.0%
162	Oregon City	278,148,504	200,125,223	44,903,805	22,695,705	10,423,771	71.9%	16.1%	8.2%	3.7%
163	Paisley	11,938,629	10,117,375	1,325,037	496,216		84.7%	11.1%	4.2%	0.0%
164	Pendleton	317,155,211	172,742,283	114,561,375	29,851,553		54.5%	36.1%	9.4%	0.0%
165	Philomath	56,547,689	39,803,350	15,219,093	1,525,246		70.4%	26.9%	2.7%	0.0%
166	Phoenix	37,694,474	28,640,949	7,841,509	1,212,016		76.0%	20.8%	3.2%	0.0%
167	Pilot Rock	41,472,261	27,447,962	11,241,828	2,782,471		66.2%	27.1%	6.7%	0.0%
168	Port Orford	45,796,683	15,320,823	15,566,767	13,785,340	1,123,752	33.5%	34.0%	30.1%	2.5%
169	Portland	4,040,518,130	2,541,540,271	908,393,310	532,641,343	57,943,206	62.9%	22.5%	13.2%	1.4%
170	Powers	18,246,359	10,057,176	5,096,712	3,092,471		55.1%	27.9%	16.9%	0.0%
171	Prairie City	26,784,825	17,776,509	5,233,413	3,774,903		66.4%	19.5%	14.1%	0.0%
172	Prescott	2,095,752	896,652	714,724	484,376		42.8%	34.1%	23.1%	0.0%
173	Prineville	311,169,408	238,844,541	44,168,630	21,280,251	6,875,986	76.8%	14.2%	6.8%	2.2%
174	Rainier	136,298,546	41,892,593	46,345,093	48,060,860		30.7%	34.0%	35.3%	0.0%
175	Redmond	455,144,170	395,260,231	56,622,474	3,261,465		86.8%	12.4%	0.7%	0.0%
176	Reedsport	63,755,190	30,629,256	17,448,299	15,677,636		48.0%	27.4%	24.6%	0.0%
177	Richland	2,779,004	2,779,004				100.0%	0.0%	0.0%	0.0%
178	Riddle	17,157,224	9,676,307	5,325,983	2,154,935		56.4%	31.0%	12.6%	0.0%
179	Rivergrove	4,977,219	3,387,389	1,266,912	322,917		68.1%	25.5%	6.5%	0.0%
180	Rockaway Beach	43,858,941	26,590,399	11,645,475	3,403,548	2,219,518	60.6%	26.6%	7.8%	5.1%
181	Rogue River	26,623,249	16,521,319	7,051,438	3,050,492		62.1%	26.5%	11.5%	0.0%
182	Roseburg	296,511,002	183,883,902	74,873,761	35,088,195	2,665,144	62.0%	25.3%	11.8%	0.9%
183	Rufus	37,553,807	17,712,691	13,598,048	6,243,068		47.2%	36.2%	16.6%	0.0%
184	Salem	1,368,874,853	949,019,916	318,283,449	48,539,854	53,031,634	69.3%	23.3%	3.5%	3.9%
185	Sandy	93,736,907	48,967,651	27,663,250	14,060,896	3,045,110	52.2%	29.5%	15.0%	3.2%
186	Scappoose	75,080,604	54,400,979	14,984,440	5,695,185		72.5%	20.0%	7.6%	0.0%
187	Scio	11,469,571	10,650,438	625,383	193,750		92.9%	5.5%	1.7%	0.0%
188	Scotts Mills	10,197,012	3,015,331	1,055,940	332,605	5,793,137	29.6%	10.4%	3.3%	56.8%
189	Seaside	111,642,929	78,840,988	17,355,729	2,811,533	12,634,678	70.6%	15.5%	2.5%	11.3%
190	Seneca	22,717,797	14,015,175	6,352,860	2,349,762		61.7%	28.0%	10.3%	0.0%
191	Shady Cove	56,666,101	30,130,909	19,105,941	7,429,251		53.2%	33.7%	13.1%	0.0%
192	Shaniko	13,861,168	12,090,504	1,305,662	465,001		87.2%	9.4%	3.4%	0.0%
193	Sheridan	54,273,946	43,691,945	7,600,397	2,981,603		80.5%	14.0%	5.5%	0.0%
194	Sherwood	120,961,557	80,332,101	35,162,466	5,454,073	12,917	66.4%	29.1%	4.5%	0.0%
195	Siletz	17,593,580	12,045,860	3,767,369	1,780,351		68.5%	21.4%	10.1%	0.0%
196	Silverton	97,150,554	65,299,067	25,007,793	6,796,333	47,361	67.2%	25.7%	7.0%	0.0%
197	Sisters	53,371,760	51,004,776	2,192,609	174,375		95.6%	4.1%	0.3%	0.0%
198	Sodaville	8,456,767	2,131,894	4,736,121	757,779	830,974	25.2%	56.0%	9.0%	9.8%
199	Spray	7,642,839	2,615,017	4,653,238	374,584		34.2%	60.9%	4.9%	0.0%
200	Springfield	440,460,888	356,261,275	45,690,647	21,466,467	17,042,499	80.9%	10.4%	4.9%	3.9%

(table continued on next page)

Table C.1. Landslide Susceptibility Exposure of Oregon Cities *(continued)*

			Landslide Susceptibility Exposure, ft²				Landslide Susceptibility Exposure, %			
	City	Area, ft²	Low	Moderate	High	Very High	Low	Moderate	High	Very High
201	St. Helens	165,426,372	128,332,861	30,277,804	6,090,221	725,488	77.6%	18.3%	3.7%	0.4%
202	St. Paul	8,154,929	7,510,170	582,328	62,431		92.1%	7.1%	0.8%	0.0%
203	Stanfield	42,092,309	36,924,555	5,005,218	162,535		87.7%	11.9%	0.4%	0.0%
204	Stayton	81,891,198	69,275,895	10,983,494	1,631,809		84.6%	13.4%	2.0%	0.0%
205	Sublimity	25,724,506	24,010,892	1,684,552	29,063		93.3%	6.5%	0.1%	0.0%
206	Summerville	7,261,527	7,075,312	186,216			97.4%	2.6%	0.0%	0.0%
207	Sumpter	60,793,097	18,653,464	16,410,658	11,405,439	14,323,536	30.7%	27.0%	18.8%	23.6%
208	Sutherlin	176,078,361	88,751,832	59,725,710	27,600,819		50.4%	33.9%	15.7%	0.0%
209	Sweet Home	161,643,770	116,812,083	27,699,847	12,919,922	4,211,918	72.3%	17.1%	8.0%	2.6%
210	Talent	36,432,983	27,418,208	7,751,092	1,263,683		75.3%	21.3%	3.5%	0.0%
211	Tangent	104,961,049	100,998,854	3,650,042	312,153		96.2%	3.5%	0.3%	0.0%
212	The Dalles	193,454,116	105,916,614	59,777,376	13,001,727	14,758,398	54.8%	30.9%	6.7%	7.6%
213	Tigard	329,116,905	177,830,144	132,030,125	19,109,170	147,466	54.0%	40.1%	5.8%	0.0%
214	Tillamook	49,863,373	45,146,627	4,453,030	263,716		90.5%	8.9%	0.5%	0.0%
215	Toledo	64,963,983	17,166,839	8,963,108	25,535,225	13,298,811	26.4%	13.8%	39.3%	20.5%
216	Troutdale	167,509,670	110,101,431	42,834,982	12,436,622	2,136,636	65.7%	25.6%	7.4%	1.3%
217	Tualatin	227,130,320	156,641,776	62,537,243	7,951,301		69.0%	27.5%	3.5%	0.0%
218	Turner	40,337,405	25,713,556	9,772,554	2,917,020	1,934,275	63.7%	24.2%	7.2%	4.8%
219	Ukiah	6,169,580	5,476,384	504,827	188,368		88.8%	8.2%	3.1%	0.0%
220	Umatilla	132,316,242	101,592,812	27,788,111	2,935,318		76.8%	21.0%	2.2%	0.0%
221	Union	69,457,696	62,206,050	6,793,104	458,543		89.6%	9.8%	0.7%	0.0%
222	Unity	17,890,847	15,738,065	2,069,900	82,882		88.0%	11.6%	0.5%	0.0%
223	Vale	31,736,557	28,101,584	3,372,333	262,639		88.5%	10.6%	0.8%	0.0%
224	Veneta	71,679,252	56,935,923	14,484,994	258,334		79.4%	20.2%	0.4%	0.0%
225	Vernonia	47,639,672	10,445		43,249,392	4,379,835	0.0%	0.0%	90.8%	9.2%
226	Waldport	85,619,621	34,431,845	22,837,789	26,364,046	1,985,941	40.2%	26.7%	30.8%	2.3%
227	Wallowa	17,076,179	12,211,968	3,455,215	1,408,996		71.5%	20.2%	8.3%	0.0%
228	Warrenton	495,000,314	406,918,159	72,004,102	16,078,053		82.2%	14.5%	3.2%	0.0%
229	Wasco	28,223,080	17,443,024	10,707,938	72,118		61.8%	37.9%	0.3%	0.0%
230	Waterloo	3,424,384	3,045,494	349,827	29,063		88.9%	10.2%	0.8%	0.0%
231	West Linn	223,398,149	78,826,992	98,247,592	35,138,786	11,184,779	35.3%	44.0%	15.7%	5.0%
232	Westfir	8,733,352	2,184,589	5,121,469	1,427,295		25.0%	58.6%	16.3%	0.0%
233	Weston	15,553,290	6,992,752	8,320,503	240,035		45.0%	53.5%	1.5%	0.0%
234	Wheeler	14,299,955	672,844	709,342	3,102,159	9,815,610	4.7%	5.0%	21.7%	68.6%
235	Willamina	26,402,748	6,912,535	2,196,914	17,293,298		26.2%	8.3%	65.5%	0.0%
236	Wilsonville	207,231,898	153,329,464	42,435,640	11,331,168	135,625	74.0%	20.5%	5.5%	0.1%
237	Winston	72,606,099	30,059,591	10,319,361	32,227,148		41.4%	14.2%	44.4%	0.0%
238	Wood Village	26,028,757	13,864,462	10,616,445	1,547,850		53.3%	40.8%	5.9%	0.0%
239	Woodburn	148,853,259	136,877,332	10,912,452	1,063,474		92.0%	7.3%	0.7%	0.0%
240	Yachats	25,746,552	8,388,670	6,518,624	8,374,322	2,464,935	32.6%	25.3%	32.5%	9.6%
241	Yamhill	14,049,006	10,313,929	3,532,715	202,362		73.4%	25.1%	1.4%	0.0%
242	Yoncalla	18,183,525	15,602,339	2,289,484	291,702		85.8%	12.6%	1.6%	0.0%

C.2 Oregon counties

Table C.2 data are also available in Excel spreadsheet format (C_2_Counties_LS_Suscep.xlsx) in the digital appendix folder.

Table C.2. Landslide Susceptibility Exposure of Oregon Counties

			Landslide Susceptibility Exposure, ft²				Landslide Susceptibility Exposure, %				
	County	Area, ft²	Low	Moderate	High	Very High	Low	Moderate	High	Very High	High + Very High
1	Baker	85,745,041,556	18,427,313,309	28,591,102,078	36,652,548,721	2,074,077,447	21.5%	33.3%	42.7%	2.4%	45.2%
2	Benton	18,898,991,855	4,992,678,348	6,847,896,474	6,304,116,636	754,300,397	26.4%	36.2%	33.4%	4.0%	37.3%
3	Clackamas	52,482,820,515	12,355,700,886	16,302,031,666	18,117,009,949	5,708,078,013	23.5%	31.1%	34.5%	10.9%	45.4%
4	Clatsop	22,700,260,108	2,057,579,309	2,998,727,490	8,227,272,218	9,416,681,090	9.1%	13.2%	36.2%	41.5%	77.7%
5	Columbia	18,493,573,546	3,374,518,239	4,776,747,887	8,769,151,149	1,573,156,271	18.2%	25.8%	47.4%	8.5%	55.9%
6	Coos	45,354,938,031	5,041,191,570	9,481,330,213	27,924,790,190	2,907,626,058	11.1%	20.9%	61.6%	6.4%	68.0%
7	Crook	83,235,830,831	31,141,381,608	32,866,611,254	15,526,337,997	3,701,499,972	37.4%	39.5%	18.7%	4.4%	23.1%
8	Curry	45,638,104,103	2,650,164,204	9,240,540,460	29,689,033,857	4,058,365,582	5.8%	20.2%	65.1%	8.9%	73.9%
9	Deschutes	85,109,220,479	56,546,695,507	21,081,050,738	7,454,901,368	26,572,866	66.4%	24.8%	8.8%	0.0%	8.8%
10	Douglas	141,317,397,747	12,133,858,652	34,455,769,154	86,836,593,291	7,891,176,650	8.6%	24.4%	61.4%	5.6%	67.0%
11	Gilliam	33,662,136,614	12,523,087,774	10,703,927,449	10,212,038,271	223,083,120	37.2%	31.8%	30.3%	0.7%	31.0%
12	Grant	126,193,657,306	21,247,595,262	47,465,778,299	49,675,296,954	7,804,986,790	16.8%	37.6%	39.4%	6.2%	45.5%
13	Harney	285,145,843,006	179,502,123,490	70,358,116,375	33,801,473,019	1,484,130,121	63.0%	24.7%	11.9%	0.5%	12.4%
14	Hood River	14,582,414,844	1,451,272,957	4,745,622,963	7,427,134,785	958,384,139	10.0%	32.5%	50.9%	6.6%	57.5%
15	Jackson	78,133,339,144	13,872,632,498	24,452,787,551	34,772,529,510	5,035,389,585	17.8%	31.3%	44.5%	6.4%	50.9%
16	Jefferson	49,946,523,725	16,986,526,937	16,904,142,211	14,442,672,705	1,613,181,872	34.0%	33.8%	28.9%	3.2%	32.1%
17	Josephine	45,768,477,096	5,686,920,023	8,136,650,857	31,328,675,574	616,230,642	12.4%	17.8%	68.5%	1.3%	69.8%
18	Klamath	171,143,448,274	102,628,506,245	48,063,317,411	19,450,752,096	1,000,872,523	60.0%	28.1%	11.4%	0.6%	11.9%
19	Lake	233,060,448,824	158,329,067,591	51,170,622,619	20,371,153,624	3,189,604,990	67.9%	22.0%	8.7%	1.4%	10.1%
20	Lane	128,802,991,658	16,755,013,466	38,682,477,990	64,663,344,708	8,702,155,495	13.0%	30.0%	50.2%	6.8%	57.0%
21	Lincoln	27,673,176,599	1,939,016,555	5,560,163,586	17,098,652,531	3,075,343,928	7.0%	20.1%	61.8%	11.1%	72.9%
22	Linn	64,272,873,796	18,507,907,440	13,731,267,567	23,983,676,960	8,050,021,829	28.8%	21.4%	37.3%	12.5%	49.8%
23	Malheur	276,601,766,018	141,882,833,248	85,058,608,415	45,456,525,427	4,203,798,928	51.3%	30.8%	16.4%	1.5%	18.0%
24	Marion	33,185,295,063	14,072,342,462	7,642,297,819	9,550,677,782	1,919,977,000	42.4%	23.0%	28.8%	5.8%	34.6%
25	Morrow	56,628,190,492	24,805,570,909	20,356,455,504	11,380,627,588	85,536,491	43.8%	35.9%	20.1%	0.2%	20.2%
26	Multnomah	12,223,672,777	4,712,992,825	3,638,767,903	3,250,418,931	621,493,118	38.6%	29.8%	26.6%	5.1%	31.7%
27	Polk	20,738,900,872	6,469,153,617	4,251,225,794	9,539,951,545	478,569,915	31.2%	20.5%	46.0%	2.3%	48.3%
28	Sherman	23,057,239,569	11,360,531,905	6,323,824,280	5,342,690,616	30,192,769	49.3%	27.4%	23.2%	0.1%	23.3%
29	Tillamook	31,340,756,476	2,581,502,742	2,662,963,451	19,610,618,770	6,485,671,513	8.2%	8.5%	62.6%	20.7%	83.3%
30	Umatilla	89,769,773,294	31,779,595,578	31,033,819,776	26,074,546,107	881,811,833	35.4%	34.6%	29.0%	1.0%	30.0%
31	Union	56,832,962,984	13,721,146,622	21,385,787,806	18,471,463,366	3,254,565,190	24.1%	37.6%	32.5%	5.7%	38.2%
32	Wallowa	87,790,890,515	14,105,102,624	22,837,879,148	49,487,844,531	1,360,064,213	16.1%	26.0%	56.4%	1.5%	57.9%
33	Wasco	66,503,203,674	18,224,397,082	27,164,026,064	17,382,971,537	3,731,808,991	27.4%	40.8%	26.1%	5.6%	31.8%
34	Washington	20,258,824,921	6,371,254,612	5,934,460,272	7,147,799,469	805,310,569	31.4%	29.3%	35.3%	4.0%	39.3%
35	Wheeler	47,835,198,973	4,792,578,409	17,939,448,483	19,167,910,975	5,935,261,107	10.0%	37.5%	40.1%	12.4%	52.5%
36	Yamhill	20,024,032,738	5,285,461,212	4,235,189,720	9,399,065,951	1,104,315,854	26.4%	21.2%	46.9%	5.5%	52.5%

C.3 Oregon watersheds

Table C.3 data are also available in Excel spreadsheet format (C_3_Watersheds_LS_Suscep.xlsx) in the digital appendix folder. Landslide Susceptibility Zones are 1: Low; 2: Moderate; 3: High; 4: Very High. Also see Figures 7 and 8 in the main text.

Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
1	Abernethy Creek-Willamette River	3,796,649,711	1	4	1.72
2	Abiqua Creek-Pudding River	7,803,107,412	0	4	1.77
3	Agency Creek-South Yamhill River	3,897,263,211	1	4	2.78
4	Alder Creek-Pritchard Creek	3,890,099,829	1	3	2.19
5	Alkali Canyon-Umatilla River	5,759,238,880	1	3	1.72
6	Alkali Lake	6,428,647,545	1	4	1.30
7	Althouse Creek	1,318,699,582	0	4	2.00
8	Alvord Lake	12,058,663,527	0	4	1.88
9	Anna River-Summer Lake	11,230,222,391	1	4	1.61
10	Antelope Creek	9,536,669,629	1	3	1.15
11	Antelope Creek	4,382,826,439	1	4	2.13
12	Bakeoven Creek	4,278,018,244	1	4	1.76
13	Baldock Slough-Powder River	3,156,271,313	1	4	1.52
14	Bear Creek	10,081,026,412	0	4	2.54
15	Bear Creek	3,037,011,491	1	4	1.94
16	Bear Creek	2,016,650,908	1	3	2.75
17	Bear Creek	6,016,835,402	0	4	2.05
18	Beaver Creek	4,650,424,787	1	3	1.82
19	Beaver Creek-Frontal Columbia River	4,256,493,652	0	4	2.05
20	Beaver Creek-Frontal Pacific Ocean	1,851,713,356	0	4	2.64
21	Beaver Creek-Grande Ronde River	5,733,475,460	1	4	2.29
22	Beaver Marsh	8,734,962,817	1	3	1.39
23	Beech Creek	3,082,511,616	1	4	2.52
24	Big Alvord Creek	7,638,464,791	1	4	1.59
25	Big Butte Creek	6,896,471,848	1	4	2.05
26	Big Creek	2,389,165,091	1	4	2.28
27	Big Creek-Burnt River	4,098,152,224	1	4	2.23
28	Big Creek-Frontal Columbia River	3,252,238,032	0	4	2.84
29	Big Creek-Middle Fork John Day River	4,857,660,201	1	4	2.42
30	Big Creek-North Fork John Day River	4,602,223,996	1	4	2.75
31	Big Elk Creek	2,477,174,052	1	4	3.16
32	Big Springs Creek-Klamath Marsh	2,791,526,521	1	3	1.15
33	Big Stick Creek	3,796,797,177	1	3	1.21
34	Birch Creek	7,929,956,867	1	4	2.10
35	Birch Creek-Snake River	3,926,550,735	0	4	1.66
36	Blue River	2,566,780,377	1	4	2.92
37	Breitenbush River	3,018,714,996	1	4	2.79
38	Bridge Creek	7,501,660,871	1	4	2.61
39	Bridge Creek-Middle Fork John Day River	3,408,182,337	1	4	2.19
40	Briggs Creek	1,907,167,946	1	4	2.73
41	Browns Creek-Deschutes River	5,718,945,257	1	3	1.61
42	Buck Creek	2,793,408,052	1	3	1.46
43	Buck Hollow Creek	5,517,944,300	1	3	1.53
44	Buckaroo Lake	5,178,670,149	1	3	1.31

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
45	Bull Run River	3,876,322,023	1	4	2.41
46	Burnt River	6,731,254,435	0	4	2.49
47	Burnt River Canyon-Burnt River	2,336,819,118	0	4	2.55
48	Butte Creek	5,055,656,952	1	4	2.41
49	Butte Creek-Pudding River	3,067,502,420	1	4	1.80
50	Buzzard Creek	6,810,359,489	1	3	1.15
51	Cabin Creek-Grande Ronde River	4,722,481,632	1	4	2.25
52	Calapooya Creek	6,857,483,889	0	4	2.49
53	Camp Creek	2,262,079,906	1	4	2.48
54	Camp Creek	4,863,132,573	1	4	2.08
55	Camp Creek-Middle Fork John Day River	5,488,710,595	1	4	2.53
56	Campbell Lake	8,267,485,111	1	4	1.41
57	Canton Creek	1,768,298,432	1	4	2.84
58	Canyon Creek	3,221,005,470	1	4	2.84
59	Cedar Island-Deschutes River	5,357,294,013	0	3	2.32
60	Chain Lakes-Sunset Valley	2,071,156,121	1	3	1.13
61	Chehalem Creek-Willamette River	7,495,200,372	1	4	1.55
62	Chesnimnus Creek	5,348,766,843	1	3	1.85
63	Chetco River	9,818,687,311	0	4	2.80
64	Chimney Rock-Crooked River	2,605,451,878	1	4	1.55
65	Christmas Lake Valley	6,415,157,136	1	4	1.22
66	Clark Branch-South Umpqua River	2,595,620,122	1	4	2.59
67	Clarks Creek-Burnt River	2,638,884,583	1	4	2.49
68	Clarno Rapids-John Day River	3,156,409,091	1	4	3.41
69	Clatskanie River	2,680,708,834	1	4	2.48
70	Claw Creek	2,591,418,968	1	3	1.65
71	Clearwater River	2,147,429,191	1	4	2.09
72	Clover Creek	4,693,550,394	1	3	2.22
73	Clover Swale	4,691,034,868	1	3	1.16
74	Cold Springs Canyon	5,591,352,016	1	3	1.76
75	Collawash River	4,245,413,282	1	4	3.28
76	Coos Bay-Frontal Pacific Ocean	6,603,879,701	0	4	2.25
77	Coquille River	4,863,618,026	0	4	2.38
78	Cottonwood Creek	6,360,566,888	0	4	1.98
79	Cottonwood Creek	6,490,380,724	1	4	2.23
80	Cow Creek	2,195,369,495	1	4	1.64
81	Crabtree Creek	4,342,301,393	1	4	2.27
82	Crane Creek	3,817,101,141	1	4	1.86
83	Crater Lake-Williamson River	4,584,608,857	1	4	1.45
84	Crescent Creek	5,205,802,738	1	3	1.74
85	Crooked Creek	2,075,338,977	1	4	2.46
86	Crowley Creek	10,618,434,015	0	4	1.45
87	Crump Lake	9,390,382,704	1	4	1.56
88	Dairy Creek	6,444,061,464	1	4	2.07
89	Days Creek-South Umpqua River	6,168,192,128	1	4	2.75
90	Deadwood Creek	1,637,946,401	1	3	2.76
91	Deep Canyon	4,245,446,651	1	3	1.52
92	Deep Creek	7,544,169,706	1	4	1.72
93	Deep Creek	2,413,520,591	1	3	1.61
94	Deep Creek-South Yamhill River	3,316,881,773	1	4	2.23
95	Deer Creek	3,164,914,733	1	4	2.54
96	Deer Creek-South Umpqua River	4,795,051,916	1	4	2.21

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
97	Deschutes River-Charleton Creek	7,166,475,930	0	4	1.78
98	Desolation Creek	3,033,113,879	1	4	2.60
99	Diamond Lake	1,868,718,182	1	4	1.66
100	Drews Creek-Frontal Goose Lake	7,361,370,521	1	4	1.89
101	Drift Creek	1,930,819,487	1	4	2.79
102	Dry Creek	8,332,692,881	1	3	1.11
103	Dry Creek-Fort Rock Valley	7,479,968,363	1	3	1.26
104	Dry Creek-Jordan Creek	5,374,434,464	1	3	1.24
105	Dumont Creek-South Umpqua River	4,308,602,819	1	4	2.86
106	Duncan Creek-Silver Lake	3,389,943,967	1	3	1.31
107	Eagle Creek	5,381,969,201	0	4	2.63
108	Eagle Creek	2,507,079,424	1	4	2.34
109	East Fork Coquille River	3,744,936,657	0	4	2.74
110	East Fork Hood River	4,399,821,577	0	4	2.44
111	Eight Mile Creek-Middle Fork John Day River	2,639,528,265	1	4	2.34
112	Eightmile Canyon	7,076,460,576	1	4	1.55
113	Eightmile Creek	3,295,062,250	1	4	2.31
114	Elk Creek	2,368,434,876	1	4	2.84
115	Elk Creek	8,149,532,028	1	4	2.54
116	Elk Creek	3,724,006,233	1	4	2.79
117	Elk River	2,544,431,269	0	4	2.76
118	Emigrant Creek	7,381,668,027	1	4	1.74
119	Euchre Creek-Frontal Pacific Ocean	2,452,125,356	0	4	2.77
120	Evans Creek	6,248,387,566	1	4	2.55
121	Fall Creek	5,392,645,924	1	4	2.65
122	Fall River-Deschutes River	5,122,149,932	1	3	1.42
123	Fanno Creek-Tualatin River	2,679,762,686	1	4	1.65
124	Ferry Canyon-John Day River	6,025,865,246	1	4	2.12
125	Fields Creek-John Day River	4,826,632,153	1	4	2.74
126	Fifteenmile Creek	6,989,369,777	0	4	2.03
127	Fire Lake	3,954,593,951	1	3	1.19
128	Fish Creek	2,342,528,296	1	4	2.40
129	Fishhole Creek	2,836,736,021	1	4	1.65
130	Five Points Creek-Grande Ronde River	3,808,662,235	1	4	2.10
131	Five Rivers	3,328,293,670	0	4	2.73
132	Flybee Lake	3,312,028,325	1	4	1.20
133	Fourmile Creek	3,222,517,799	1	4	2.09
134	Gales Creek	2,090,612,966	1	4	2.66
135	Gerber Reservoir-Miller Creek	7,669,261,415	1	4	1.35
136	Gold Hill-Rogue River	5,929,647,727	1	4	2.29
137	Granite Creek	4,113,927,811	1	4	2.45
138	Grants Pass-Rogue River	2,345,224,656	1	4	2.15
139	Grass Valley Canyon	5,919,470,450	1	3	1.41
140	Grave Creek	4,554,590,463	1	4	2.72
141	Griffin Creek-Upper Malheur River	3,721,133,345	1	3	1.85
142	Grindstone Creek	2,995,117,275	1	3	1.69
143	Grossman Creek-Grande Ronde River	5,003,868,549	1	4	2.57
144	Grub Creek-John Day River	6,520,250,575	1	4	2.31
145	Hamilton Creek-South Santiam River	5,141,554,033	0	4	2.29
146	Harney Lake-Malheur Lake	11,608,559,849	1	3	1.11
147	Hay Creek	3,843,718,139	1	4	2.35
148	Hayden Island-Columbia River	809,201,723	0	3	0.27

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
149	Headwaters Malheur River	6,323,796,293	1	4	1.97
150	Headwaters McKenzie River	10,045,690,647	1	4	2.13
151	Headwaters Middle Fork Willamette River	4,941,448,633	1	4	2.71
152	Headwaters Middle Santiam River	2,906,570,119	1	4	2.90
153	Headwaters Nehalem River	6,216,217,467	1	4	2.87
154	Headwaters North Fork John Day River	3,121,137,909	1	4	2.34
155	Headwaters North Santiam River	6,378,725,605	1	4	2.52
156	Headwaters North Umpqua River	3,340,692,619	1	3	1.94
157	Headwaters Rogue River	10,828,597,213	1	4	2.01
158	Headwaters Silvies River	4,416,993,244	1	4	1.86
159	Headwaters Umatilla River	3,781,367,111	1	4	2.65
160	Hellgate Canyon-Rogue River	4,068,850,707	1	4	2.71
161	Hidden Lake	2,556,026,154	1	3	1.10
162	Hills Creek	1,675,895,643	1	4	3.06
163	Hills Creek Reservoir-Middle Fork Willamette River	4,782,968,351	1	4	2.79
164	Hog Creek-Lower Malheur River	4,630,797,873	0	4	2.11
165	Hog Creek-Williamson River	6,278,703,043	1	3	1.44
166	Home Creek-Garrison Lake	5,856,130,219	1	4	1.29
167	Honey Creek	4,690,717,333	1	4	1.69
168	Hood River	2,205,879,377	0	4	2.24
169	Horse Creek	4,436,704,116	1	4	2.37
170	Horse Heaven Creek-Crooked River	7,102,718,060	1	4	2.37
171	Horseshoe Bend-Rogue River	4,537,293,936	1	4	2.88
172	Hunt Ditch-Umatilla River	5,345,806,768	0	3	1.26
173	Hunter Creek	1,240,343,696	0	4	2.94
174	Hunter Creek-Lower Malheur River	4,522,619,497	0	4	2.55
175	Indian Creek	1,341,753,725	1	4	2.73
176	Indian Creek-Grande Ronde River	4,190,966,194	0	4	1.97
177	Indigo Creek	2,134,593,228	1	4	2.90
178	Jack Creek-Williamson River	10,267,756,577	1	3	1.29
179	Jackass Creek	5,414,636,593	1	3	1.29
180	Jackson Creek	4,463,730,143	1	4	3.21
181	Jackson Creek-Owyhee River	9,294,447,200	0	4	1.78
182	Jackson Creek-Williamson River	7,449,826,184	1	3	1.49
183	Jenny Creek	5,830,457,216	0	4	1.87
184	John Day River	2,259,188,720	0	3	1.75
185	John Day River-Johnson Creek	4,365,067,063	1	4	2.66
186	Johnson Creek	2,620,480,449	1	4	1.59
187	Johnston Gulch Reservoir-Lower Malheur River	3,709,922,732	1	4	1.62
188	Jordan Creek-Sheep Spring Creek	5,817,156,252	0	4	1.28
189	Josephine Creek-Illinois River	3,563,531,398	0	4	2.73
190	Jumpoff Joe Creek	3,038,800,453	1	4	2.31
191	Juniper Basin Creek-Upper Malheur River	3,589,439,054	1	4	2.01
192	Juniper Butte-Crooked River	2,733,439,078	0	4	1.53
193	Juniper Canyon	4,227,758,317	1	3	1.27
194	Juniper Creek-Dry Valley	6,448,349,806	1	4	1.27
195	Kahler Creek-John Day River	8,611,853,821	1	4	2.60
196	Kiger Creek-Diamond Canal	6,002,187,872	1	4	1.78
197	Kilchis River	1,798,109,082	1	4	2.95
198	Kit Canyon-Frontal Blue Joint Lake	6,592,260,059	0	4	1.27
199	Klondike Creek-Illinois River	2,925,568,421	1	4	2.89
200	Kotzman Basin	6,660,684,085	1	3	1.28

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
201	Ladd Creek	2,555,651,570	1	4	2.01
202	Lake Creek	3,244,514,927	1	4	2.69
203	Lake Ewauna-Klamath River	3,393,168,835	1	4	1.50
204	Langell Valley-Lost River	4,274,079,729	0	4	1.51
205	Lawson Creek-Illinois River	1,794,674,319	0	4	2.63
206	Laycock Creek-John Day River	4,713,908,178	1	4	2.56
207	Little Applegate River	3,152,286,513	1	4	2.74
208	Little Butte Creek	10,411,768,011	0	4	2.39
209	Little Fall Creek	1,635,326,465	1	4	2.48
210	Little Malheur River	3,767,242,708	1	4	2.38
211	Little Nestucca River	1,716,921,212	0	4	3.28
212	Little North Santiam River	3,146,268,411	1	4	3.06
213	Little River	5,746,945,417	1	4	2.67
214	Little Sandy Reservoir-Lower Malheur River	2,608,739,176	1	4	1.74
215	Little Tank Creek-Big Tank Creek	3,858,349,522	1	3	1.36
216	Little Walker Mountain	3,782,497,322	1	3	1.50
217	Lobster Creek	1,931,050,911	1	4	2.69
218	Long Creek	5,682,730,081	1	4	1.94
219	Long Lake Valley-Upper Klamath Lake	11,699,613,920	0	4	1.60
220	Long Prairie	7,599,314,296	1	3	1.25
221	Long Tom River	11,478,156,151	0	4	1.88
222	Lookingglass Creek	2,638,772,639	1	4	2.48
223	Lookout Point Reservoir-Middle Fork Willamette River	4,450,360,290	1	4	2.58
224	Lost Creek-Rogue River	1,398,046,824	1	4	2.39
225	Lostine River	2,530,957,006	1	3	2.56
226	Love Creek-Powder River	3,831,796,032	1	4	2.00
227	Lower Alsea River	4,341,839,621	0	4	2.74
228	Lower Applegate River	3,949,189,391	1	4	2.48
229	Lower Beaver Creek	3,542,473,960	1	3	1.57
230	Lower Big Sheep Creek	5,648,409,352	1	3	2.36
231	Lower Bully Creek	4,956,597,760	1	4	1.89
232	Lower Butter Creek	3,531,757,411	1	4	2.04
233	Lower Calapooia River	2,387,617,240	1	4	1.32
234	Lower Camas Creek	6,834,251,064	1	4	1.67
235	Lower Catherine Creek	3,641,172,560	1	4	1.65
236	Lower Chewaucan River	7,965,092,423	1	4	1.74
237	Lower Clackamas River	5,147,580,747	1	4	1.85
238	Lower Coast Fork Willamette River	3,881,798,701	0	4	1.90
239	Lower Cow Creek	4,821,177,003	1	3	1.22
240	Lower Cow Creek	4,463,805,490	1	4	2.75
241	Lower Crooked Creek	7,308,456,214	1	3	1.44
242	Lower Crooked Valley-Crooked River	4,386,190,161	1	4	1.79
243	Lower Donner und Blitzen River	3,710,164,920	1	3	1.17
244	Lower Dry Creek	6,790,902,644	0	4	1.80
245	Lower Dry River	9,099,154,344	1	4	1.32
246	Lower Guano Slough	5,884,873,089	1	3	1.14
247	Lower Imnaha River	6,403,188,744	1	3	2.74
248	Lower Joseph Creek	4,565,450,173	0	3	2.44
249	Lower Little Deschutes River	4,802,265,889	1	4	1.50
250	Lower Metolius River	6,349,262,629	1	4	1.99
251	Lower Molalla River	4,022,603,566	1	4	1.71

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
252	Lower Nehalem River	3,052,273,639	0	4	2.84
253	Lower North Fork Crooked River	1,956,068,391	1	4	2.01
254	Lower North Fork John Day River	5,090,858,168	1	4	2.26
255	Lower North Fork Malheur River	6,109,767,775	0	4	2.21
256	Lower North Santiam River	3,171,230,995	0	4	1.45
257	Lower North Umpqua River	4,634,988,263	1	4	2.32
258	Lower Ochoco Creek	3,256,599,569	1	4	2.18
259	Lower Powder River	2,678,855,288	1	4	2.38
260	Lower Rock Creek	6,397,400,989	1	3	1.98
261	Lower Sandy River	1,946,250,629	1	4	1.94
262	Lower Siletz River-Frontal Pacific Ocean	5,330,529,550	0	4	2.66
263	Lower Silver Creek	6,647,655,448	1	3	1.09
264	Lower Silvies River	7,885,787,160	1	4	1.27
265	Lower Siuslaw River	4,813,935,045	0	4	2.65
266	Lower Smith River	6,133,170,669	1	4	2.77
267	Lower South Fork Crooked River	7,231,415,678	1	4	1.52
268	Lower South Fork John Day River	3,773,935,708	1	4	2.43
269	Lower South Fork Malheur River	7,732,679,146	1	4	1.87
270	Lower Sycan River	6,386,293,710	1	3	1.41
271	Lower Trout Creek	1,622,401,161	1	4	2.25
272	Lower Umpqua River	2,976,301,960	0	3	2.56
273	Lower Wallowa River	4,813,106,223	1	3	2.13
274	Lower Willow Creek	3,799,353,606	1	3	1.65
275	Lower Willow Creek	3,078,750,706	0	4	1.65
276	Lower Yaquina River	2,207,864,242	0	4	2.68
277	Luckiamute River	8,787,194,692	1	4	2.19
278	Malheur Gap	1,721,646,568	1	3	1.38
279	Malheur Slough	6,640,847,275	1	4	1.47
280	Marys River	8,445,112,237	0	4	2.19
281	Mayfield Pond-Central Oregon Canal	1,977,222,704	1	3	1.05
282	McKay Creek	5,551,669,784	1	3	2.29
283	McKay Creek	2,763,927,854	1	4	2.57
284	McKenzie Canyon-Deschutes River	9,507,903,078	1	4	1.24
285	McKenzie River	7,197,933,458	1	4	2.48
286	Meacham Creek	4,972,289,389	1	4	2.59
287	Meadow Creek	5,053,516,010	1	3	1.91
288	Miami River	1,004,343,884	1	4	2.95
289	Middle Applegate River	3,600,881,091	1	4	2.67
290	Middle Chewaucan River	2,192,994,976	1	4	2.13
291	Middle Clackamas River	6,039,249,092	1	4	3.00
292	Middle Cow Creek	4,932,330,524	1	4	2.75
293	Middle Donner und Blitzen River	6,471,257,561	1	4	1.48
294	Middle Fork Coquille River	8,596,632,575	0	4	2.69
295	Middle Imnaha River	3,829,800,403	1	3	2.70
296	Middle Little Deschutes River	2,118,768,126	1	3	1.20
297	Middle Nehalem River	4,962,681,523	1	4	3.07
298	Middle North Santiam River	2,471,815,777	1	4	2.76
299	Middle North Umpqua River	6,317,679,163	1	4	2.91
300	Middle Sandy River	1,780,150,574	1	4	2.27
301	Middle Siletz River	1,808,091,533	1	4	2.73
302	Middle Silver Creek	7,778,017,813	0	3	1.38
303	Middle Silvies River	3,490,542,398	1	3	1.85

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
304	Middle South Fork John Day River	5,298,659,764	1	4	2.66
305	Middle Sycan River	6,280,044,227	1	3	1.30
306	Middle Wallowa River	3,701,612,993	1	3	1.92
307	Middle Willow Creek	5,376,490,371	1	4	2.02
308	Middle Willow Creek	3,569,832,591	1	3	1.64
309	Middle Willow Creek	2,852,947,546	1	4	2.45
310	Mill Creek	1,994,287,808	1	4	2.77
311	Mill Creek	3,008,381,642	1	3	1.72
312	Mill Creek	3,129,524,072	1	4	1.40
313	Mill Creek	3,750,162,535	1	4	2.87
314	Mill Creek	1,491,787,567	1	3	2.62
315	Millicoma River	4,211,515,576	0	4	2.83
316	Minam River	6,660,325,647	1	4	2.66
317	Mission Creek-Umatilla River	5,724,485,442	1	4	1.95
318	Mohawk River	4,991,696,719	1	4	2.73
319	Mosby Creek	2,645,719,666	1	4	2.68
320	Mountain Creek	5,117,292,179	1	4	2.31
321	Mud Creek-Grande Ronde River	6,716,980,413	1	4	2.21
322	Mud Springs Creek	2,567,414,371	1	4	1.77
323	Muddy Creek-John Day River	9,334,585,822	1	4	2.75
324	Muddy Creek-Willamette River	13,091,538,232	1	4	1.36
325	Murderers Creek	3,699,204,030	1	4	2.73
326	Myrtle Creek	3,321,939,734	1	4	2.70
327	Necanicum River-Frontal Pacific Ocean	3,814,143,219	0	4	3.29
328	Nestucca River-Frontal Pacific Ocean	7,178,555,190	0	4	3.12
329	New River-Frontal Pacific Ocean	4,339,744,964	0	4	2.70
330	North Basin	7,668,836,240	1	4	1.44
331	North Fork Burnt River	5,407,936,059	0	4	2.27
332	North Fork Coquille River	4,286,794,060	0	4	2.73
333	North Fork Middle Fork Willamette River	6,949,932,962	1	4	2.34
334	North Fork of Nehalem River	2,711,313,860	0	4	3.39
335	North Fork Siuslaw River	1,832,505,158	1	4	2.97
336	North Fork Sprague River	5,777,852,910	1	3	1.60
337	North Powder River	3,270,353,693	1	4	2.19
338	North Unit Diversion Dam-Deschutes River	4,407,386,454	1	3	1.42
339	North Yamhill River	4,942,973,879	1	4	2.44
340	Oak Grove Fork Clackamas River	3,941,202,570	1	4	2.16
341	Olalla Creek-Lookingglass Creek	4,496,507,326	1	4	2.43
342	Otis Creek	4,309,714,731	1	3	1.90
343	Paulina Creek	2,256,787,291	1	3	1.46
344	Peters Creek Sink	3,579,009,901	1	3	1.02
345	Pine Creek	3,204,463,492	0	4	1.93
346	Pine Creek	4,680,611,097	0	3	1.76
347	Pine Creek	8,430,325,854	1	4	2.41
348	Pine Hollow	3,645,328,506	1	4	2.10
349	Pine Lake-Devils Garden	7,356,404,053	1	3	1.28
350	Pistol River	2,933,019,199	0	4	2.85
351	Plympton Creek-Frontal Columbia River	1,369,018,710	0	4	2.62
352	Post Lake	1,950,086,886	0	3	1.45
353	Potamus Creek-North Fork John Day River	8,077,133,967	1	4	2.11
354	Potter Canyon-Deschutes River	2,549,226,591	1	4	1.40
355	Poverty Basin	3,490,693,092	1	3	1.20

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
356	Prineville Reservoir-Crooked River	2,356,074,677	1	4	2.13
357	Pudding Creek-Middle Fork Willamette River	1,535,282,376	0	4	1.93
358	Quail Creek	3,968,834,604	1	4	1.93
359	Quartz Creek-McKenzie River	2,080,579,925	1	4	2.80
360	Quartzville Creek-Green Peter Lake	4,768,311,134	1	4	2.90
361	Rabbit Creek	7,763,096,880	1	4	1.30
362	Rattlesnake Creek	8,299,496,981	1	3	1.43
363	Reynolds Creek-John Day River	4,646,353,876	1	4	2.43
364	Rhea Creek	6,358,048,133	1	4	2.12
365	Rickreall Creek-Willamette River	5,394,978,464	1	4	1.73
366	Riddle Creek	5,358,509,259	1	3	1.52
367	Rock Creek	3,138,840,236	1	4	2.53
368	Rock Creek	2,387,290,018	1	4	1.50
369	Rock Creek	1,201,537,646	1	4	2.76
370	Rock Creek	2,732,269,041	1	4	2.93
371	Rock Creek	8,052,233,813	1	4	1.14
372	Rock Creek-Buck Creek	8,288,921,439	1	3	1.26
373	Rock Creek-Frontal Pacific Ocean	1,790,195,455	0	4	2.71
374	Rock Creek-Powder River	5,258,647,080	1	4	1.85
375	Rock Creek-Tualatin River	4,213,627,455	0	4	1.68
376	Rogue River	3,604,797,001	0	4	2.56
377	Row River	7,800,160,253	1	4	2.92
378	Ruckles Creek-Powder River	7,260,255,423	0	4	1.79
379	Ryegrass Creek-Owyhee River	8,148,585,880	1	4	1.29
380	Sage Hen Creek	3,758,265,607	1	4	1.44
381	Sagehen Waterhole	3,441,271,674	0	3	1.08
382	Salmon Creek	3,577,187,571	1	4	2.76
383	Salmon River	3,212,104,792	1	4	2.59
384	Salmon River	2,073,858,939	1	4	2.91
385	Salmonberry River	1,986,122,306	1	4	2.83
386	Salt Creek	3,152,860,229	1	4	2.63
387	Salt Creek	2,726,643,821	1	4	1.93
388	Sand Canyon-Lake Abert	7,495,207,907	0	3	1.29
389	Sand Hollow	4,663,324,257	1	4	1.49
390	Sand Hollow Creek	4,599,381,247	1	4	1.74
391	Sand Hollow Creek-Owyhee River	6,279,629,816	1	4	1.93
392	Sand Lake-Frontal Pacific Ocean	2,351,293,348	0	4	2.78
393	Scappoose Creek-Frontal Columbia River	5,368,308,723	0	4	2.12
394	Scoggins Creek-Tualatin River	4,334,551,377	1	4	2.35
395	Scott Canyon-John Day River	7,193,650,498	1	3	2.07
396	Seekseequa Creek-Deschutes River	2,613,572,172	1	4	1.74
397	Sellers Creek	2,388,653,805	1	3	1.35
398	Senecal Creek-Pudding River	1,478,884,867	1	4	1.19
399	Service Creek-John Day River	7,350,022,131	1	4	2.67
400	Shady Cove-Rogue River	3,236,698,175	1	4	2.19
401	Shallow Lake-Slickey Lake	10,574,793,893	1	3	1.35
402	Shasta Costa Creek-Rogue River	1,962,018,681	1	4	2.83
403	Shitike Creek-Deschutes River	6,318,028,990	1	4	1.81
404	Siltcoos River-Frontal Pacific Ocean	3,634,237,373	0	4	2.42
405	Silver Creek	2,249,680,958	1	4	2.88
406	Silver Creek	10,565,708,076	1	3	1.32
407	Sixes River	3,758,267,760	0	4	2.85

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
408	Sixmile Canyon	4,223,556,086	0	4	1.25
409	Skull Creek	3,409,032,686	1	3	1.84
410	Skull Creek-Owyhee River	5,560,743,760	1	4	1.48
411	Soldiers Cap	5,690,409,054	1	3	1.12
412	South Fork Beaver Creek	2,873,315,017	1	3	2.07
413	South Fork Burnt River	3,271,619,529	1	4	2.29
414	South Fork Coos River	6,975,872,910	1	4	2.77
415	South Fork Coquille River	7,972,073,895	1	4	2.73
416	South Fork McKenzie River	5,994,102,023	0	4	2.70
417	South Fork Rogue River	7,005,115,225	0	4	2.18
418	South Fork Sprague River	5,303,250,572	1	4	1.62
419	South Santiam River	4,437,332,729	1	4	2.76
420	South Santiam River-Foster Reservoir	1,591,465,683	1	4	3.09
421	Spencer Creek	2,364,615,840	1	4	1.87
422	Sprague River	15,456,924,768	1	4	1.57
423	Squaw Lake-Capehart Lake	1,692,845,573	1	3	1.16
424	Stage Gulch	3,099,542,275	1	3	1.24
425	Stair Creek-Rogue River	1,592,312,803	1	4	2.82
426	Steamboat Creek	4,564,677,324	0	4	2.90
427	Stinkingwater Creek	4,547,628,366	1	4	1.71
428	Sucker Creek	2,682,037,100	1	4	2.62
429	Summit Creek-Storehouse Canyon	7,338,695,268	1	4	1.98
430	Sutton Creek-Powder River	5,044,158,942	1	4	2.19
431	Swan Lake Valley	3,621,926,688	1	4	1.84
432	Tenmile Creek-Frontal Pacific Ocean	3,017,067,041	0	4	2.78
433	Tenmile Creek-Frontal Pacific Ocean	2,762,969,866	0	4	2.54
434	Thirtymile Creek	7,596,500,610	1	4	2.16
435	Thomas Creek	7,886,490,044	1	4	1.92
436	Thomas Creek	4,048,788,931	0	4	2.35
437	Thorn Lake	12,503,835,181	1	3	1.16
438	Three Fingers Gulch-Owyhee River	8,146,030,528	1	4	2.40
439	Tillamook Bay-Frontal Pacific Ocean	926,582,166	0	4	1.65
440	Tillamook River	1,714,566,068	0	4	3.07
441	Tired Horse Lake	7,574,107,370	1	3	1.24
442	Trail Creek	1,539,832,281	1	4	2.55
443	Trask River	4,860,356,561	0	4	2.82
444	Tumalo Creek	1,654,705,809	1	3	1.92
445	Twelvemile Creek	3,919,127,942	1	4	1.47
446	Twelvemile Creek-Coyote Lake	7,674,482,988	1	3	1.41
447	Twin Lakes	3,756,613,347	1	4	1.44
448	Tygh Creek	3,513,133,693	1	4	2.33
449	Umpqua River-Sawyers Rapids	2,767,747,966	1	4	2.80
450	Upper Alsea River	3,541,424,479	0	4	2.58
451	Upper Applegate River	2,280,065,324	1	4	2.86
452	Upper Beaver Creek	2,706,825,309	1	3	1.61
453	Upper Big Sheep Creek	3,894,271,920	1	3	2.51
454	Upper Bully Creek	6,678,088,252	0	4	2.07
455	Upper Butter Creek	9,001,633,316	1	4	2.21
456	Upper Calapooia River	7,993,351,994	1	4	2.35
457	Upper Camas Creek	4,562,420,132	1	4	1.98
458	Upper Catherine Creek	5,110,144,942	1	4	2.38
459	Upper Chewaucan River	5,272,500,232	1	4	2.11

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
460	Upper Clackamas River	4,395,708,687	1	4	2.25
461	Upper Coast Fork Willamette River	4,245,164,636	1	4	2.39
462	Upper Cow Creek	2,069,740,667	1	4	2.65
463	Upper Crooked Creek	9,029,700,212	1	3	1.54
464	Upper Donner und Blitzen River	5,835,981,255	1	3	1.79
465	Upper Dry Creek	5,783,801,047	1	4	1.57
466	Upper Dry River	11,844,830,912	0	3	1.41
467	Upper Grande Ronde River	5,825,143,074	1	4	2.47
468	Upper Guano Slough	8,655,378,769	1	3	1.24
469	Upper Imnaha River	3,936,656,971	1	4	2.64
470	Upper Joseph Creek	5,457,229,387	1	3	2.25
471	Upper Little Deschutes River	3,447,611,617	1	3	1.60
472	Upper Metolius River	6,135,153,381	1	4	2.10
473	Upper Middle John Day	3,082,532,068	1	4	2.56
474	Upper Molalla River	5,640,439,753	1	4	2.70
475	Upper Nehalem River	4,905,472,415	0	4	2.88
476	Upper North Fork Crooked River	4,938,031,091	1	4	1.95
477	Upper North Fork Malheur River	4,793,466,392	1	3	2.14
478	Upper North Santiam River	3,109,342,816	1	4	2.90
479	Upper North Umpqua River	2,830,923,509	1	4	2.57
480	Upper Ochoco Creek	4,181,716,766	1	4	2.70
481	Upper Powder River	4,591,509,600	1	4	2.51
482	Upper Rock Creek	7,715,033,868	1	4	2.30
483	Upper Sandy River	1,489,025,547	1	4	2.76
484	Upper Siletz River	1,938,434,953	1	4	2.62
485	Upper Silver Creek	4,777,719,868	1	4	1.69
486	Upper Silvies River	6,766,785,027	1	4	1.89
487	Upper Siuslaw River	5,562,305,604	1	4	2.49
488	Upper Smith River	4,162,862,701	1	4	2.77
489	Upper South Fork Crooked River	8,636,376,162	1	3	1.27
490	Upper South Fork John Day River	4,120,445,359	1	4	2.22
491	Upper South Fork Malheur River	7,615,576,412	1	3	1.63
492	Upper South Umpqua River	3,799,649,613	1	4	2.90
493	Upper Sycan River	2,871,936,161	1	3	1.29
494	Upper Trout Creek	6,872,286,418	1	4	2.43
495	Upper Umpqua River	7,397,619,066	1	4	2.67
496	Upper Walla Walla River	4,438,691,134	0	3	2.60
497	Upper Wallowa River	6,877,294,866	1	4	2.03
498	Upper Willow Creek	4,915,021,080	1	3	1.93
499	Upper Willow Creek	4,097,509,619	1	4	2.36
500	Upper Yaquina River	2,316,931,717	1	4	2.80
501	Walker Creek	3,419,231,491	1	3	1.17
502	Wall Creek	5,589,211,074	1	3	2.12
503	Walls Lake Reservoir	10,413,534,369	0	3	1.19
504	Warm Springs Reservoir-Upper Malheur River	3,990,777,912	1	4	2.12
505	Warm Springs River	7,426,665,478	1	4	1.83
506	Watson Creek-Crooked River	2,565,035,547	1	4	1.60
507	West Fork Cow Creek	2,436,737,269	1	3	2.78
508	West Fork Hood River	2,852,977,685	0	4	2.69
509	West Little Owyhee River	8,635,305,152	0	4	1.18
510	West Tub Mountain Reservoir	2,029,648,330	1	3	1.75
511	Wheatgrass Lake	1,771,479,168	1	3	1.24

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Table C.3. Landslide Susceptibility Exposure of Oregon Watersheds *(continued)*

	Watershed Name	Area, ft^2	Minimum Landslide Susceptibility Zone Value	Maximum Landslide Susceptibility Zone Value	Mean Landslide Susceptibility Zone Value
512	White Horse Rapids-Deschutes River	8,511,118,689	1	4	2.28
513	White River	7,721,064,887	0	4	1.86
514	Whitehorse Creek	5,257,611,592	1	4	1.71
515	Whychus Creek	7,175,323,864	1	3	1.74
516	Wildcat Creek	4,103,090,706	0	4	1.81
517	Wildcat Creek	1,518,866,336	1	3	2.67
518	Wildhorse Creek	5,465,362,597	1	3	1.52
519	Wiley Creek	1,771,934,481	1	4	2.84
520	Willamette River-Frontal Columbia River	3,429,236,546	0	4	1.50
521	Willamina Creek	2,342,889,964	1	4	2.85
522	Williams Creek	2,308,926,597	1	4	2.47
523	Willow Creek	2,334,249,773	1	4	1.95
524	Willow Creek	5,068,118,331	1	4	1.61
525	Willow Creek	6,648,401,387	1	4	1.49
526	Wilson Creek	3,896,067,341	1	3	1.13
527	Wilson River	5,360,862,249	1	4	2.99
528	Wolf Creek	4,148,873,923	1	4	2.33
529	Wolf Creek	1,651,096,670	1	3	2.49
530	Wolf Creek-Powder River	4,733,030,265	1	4	2.07
531	Wood River	5,270,962,070	1	4	1.67
532	Yachats River	1,214,490,936	0	4	2.81
533	Yamhill River	2,789,890,406	1	4	1.47
534	Yonna Valley-Lost River	6,289,041,779	0	4	1.66
535	Youngs River-Frontal Columbia River	5,859,665,087	0	4	3.17
536	Zigzag River	1,645,509,124	1	4	2.51