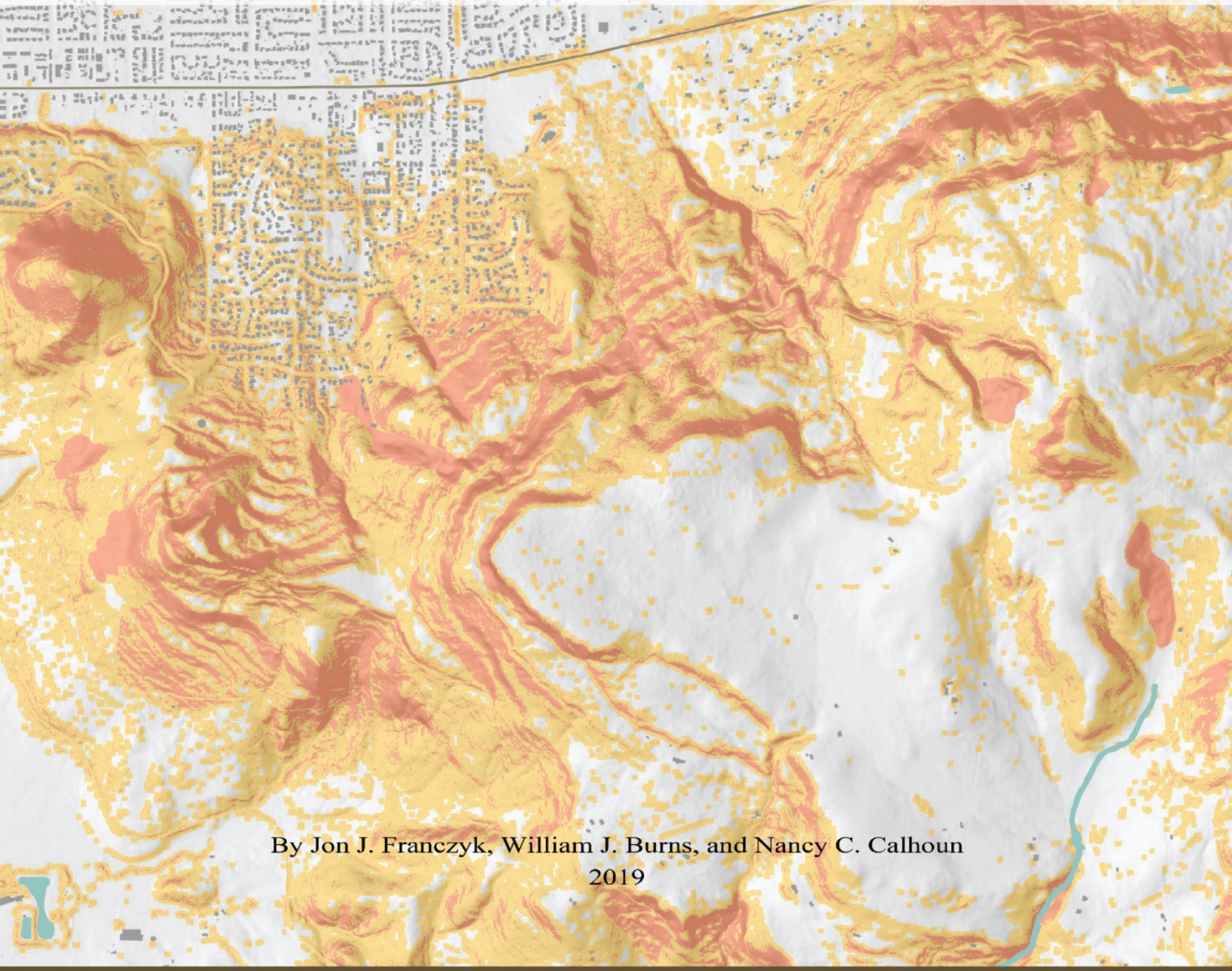
SLIDO 4.0

Statewide Landslide Information Database for Oregon (SLIDO)

RELEASE 4.0



By Jon J. Franczyk, William J. Burns, and Nancy C. Calhoun

2019

OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

Cover image: Shallow (less than 15 feet deep) landslide susceptibility, Eugene-Springfield area, Lane County, Oregon. Yellow areas indicate areas with moderate susceptibility to shallow landslides; orange areas indicate areas with high susceptibility to shallow landslides. Image created using data from the SLIDO-4.0 geodatabase.

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

STATEWIDE LANDSLIDE INFORMATION DATABASE FOR OREGON (SLIDO) RELEASE 4.0

By Jon J. Franczyk, William J. Burns, and Nancy C. Calhoun

2019

DISCLAIMER

This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information. This publication cannot substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from the results shown in the publication.

Oregon Department of Geology and Mineral Industries Digital Data Series SLIDO, release 4.0
Published in conformance with ORS 516.030

For additional information:
Administrative Offices
800 NE Oregon Street, Suite 965
Portland, OR 97232
Telephone (971) 673-1555
https://www.oregongeology.org
https://www.oregon.gov/DOGAMI/

TABLE OF CONTENTS

1.0 Report Summary **1**
2.0 Introduction and Background **3**
Statewide Landslide Information Database for Oregon, Release 1 4
Statewide Landslide Information Database for Oregon, Release 2 5
Statewide Landslide Information Database for Oregon, Release 3 6
3.0 Statewide Landslide Information Database for Oregon, Release 4.0 ..... **8**
New Inventory and Historic Landslide Data and Field Formatting 8
New Landslide Susceptibility Datasets 9
4.0 Future Updates **11**
5.0 Results and Discussion **12**
6.0 Map Limitations **14**
7.0 Acknowledgments **14**
8.0 References **15**
Appendix A. SLIDO-4.0 Geodatabase **17**
A.1 Structure 17
A.2 Feature Class Table Descriptions 18
A.3 Raster Dataset Descriptions 21
Appendix B. Source Data Used to Compile SLIDO-4.0 ..... **23**
Appendix C. SLIDO Geodatabase Update Procedure **46**
C.1 Historic Landslide Points 46
C.2 Landslide Inventory 47
C.3 Detailed Landslide Susceptibility 48
C.4 Statewide Landslide Susceptibility Overview 48

LIST OF FIGURES

Figure 1. Risk diagram displaying the overlap of landslide hazard and vulnerable population 1
Figure 2. SLIDO 4.0 geodatabase format 2
Figure 3. Representations of SLIDO-1 data 4
Figure 4. Format of the SLIDO-2 geodatabase. 5
Figure 5. Representations of SLIDO-2 data 6
Figure 6. Format of the SLIDO-3.0 geodatabase. 6
Figure 7. Representations of SLIDO-3.0 data 7
Figure 8. Representations of SLIDO-4.0 data 8
Figure 9. Comparison of resolutions of landslide susceptibility datasets 10
Figure 10. Index map of the locations of shallow and deep landslide susceptibility maps 11
Figure 11. Map view of the range of original mapping scales in SLIDO-4.0 source data 12
Figure 12. Map view of locations of hazard-specific studies used as source data in SLIDO-4.0 13
Figure A-1. Format of the SLIDO-4.0 geodatabase. 17

LIST OF TABLES

Table 1. Comparison of the number of landslide deposits, studies used, and historical landslides contained in SLIDO-1, -2, -3.0, and -4.0 2
Table 2. SLIDO date field change for SLIDO-4.0. Example date fields with data in (A) previous releases and (B)SLIDO-4.0 9
Table A-1. Historic_Landslide_Points feature dataset (points). Contains historical landslide points. 18
Table A-2. Deposits feature dataset (polygons). 19
Table A-3. Index_LS_Studies feature class (points). Index of deposit points for detailed landslide studies. 20
Table A-4. Inventory_Map_Index feature class (polygons). Extents of studies included in Deposit polygons. 20
Table A-5. Scarp_Flanks feature class (polygons). 20
Table A-6. Scarps feature class (polylines). 20
Table A-7. Detailed_Deep_Landslide_Susceptibility feature class (polygons). 21
Table A-8. Detailed_Susceptibility_Map_Index feature class (polygons). 21
Table A-9. References table. Original source data included in SLIDO-4.0. Also see Appendix B of this report. 21
Table A-10. Detailed_Shallow_Landslide_Susceptibility. 3-foot (1-meter) resolution. 21
Table A-11. Statewide_Landslide_Susceptibility_Overview. 32-foot (10-meter) resolution. 22
Table B-1. SLIDO-4.0 source references. Sources new to SLIDO-4 or added to interim SLIDO-3.x releases are shown in boldface with light green background. 23

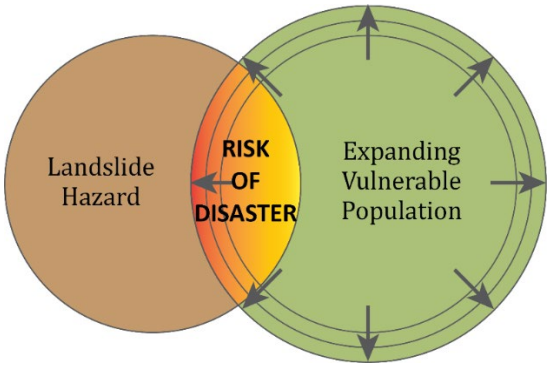
GEOGRAPHIC INFORMATION SYSTEM (GIS) DATA

See the digital publication folder for files and Appendix A of this report for geodatabase structure. Metadata is embedded in the geodatabase and is also provided as separate .xml format files.

1.0 REPORT SUMMARY

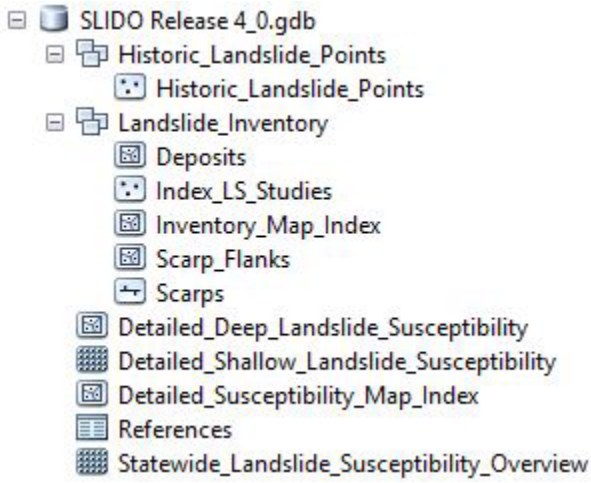
Landslides are a significant natural hazard in Oregon, causing millions of dollars in damage annually (Wang and others, 2002). As the population vulnerable to landslides grows, greater losses are likely to result. In order to reduce the risk from future landslides, a variety of mitigation measures are required, all of which begin with an accurate and complete assessment of where landslide hazards exist (**Figure 1**). The first step in that hazard assessment is to inventory existing landslides and make that data easily accessible by anyone. The next step is to try to predict which areas are likely to have landslides in the future (landslide susceptibility). To meet this need, the Oregon Department of Geology and Mineral Industries (DOGAMI) has updated the Statewide Landslide Information Database for Oregon (SLIDO) to release 4.0 (SLIDO-4.0).

Figure 1. Risk diagram displaying the overlap of landslide hazard and vulnerable population.



SLIDO-4.0 is an Esri® ArcGIS® version 10.6 file geodatabase. The geodatabase contains two feature datasets containing six feature classes, two raster datasets, two individual feature classes, and one individual table (**Figure 2**):

Figure 2. SLIDO 4.0 geodatabase format. See Appendix A for feature class table descriptions.



SLIDO-4.0 includes 47,586 landslide polygons in the Deposits feature class dataset and 13,994 historic landslide point locations compiled from 357 studies. For comparison, the data totals for previous releases of SLIDO are shown in **Table 1**. Data from the previous release was re-examined and revised where needed (for example, to remove duplicate entries).

Table 1. Comparison of the number of landslide deposits, studies used, and historical landslides contained in SLIDO-1, -2, -3.0, and -4.0.

	Landslide Polygons	Studies Used	Historical Landslide Points
SLIDO-1	15,093	257	0
SLIDO-2	22,154	313	10,626
SLIDO-3.0	37,226	347	12,075
SLIDO-3.4	44,929	354	13,048
SLIDO-4.0	47,586	357	13,994

The original studies vary widely in scale, scope, and focus. This variety is reflected in the wide range of accuracy, detail, and completeness with which landslides are mapped. We propose incremental updates of SLIDO 4.0. Given expected available funding, these updates would take place: 1) each time DOGAMI publishes a new GIS dataset that contains landslide inventory or susceptibility data, or 2) at the end of each rainy season, a common time for landslide occurrences in Oregon. Incremental updates will include any recent historic landslide point data that has been published by others. Successive releases of SLIDO 4.0 will be identified by a release number, such as SLIDO-4.1.

2.0 INTRODUCTION AND BACKGROUND

Many parts of Oregon are highly susceptible to landslides, which can pose significant threats to people and infrastructure, particularly in the portions of the state with moderate to steep slopes. As population growth expands and development on landslide susceptible terrain occurs, greater losses are likely to result. Most of Oregon's landslide damage has been associated with severe winter storms, where landslide losses can exceed $100 million in direct damage, as occurred from the February 1996 event (Wang and others, 2002). However, landslides are a chronic hazard in Oregon and annual average maintenance and repair costs for landslides are over $1.5 million (Burns and others, 2017). Landslides induced by earthquake shaking are also likely in many parts of Oregon, and losses associated with sliding in moderate-to-large earthquakes are likely to be significant. Volcano induced and/or associated landslide hazards are potential threats to parts of Oregon.

To begin to reduce risk from landslides, the most accurate and complete information about the hazard must be readily available. To gather accurate information about landslides, two approaches were employed. 1) In 2007, DOGAMI began to compile systematically all previously mapped landslides from geologic and hazard maps. This landslide compilation database, called the Statewide Landslide Information Database for Oregon (SLIDO), served as a starting point for all future landslide studies (Burns, 2007). 2) Research was performed to choose the best remote sensing dataset (i.e., aerial photos, photogrammetric elevation data, lidar [laser technology] elevation data, and so on) to use as a primary tool to begin systematic mapping of landslides in Oregon. The accuracy provided by lidar-derived elevation data was deemed necessary for understanding and mapping the landslide hazard in Oregon.

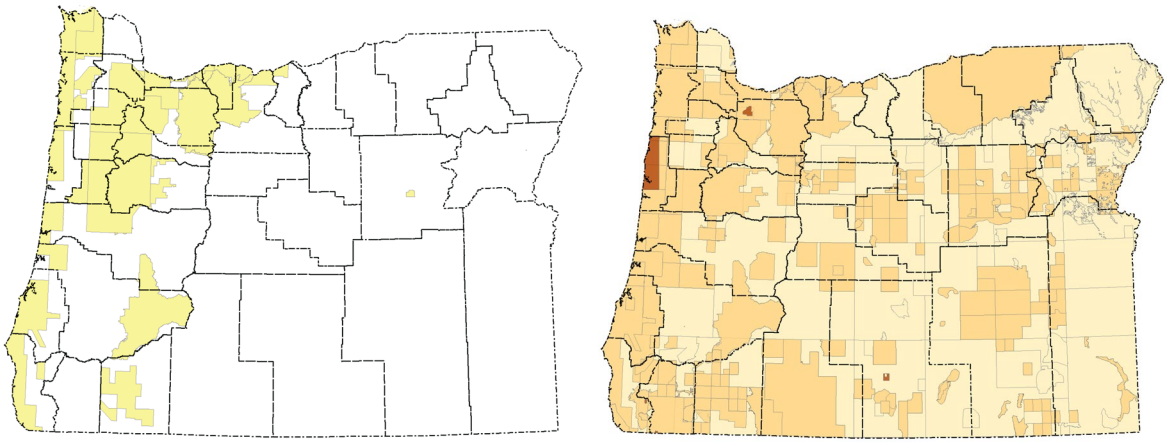
This report provides a brief history of the SLIDO program and describes additions and updates for the current geodatabase, SLIDO release 4.0. Like previous versions of SLIDO, SLIDO-4.0 is available as a dataset for download and as an interactive map on the DOGAMI website.

Statewide Landslide Information Database for Oregon, Release 1

In 2008, DOGAMI created and published SLIDO, release 1 (Burns and others, 2008). SLIDO-1 was created to improve our understanding of the landslide hazard in Oregon and to create a statewide base level of existing landslide data. The three main objectives of this study were: 1) to identify previously mapped landslide deposits statewide, 2) to improve the abilities of communities to begin effective landslide management and risk reduction activities, and 3) to recommend future improvements and updates to the database. SLIDO-1 was funded by the U.S. Geological Survey (USGS) Landslide Hazards Program and the State of Oregon.

The resulting database included 15,093 landslide and landslide-related features (polygons) extracted from 257 published and unpublished studies, contained in a single Esri shapefile. The original studies varied widely in scale, scope, and objectives, which is reflected in the broad range of accuracy, detail, and completeness with which landslides were mapped (**Figure 3**).

Figure 3. Representations of SLIDO-1 data (Burns and others, 2008). (left) Areas of hazard-specific original mapping are shown in yellow. (right) Map scales of source data. Red indicates scales of 1:24,000 or finer; orange indicates scales from 1:24,000 to 1:62,500, and yellow indicates scales of 1:62,500 or coarser.



Statewide Landslide Information Database for Oregon, Release 2

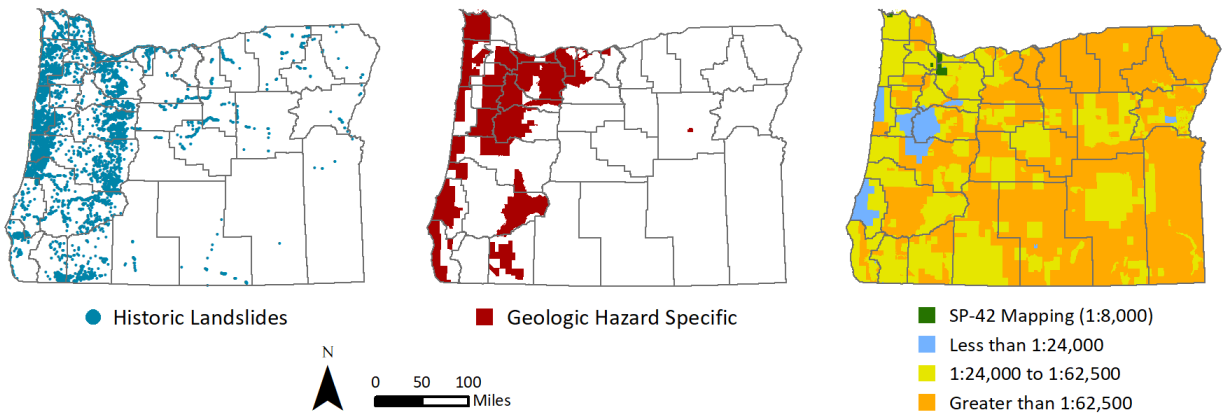
In 2011, DOGAMI updated SLIDO-1 to SLIDO-2 (Burns and others, 2011a). SLIDO-2 improved the range and format of the SLIDO-1 data structure and updated the database with recently published studies, most of which used lidar data as basemaps to provide comprehensive and accurate landslide maps. SLIDO-2 was partially funded by the Oregon Geospatial Enterprise Office (GEO) Framework Implementation Team (FIT).

One of the improvements in SLIDO-2 was conversion of the digital data from an Esri shapefile format to an Esri ArcGIS geodatabase format, which is Esri's primary format for editing and managing spatial data. Part of the conversion to a geodatabase included matching the structure of the geodatabase published with the recently published DOGAMI Special Paper 42, Protocol for Inventory Mapping of Landslide Deposits from Light Detection and Ranging (lidar) Imagery (Burns and Madin, 2009), so that new data created following the DOGAMI protocol could be easily added to future SLIDO releases. Another improvement was the addition of historical landslide points. (Historical points are termed historic landslide points in SLIDO.) The geodatabase contained three feature datasets (SLIDO Release 1, and a collection of 20 feature classes), two additional feature classes, and an individual table (**Figure 4**):

Figure 4. Format of the SLIDO-2 geodatabase.

The resulting SLIDO-2 geodatabase included 22,154 landslide deposit polygons and landslide-related features (polygons) from 313 published and unpublished studies, 10,626 historic landslide point locations, and 72 locations of detailed studies on individual landslides. **Figure 5** shows the spatial extent of the historic landslides, hazard specific studies, and all included studies.

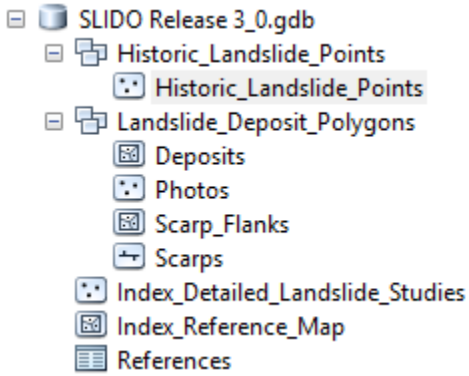
Figure 5. Representations of SLIDO-2 data (Burns and others, 2011a). (left) historic landslide points, (middle) areas of hazard-specific original mapping, and (right) map scales of source data.



Statewide Landslide Information Database for Oregon, Release 3

The two primary improvements in SLIDO-3.0 (Burns and Watzig, 2014) were the addition of data from 34 new studies and a proposed incremental update procedure to provide SLIDO-3.x releases. Four incremental releases occurred through 2017 as new data were added to the historic points, landslide deposit polygons, index reference map, and reference table feature classes. The geodatabase contained two feature datasets (five feature classes), two additional feature classes, and an individual table (see **Figure 6**).

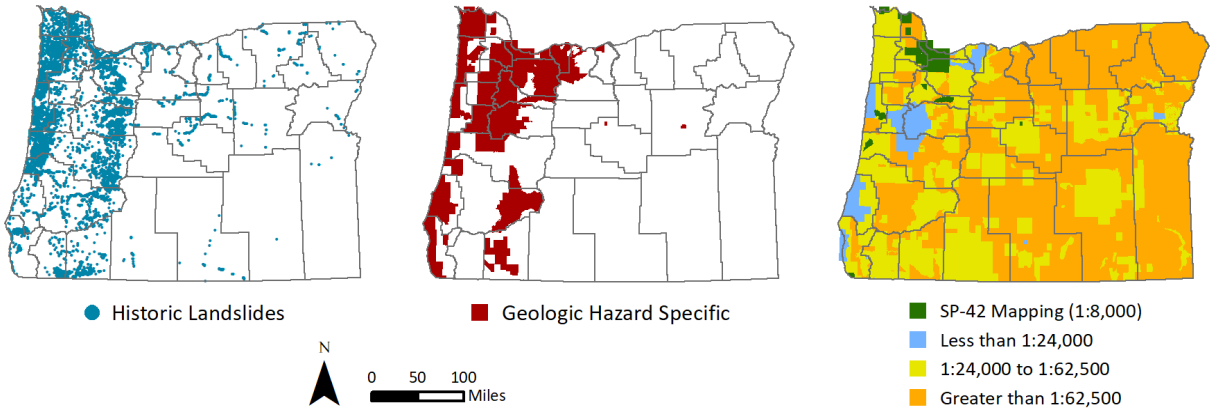
Figure 6. Format of the SLIDO-3.0 geodatabase.



One of the studies added was a comprehensive database of 1,358 landslides that occurred between 2005 and 2009 in Clatsop, Columbia, Tillamook, and Washington counties (W. J. Burns and others, unpublished data, 2014). Most of these landslides likely occurred during the so-called Great Coastal Gale of December 2007.

The resulting SLIDO-3.0 geodatabase included 37,226 landslide deposit polygons and landslide related features from 347 published and non-published studies, 12,075 historic landslide point locations, and 72 locations of detailed studies on individual landslides. **Figure 7** shows the spatial extent of the historic landslides, hazard specific studies, and all included studies.

Figure 7. Representations of SLIDO-3.0 data (Burns and Watzig, 2014): (left) historic landslide points, (middle) areas of hazard-specific original mapping, and (right) map scales of source data.



3.0 STATEWIDE LANDSLIDE INFORMATION DATABASE FOR OREGON, RELEASE 4.0

SLIDO-4.0 contains extensive updates to the landslide inventory dataset (deposits, scarp flanks, and scarps) and historic landslide points. These updates reflect the most recent published studies as well as contributions from other Oregon government agencies. However, the major change from release 3.4 to 4.0 is the addition of landslide susceptibility data. The geodatabase structure was modified to accommodate these new data (see **Appendix A**).

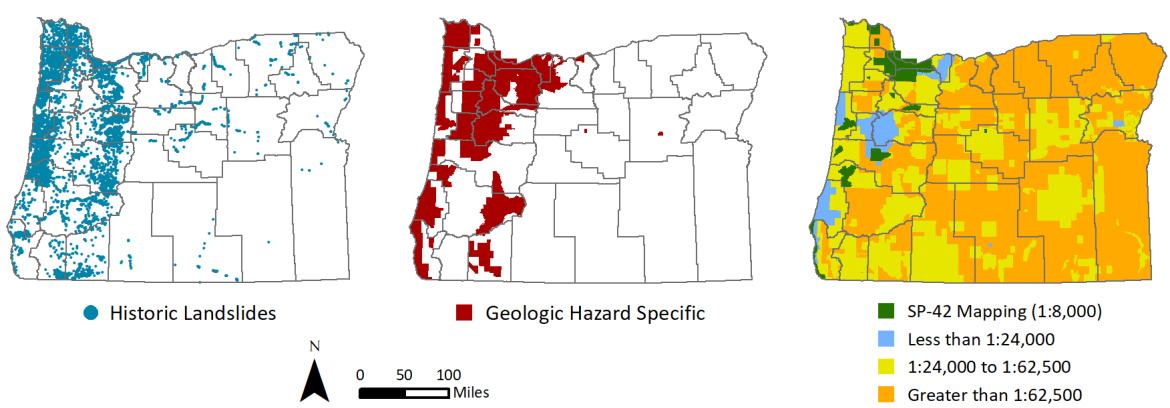
New Inventory and Historic Landslide Data and Field Formatting

Additions to the Landslide Inventory dataset were derived from 12 DOGAMI landslide inventory studies and from two datasets from the City of Portland. The 12 new studies focus on western Multnomah County (Burns and others, 2018), Eugene-Springfield (Calhoun and others, 2018), Portland (Ericka Koss, Bureau of Development Services, City of Portland, written communication, 2019), sites in Harney County and the Mid-Columbia Basin (Houston and others, 2018; Niewendorp and others, 2018; Madin and McClaughry, 2019; McClaughry and others, 2019), Linnton and North Bethany (Burns and others, 2011b; Burns and Mickelson, 2009; Burns and Mickelson, 2015), Drift Creek (Dirringer, 2015), and Panther Creek (Burns and others, 2010). Eight studies contain highly detailed landslide data created using protocol developed by DOGAMI and described in DOGAMI Special Paper 42 (Burns and Madin, 2009).

Updates to the Historic Landslide Points dataset were derived from three regional sources: western Multnomah County (Burns and others, 2018), Eugene-Springfield (Calhoun and others, 2018), and the City of Portland (Ericka Koss, Bureau of Development Services, City of Portland, written communication, 2019). Updates are new landslide occurrences or the result of additional research to verify existing points in these study areas.

SLIDO-4.0 data contain 47,586 landslide polygons in the Deposits feature class dataset and 13,994 historic landslide point locations compiled from 357 studies. **Appendix B** contains the full data source list for SLIDO-4.0; of the 357 total studies, 14 studies are new for this release. In this update, previous study data were removed in locations where new study data created using DOGAMI Special Paper 42 protocol was added. **Figure 8** shows the spatial extent of the historic landslides, hazard specific studies, and all included studies.

Figure 8. Representations of SLIDO-4.0 data: (left) historic landslide points, (middle) areas of hazard-specific original mapping, and (right) map scales of source data.



The DATE record format in the Deposits and Historic Landslide Points feature class datasets has been expanded in SLIDO-4.0 to allow for streamlined sorting, searchability, and accommodation of diverse entry formats. This modification is an advantage to users of both the geodatabase itself and the interactive SLIDO web map. In previous SLIDO versions, date information was recorded in a single field in a variety of formats, as illustrated in **Table 2A**. In the SLIDO-4.0 release, that single field is now fields YEAR, REACTIVATION, DATE_RANGE, MONTH, and DAY (**Table 2B**). The REACTIVATION field records any dates an existing landslide has moved, so that each movement date has a unique record. The DATE_RANGE field includes the bounding years over which landsliding may have taken place, when the exact year is unknown. Example 3 in **Table 2** illustrates how multiple dates in a single field (A) are split so that the additional date is moved into the REACTIVATION field (B).

Table 2. SLIDO date field change for SLIDO-4.0. Example date fields with data in (A) previous releases and (B)SLIDO-4.0.

A) *Date record format in previous SLIDO releases*.

	DATE
Example 1	2005-2009
Example 2	Jan-96
Example 3	1980 & 01/01/09

B) *The same date records in SLIDO-4.0 format.*

	YEAR	REACTIVATION	DATE RANGE	MONTH	DAY
Example 1			2005-2009		
Example 2	1996			01	
Example 3	1980	01/01/2009			

New Landslide Susceptibility Datasets

A landslide susceptibility map shows modeled data that predicts the potential of a region or area to have landslides. SLIDO 4.0 includes three kinds of landslide susceptibility data:

- *Detailed **shallow** landslide susceptibility.* These data model the potential for landslides that involve movement of a relatively thin layer of slope material and have a shallow failure plane (**Figure 9A**). These are fine-grained, large-scale maps (1:8,000) and are thus intended for use at a local scale. This dataset is in raster format at a 3-foot (1-meter) resolution.
- *Detailed **deep** landslide susceptibility.* These data model the potential for landslides that involve movement of a thicker layer of slope material (**Figure 9B**). These are fine-grained, large-scale maps (1:8,000) and are thus intended for use at a local scale. This dataset is in polygon feature class format.
- *Statewide landslide susceptibility overview map*. This map is a coarse-grained, small-scale (1:500,000) map of the entire state of Oregon and is for use at a regional scale (**Figure 9C**). This dataset is in raster format at a 32-foot (10-meter) resolution.

Note that detailed shallow and deep landslide susceptibility data do not cover the entire state; an index map for the detailed datasets is included in the geodatabase as a feature class (**Figure 10**).

Further details about the creation and use of landslide susceptibility datasets are provided by Mickelson and Burns (2012; statewide), Burns and others (2012; shallow susceptibility), and Burns and Mickelson (2016; deep susceptibility). **Figure 10** shows the locations of detailed landslide susceptibility maps in the state.

Figure 9. Comparison of resolutions of landslide susceptibility datasets (A) detailed shallow landslide susceptibility, B) detailed deep landslide susceptibility, and C) statewide landslide susceptibility. The bottom set of figures shows the resolution of mapping when zoomed in on the boxed areas in the top images.

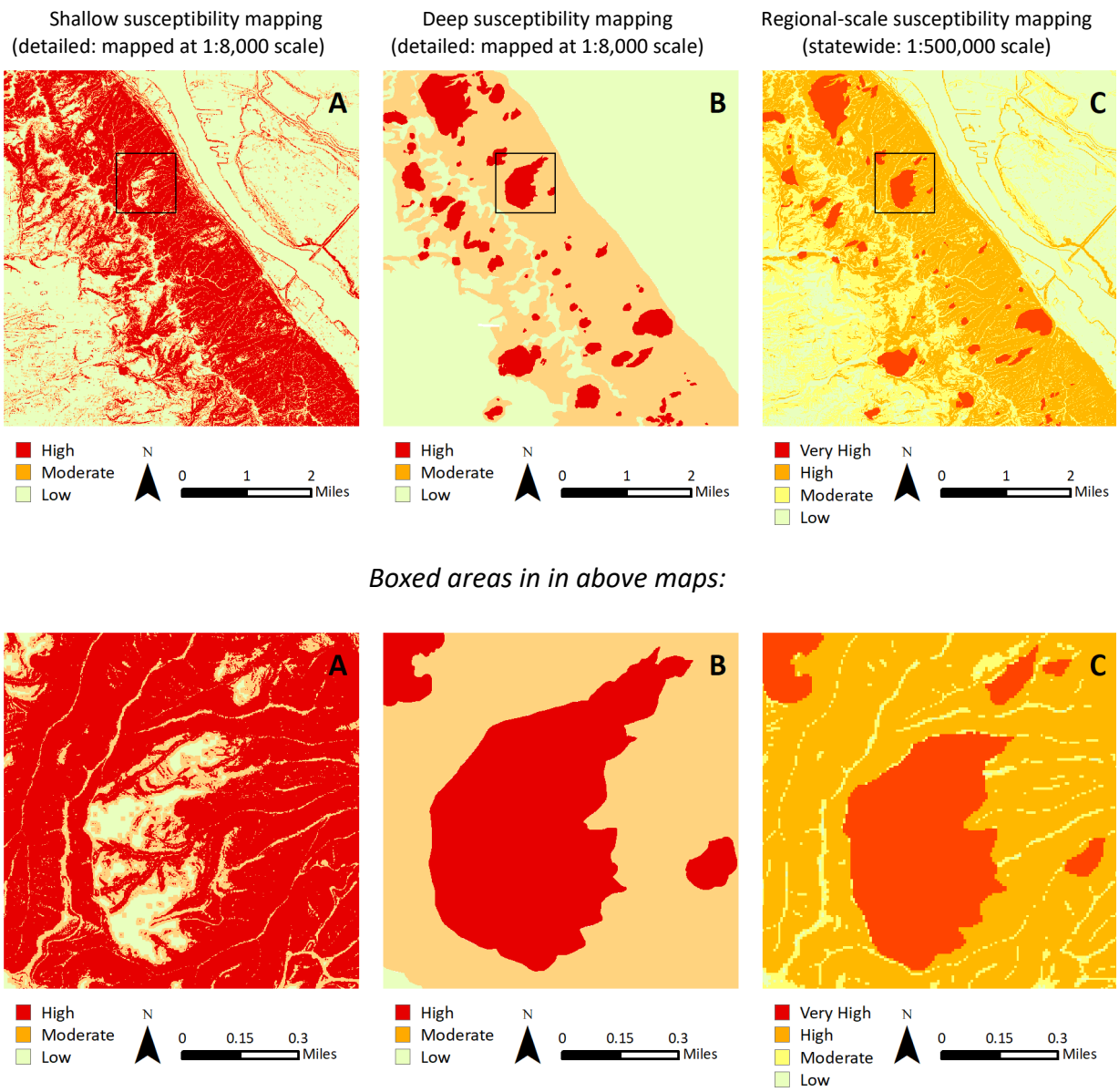


Figure 10. Index map of the locations of shallow and deep landslide susceptibility maps. Areas with susceptibility data are outlined in black.

4.0 FUTURE UPDATES

As with SLIDO-3, SLIDO-4 will be incrementally updated. The current implementation of the SLIDO update procedure is described in **Appendix C**. Based on funding availability, updates will occur:

- When DOGAMI publishes a new study that contains landslide inventory data
- When DOGAMI publishes a new study that contains landslide susceptibility data
- Annually, to add landslide points and data published by authors outside DOGAMI. (Note, if SLIDO is updated with new DOGAMI published data, any known non-DOGAMI landslide data will be included as well.)

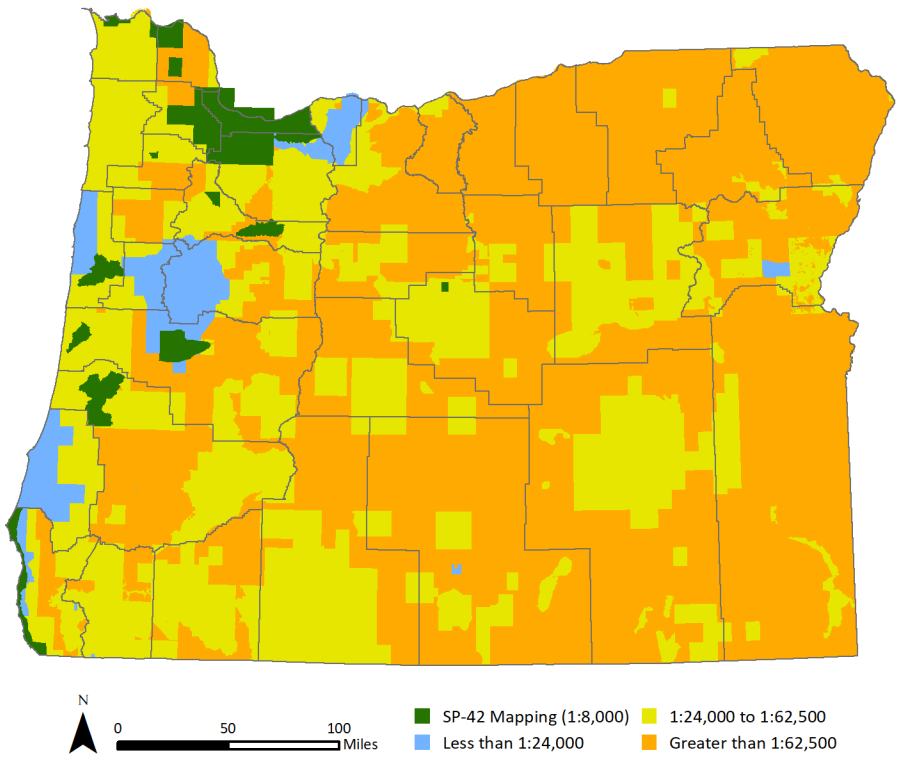
The annual update of SLIDO-4 including new landslide points is expected to occur at the end of the rainy season (July 1).

Successive releases of SLIDO 4.0 will be identified by a release number, such as SLIDO-4.1. Major new SLIDO releases (e.g., 5.0). will occur after major database updates or the additions of new landslide product feature classes (e.g., landslide data derived from debris flow modeling).

5.0 RESULTS AND DISCUSSION

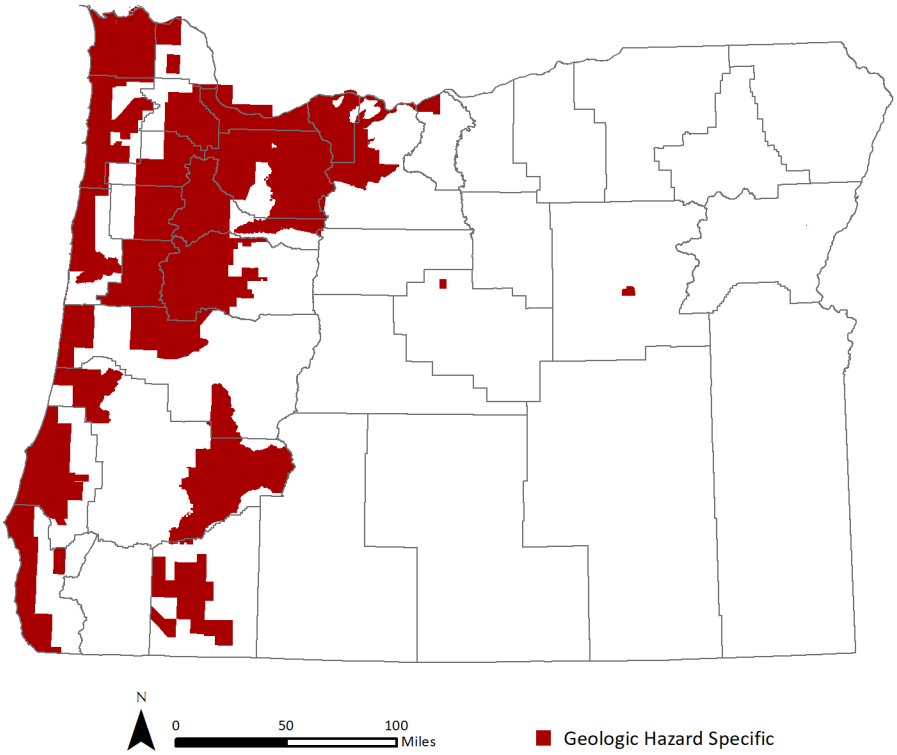
SLIDO-4.0 includes 47,586 landslide polygons from 357 studies and 13,994 historic landslide point locations. The original studies vary widely in scale, scope, and focus, and this variety is reflected in the wide range of accuracy, detail, and completeness with which landslides are mapped. One important factor included is the original mapping scale (**Figure 11**). In general, the original mapping scale can be used as a proxy for level of detail.

Figure 11. Map view of the range of original mapping scales in SLIDO-4.0 source data.



Another important factor included is the original mapping purpose. This factor is extremely important and can be used as a proxy for both level of detail and accuracy. For example, mapping focused on mineral resources or bedrock geology may depict surficial deposits in a generalized or inconsistent manner. **Figure 12** shows locations of hazard-specific mapping studies compiled in SLIDO-4.0.

Figure 12. Map view of locations of hazard-specific studies used as source data in SLIDO-4.0.



Information available about the year the mapping was completed is also included. This factor can be useful for estimating the technology and standards used to create the landslide data. For example, in the 1950s and 1960s, geologists began using aerial photography as a standard tool to aid in the mapping. This advance generally resulted in an increase in identification of landslides as well as other geologic features. More recently, the use of lidar-derived digital elevation models (DEMs) has resulted in a significant increase in the ability to identify landslides.

In summary, SLIDO-4.0 is a compilation of available data of widely varying quality. Although SLIDO-4.0 covers the entire state, in all but a few places the geodatabase cannot be considered a complete inventory. We believe that source landslide inventories created by using the DOGAMI SP-42 protocol (Burns and Madin, 2009) are as complete as is currently possible. As we noted for SLIDO-2 (Burns and others, 2011a) and as continues to be the case for SLIDO-3.0 and -4.0, source data that are based on the DOGAMI SP-42 protocol show a significant improvement in both the number of landslides captured and their detail when compared to the results of previous methods. As we continue to complete landslide mapping following the SP-42 protocol across the state and add these data to SLIDO, we expect the capture rate to increase. SLIDO users should also be aware that database queries on the number or area of landslides in a given region may give exaggerated results for areas with multiple overlapping polygons that represent the outline of an individual landslide deposit from multiple sources.

6.0 MAP LIMITATIONS

We created SLIDO-4.0 by compiling the best landslide inventory data available for Oregon. However, this product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. Users should review or consult the primary data and information sources to ascertain the usability of the SLIDO-4.0 data. This publication cannot substitute for site-specific investigations by qualified practitioners. Site-specific data may give results that differ from SLIDO-4.0. Several limitations are worth noting:

- Although every effort was made to ensure that database entries were accurate and complete, no effort was made to verify the original data on which the compilation is based. Geologic data in the less populated eastern portions of the state were particularly limited in terms of scale; for example, the 1:500,000-scale geologic map of the state was used in some locations.
- The database is from original sources that vary in scale, original purpose of mapping, available tools at the time of mapping, and background and interpretation by original mapper. These factors all affect the level of detail and accuracy of landslide data.
- DOGAMI neither collected nor analyzed any new data for SLIDO-4.0.

7.0 ACKNOWLEDGMENTS

Funding for this project was provided in part by FEMA through an interagency agreement with OEM (HMGP DR-4258-OR). We thank them and, especially, Angie Lane. We thank DOGAMI staff who helped with technical assistance, review, and general aid, especially Carli Duda, Bob Houston, Rudie Watzig, and Deb Schueller.

8.0 REFERENCES

Burns, W. J., 2007, Comparison of remote sensing datasets for the establishment of a landslide mapping protocol in Oregon, *in* Schaefer, V. R., Schuster, R. L., and Turner, A.K., eds., Proceedings, 1st North American Landslide Conference, Vail, Colo.: Association of Environmental and Engineering Geologists, AEG Special Publication 23.

Burns, W. J., and Madin, I. P., 2009, Protocol for inventory mapping of landslide deposits from light detection and ranging (lidar) imagery: Oregon Department of Geology and Mineral Industries, Special Paper 42. https://www.oregongeology.org/pubs/sp/p-SP-42.htm

Burns, W. J., and Mickelson, K., 2009, Regional landslide susceptibility maps of the western half of the Linnton quadrangle, Washington and Multnomah counties, Oregon: Oregon Department of Geology and Mineral Industries, technical report to Washington County, Oregon, 25 p.

Burns, W. J., and Mickelson, K., 2015, Landslide susceptibility of the SW quarter of the Linnton quadrangle including Area 93/Bonny Slope West, Washington and Multnomah counties, Oregon: Oregon Department of Geology and Mineral Industries, technical report to Washington County, Oregon, 62 p.

Burns, W. J., and Mickelson, K. A., 2016, Protocol for deep landslide susceptibility mapping: Oregon Department of Geology and Mineral Industries, Special Paper 48, 69 p. https://www.oregongeology.org/pubs/sp/p-SP-48.htm

Burns, W. J., and Watzig, R. J., 2014, Statewide Landslide Information Database for Oregon, release 3: Oregon Department of Geology and Mineral Industries, SLIDO Digital Data Series.

Burns, W. J., Madin, I. P., and Ma, L., 2008, Statewide Landslide Information Database for Oregon, release-1: Oregon Department of Geology and Mineral Industries, SLIDO Digital Data Series.

Burns, W. J., Coe, J. A., Sener Kaya, B., and Ma, L., 2010, Analysis of elevation changes detected from multi-temporal lidar surveys in forested landslide terrain in western Oregon: Environmental and Engineering Geoscience, v. 16, no. 4, p. 315–341. https://doi.org/10.2113/gseegeosci.16.4.315

Burns, W. J., Mickelson, K. A., and Saint-Pierre, E. C., 2011a, Statewide Landslide Information Database for Oregon, release 2: Oregon Department of Geology and Mineral Industries, SLIDO Digital Data Series.

Burns, W. J., Madin, I. P., Mickelson, K. A., and Drazba, M. C., 2011b, Landslide inventory maps of the Linnton quad, Multnomah and Washington Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 35, 4 pls., scale 1:8,000, 1 pl., 1:16,000, geodatabase, scale 1:8,000. https://www.oregongeology.org/pubs/ims/p-ims-035.htm

Burns, W. J., Madin, I. P., and Mickelson, K. A., 2012, Protocol for shallow-landslide susceptibility mapping: Oregon Department of Geology and Mineral Industries, Special Paper 45, 38 p. https://www.oregongeology.org/pubs/sp/p-SP-45.htm

Burns, W. J., Mickelson, K. A., and Madin, I. P., 2016, Statewide landslides susceptibility overview map of Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-16-02. http://www.oregongeology.org/pubs/ofr/p-O-16-02.htm

Burns, W. J., Calhoun, N. C., Franczyk, J. J., Koss, R. J., and Bordal, M. G., 2017, Estimating losses from landslides in Oregon, *in* De Graff, J. V. and Shakoor, A., eds., Landslides: Putting experience, knowledge, and emerging technologies into practice: Association of Environmental and Engineering Geologists, AEG Special Publication No. 27, p. 473–482.

Burns, W. J., Calhoun, N. C., Franczyk, J. J., Lindsey, K. O., and Ma, L., 2018, Landslide hazard and risk study of central and western Multnomah County, Oregon: Oregon Department of Geology and Mineral Industries Interpretive Map IMS-57. https://www.oregongeology.org/pubs/ims/p-ims-057.htm

Calhoun, N. C., Burns, W. J., Franczyk, J. J., and Monteverde, G., 2018, Landslide hazard and risk study of Eugene-Springfield and Lane County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map IMS-60. https://www.oregongeology.org/pubs/ims/p-ims-060.htm

Dirringer, S., 2015, Landslide inventory mapping of the Drift Creek Watershed, Lincoln County, Oregon, Using LiDAR data: Columbus, Ohio, Kent State University, M.S. thesis. http://rave.ohiolink.edu/etdc/view?acc_num=kent1445452392

Houston, R. A., McClaughry, J. D., Duda, C. J. M., and Niewendorp, C. A., 2018, Geologic map of the Devine Ridge North 7.5' quadrangle, Harney County, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-121, 110 p. https://www.oregongeology.org/pubs/gms/p-GMS-121.htm

Madin, I. P., and McClaughry, J. D., 2019, Geologic map of the Biggs Junction and Rufus 7.5' quadrangles, Sherman and Gilliam Counties, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-124, 126 p. https://www.oregongeology.org/pubs/gms/p-GMS-124.htm

McClaughry, J. D., Duda, C. J. M., and Ferns, J. L., 2019, Geologic map of the Poison Creek and Burns 7.5' quadrangles, Harney County, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-123, 127 p. https://www.oregongeology.org/pubs/gms/p-GMS-123.htm

Mickelson, K. A., and Burns, W. J., 2012, Landslide hazard and risk study of the U.S. Highway 30 corridor, Clatsop and Columbia counties, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-12-06. http://www.oregongeology.org/pubs/ofr/p-O-12-06.htm

Niewendorp, C. A., Duda, C. J. M., Houston, R.A., and McClaughry, J. D., 2018, Geologic map of the Devine Ridge South 7.5' quadrangle, Harney County, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-120, 65 p. https://www.oregongeology.org/pubs/gms/p-GMS-120.htm

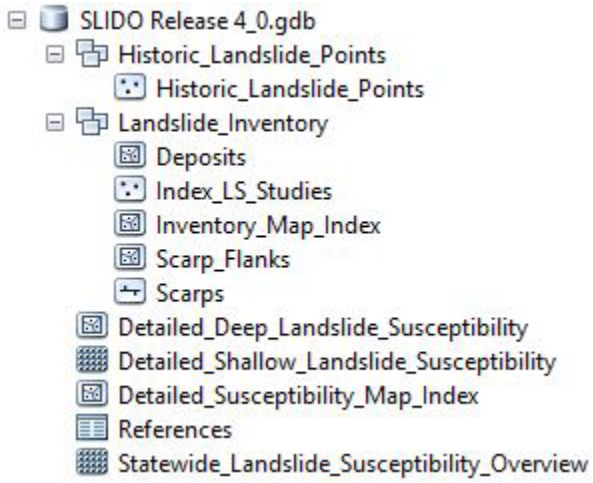
Wang, Y., Summers, R. D., and Hofmeister, R. J., 2002, Landslide loss estimation pilot project in Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-02-05, 23 p. https://www.oregongeology.org/pubs/ofr/O-02-05.pdf

APPENDIX A. SLIDO-4.0 GEODATABASE

A.1 Structure

The SLIDO-4.0 file geodatabase was created with Esri® ArcGIS® version 10.6 software. The geodatabase is Esri® version 10.2 format. The projection is NAD-1983 HARN Oregon Statewide Lambert, International Feet. Metadata are embedded in the geodatabase. SLIDO-4.0 contains two feature datasets (a collection of six related feature classes), two raster datasets, one individual table (see **Appendix B**), and two individual feature class datasets (**Figure A-1**).

Figure A-1. Format of the SLIDO-4.0 geodatabase.



A.2 Feature Class Table Descriptions

Table A-1. Historic_Landslide_Points feature dataset (points). Contains historical landslide points.

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
Shape	geometry		geometry type
REF_ID_COD	string	50	unique code assigned by data steward to each original reference map
UNIQUE_ID	string	50	unique code assigned by data steward to each data point in database
DATA_SOURC	string	100	the original source that provided the data
LOC_METHOD	string	100	landslide mapping method
ORIG_ID	string	25	unique ID from original study
SLIDE_NAME	string	50	landslide name
LENGTH_ft	float		landslide length in feet
WIDTH_ft	float		landslide width in feet
DEPTH_ft	float		landslide failure depth in feet
SLOPE	float		adjacent slope angle in degrees
TYPE_MOVE	string	50	type of landslide movement, for example flow or slide
MOVE_CLASS	string	50	movement classification which includes type of material and type of landslide movement
CONTR_FACT	string	100	factors contributing to slide
TYPE_MTRL	string	25	type of slide material
AREA_ft2	float		size of landslide deposit in square feet
VOLUME_ft3	float		volume of landslide deposit in cubic feet
DEEP_SHAL	string	25	The landslide is shallow seated (less than 15 feet) or deep seated (greater than 15 feet)
DAMAGES	string	254	direct and indirect damages caused by the slide in dollars
LOSSES	text	50	monetary value associated with damages from the landslide in dollars
COMMENTS	string	254	additional comments or attributes
ANNUAL_COST	float		estimated monetary value spent in maintaining the stability of each landslide yearly in dollars
REPAIR_COST	float		initial monetary value spent repairing and stabilizing the landslide in dollars
YEAR	short		Year of landslide failure
DATE_RANGE	string	25	Date range of landslide failure
REACTIVATION	string	50	Date of reactivation of previous landslide failure
MONTH	string	2	Month of landslide failure
DAY	string	2	Day of landslide failure

Table A-2. Deposits feature dataset (polygons).

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
SHAPE	geometry		geometry type
REF_ID_COD	string	25	unique code assigned by data steward to each original reference map
UNIQUE_ID	string	25	unique code assigned by data steward to each landslide polygon in database
TYPE_MOVE	string	25	type of landslide movement for example flow or slide
MOVE_CLASS	string	50	movement classification which includes type of material and type of landslide movement
MOVE_CODE	string	50	classification code based on type of material and type of landslide movement
CONFIDENCE	string	25	confidence of identification—high, moderate, low
AGE	string	25	estimated age—historical landslide age less than 150 years; prehistorical greater than 150 years
NAME	string	50	landslide name
GEOL	string	50	geologic unit that the landslide occurred in
SLOPE	float		adjacent slope angle in degrees
HS_HEIGHT	float		change in elevation in feet from bottom to top of head scarp
FAN_HEIGHT	float		change in elevation from top to toe of fan in feet
FAIL_DEPTH	float		estimated and/or calculated slope normal thickness of failure depth in feet
DEEP_SHAL	string	25	The landslide is shallow seated (less than 15 feet) or deep seated (greater than 15 feet)
HS_IS1	float		horizontal distance in feet from head scarp to internal scarp no. 1
IS1_IS2	float		horizontal distance in feet from internal scarp no. 1 to internal scarp no. 2
IS2_IS3	float		horizontal distance in feet from internal scarp no. 2 to internal scarp no. 3
IS3_IS4	float		horizontal distance in feet from internal scarp no. 3 to internal scarp no. 4
HD_AVE	float		calculated average horizontal distance between scarps in feet
DIRECT	float		direction of movement of the landslide in Azimuth degrees
AREA	float		size of landslide deposit in square feet
VOL	float		Volume of landslide deposit in cubic feet
MAP_UNIT_L	string	50	map unit label—reference map unit label symbol taken from the original source map
DESCRIPTION	string	25	unit descriptor: landslide, flow, talus-colluvium
YEAR	short		Year of landslide failure
DATE_RANGE	string	25	Date range of landslide failure
REACTIVATION	string	50	Date of reactivation of previous landslide failure
MONTH	string	2	Month of landslide failure
DAY	string	2	Day of landslide failure
Shape_Length	double		length of shape in feet
Shape_Area	double		area of shape in square feet

Table A-3. Index_LS_Studies feature class (points). Index of deposit points for detailed landslide studies.

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
Shape	geometry		geometry type
REFERENCE	string	400	original reference for data

Table A-4. Inventory_Map_Index feature class (polygons). Extents of studies included in Deposit polygons.

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
Shape	geometry		geometry type
REF_ID_COD	string	50	unique code assigned by data steward to each original reference map
SCALE	string	25	original map scale
PURPOSE	string	25	geologic hazard specific mapping or not
LIDAR	string	25	landslide datasets created using lidar-derived data
SP-42	string	25	landslide datasets created using techniques outlines in Special Paper 42
DATE	string	25	date of landslide data inclusion, from published or unpublished sources
Shape_Length	double		length of shape in feet
Shape_Area	double		area of shape in square feet

Table A-5. Scarp_Flanks feature class (polygons).

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
Shape	geometry		geometry type
REF_ID_COD	string	25	unique code assigned by data steward to each original reference map
UNIQUE_ID	string	25	same unique code assigned by data steward to each landslide polygon in database
Shape_Length	double		length of shape in feet
Shape_Area	double		area of shape in square feet

Table A-6. Scarps feature class (polylines).

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
Shape	geometry		geometry type
REF_ID_COD	string	50	unique code assigned by data steward to each original reference map
Shape_Length	double		length of shape in feet

Table A-7. Detailed_Deep_Landslide_Susceptibility feature class (polygons).

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
Shape	geometry		geometry type
Suscept	string	25	represents high, moderate, or low susceptibility levels
Shape_Length	double		length of shape in feet
Shape_Area	double		area of shape in square feet

Table A-8. Detailed_Susceptibility_Map_Index feature class (polygons).

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
Shape	geometry		geometry type
REF_ID_COD	string	50	unique code assigned by data steward to each original reference map
Shape_Length	double		length of shape in feet
Shape_Area	double		area of shape in square feet

Table A-9. References table. Original source data included in SLIDO-4.0. Also see Appendix B of this report.

Field Name	Field Type	Size	Description
OBJECTID	OBJECTID		numeric ID
REF_ID_COD	string	254	unique code assigned by data steward to each original reference map
SCALE	string	254	original map scale
REFERENCE	string	254	original reference for data
DATE	string	25	date of reference

A.3 Raster Dataset Descriptions

Table A-10. Detailed_Shallow_Landslide_Susceptibility. 3-foot (1-meter) resolution.

Value	Numeric field corresponding to landslide susceptibility values; 1-3
Count	Number of cells assigned a high, moderate, or low susceptibility to shallow landsliding
Susceptibility	Description field corresponding to Value field values; 1 = low, 2 = moderate, and 3 = high landslide susceptibility

Table A-11. Statewide_Landslide_Susceptibility_Overview. 32-foot (10-meter) resolution.

VALUE	Numeric field corresponding to landslide susceptibility values; 1-4
COUNT	Number of cells assigned a very high, high, moderate, or low susceptibility to shallow landsliding
Description	Descriptive field corresponding to VALUE field values; 1=Low, 2=Moderate, 3=High, 4=Very high landslide susceptibility

APPENDIX B. SOURCE DATA USED TO COMPILE SLIDO-4.0

The full reference for each source in the Statewide Landslide Information Database for Oregon (SLIDO), release 4 is given here. The Reference identification codes for sources completely new to SLIDO-4.0 are shown in boldface with green cell background color. Older sources with susceptibility data added to SLIDO-4.0 are shown in boldface. This table is also available as a Microsoft® Excel® spreadsheet with the digital publication.

Table B-1. SLIDO-4.0 source references. Sources new to SLIDO-4 or added to interim SLIDO-3.x releases are shown in boldface with light green background.

Reference Identification Code	Original Mapping Scale	Reference
AchJA1991	1:24,000	Ach, J. A., and Bateson, J. T., 1991, Geologic map of the Sand Hollow quadrangle, Crook County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies MF-2156, map scale 1:24,000.
AllaJC2001	1:25,000	Allan, J. C., and Priest, G. R., 2001, Evaluation of coastal erosion hazard zones along dune and bluff backed shorelines in Tillamook County, Oregon: Cascade Head to Cape Falcon: Oregon Department of Geology and Mineral Industries Open-File Report O-01-03, scale 1:24,000.
AlleJE1988	1:24,000	Allen, J. E., 1988, Geologic hazards in the Columbia River Gorge National Scenic Area: U.S. Department of Agriculture Forest Service, Pacific Northwest Region, scale 1:24,000.
AndeJL1978	1:24,000	Anderson, J. L., 1978, The stratigraphy and structure of the Columbia River Basalt in the Clackamas River drainage: Portland, Oreg., Portland State University, thesis, scale 1:24,000.
AshlRP1966	1:21,100	Ashley, R. P., 1966, Metamorphic petrology and structure of the Burnt River Canyon area, northeastern Oregon: Palo Alto, Calif., Stanford University, dissertation, scale 1:21,100.
BacoCRUnpub	1:24,000	Bacon, C. R., unpublished data, Geologic map of Mount Mazama and Crater Lake caldera, Oregon: Reston, Va., U.S. Geological Survey, scale 1:24,000. [Available as Ramsey, D. W., Dutton, D. R., and Bacon, C. R., 2008, Database for the geologic map of Mount Mazama and Crater Lake Caldera, Oregon *in* Bacon, Charles R., Geologic map of Mount Mazama and Crater Lake Caldera, Oregon: U.S. Geological Survey Scientific Investigations Map 2832, 4 sheets, scale 1:24,000, 45 p. (CD-ROM)]
BaldEM1952	1:48,000	Baldwin, E. M., and Roberts, A. E., 1952, Geology of the Spirit Mountain quadrangle, northwestern Oregon: Washington, D.C., U.S. Geological Survey Oil and Gas Investigation Map OM-129, scale 1:48,000.
BaldEM1955	1:62,500	Baldwin, E. M., 1955, Geology of the Mary's Peak and Alsea quadrangles, Oregon: Washington, D.C., U.S. Geological Survey Oil and Gas Investigation Map OM-162, scale 1:62,500.
BaldEM1956	1:62,500	Baldwin, E. M., 1956, Geologic map of the lower Siuslaw River area, Oregon: Washington, D.C., U.S. Geological Survey Oil and Gas Investigation Map OM-86, scale 1:62,500.
BaldEM1961	1:62,500	Baldwin, E. M., 1961, Geologic map of the Lower Umpqua River area, Oregon: Washington, D.C., U.S. Geological Survey Oil and Gas Investigation Map OM-204, scale 1:62,500.
BaldEM1969	1:48,000	Baldwin, E. M., 1969, Geologic map of the Myrtle Point area, Coos County, Oregon: Washington, D.C., U.S. Geological Survey Miscellaneous Field Studies Map MF-302, scale 1:48,000.
BaldEM1973	1:62,500	Baldwin, E. M., Beaulieu, J. D., Ramp, L., Gray, J. J., Newton, V. C., and Mason, R. S., 1973, Geology and mineral resources of Coos County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 80, 82 p., scale 1:62,500.

Reference Identification Code	Original Mapping Scale	Reference
BaraP1991	1:24,000	Bararras, P., and Wickwire, P., 1991, Landslides in Mount Hood National Forest: U.S. Department of Agriculture Forest Service, Pacific NW Region, scale 1:24,000.
BarnCG1978	1:31,250	Barnes, C. G., 1978, Geology of the Mt. Bailey area, Douglas County, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:31,250.
BeauJD1973hazards	1:62,500	Beaulieu, J. D., 1973, Environmental geology of inland Tillamook and Clatsop Counties: Oregon Department of Geology and Mineral Industries Bulletin 79, 65 p., scale 1:62,500.
BeauJD1974ahazards	1:31,680	Beaulieu, J. D., Hughes, P. D., and Mathiot, K., 1974, Environmental geology of western Linn County: Oregon Department of Geology and Mineral Industries Bulletin 84, 117 p., scale 1:31,680.
BeauJD1974bhazards	1:62,500	Beaulieu, J. D., 1974, Geologic hazards of the Bull Run watershed, Multnomah and Clackamas Counties, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 82, 77 p., scale 1:62,500.
BeauJD1975hazards	1:62,500	Beaulieu, J. D., and Hughes, P. W., 1975, Environmental geology of western Coos and Douglas Counties, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 87, 148 p., scale 1:62,500.
BeauJD1976hazards	1:62,500	Beaulieu, J. D., and Hughes, P. W., 1976, Land-use geology of western Curry County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 90, 148 p., scale 1:62,500.
BeauJD1977ahazards	1:62,500	Beaulieu, J. D., and Hughes, P. W., 1977, Land use geology of central Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 94, 87 p., scale 1:62,500.
BeauJD1977bhazards	1:62,500	Beaulieu, J. D., 1977, Geologic hazards of parts of northern Hood River, Wasco, and Sherman Counties, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 91, 95 p., scale 1:62,500.
BelaJL1981	1:24,000	Bela, J. L., 1981, Geology of the Rickreall, Salem West, Monmouth, and Sidney 7 1/2 minute quadrangles, Marion, Polk, and Linn Counties, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-18, scale 1:24,000.
BelaJL1982	1:250,000	Bela, J. L., 1982, Geologic and neotectonic evaluation of north-central Oregon: Geologic compilation map of the The Dalles 1 degree by 2 degree quadrangle, Oregon and Washington: Oregon Department of Geology and Mineral Industries Geologic Map GMS-27, scale 1:250,000.
BestEA2002Figure3	1:34,250	Bestland, E. A., Retallack, G. J., Rice, A. E., and Mindszenty, A., 2002, Geologic framework of the Clarno Unit, John Day Fossil Beds National Monument, central Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-02-03, 39 p., Figure 3, scale 1:34,250.
BingNJ1984	1:24,000	Bingert, N. J., 1984, Geology of the northeast one-quarter of the Prineville quadrangle, northcentral Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
BlacGL1987	1:62,500	Black, G. L., 1987, Woller, N. M., and Ferns, M. L., 1987, Geologic map of the Crescent Mountain area, Linn County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-47, scale 1:62,500.
BlacGL1995	1:24,000	Black, G. L., and Madin, I. P., 1995, Geologic map of the Coos Bay quadrangle, Coos County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-GMS 97, scale 1:24,000.
BlacGL2000	1:48,000	Black, G. L., 2000, Eugene earthquake hazards: Oregon Department of Geology and Mineral Industries Interpretive Map IMS-14, scale 1:48,000.
BrikTH1983	1:62,500	Brikowski, T. H., 1983, Geology and petrology of Gearhart Mountain: a study of calc-alkaline volcanism east of the Cascades in Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:62,500.
BroeL1995	1:24,000	Broeker, L., 1995, Geomorphology of the Umpqua National Forest, U.S. Department of Agriculture Forest Service, Pacific NW Region, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
BrooHC1976	1:250,000	Brooks, H. C., McIntyre, J. R., and Walker, G. W., 1976, Geology of the Oregon part of the Baker 1 degree by 2 degree quadrangle: Oregon Department of Geology and Mineral Industries Geologic Map GMS-7, scale 1:250,000.
BrooHC1977a	1:24,000	Brooks, H. C., and McIntyre, J. R., 1977, Preliminary geologic map of the Bowen Valley quadrangle, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-78-3, scale 1:24,000.
BrooHC1977cplateA	1:24,000	Brooks, H. C., Bowen, R. G., Hull, D. A., and Hammitt, R. W., 1977, Preliminary geologic map of the Sawtooth Ridge quadrangle, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-77-1, Plate A, scale 1:24,000.
BrooHC1977cplateB	1:24,000	Brooks, H. C., and Bowen, R. G., 1977, Preliminary geologic map of the Keating NW quadrangle, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-77-1, Plate B, scale 1:24,000.
BrooHC1979a	1:62,500	Brooks, H. C., 1979, Geologic map of Huntington and part of Olds Ferry quadrangles, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS- 13, scale 1:62,500.
BrooHC1979b	1:62,500	Brooks, H. C., 1979, Geologic map of the Oregon part of the Mineral quadrangle: Oregon Department of Geology and Mineral Industries Geologic Map GMS-12, scale 1:62,500.
BrooHC1979c	1:24,000	Brooks, H. C., Ferns, M. L., Nusbaum, R. W., and Kovich, P. M., 1979, Geologic map of the Rastus Mountain quadrangle, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-79-7, scale 1:24,000.
BrooHC1982a	1:24,000	Brooks, H. C., Ferns, M. L., and Mullen, E. D., 1982, Geology and gold deposits map of the Granite quadrangle, Grant County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-25, scale 1:24,000.
BrooHC1982b	1:24,000	Brooks, H. C., Ferns, M. L., Coward, R. I., Paul, E. K., and Nunlist, M., 1982, Geology and gold deposits of the Bourne quadrangle, Baker and Grant Counties, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-19, scale 1:24,000.
BrooHC1983	1:62,500	Brooks, H. C., Ferns, M. L., Wheeler, G. R., and Avery, D. G., 1983, Geology and gold deposits map of the northeast quarter of the Bates quadrangle, Baker and Grant Counties, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS- 29, scale 1:62,500.
BrooHC1984	1:62,500	Brooks, H. C., Ferns, M. L., and Avery, D. G., 1984, Geology and gold deposits map of the southwest quarter of the Bates quadrangle, Grant County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-35, scale 1:62,500.
BrooHCUnpubB	1:24,000	Brooks, H. C., unpublished data, Geologic and mineral resources map of the Mormon Basin quadrangle, Baker and Malheur Counties, Oregon: Baker City, Oreg., Oregon Department of Geology and Mineral Industries, vector digital data, scale 1:24,000.
BrowCE1966a	1:62,500	Brown, C. E., and Thayer, T. P., 1966, Geologic map of the Mount Vernon quadrangle, Grant County, Oregon: Washington, D.C., U.S. Geological Survey Geologic Quadrangle Map GQ-548, scale 1:62,500.
BrowCE1966b	1:250,000	Brown, C. E., and Thayer, T. P., 1966, Geologic map of the Canyon City quadrangle, northeastern Oregon: Washington, D.C., U.S. Geological Survey Miscellaneous Investigations Map 447, scale 1:250,000.
BrowCE1977	1:62,500	Brown, C. E., and Thayer, T. P., 1977, Geologic map of pre-Tertiary rocks in the eastern Aldrich Mountains and adjacent areas to the south, Grant County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map 1021, scale 1:62,500.
BrowDE1980aplate1	1:62,500	Brown, D. E., McLean, G. D., and Black, G. L., 1980, Preliminary geology and geothermal resource potential of the southern Harney Basin, Oregon; Portland, Oreg., Oregon Department of Geology and Mineral Industries Open-File Report O-80-7, Plate 1, scale 1:62,500.

Reference Identification Code	Original Mapping Scale	Reference
BrowDE1980aplate2	1:62,500	Brown, D. E., McLean, G. D., and Black, G. L., 1980, Preliminary geology and geothermal resource potential of the southern Harney Basin, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-80-7, Plate 2, scale 1:62,500.
BrowDE1980aplate3	1:62,500	Brown, D. E., McLean, G.D., and Black, G.L., 1980, Preliminary geology and geothermal resource potential of the southern Harney Basin, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-80-7, Plate 3, scale 1:62,500.
BrowDE1980aplate4	1:62,500	Brown, D. E., McLean, G. D., and Black, G. L., 1980, Preliminary geology and geothermal resource potential of the southern Harney Basin, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-80-7, Plate 4, scale 1:62,500.
BrowDE1980b	1:62,500	Brown, D. E., McLean, G.D., and Black, G.L., 1980, Preliminary geology and geothermal resource potential of the northern Harney Basin, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-80-6, scale 1:62,500.
BrowDE1980c	1:62,500	Brown, D. E., McLean, G. D., Priest, G. R., Woller, N. M., and Black, G. L., 1980, Reconnaissance geologic map of the Belknap-Foley Area, Oregon, Preliminary geology and geothermal resource potential of the Belknap-Foley Area, Oregon: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Open-File Report O-80-2, scale 1:62,500.
BrowDE1980d	1:62,500	Brown, D. E., McLean, G. D., Woller, N. M., and Black, G. L., 1980, Reconnaissance geologic map of the Willamette Pass Area, Oregon, Preliminary geology and geothermal resource potential of the Willamette Pass Area, Oregon: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Open-File Report O-80-3., scale 1:62,500.
BrowDE1982	1:24,000	Brown, D. E., 1982, Map showing geology and geothermal resources of the southern half of the Burns 15’ quadrangle, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-20, scale 1:24,000.
BrowME1982	1:24,000	Brownfield, M. E., 1982, Geologic map of the Sheridan Quad, Polk and Yamhill Counties, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-23, scale 1:24,000.
BurnSF1997	1:100,000	Burns, S., Growney, L., Brodersen, B., Yeats, R. S., and Popowski, T. A., 1997, Map showing faults, bedrock geology, and sediment thickness of the western half of the Oregon City 1;100,000 quadrangle, Washington, Multnomah, and Marion Counties: Oregon Department of Geology and Mineral Industries Interpretive Map IMS-4, scale 100,000.
BurnWJ2009b	1:8,000	Burns, W. J., 2009, Landslide inventory maps for the Canby quadrangle, Clackamas, Marion, and Washington Counties: Oregon Department of Geology and Mineral Industries Interpretive Map 29, scale 1:8,000.
BurnWJ2009c	**1:8,000**	**Burns, W. J. and Mickelson, K., 2009, Regional landslide susceptibility maps of the western half of the Linnton quadrangle, Washington and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, technical report to Washington County, Oreg., 25 p.**
BurnWJ2010a	1:8,000	Burns, W. J., and Mickelson, K. A., 2010, Landslide inventory maps of the Oregon City quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries Interpretive Map 30, scale 1:8,000.
BurnWJ2010b	1:8,000	Burns, W. J., and Mickelson, K. A., 2010, Landslide inventory maps of the Astoria quadrangle, Clatsop County, Oregon: Oregon Department of Geology and Mineral Industries Interpretive Map 31, scale 1:8,000.
BurnWJ2010c	1:8,000	Burns, W. J., and Duplantis, S., 2010, Overview of the landslide inventory of the Lake Oswego quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon: Oregon Department of Geology and Mineral Industries Interpretive Map 32, scale 1:8,000.

Reference Identification Code	Original Mapping Scale	Reference
BurnWJ2010d	1:8,000	Burns, W. J., and Duplantis, S., 2010, Landslide inventory map of the northeast quarter of the Portland quadrangle, Multnomah County, Oregon: Oregon Department of Geology and Mineral Industries Interpretive Map 33, scale 1:8,000.
BurnWJ2010e		**Burns, W. J., Coe, J. A., Sener Kaya, B., Ma, L., 2010, Analysis of elevation changes detected from multi-temporal LiDAR surveys in forested landslide terrain in western Oregon: Environmental and Engineering Geoscience, v. XVI, no. 4, p. 315–341.**
BurnWJ2011	1:10,000	Burns, W. J., Madin, I. P., Mickelson, K. A., and Williams, K. J., 2011, Partial landslide inventory of the western portion of Coos County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-11-01, scale 1:10,000.
BurnWJ2011b	**1:8,000**	**Burns, W. J., Madin, I. P., Mickelson, K. A., and Drazba, M. C., 2011, Landslide inventory maps of the Linnton quadrangle, Multnomah and Washington counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 35, 4 pls., scale 1:8,000, 1 pl., 1:16,000, geodatabase data scale 1:8,000.**
BurnWJ2011c	**1:8,000**	**Burns, W. J., Madin, I. P., and Mickelson, K. A., 2011, Landslide inventory maps of the Beaverton quadrangle, Washington County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 34, 4 pls., scale 1:8,000, 1 pl., 1:16,000, geodatabase data scale 1:8,000.**
BurnWJ2011d	1:8,000	Burns, W. J., Hughes, K. L. B., Olson, K. V., McClaughry, J. D., Mickelson, K. A., Coe, D. E., English, J. T., Roberts, J. T., Lyles Smith, R. R., and Madin, I. P., 2011, Multi-hazard and risk study for the Mount Hood region, Multnomah, Clackamas, and Hood River Counties, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-11-16, 179 p., 7 pls., plate scale 1:72,000, geodatabase scale 1:8,000.
BurnWJ2012a	1:8,000	Burns, W. J., Duplantis, S., Jones, C. B., and English, J. T., 2012, Lidar data and landslide inventory maps of the North Fork Siuslaw River and Big Elk Creek watersheds, Lane, Lincoln, and Benton Counties, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-12-07, 15 p., 2 pls., plate scale 1:24,000, geodatabase scale 1:8,000.
BurnWJ2012b	**1:8,000**	**Burns, W. J., and Mickelson, K. A., 2012, Regional hazard maps of the City of Silverton, Marion County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-12-05, 21 p., 3 pls., scale 1:8,000.**
BurnWJ2012c	1:8,000	Burns, W. J., Madin, I. P., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Estacada quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 51, 4 pls., scale 1:8,000.
BurnWJ2012d	1:8,000	Burns, W. J., Duplantis, S., Mickelson, K. A., and Madin, I. P., 2012, Landslide inventory maps of the Redland quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 51, 4 pls., scale 1:8000.
BurnWJ2012e	1:8,000	Burns, W. J., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Sherwood quadrangle, Clackamas, Marion, Washington, and Yamhill Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 50, 4 pls., scale 1:8,000.
BurnWJ2012f	1:8,000	Burns, W. J., Madin, I. P., Duplantis, S., Mickelson, K. A., and Jones, C. B., 2012, Landslide inventory maps of the Damascus quadrangle, Clackamas and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 49, 4 pls., scale 1:8,000.
BurnWJ2012g	1:8,000	Burns, W. J., Mickelson, K. A., Duplantis, S., and Madin, I. P., 2012, Landslide inventory maps of the Gladstone quadrangle, Clackamas and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 48, 4 pls., scale 1:8,000.

Reference Identification Code	Original Mapping Scale	Reference
BurnWJ2012h	1:8,000	Burns, W. J., Mickelson, K. A., Duplantis, S., and Williams, K., 2012, Landslide inventory maps of the Hillsboro quadrangle, Washington and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 47, 4 pls., scale 1:8,000.
BurnWJ2012i	1:8,000	Burns, W. J., Duplantis, S., Mickelson, K. A., Spritzer, J. M., and Wells, R. E., 2012, Landslide inventory maps of the Gales Creek quadrangle, Washington County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 46, 4 pls., scale 1:8,000.
BurnWJ2012j	1:8,000	Burns, W. J., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Vancouver quadrangle, Multnomah County, Oregon, and Clark County, Washington: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Interpretive Map 45, 4 pls., scale 1:8,000.
BurnWJ2012k	1:8,000	Burns, W. J., Mickelson, K. A., Duplantis, S., and Madin, I. P., 2012, Landslide inventory maps of the Dixie Mountain quadrangle, Washington, Multnomah, and Columbia Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 44, 4 pls., scale 1:8,000.
BurnWJ2012l	1:8,000	Burns, W. J., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Camas quadrangle, Multnomah County, Oregon, and Clark County, Washington: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Interpretive Map 43, 4 pls., scale 1:8,000.
BurnWJ2012m	1:8,000	Burns, W. J., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Washougal quadrangle, Multnomah County, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries, Interpretive Map 42, 4 pls., scale 1:8,000.
BurnWJ2012n	1:8,000	Burns, W. J., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Mount Tabor quadrangle, Multnomah County, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries, Interpretive Map 41, 4 pls., scale 1:8,000.
BurnWJ2012o	1:8,000	Burns, W. J., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Sauvie Island quadrangle, Columbia and Multnomah Counties, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries, Interpretive Map 40, 4 pls., scale 1:8,000.
BurnWJ2012p	1:8,000	Burns, W. J., Mickelson, K. A., Duplantis, S., and Williams, K., 2012, Landslide inventory maps of the Forest Grove quadrangle, Washington County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 39, 4 pls., scale 1:8,000.
BurnWJ2012q	1:8,000	Burns, W. J., Mickelson, K. A., and Duplantis, S., 2012, Landslide inventory maps of the Sandy quadrangle, Clackamas and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 38, 4 pls., scale 1:8,000.
BurnWJ2012r	1:8,000	Burns, W. J., Mickelson, K. A., Duplantis, S., and Williams, K., 2012, Landslide inventory maps of the Scholls quadrangle, Washington County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 37, 4 pls., scale 1:8,000.
BurnWJ2013a	**1:8,000**	**Burns, W. J., Mickelson, K. A., and Saint-Pierre, E. C., 2013, Landslide inventory maps of the northern half of the Vernonia quadrangle, Columbia County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 54, 2 pl., scale 1:8,000.**
BurnWJ2013b	1:8,000	Burns, W. J., Mickelson, K. A., and Saint-Pierre, E. C., 2013, Landslide inventory maps of the southern half of the Pittsburg quadrangle, Columbia County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map 55, 2 pls., scale 1:8,000.
BurnWJ2013c	1:8,000	Burns, W. J., Duplantis, S., and Jones, C. B., 2013, Landslide inventory map of the Harbor Hills area, Curry County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-13-02, 1 pl., scale 1:8,000.

Reference Identification Code	Original Mapping Scale	Reference
BurnWJ2013d	**1:8,000**	**Burns, W. J., and Mickelson, K. A., 2013, Landslide inventory, susceptibility maps, and risk analysis for the City of Astoria, Clatsop County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-13-05, 33 p., 3 pls., scale 1:8,000.**
BurnWJ2013e	**1:8,000**	**Burns, W. J., Mickelson, K. A., Jones, C. B., Pickner, S. G., Hughes, K. L. B., and Sleeter, R., 2013, Landslide hazard and risk study of northwestern Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-13-08, 38 p., 74 pl., 1:50,000; 1:8,000.**
BurnWJ2014	**1:8,000**	**Burns, W. J., Mickelson, K. A., and Stimely, L. L., 2014, Landslide inventory of coastal Curry County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-14-10, 8 pl.**
BurnWJ2015a	**1:8,000**	**Burns, W. J., Mickelson, K. A., Jones, C. B., Tilman, M. A., and Coe, D. E., 2015, Surficial and bedrock engineering geology, landslide inventory and susceptibility, and surface hydrography of the Bull Run Watershed, Clackamas and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, Special Paper 46, 59 p.**
BurnWJ2015b	**1:8,000**	**Burns, W. J., and Mickelson, K., 2015, Landslide susceptibility of the southwest quarter of the Linnton quadrangle including Area 93/Bonny Slope West, Washington and Multnomah Counties, Oregon: Oregon Department of Geology and Mineral Industries, technical report to Washington County, Oregon, 62 p.**
BurnWJ2017	**1:12,000**	**Burns, W. J., and Lindsey, K. O., 2017, Landslide inventory of eastern Multnomah County: Oregon Department of Geology and Mineral Industries, Open-File Report O-17-03, 4 pl., geodatabase.**
BurnWJ2017a	**1:20,000**	**Burns, W. J., Herinckx, H. H., and Lindsey, K. O., 2017, Landslide inventory of portions of northwest Douglas County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-17-04, 4 pl., geodatabase.**
BurnWJ2018	**1:8,000**	**Burns, W. J., Calhoun, N. C., Franczyk, J. J., Lindsey, K. O., and Ma, L., 2018, Landslide hazard and risk study of central and western Multnomah County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map Series IMS-57.**
BurnWJunpub2011	1:8,000	Burns, W. J., Madin, I. P., Mickelson, K. A., unpublished data, 2011, Landslide inventory of the northwestern quarter of the Salt Butte quadrangle, Crook County, Oregon: Oregon Department of Geology and Mineral Industries, scale 1:8,000.
BurnWJunpub2013a	1:8,000	Burns, W. J., and Mickelson, K. A., unpublished data, 2013, Landslide inventory, Clatsop County, Oregon: Oregon Department of Geology and Mineral Industries, scale 1:8,000.
BurnWJunpub2013b	1:8,000	Burns, W. J., and Mickelson, K. A., unpublished data, 2013, 2005-2009 landslide points, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries.
BurnWJunpub2014		Burns, W. J., Mickelson, K. A., Saint-Pierre, E. C., unpublished data, 2014, Landslide locations from 2005 through 2009 in Clatsop, Columbia, Tillamook, and Washington Counties, Oregon: Oregon Department of Geology and Mineral Industries.
BurnWJunpub2019		**Burns, W. J., 2019, unpub. data, Western and northern landslide locations in 2016-2018: Oregon Department of Geology and Mineral Industries.**
BussC2006	1:100,000	Busskohl, C., 2006, Land type associations of the Malheur, Umatilla, and Wallowa-Whitman National Forests, U.S. Department of Agriculture Forest Service, Pacific NW Region, scale 100,000.
CalhNC2018	**1:8,000**	**Calhoun, N. C., Burns, W. J., Franczyk, J. J., and Monteverde, G., 2018, Landslide hazard and risk study of Eugene-Springfield and Lane County, Oregon: Oregon Department of Geology and Mineral Industries, Interpretive Map Serie IMS-60.**
CampVCunpubA	1:24,000	Camp, V. C., Ross, M., and Hanson, B., unpublished data, Geologic map of the McEwen Butte and Dunnean quadrangles, eastern Oregon, scale 1:24,000.
CampVCunpubB	1:24,000	Camp, V. C., Ross, M., and Hanson, B., unpublished data, Geologic map of the Juntura and part of the Selle Gap quadrangles, eastern Oregon, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
CampVCunpubC	1:24,000	Camp, V. C., Ross, M., and Hanson, B., unpublished data, Geologic map of the Venator and Circle Bar quadrangles, eastern Oregon, scale 1:24,000.
CampVCunpubD	1:24,000	Camp, V. C., Ross, M., and Hanson, B., unpublished data, Geologic map of the Mosquito Mountain and Warm Springs Reservoir quadrangles, Eastern Oregon, scale 1:24,000.
ConrRM1991	1:50,000	Conrey, R. M., 1991, Geology and petrology of the Mt. Jefferson area, high Cascade Range, Oregon: Pullman, Wash., Washington State University, dissertation, scale 1:50,000.
CoxGM1977	1:62,500	Cox, G. M., 1977, Bedrock geology of the Connor Creek area, Baker County, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:62,500.
CummJA1958	1:62,500	Cummings, J. A., 1958, The geology of the southern third of the Courtrock quadrangle, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:62,500.
CunnCT1979	1:4,800	Cunningham, C. T., 1979, Geology and geochemistry of a massive sulfide deposit and associated volcanic rocks, Blue Creek District, southwestern Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:4,800.
DickWR1965easthalf	1:63,360	Dickinson, W. R., and Vigrass, L. W., 1965, Geology of the Suplee-Izee area, Crook, Grant, and Harney Counties, Oregon (East): Oregon Department of Geology and Mineral Industries Bulletin 58, scale 1:63,360.
DickWR1965westhalf	1:63,360	Dickinson, W. R., and Vigrass, L. W., 1965, Geology of the Suplee-Izee area, Crook, Grant, and Harney Counties, Oregon (West), Portland, Oreg., Oregon Department of Geology and Mineral Industries Bulletin 58, 109 p., scale 1:63,360.
DiggMF1991	1:24,000	Diggles, M. F., Conrad, J. E., and Soreghan, G. A., 1991, Geologic map of the Diablo Mountain Wilderness Study Area, Lake County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-2121, scale 1:24,000.
DirrS2015	**1:8,000**	**Dirringer, S., 2015, Landslide inventory mapping of the Drift Creek Watershed, Lincoln County, Oregon, using LiDAR data: Kent, Ohio, Kent State University, M.S. thesis.**
DonaMM1992	1:24,000	Donato, M. M., 1992, Preliminary geologic map of the Carberry Creek quadrangle, Oregon and California: Reston, Va., U.S. Geological Survey Open-File Report 92-695, scale 1:24,000.
DonaMM1993	1:24,000	Donato, M. M., 1993, Preliminary geologic map of the Squaw Lakes quadrangle, Oregon and California: Reston, Va., U.S. Geological Survey Open-File Report 93-703, scale 1:24,000.
ErikA2002	1:24,000	Eriksson, A., 2002, Stratigraphy, structure, and natural gas potential of Tertiary sedimentary and volcanic units, Clatskanie 7.5-minute quadrangle, northwest Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
EvanJG1986a	1:62,500	Evans, J. G., 1986, Geologic map of the Homestead, Lake Fork, and Lick Creek roadless areas, Baker and Wallowa Counties, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map 1612-A, scale 1:62,500.
EvanJG1987	1:24,000	Evans, J. G., 1987, Geologic map of the Owyhee Canyon Wilderness study area, Malheur County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map 926, scale 1:24,000.
EvanJG1989	1:62,500	Evans, J. G., 1989, Geologic map of the Desolation Butte quadrangle, Grant and Umatilla Counties, Oregon: Reston, Va., U.S. Geological Survey Geologic Quadrangle 1654, scale 1:62,500.
EvanJG1990	1:24,000	Evans, J. G., 1990, Preliminary geologic map of the Dooley Mountain quadrangle, Baker County, Oregon: Reston, Va., U.S. Geological Survey Open-File Report 90-312, scale 1:24,000.
EvanJG1991	1:48,000	Evans, J. G., 1991, Geologic map of the Lower Owyhee Canyon Wilderness study area, Malheur County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map 2167, scale 1:48,000.

Reference Identification Code	Original Mapping Scale	Reference
EvanJG1993	1:24,000	Evans, J. G., 1993, Geologic map of the Brann Gulch 7.5 minute quadrangle, Baker County, Oregon: Reston, Va., U.S. Geological Survey Geologic Quadrangle 1744, scale 1:24,000.
EvanJG1995	1:24,000	Evans, J. G., 1995, Geologic map of the Beaverdam Creek quadrangle, Baker County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map 2299, scale 1:24,000.
EvanJG2001	1:100,000	Evans, J. G., and Geisler, T. M., 2001, Geologic field-trip guide to Steens Mountain Loop Road, Harney County, Oregon: Reston, Va., U.S. Geological Survey Bulletin 2183, scale 100,000.
EvarRC2002	1:24,000	Evarts, R. C., 2002, Map of the Deer Island quadrangle, Columbia County, Oregon and Cowlitz County, Washington: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-2392, scale 1:24,000.
EvarRC2004	1:24,000	Evarts, R. C., 2004, Geologic map of the Saint Helens quadrangle, Columbia County, Oregon, and Clark and Cowlitz Counties, Washington: Reston, Va., U.S. Geological Survey Scientific Investigations Map 2834, scale 1:24,000.
FEMA2006	1:24,000	Federal Emergency Management Agency (FEMA), 2006, Preliminary landslide locations database and GIS files for December 2005 to January 2006 storms, *in* FEMA 1632-DR-OR: Bothell, Wash., FEMA Region X, CD-ROM.
FernML1983	1:24,000	Ferns, M. L., Brooks, H. C., and Avery, D. G., 1983, Geology and gold deposits of the Greenhorn quadrangle, Baker and Grant Counties, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-28, scale 1:24,000.
FernML1984	1:62,500	Ferns, M. L., Brooks, H. C., and Wheeler, G. R., 1984, Geology and gold deposits map of the northwest quarter of the Bates quadrangle, Grant County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-31, scale 1:62,500.
FernML1987	1:24,000	Ferns, M. L., Brooks, H. C., Avery, D. G., and Blome, C. D., 1987, Geology and mineral resources map of the Elkhorn Peak quadrangle, Baker County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-41, scale 1:24,000.
FernML1993a	1:100,000	Ferns, M. L., Brooks, H. C., Evans, J. G., and Cummings, M. L., 1993, Geologic map of the Vale 30’ x 60’ quadrangle, Malheur County, Oregon and Owyhee County, Idaho: Oregon Department of Geology and Mineral Industries Geologic Map GMS-77, vector digital data, scale 100,000.
FernML1993b	1:100,000	Ferns, M. L., Evans, J. G., and Cummings, M. L., 1993, Geologic map of the Mahogany Mountain 30’ x 60’ quadrangle, Malheur County, Oregon and Owyhee County, Idaho: Oregon Department of Geology and Mineral Industries Geologic Map GMS-78, vector digital data, scale 100,000.
FernML2001a	1:100,000	Ferns, M. L., Madin, I. P., and Taubeneck, W. H., 2001, Reconnaissance geologic map of the La Grande 30’ x 60’ quadrangle, Baker, Grant, Umatilla, and Union Counties, Oregon, : Oregon Department of Geology and Mineral Industries Recon. Map RMS-1, vector digital data scale 100,000.
FernML2001b	1:24,000	Ferns, M. L., Madin, I. P., McConnell, V. S., and Johnson, J. J., 2001, Geology of the surface and subsurface of the southern Grande Ronde Valley and lower Catherine Creek drainage, Union County, Oregon; a preliminary release: Oregon Department of Geology and Mineral Industries Open-File Report O-02-02, vector digital data, scale 1:24,000.
FernML2006a	1:24,000	Ferns, M. L., 2006, Preliminary geologic map of the Cayuse 7.5’ quadrangle, Umatilla County, Oregon: Portland, Oreg, Oregon Department of Geology and Mineral Industries Open-File Report O-06-08, scale 1:24,000.
FernML2006b	1:24,000	Ferns, M. L., and McClaughry, J. D., 2006, Preliminary geologic map of the Houston Lake 7.5’ quadrangle, Crook County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-21, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
FernML2006c	1:24,000	Ferns, M. L., and McClaughry, J. D., 2006, Preliminary geologic map of the Powell Buttes 7.5' quadrangle, Crook County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-24, scale 1:24,000.
FernML2010	1:100,000	Ferns, M. L., McConnell, V. S., Madin, I. P., and Johnson, J. A., 2010, Geology of the Upper Grande Ronde River Basin, Union County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 107, vector digital data, scale 1:100,000.
FernMLUnpubB	1:24,000	Ferns, M. L., and McConnell, V. S., unpublished data, Unpublished mapping in the Telocaset quadrangle, Baker and Union Counties, Oregon: Baker City, Oreg., Oregon Department of Geology and Mineral Industries, vector digital data, scale 1:24,000.
GrayF1980	1:12,000	Gray, F., 1980, Geology of the igneous complex at Tincup Peak, Kalmiopsis Wilderness Area, southwestern Oregon: Reston, Va., U.S. Geological Survey Open-File Report 80-1243, scale 1:12,000.
GrayF1982	1:62,500	Gray, F., Ramp, L., Moring, B., Douglas, I., and Donahoe, J., 1982, Geologic map of the Wild Rogue Wilderness, Coos, Curry, and Douglas Counties, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-1381A, scale 1:62,500.
GreeRC1972a	1:250,000	Greene, R. C., Walker, G. W., and Corcoran, R. E., 1972, Geologic map of the Burns quadrangle, Oregon: Washington, D.C., U.S. Geological Survey Interpretive Map I-680, scale 1:250,000.
HaddGH1959	1:31,680	Haddock, G. H., 1959, Geology of the Cougar Peak volcanic area, Lake County, Oregon: Pullman, Wash., Washington State University, thesis, scale 1:31,680.
HalePO1975	1:24,000	Hales, P. O., 1975, Geology of Green Ridge area, Whitewater River quadrangle, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
HammPE1982	1:62,500	Hammond, P. E., Geyer, K. M., and Anderson, J. L., 1982, Preliminary geologic map and cross sections of the upper Clackamas and North Santiam Rivers area, northern Oregon Cascade Range: Portland, Oreg., Portland State University Department of Earth Sciences, scale 1:62,500.
HampER1972	1:48,000	Hampton, E. R., 1972, Geologic map and sections of the Molalla-Salem slope area, Northern Willamette Valley, Oregon: Washington, D.C., U.S. Geological Survey Water Supply Paper 1997, scale 1:48,000.
HaucSM1962	1:20,500	Hauck, S. M., 1962, Geologic map of the southwest quarter of the Brownsville Quadrangle, Oregon: Eugene, Oreg., University of Oregon, thesis, Plate 13, scale 1:20,500.
HeriCW1981	1:62,500	Hering, C. W., 1981, Geology and petrology of the Yamsay Mountain complex, south-central Oregon: A study of bimodal volcanism: Eugene, Oreg., University of Oregon, dissertation, scale 1:62,500.
HewiSL1970	1:24,000	Hewitt, S. L., 1970, Geology of the Fly creek quadrangle and the north half of the Round Butte dam quadrangle, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
HladFR1992	1:24,000	Hladky, F. R., 1992, Geology and mineral resources of the Shady Cove quadrangle, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-52, scale 1:24,000.
HladFR1993	1:24,000	Hladky, F. R., 1993, Geology and mineral resources map of the McLeod quadrangle, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-80, scale 1:24,000.
HladFR1994	1:24,000	Hladky, F. R., 1994, Geologic map of the Lakecreek quadrangle, Jackson County, Oregon: Portland, Oreg., Oregon Department of Geology and Mineral Industries Geological Map GMS- 88, scale 1:24,000.
HladFR1996	1:24,000	Hladky, F. R., 1996, Geology and mineral resources map of the Grizzly Peak quadrangle, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-106, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
HladFR1998	1:24,000	Hladky, F. R., 1998, Geology and mineral resources map of the Rio Canyon quadrangle, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-108, scale 1:24,000.
HladFR1999	1:24,000	Hladky, F. R., 1999, Geology and mineral resources map of the Brownsboro quadrangle, Jackson County, Oregon: Portland, Oreg. Oregon Department of Geology and Mineral Industries Geological Map GMS-109, scale 1:24,000.
HladFR2006	1:24,000	Hladky, F. R., and McCaslin, G. R., 2006, Preliminary geologic map of the Springfield 7.5' quadrangle, Lane County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-07, scale 1:24,000.
HladFR2007	1:24,000	Hladky, F. R., and Jenks, M. D., 2007, Preliminary geologic map of the Hamaker Mountain, Worden, and Lost River 7.5' quadrangles, Klamath County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-07-14, scale 1:24,000.
HofmRJ2000		Hofmeister, R. J., 2000, Slope failures in Oregon: GIS inventory for three 1996/97 storm events: Oregon Department of Geology and Mineral Industries Special Paper 34, 20 p., 1 CD-ROM.
HoodNF1997	1:24,000	Mount Hood National Forest, 1997, Landforms of the Mount Hood National Forest: U.S. Department of Agriculture Forest Service, Pacific NW Region, scale 1:24,000.
HoovL1963	1:62,500	Hoover, L., 1963, Geologic map and sections of the Anlauf and Drain quadrangles, Douglas and Lane Counties, Oregon: Washington, D.C., U.S. Geological Survey Bulletin 1122-D, scale 1:62,500.
HousRA2018	**1:24,000**	**Houston, R. A., McClaughry, J. D., Duda, C. J. M., and Niewendorp, C. A., 2018, Geologic map of the Devine Ridge North 7.5' quadrangle, Harney County, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-121, 110 p.**
HuggJW1978	1:24,000	Huggins, J. W., 1978, Geology of a portion of Painted Hills quadrangle, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
JackJS1979	1:24,000	Jackson, J. S., 1978, Geologic map of the Bull of the Woods area, Oregon: Portland, Oreg., Portland State University, thesis, scale 1:24,000.
JacoR1985	1:63,360	Jacobson, R., Milne, W., Brooks, H. C., Zollweg, J., and Brandsdottir, B., 1985, The 1984 landslide and earthquake activity on the Baker-Homestead highway near Halfway, Oregon: Portland, Oreg., Oregon Geology, v. 47, no. 8, p. 51–56, scale 1:63,360.
JenkMDUnpub	1:24,000	Jenks, M. D., unpublished data, Geologic compilation map of part of the Upper Klamath Basin, Klamath County, Oregon: Oregon Department of Geology and Mineral Industries, scale 1:24,000.
JohaNP1972	1:62,500	Johannesen, N. P., 1972, The geology of the northeast quarter of the Bone Mountain quadrangle, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:62,500.
JohnJA1994	1:24,000	Johnson, J. A., 1994, Geologic map of the Krumbo Reservoir quadrangle, Harney County, southeastern Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies 2267, scale 1:24,000.
JohnJA1995	1:24,000	Johnson, J. A., 1995, Geologic evolution of the Duck Creek Butte eruptive center, High Lava Plains, southeastern Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
JohnJA1998a	1:24,000	Johnson, J. A., Hooper, P. R., Hawkesworth, C. J., and Binger, G. B., 1998, Geologic map of the Stemler Ridge quadrangle, Malheur County, southeastern Oregon: Reston, Va., U.S. Geological Survey Open-File Report 98-105, scale 1:24,000.
JohnJA1998b	1:24,000	Johnson, J. A., 1998, Geologic map of the Frederick Butte volcanic center, Deschutes and Lake Counties, south-central Oregon: Reston, Va., U.S. Geological Survey Open-File Report 98- 0208, scale 1:24,000.
KoroMA1987	1:100,000	Korosec, M. A., 1987, Geologic map of the Hood River quadrangle, Washington and Oregon: Olympia, Wash., Washington Department of Natural Resources Open-File Report 87-6, scale 100,000.

Reference Identification Code	Original Mapping Scale	Reference
KossEunpub2019		**Ericka Koss, 2019, unpub. data, Bureau of Development Services, City of Portland, Oreg.**
LangVW1991	1:24,000	Langer, V. W., 1991, Geology and petrologic evolution of the silicic to intermediate volcanic rocks underneath Steens Mountain Basalt, SE Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
MacLJW1994plate1	1:24,000	MacLean, J. W., 1994, Geology and geochemistry of Juniper Ridge, Horsehead Mountain and Burns Butte: Implications for the petrogenesis of silicic magma on the High Lava Plains, southeastern Oregon: Corvallis, Oreg., Oregon State University, thesis, Plate 1, scale 1:24,000.
MacLJW1994plate2	1:24,000	MacLean, J. W., 1994, Geology and geochemistry of Juniper Ridge, Horsehead Mountain and Burns Butte: Implications for the petrogenesis of silicic magma on the High Lava Plains, southeastern Oregon: Corvallis, Oreg., Oregon State University, thesis, Plate 2, scale 1:24,000.
MacLNS1995sheet1	1:24,000	MacLeod, N. S., Sherrod, D. R., Chitwood, L. A., and Jenson, R. A., 1995, Geologic map of Newberry Volcano, Deschutes, Klamath, and Lake Counties, Oregon:
MacLNS1995sheet2	1:24,000	MacLeod, N. S., Sherrod, D. R., Chitwood, L. A., and Jenson, R. A., 1995, Geologic map of Newberry Volcano, Deschutes, Klamath, and Lake Counties, Oregon: Reston, Va., U.S. Geological Survey Interpretive Map I-2455, sheet 2, scale 1:24,000.
MaddT1965	1:62,500	Maddox, T., 1965, Geologic map of the southern third of the Marcola quadrangle, Oregon: Eugene, Oreg., University of Oregon, thesis, Plate 17, scale 1:62,500.
MadiIP2006a	1:24,000	Madin, I. P., Murray, R. B., and Hladky, F. R., 2006, Preliminary geologic map of the Coburg 7.5’ quadrangle, Lane and Linn Counties, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-06, scale 1:24,000.
MadiIP2006b	1:24,000	Madin, I. P., and Murray, R. B., 2006, Preliminary geologic map of the Eugene East and Eugene West 7.5’ quadrangles, Lane County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-17, scale 1:24,000.
MadiIP2007	1:100,000	Madin, I. P., and Geitgey, R. P., 2007, Preliminary geologic map of the Umatilla Basin, Morrow and Umatilla Counties, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-07-15, vector digital data scale 100,000.
MadiIP2019	**1:24,000**	**Madin, I. P., and McClaughry, J. D., 2019, Geologic map of the Biggs Junction and Rufus 7.5' quadrangles, Sherman and Gilliam Counties, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-124, 126 p.**
MathAC1993	1:24,000	Mathis, A. C., 1993, Geology and petrology of a 26-Ma trachybasalt to peralkaline rhyolite suite exposed at Hart Mountain, southern Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
McclJD2006a	1:24,000	McClaughry, J. D., and Ferns, M. L., 2006, Preliminary geologic map of the Prineville 7.5’ quadrangle, Crook County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-22, scale 1:24,000.
McclJD2006b	1:24,000	McClaughry, J. D., and Ferns, M. L., 2006, Preliminary geologic map of the Ochocco Reservoir 7.5’ quadrangle, Crook County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-23, scale 1:24,000.
McClJD2010	1:8,000	McClaughry, J. D., Wiley, T. J., Ferns, M. L., and Madin, I. P., 2010, Digital geologic map of the southern Willamette Valley, Benton, Lane, Linn, Marion, and Polk Counties, Oregon: Portland Oreg., Oregon Department of Geology and Mineral Industries Open-File Report O-10-03, 116 p., scale 1:8,000.
McClJD2012	1:8,000	McClaughry, J. D., Wiley, T. J., Conrey, R. M., Jones, C. B., and Lite, Jr., K. E., 2003, Digital geologic map of the Hood River Valley, Hood River and Wasco Counties, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-12-03, 142 p., 1 pl., scale 1:36,000, geodatabase scale 1:8,000.

Reference Identification Code	Original Mapping Scale	Reference
McClJD2013	1:8,000	McClaughry, J. D., Ma, L., Jones, C. B., Mickelson, K. A., and Wiley, T. J., 2013, Geologic map of the southwestern Oregon coast between Crook Point and Port Orford, Curry County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-13-21, 55 p., 4 pls., plate scale 1:24,000, geodatabase data scale 1:8,000.
McClJD2019	**1:24,000**	**McClaughry, J. D., Duda, C. J. M., and Ferns, J. L., 2019, Geologic map of the Poison Creek and Burns 7.5' quadrangles, Harney County, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-123, 127 p.**
McClJDunpub2013	1:24,000	McClaughry, J. D., Ferns, M. L., Gordon, C. L., Patridge, K. A., Lite, K. E., and Conrey, R. C., 2013, unpublished data, Digital geologic map of the north half of the Lower Crooked Basin, Crook, Deschutes, Jefferson, and Wheeler Counties, Oregon: Oregon Department of Geology and Mineral Industries, 1 pl., scale 1:63,360, geodatabase scale 1:24,000.
McCoVSUnpubA	1:24,000	McConnell, V. S., unpublished data, Geologic map of the China Cap quadrangle, Union and Wallowa Counties, Oregon: Oregon Department of Geology and Mineral Industries, vector digital data, scale 1:24,000.
McCoVSUnpubB	1:24,000	McConnell, V. S., Ferns, M. L., unpublished data, Mapping in the Flagstaff Butte and Medical Springs quadrangles, Union and Baker Counties, Oregon: Oregon Department of Geology and Mineral Industries, vector digital data, scale 1:24,000.
MertSA2007a	1:75,000	Mertzman, S. A., and others, 2007, Preliminary geologic map of the Lake of the Woods South 7.5’ quadrangle, Klamath County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report 07-13, scale 1:75,000.
MertSA2007b	1:75,000	Mertzman, S. A., Weaver, S. G., Gavi, A., and Powers, K., 2007, Preliminary geologic map of the Aspen Lake 7.5’ quadrangle, Klamath County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report 07-17, scale 1:75,000.
MertSA2008	1:75,000	Mertzman, S. A., and others, 2008, Preliminary geologic map of the Mule Hill 7.5’ quadrangle, Klamath County, Oregon and Siskiyou County, California: Oregon Department of Geology and Mineral Industries Open-File report O-08-08, scale 1:75,000.
MertSA2009	1:75,000	Mertzman, S. A., and others, 2009, Preliminary geologic map of the Robinson Butte 7.5’ quadrangle, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-09-02, scale 1:75,000.
MertSAUnpub	1:24,000	Mertzman, S. A., unpublished data, Geologic mapping of the High Cascade Mountains, southcentral Oregon: Lancaster, Pa., Franklin and Marshall College, scale 1:24,000.
MickKA2011	**1:8,000**	**Mickelson, K. A., 2011, Lidar-based landslide inventory and susceptibility mapping, and differential LiDAR analysis for the Panther Creek Watershed, Coast Range, Oregon: Portland State University, Department of Geology, M.S. thesis, 82 p.**
MickKA2012	**1:8,000**	**Mickelson, K. A., and Burns, W. J., 2012, Landslide hazard and risk study of the U.S. Highway 30 corridor, Clatsop and Columbia Counties, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-12-06, 4 pls., plate scale, 1:24,000, geodatabase data scale 1:8,000.**
MickKAunpub2012		Mickelson, K. A., 2012, unpublished data, Landslide locations in 2012 in western Oregon from the January 2012 storm: Oregon Department of Geology and Mineral Industries.
MickKAunpub2014		Mickelson, K. A., and Burns, W. J., 2014, unpub. data, Landslide point locations in 2013-2014 winter season in Oregon: Oregon Department of Geology and Mineral Industries.
MillPR1984	1:24,000	Miller, P. R., and Orr, W. N., 1984, Geologic map of the Wilhoit quadrangle, Oregon: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Geological Map GMS-32, scale 1:24,000.
MinoSA1987b	1:24,000	Minor, S. A., Rytuba, J. J., Vander Meulen, D. B., Grubensky, M., and Tegtmeyer, K. J., 1987, Geologic map of the Wildhorse Lake quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies 1915, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
MinoSA1990a	1:24,000	Minor, S. A., Vander Meulen, D. B., Rytuba, J. J., and Vercoutere, T. L., 1990, Geologic map of the Windy Point quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Open- File Report 89-212, scale 1:24,000.
MinoSA1990b	1:24,000	Minor, S. A., Vander Meulen, D. B., Rytuba, J. J., Vercoutere, T. L., 1990, Geologic map of the V quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Open-File Report 89-351, scale 1:24,000.
Misc_unpub		Miscellaneous newspaper articles in local papers and personal accounts of landslides as reported to the Oregon Department of Geology and Mineral Industries from various years.
MoorR2004	1:300	Moore, R., and Balzer, V., 2004, Review and analysis of the Winston Slide Event of February 2, 2004, Douglas County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-04-15, scale 1:300.
MuntJK1969	1:12,000	Muntzert, J. K., 1969, Geology and Mineral Deposits of the Brattain District, Lake County, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:12,000.
MuntSR1978	1:24,000	Munts, S. R., 1978, Geology of the Quartzville Mining District, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:24,000.
MurrRB2001	1:24,000	Murray, R. B., and Kays, M. A., 2001, Geologic map of the Richter Mountain quadrangle, Douglas and Jackson Counties, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-103, scale 1:24,000.
MurrRB2006a	1:24,000	Murray, R. B., 2006, Preliminary geologic nap of the Creswell 7.5’ quadrangle, Lane County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-12, scale 1:24,000.
MurrRBUnpubA	1:24,000	Murray, R. B., unpublished data, Compilation and synthesis of geologic mapping for the upper Illinois River basin, Josephine and Curry Counties, Oregon: Oregon Department of Geology and Mineral Industries, scale 1:24,000.
MurrRBunpubB	1:24,000	Murray, R. B., unpublished data, Compilation and synthesis of geologic mapping for the Williams Creek basin, Josephine and Jackson Counties, Oregon, Portland, Oreg., Oregon Department of Geology and Mineral Industries, scale 1:24,000.
NappJE1958	1:62,500	Napper, J. E., 1958, The geology of the northern two thirds of the Courtrock quadrangle, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:62,500.
NichDK1989	1:24,000	Nicholson, D. K., 1989, Geologic map of the Yellowbottom-Boulder Creek area, Linn County, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
NiemAR1985	1:100,000	Niem, A. R., and Niem, W. A., 1985, Oil and gas investigation of the Astoria Basin, Clatsop and northernmost Tillamook Counties, Northwest Oregon: Oregon Department of Geology and Mineral Industries Oil and Gas Investigation OGI-14, scale 100,000.
NiemAR1990	1:125,000	Niem, A. R., Niem, W. A., and Baldwin, E. M., 1990, Geology, and oil, gas and coal resources of the southern Tyee Basin, southern Coast Range: Oregon Department of Geology and Mineral Industries Open-File Report 0-89-03, scale 1:125,000.
NiewCA2018	**1:24,000**	**Niewendorp, C. A., Duda, C. J. M., Houston, R. A., and McClaughry, J. D., 2018, Geologic map of the Devine Ridge South 7.5' quadrangle, Harney County, Oregon: Oregon Department of Geology and Mineral Industries, Geologic Map GMS-120, 65 p.**
NoblJB1979	1:62,500	Noblett, J. B., 1979, Volcanic petrology of the Eocene Clarno Formation on the John Day River near Cherry Creek, Oregon: Corvallis, Oreg., Oregon State University, dissertation, scale 1:62,500.
OConJE2001	1:250,000	O’Connor, J. E., Sarna-Wojcicki, A., Wozniak, K. C., Polette, D. J., and Fleck, R. J., 2001, Geologic map of Quaternary units in the Willamette Valley, Oregon: Reston, Va., U.S. Geological Survey Professional Paper 1620, scale 1:250,000.
ODOT2011		Oregon Department of Transportation, 2011, Unstable slopes asset management database: Salem, Oreg., ODOT Geo-Environmental Section, Technical Services Branch.

Reference Identification Code	Original Mapping Scale	Reference
OlesKF1971	1:62,500	Oles, K. F., and Enlows, H. E., 1971, Bedrock geology of the Mitchell quadrangle, Wheeler County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 72, scale 1:62,500.
OlivJA1981	1:24,000	Oliveira, J. A. L., 1981, The stratigraphy, petrology, and paleomagnetics of the Moss Flat area, Lake County, Oregon: Reno, Nev., University of Nevada Reno, dissertation, scale 1:24,000.
OrrWN1986a	1:24,000	Orr, W. N., and Miller, P. R., 1986, Geologic map of the Drake Crossing quadrangle, Marion County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-50, scale 1:24,000.
OrrWN1986b	1:24,000	Orr, W. N., and Miller, P. R., 1986, Geologic map of the Elk Prairie quadrangle, Marion County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-51, scale 1:24,000.
OwenPC1977	1:24,000	Owen, P. C., 1976, Geological map of the Black Butte-Stephenson Mountain area, central Oregon, Wheeler, Jefferson, and Crook Counties: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
PageNJ1977	1:62,500	Page, N. J., Blair, W. N., Gray, F., Cannon, J. K., Grimes, D. J., and Leinz, R. W., 1977, Preliminary reconnaissance geologic map of the Wimer quadrangle, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-848, scale 1:62,500.
PageNJ1981	1:62,500	Page, N.J., Gray, F., Cannon, J. K., Foose, M.P., Lipin, B., Moring, B. C., Nicholson, S. W., Sawlin, M. G., Till, A., and Ziemianski, W. P., 1981, Geologic map of the Kalmiopsis Wilderness Area, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-1240A, scale 1:62,500.
PattRL1965	1:125,000	Patterson, R. L., 1965, Geology of part of the northeast quarter of the Mitchell quadrangle, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 125,000.
PertRK1976	1:62,500	Perttu, R. K., 1976, Structural geology of the northeast quarter of the Dutchman Butte quadrangle, southwest Oregon: Portland, Oreg., Portland State University, thesis, scale 1:62,500.
PeteNV1976Redmond	1:24,000	Peterson, N. V., Groh, E. A., Taylor, E. M., and Stensland, D. E., 1976, Geology & mineral resources of Deschutes County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 89, scale 1:24,000.
PeteNV1980	1:62,500	Peterson, N. V., Brown, D. E., and McLean, G. D., 1980, Preliminary geology and geothermal resource potential of the Lakeview area, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-80-9, scale 1:62,500.
PoguKR1999	1:24,000	Pogue, K. R., Carson, R. J., Crowley, P. D., and Hazlett, R. W., 1999, Geology of the Elkhorn Mountains, northeastern Oregon: Northfield, Minn., Fairway Foods, scale 1:24,000.
Portland2011		City of Portland, 2011, unpublished data from multi-bureau landslide points spreadsheet: Portland, Oreg.
PrieGR1982plate5	1:24,000	Priest, G. R., Vogt, B. F., and Woller, N. M, 1982, Geology and geothermal resources of the Cascades, plate 5, Lookout Point area: Oregon Department of Geology and Mineral Industries Open-File Report O-82-07, Plate 5, scale 1:24,000.
PrieGR1982plate6	1:62,500	Priest, G. R., Vogt, B. F., and Woller, N. M, 1982, Geology and geothermal resources of the Cascades, plate 6, Swift Creek area: Oregon Department of Geology and Mineral Industries Open-File Report O-82-07, Plate 6, scale 1:62,500.
PrieGR1983plate2	1:24,000	Priest, G. R., and Vogt, B. F., 1983, Geologic map of the Cougar Reservoir Area, Lane County, Oregon: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Special Paper 15, 123 p., Plate 2, scale 1:24,000.
PrieGR1983plate3	1:24,000	Priest, G. R., and Vogt, B. F., 1983, Geology and geothermal resources of the central Oregon Cascade Range: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Special Paper 15, 123 p., Plate 3, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
PrieGR1987	1:62,500	Priest, G. R., Woller, N.M., and Ferns, M. L., 1987, Geologic map of Brietenbush River area, Linn and Marion Counties, Oregon, , Portland, Oreg., Oregon Department of Geology and Mineral Industries Geologic Map GMS-46, scale 1:62,500.
PrieGR1988	1:62,500	Priest, G. R., Black, G. L., Woller, N. M., and Taylor, E. M., 1988, Geologic map of McKenzie Bridge 15' quad, Lane Co, Oregon, , Portland, Oreg., Oregon Department of Geology and Mineral Industries Geologic Map GMS-48, scale 1:62,500.
PrieGR2000	1:150	Priest, G. R., 2000, Memo: Cape Cove landslide, findings from field visit, February 10 & March 10, 2000, Portland, Oreg., Oregon Department of Geology and Mineral Industries Open-File Report O-00-03, scale 1:150.
PrieGR2004a	1:4,800	Priest, G. R., and Allan, J. C., 2004, Evaluation of coastal erosion hazard zones along dune and bluff backed shorelines in Lincoln County Oregon: Cascade Head to Seal Rock, Technical Report to Lincoln County, , Portland, Oreg., Oregon Department of Geology and Mineral Industries Open-File Report O-04-09, scale 1:4,800.
PrieGR2004b	1:4,800	Priest, G. R., Allan, J. C., and Sonnevil, R., 2004, Evaluation of Coastal Erosion Hazard Zones from Sisters Rock to North Gold Beach, Curry Co., Oregon: Technical report to Curry County, Portland, Oreg., Oregon Department of Geology and Mineral Industries Open-File Report O-04-20, scale 1:4,800.
ProsHJ1967	1:62,500	Prostka, H. J., 1967, Preliminary geologic map of the Durkee quadrangle, Oregon, , Portland, Oreg., Oregon Department of Geology and Mineral Industries Geologic Map GMS-3, scale 1:62,500.
RampL1961	1:275,500	Ramp, L., 1961, Geologic map of Babyfoot-Little Chetco area, Curry County, Oregon, Plate 10, Chromite in southwestern Oregon: Oregon Department of Geology and Mineral Industries Bulletin 52, scale 1:275,500.
RampL1986	1:62,500	Ramp, L., and Moring, B., 1986, Reconnaissance geologic map of the Marial quadrangle, southwestern Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-1735, scale 1:62,500.
RitcB1987	1:62,500	Ritchie, B., 1987, Inferred bedrock geology of the southern Sweet Home quadrangle, Western Cascades, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:62,500.
RobaRC1987	1:48,000	Roback, R. C., Vander Meulen, D. B., King, H. D., Plouff, D., Munts, S. R., and Willett, S. L., 1987, Mineral resources of the Pueblo Mountains Wilderness study area, Harney County, Oregon: Reston, Va., U.S. Geological Survey Bulletin 1740-B, scale 1:48,000.
RobiPT1975	1:125,000	Robinson, P. T., 1975, Reconnaissance geologic map of the John Day Formation in the southwestern part of the Blue Mountains and adjacent areas, north-central, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map I-872, scale 1:125,000.
RobyTL1977	1:24,000	Robyn, T. L., 1977, Geology and petrology of the Strawberry Volcanics, NE Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:24,000.
RytuJJ1982a	1:24,000	Rytuba, J. J., Vander Meulen, D. B., Vercoutere, T. L., and Minor, S. A., 1982, Reconnaissance geologic map of Borax Lake quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Open-File Report 82-1126, scale 1:24,000.
RytuJJ1983b	1:24,000	Rytuba, J. J., Minor, S. A., Miller, R. J., and Vander Meulen, D. B., 1983, Geologic map of the Red Mountains quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Open-File Report 83-282, scale 1:24,000.
RytuJJ1983c	1:24,000	Rytuba, J. J., Minor, S. A., Miller, R. J., and Vander Meulen, D. B., 1983, Geologic map of the Red Lookout Butte quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Open- File Report 83-283, scale 1:24,000.
RytuJJ1983e	1:24,000	Rytuba, J. J., Minor, S. A., and Vander Meulen, D. B., 1983, Geologic map of the Pole Canyon quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Open-File Report 83-285, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
RytuJJ1983g	1:24,000	Rytuba, J. J., Bateson, J. T., Curtis Jr., D. L., and Cox, G. A., 1983, Geologic map of the Little Whitehorse Creek quadrangle, Harney County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies 1472, scale 1:24,000.
RytuJJ1983h	1:24,000	Rytuba, J. J., and Curtis Jr., D. L., 1983, Geologic map of the Oregon Canyon 3NW quadrangle, Malheur County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-1473, scale 1:24,000.
SchlHG1967Plate3	1:48,000	Schlicker, H. G., and Deacon, R. J., 1967, Engineering geology of the Tualatin Valley region: Oregon Department of Geology and Mineral Industries Bulletin 60, Plate 3, scale 1:48,000.
SchlHG1972hazards	1:62,500	Schlicker, H. G., Deacon, R. J., Beaulieu, J. D., and Olcott, G. W., 1972, Environmental geology of the coastal region of Tillamook and Clatsop Counties, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 74, scale 1:62,500.
SchlHG1973	1:62,500	SchlHG1973 1:62,500 Schlicker, H. G., Deacon, R. J., Olcott, G. W., and Beaulieu, J. D., 1973, Environmental geology of Lincoln County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin B-81, scale 1:62,500.
SchlHG1974	1:62,500	Schlicker, H. G., Deacon, R. J., Newcomb, R. C., and Jackson, R. L., 1974, Environmental geology of coastal Lane County, Oregon: Portland, Oreg., Oregon Department of Geology and Mineral Industries, Bulletin 85., scale 1:62,500.
SchlHG1974hazards	1:62,500	Schlicker, H. G., Deacon, R. J., Newcomb, R. C., and Jackson, R. L., 1974, Environmental geology of coastal Lane County. Oregon: Oregon Department of Geology and Mineral Industries Bulletin 85, scale 1:62,500.
SchlHG1975	1:24,000	Schlicker, H. G., and Brooks, H. C., 1975, Engineering geology of John Day: Oregon Department of Geology and Mineral Industries Open-File Report O-76-06, scale 1:24,000.
SchlHG1979hazards	1:24,000	Schlicker, H. G., and Finlayson, C., 1979, Geology and geologic hazards of northwestern Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries Bulletin 99, 79 p., scale 1:24,000.
SchnDR1958	1:62,500	Schnaible, D. R., 1958, Geologic map and sections of the southwestern part of the Valsetz quadrangle, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:62,500.
SchuMG1980	1:24,000	Schulz, M. G., 1980, The quantification of soil mass movements and their relationship to bedrock geology in the Bull Run Watershed, Multnomah and Clackamas Counties, Oregon: Corvallis, Oreg., Oregon State University, thesis, Plate 1, scale 1:24,000.
ScotWE1992	1:24,000	Scott, W. E., and Gardner, C. A., 1992, Geologic map of the Mount Bachelor Volcanic Chain and surrounding area, Cascade Range, Oregon: Reston, Va., U.S. Geological Survey Interpretive Map I-1967, scale 1:24,000.
SherDR1988	1:62,500	Sherrod, D. R., 1988, Geology and Geothermal Resources of the Breitenbush-Austen Hot Springs Area, Clackamas and Marion Counties, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report OFR-88-05, scale 1:62,500.
SherDR1989	1:100,000	Sherrod, D. R., Minor, S. A., and Vercoutere, T. L., 1989, Geologic map of the Sheepshead Mountains, Harney and Malheur Counties, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-2079, scale 100,000.
SherDR1991	1:125,000	Sherrod, D. R., 1991, Geologic map of a part of the Cascade Range between latitudes 43 degrees - 44 degrees, central Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map I-1891, scale 1:250,000.
SherDR1992	1:250,000	Sherrod, D. R., and Pickthorn, L. B. G., 1992, Geologic map of the west half of the Klamath Falls 1 by 2 degree quadrangle, south-central Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map I-2182, scale 1:250,000.
SherDR1994	1:24,000	Sherrod, D. R., and Johnson, J. A., 1994, Geologic map of the Irish Lake quadrangle, Harney County, south-central Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-2256, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
SherDR1995	1:100,000	Sherrod, D. R., and Scott, W. E., 1995, Preliminary map of the Mount Hood 30- by 60-minute quadrangle, Cascade Range, north-central Oregon: Reston, Va., U.S. Geological Survey Open- File Report 95-219, scale 100,000.
SherDR2000	1:500,000	Sherrod, D. R., and Smith, J. G., 2000, Geologic map of Upper Eocene to Holocene Volcanic and Related Rocks of the Cascade Range, Oregon: Reston, Va., U.S. Geological Survey Interpretive Map I-2569, sheet 1, scale 1:500,000.
SherDR2004	1:100,000	Sherrod, D. R., Taylor, E. M., Ferns, F. L., Scott, W. E., Conrey, R. M., and Smith, G. A., 2004, Geologic map of the Bend 30- x 60-minute quadrangle, central Oregon: Reston, Va., U.S. Geological Survey Interpretive Map I-2683, scale 100,000.
SmitGA1987a	1:24,000	Smith, G. A., 1987, Geologic map of the Seekseequa Junction and a portion of the Metolius Bench quadrangles, Jefferson County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-43, scale 1:24,000.
SmitGA1987b	1:24,000	Smith, G. A., and Hayman, G. A., 1987, Geologic map of the Eagle Butte and Gateway quadrangles, Jefferson and Wasco Counties, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-44, scale 1:24,000.
SmitGA1987c	1:24,000	Smith, G. A., 1987, Geologic map of the Madras West and Madras East quadrangles, Jefferson County, Oregon: Oregon Department of Geology and Mineral Industries Geologic Map GMS-GMS 45, scale 1:24,000.
SmitJG1982	1:250,000	Smith, J. G., Page, N. J., Johnson, M. G., Moring, B. C., and Gray, F., 1982, Preliminary geologic map of the Medford 1 by 2 degree quadrangle, Oregon and California: Reston, Va., U.S. Geological Survey Open-File Report 82-955, scale 1:250,000.
SnavPD1976b	1:62,500	Snavely, P. D. Jr., MacLeod, N. S., Wagner, H. C., and Rau, W. W., 1976, Geologic map of the Waldport and Tidewater quadrangles, Lincoln, Lane and Benton Counties, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map I-866, scale 1:62,500.
SnavPD1976c	1:62,500	Snavely, P. D. Jr., MacLeod, N. S., Wagner, H. C., and Rau, W. W., 1976, Geologic map of the Yaquina and Toledo quadrangles, Lincoln County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map I-867, scale 1:62,500.
SnavPD1996	1:24,000	Snavely, P. D. Jr., MacLeod, N. S., Wagner, H. C., and Rau, W. W., 1976, Geologic map of the Cape Foulweather and Euchre Mountain quadrangles, Lincoln County, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map I-868, scale 1:62,500.
SobiS2010	1:4,000	Snavely, P. D. Jr., Niem, A., Wong, F. L., MacLeod, N. S., Calhoun, T. K., Minasian, D. L., and Niem, W., 1996, Geologic map of the Cascade Head area, northwestern Oregon Coast Range: (Neskowin, Netucca Bay, Hebo, and Dolph 7.5-minute quadrangles): Reston, Va., U.S. Geological Survey Open-File Report 96-534, scale 1:24,000.
StimJP1988	1:62,500	Stimac, J. P., 1988, Geology of the Stockade Mountain 15’ quadrangle, Malheur and Harney Counties, Oregon: Hays, Kan., Fort Hays State University, thesis, scale 1:62,500.
StocAO1982	1:24,000	Stockman, A. O., 1982, Bedrock geology and structure of the Murderers Creek area, Grant County, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
StroHR1980	1:24,000	Stroh, H. R., 1980, Geology of the Clarno Formation in the vicinity of Stephenson Mountain, Jefferson, Crook and Wheeler Counties, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
SwanDA1969	1:250,000	Swanson, D. A., 1969, Reconnaissance geologic map of the east half of the Bend quadrangle, Crook, Wheeler, Jefferson, Wasco, and Deschutes Counties, Oregon: Washington, D.C., U.S. Geological Survey Miscellaneous Investigation I-568, scale 1:250,000.

Reference Identification Code	Original Mapping Scale	Reference
SwanDA1981sheet1	1:250,000	Swanson, D. A., Anderson, J. L., Camp, V. E., Hooper, P. R., Taubeneck W. H., and Wright, T. L., 1981, Reconnaissance geologic map of the Columbia River Basalt Group, Northern Oregon and Western Idaho: Reston, Va., U.S. Geological Survey Open-File Report 81-797, Sheet 1, scale 1:250,000.
SwanDA1981sheet2	1:250,000	Swanson, D. A., Anderson, J. L., Camp, V. E., Hooper, P. R., Taubeneck, W. H., and Wright, T. L., 1981, Reconnaissance geologic map of the Columbia River Basalt Group, northern Oregon and western Idaho (sheet 2): Reston, Va., U.S. Geological Survey Open-File Report 81-797, Sheet 2, scale 1:250,000.
SwanDA1981sheet3	1:250,000	Swanson, D. A., 1981, Reconnaissance geologic map of the Columbia River Basalt Group, northern Oregon and western Idaho (sheet 3): Reston, Va., U.S. Geological Survey Open-File Report 81-797, Sheet 3, scale 1:250,000.
SwanDA1983	1:24,000	Swanson, D. A., and Wright, T. L., 1983, Geologic map of the Weha Tucannon Wilderness, Washington and Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Field Studies Map MF-1536, scale 1:24,000.
SwinCM1968	1:62,500	Swinney, C. M., 1968, Reconnaissance geologic map of the Lookout Mountain quadrangle, Crook and Wheeler Counties, Oregon: Washington, D.C., U.S. Geological Survey Interpretive Map I-543, scale 1:62,500.
ThayTP1956	1:62,500	Thayer, T. P., 1956, Preliminary geologic map of the John Day quadrangle, Oregon: Washington, D.C., U.S. Geological Survey Miscellaneous Field Studies Map MF-51, scale 1:62,500.
ThayTP1966	1:62,500	Thayer, T. P., and Brown, C. E., 1966, Geologic map of the Aldrich Mountain quadrangle, Grant County, Oregon: Washington, D.C., U.S. Geological Survey Geologic Quadrangle Map GQ-438, scale 1:62,500.
ThayTP1967b	1:62,500	Thayer, T. P., and Brown, C. E., 1967, Preliminary geologic map of the Long Creek quadrangle, Grant County, Oregon: Washington, D.C., U.S. Geological Survey Open-File Report 67-213, scale 1:62,500.
ThayTP1967c	1:62,500	Thayer, T. P., Brown, C.E., and Hay, R. L., 1967, Preliminary geologic map of the Prairie City quadrangle, Grant County, Oregon: Washington, D.C., U.S. Geological Survey Open-File Report 67-214, scale 1:62,500.
ThayTP1981	1:62,500	Thayer, T. P., Case, J. E., and Stotelmeyer, R. B., 1981, Mineral resources of the Strawberry Mountain Wilderness and adjacent areas, Grant County, Oregon: Reston, Va., U.S. Geological Survey Bulletin 1498, scale 1:62,500.
ThomTH1981	1:24,000	Thomas, T. H., 1981, Geology and mineral deposits of the Coyote Hills Mining District, Lake County, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
ThorDJ1984	1:24,000	Thormahlen, D.J., 1984, Geology of the northwest one-quarter of the Prineville quadrangle, central Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
TolaTL1982	1:21,120	Tolan, T. L., 1982, Geologic map of the Lower Columbia River Gorge, Oregon and Washington: Portland, Oreg., Portland State University, thesis, scale 1:21,120.
TolaTL1999sheet1	1:24,000	Tolan, T. L., and Beeson, M. H., 1999, Geologic map of the Silverton and Scotts Mills 7.5 minute quadrangles, northwest Oregon: Reston, Va., U.S. Geological Survey Open-File Report 99-141, Sheet 1, scale 1:24,000.
TolaTL2000sheet2	1:24,000	Tolan, T. L., and Beeson, M.H., 2000, Geologic map of the Salem East and Turner 7.5' quadrangles, Marion County, Oregon: a digital database: Reston, Va., U.S. Geological Survey Open-File Report 00-351, Sheet 2, scale 1:24,000.
TravPL1977	1:160,000	Travis, P. L., 1977, Geology of the area near the north end of Summer Lake, Lake County, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:160,000.
TuckER1975	1:24,000	Trimble, D. E., 1963, Geologic map and diagrammatic section of Portland, Oregon and adjacent areas: Washington, D.C., U.S. Geological Survey Bulletin B-1119, scale 1:62,500.

Reference Identification Code	Original Mapping Scale	Reference
VandDB1988	1:62,500	Tucker, E. R., 1975, Geology and structure of the Brothers Fault Zone in the central part of the Millican SE quadrangle, Deschutes, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
WalkGW1963	1:250,000	Walker, G. W., 1963, Reconnaissance geologic map of the eastern half of the Klamath Falls (AMS) quadrangle, Lake and Klamath Counties, Oregon: Washington, D.C., U.S. Geological Survey Miscellaneous Field Studies Map MF-280, scale 1:250,000.
WalkGW1965	1:250,000	Walker, G. W., and Repenning, C. A., 1965, Reconnaissance geologic map of the Adel quadrangle, Lake, Harney, and Malheur Counties, Oregon: Washington, D.C., U.S. Geological Survey Interpretive Map 446, scale 1:250,000.
WalkGW1966	1:250,000	Walker, G. W., and Repenning, C. A., 1966, Reconnaissance geologic map of the west half of the Jordan Valley quadrangle, Malheur County, Oregon: Washington, D.C., U.S. Geological Survey Interpretive Map 457, scale 1:250,000.
WalkGW1967	1:250,000	Walker, G. W., Peterson, N. V., and Greene, R. C., 1967, Reconnaissance geologic map of the east half of the Crescent quadrangle, Lake, Deschutes, and Crook Counties, Oregon: Washington, D.C., U.S. Geological Survey Miscellaneous Investigation Map I-493, scale 1:250,000.
WalkGW1968figure2	1:62,500	Walker, G. W., and Swanson, D. A., 1968, Summary report on the geology and mineral resources of the Poker Jim Ridge and Fort Warner areas of the Hart Mountain National Antelope Refuge, Lake County, Oregon: Washington, D.C., U.S. Geological Survey Bulletin 1260-M, Figure 2, scale 1:62,500.
WalkGW1968figure3	1:62,500	Walker, G. W., and Swanson, D. A., 1968, Summary report on the geology and mineral resources of the Poker Jim Ridge and Fort Warner areas of the Hart Mountain National Antelope Refuge, Lake County, Oregon: Washington, D.C., U.S. Geological Survey Bulletin 1260-M, Figure 3, scale 1:62,500.
WalkGW1979	1:250,000	Walker, G. W., 1979, Reconnaissance geologic map of the Oregon part of the Grangeville quadrangle, Baker, Union, Umatilla, and Wallowa Counties, Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigations Map 1116, scale 1:250,000.
WalkGW1980b	1:24,000	Walker, G. W., 1980, Preliminary report on the geology of the Lakeview uranium area, Lake County, Oregon: Reston Va., U.S. Geological Survey Open-File Report 80-532, scale 1:24,000.
WalkGW1989	1:250,000	Walker, G. W., and Duncan, R. A., 1989, Geologic map of the Salem 1 degree x 2 degrees, quadrangle, western Oregon: Reston, Va., U.S. Geological Survey Miscellaneous Investigation Map I-1893, scale 1:250,000.
WalkGW2002	1:500,000	Walker, G. W., 2002, Spatial digital database for the geologic map of Oregon: Reston, Va., U.S. Geological Survey Open-File Report 03-67, scale 1:500,000.
WangZ2001	1:50,000	Wang, Z., Graham, G. B., and Madin, I. P., 2001, Preliminary earthquake hazard and risk assessment and water-induced landslide hazard in Benton County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-01-05, 89 p., scale 1:50,000.
WateAC1968a	1:62,500	Waters, A. C., 1968, Reconnaissance geologic map of the Eagle Rock quadrangle, Crook County, Oregon: Washington, D.C., U.S. Geological Survey Interpretive Map I-540, scale 1:62,500.
WateAC1968b	1:62,500	Waters, A. C., 1968, Reconnaissance geologic map of the Ochoco Reservoir quadrangle, Crook County, Oregon: Washington, D.C., U.S. Geological Survey Interpretive Map I-541, scale 1:62,500.
WateAC1968c	1:62,500	Waters, A. C., 1968, Reconnaissance geologic map of the Post quadrangle, Crook County, Oregon: Reston, Va., U.S. Geological Survey Interpretive Map I-542, scale 1:62,500.
WateAC1968d	1:125,000	Waters, A. C., 1968, Reconnaissance geologic map of the Madras quadrangle, Jefferson and Wasco County, Oregon: Washington, D.C., U.S. Geological Survey Interpretive Map I-555, scale 1:125,000.

Reference Identification Code	Original Mapping Scale	Reference
WeidJP1980	1:62,500	Weidenheim, J. P., 1980, The petrography, structure, and stratigraphy of Powell Buttes, Crook County, Central Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:62,500.
WeisKW1984	1:24,000	Weissenburger, K. W., 1984, Lakeview uranium area, Lake County, Oregon: Constraints on genetic modelling from a district-scale perspective: Palo Alto, Calif., Stanford University, dissertation, scale 1:24,000.
WellFG1949	1:96,000	Wells, F., Holtz, P., and Cater Jr., F., 1949, Prelim. Description of Kerby quad geology: Oregon Department of Geology and Mineral Industries Bulletin B-40, scale 1:96,000.
WellFG1953	1:62,500	Wells, F. G., and Walker, G. W., 1953, Geology of the Galice quadrangle, Oregon: Reston Va., U.S. Geological Survey Geologic Quadrangle GQ-25, scale 1:62,500.
WellRE1975	1:62,500	Wells, R. E., 1975, The geology of the Drake Peak Rhyolite complex and the surrounding area, Lake County, Oregon: Eugene, Oreg., University of Oregon, thesis, scale 1:62,500.
WellRE1983	1:250,000	Wells, R. E., Niem, A. R., MacLeod, N. S., Snavely, P. D. Jr., and Niem, W. A., 1983, Preliminary geologic map of the west half of the Vancouver (Washington-Oregon) 1 x 2 degree quadrangle, Reston, Va., U.S. Geological Survey Open-File Report 83-591, scale 1:250,000.
WellRE1995	1:48,000	Wells, R. E., Snavely, P. D., MacLeod, N. S., Kelly, M. M., Parker, M. J., Fenton, J. S., and Felger, T. J., 1995, Geologic map of the Tillamook Highlands, northwest Oregon Coast Range; a digital database: Reston, Va., U.S. Geological Survey Open-File Report 95-670, scale 1:48,000.
WellRE2000	1:100,000	Wells, R. E., Jayko, A. S., Niem, A. R., Black, G., Wiley, T. J., Baldwin, E., Molenaar, K. M., Wheeler, K. L., DuRoss, C. B., and Givler, R. W., 2000, Geologic map and database of the Roseburg 30’ x 60’ quadrangle, Douglas and Coos Counties: Reston, Va., U.S. Geological Survey Open-File Report 00-376, scale 100,000.
WendDW1988	1:24,000	Wendland, D. W., 1988, Castle Rock: a Late Miocene eruptive center at the north end of Green Ridge, Jefferson County, Oregon, Geologic map of the northern end of Green Ridge, Jefferson County, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
WethCE1960	1:24,000	Wetherell, C. E., 1960, Geology of part of the southeastern Wallowa Mountains, northeastern Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
WhitDL1994	1:24,000	White, D. L., and Vallier, T. L., 1994, Geologic evolution of the Pittsburg Landing area, Snake River Canyon, Oregon and Idaho: Reston, Va., U.S. Geological Survey Professional Paper 1439, scale 1:24,000.
WhitWH1964	1:62,500	White, W. H., 1964, Geology of the Picture Gorge quadrangle, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:62,500.
WilcRE1966	1:62,500	Wilcox, R. E., and Fisher, R. V., 1966, Geologic map of the Monument quadrangle, Grant County, Oregon: Washington, D.C., U.S. Geological Survey Geologic Quadrangle Map GQ-541, scale 1:62,500.
WileTJ1991	1:24,000	Wiley, T. J., Hladky, F. R., 1991, Geology and mineral resources map of the Boswell Mountain quadrangle, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-70, scale 1:24,000.
WileTJ1993a	1:24,000	Wiley, T. J., 1993, Geology and mineral resources map of the Cleveland Ridge quadrangle, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Geological Map GMS-73, scale 1:24,000.
WileTJ1993bplate1	1:24,000	Wiley, T. J., Smith, J. G., 1993, Preliminary geologic map of the Medford East, Medford West, Eagle Point, and Sams Valley quadrangles, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-93-13, Plate 1, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
WileTJ2006a	1:24,000	Wiley, T. J., 2006, Preliminary geologic map of the Wimer and McConville Peak quadrangles, Jackson and Josephine Counties, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-05, scale 1:24,000.
WileTJ2006b	1:24,000	Wiley, T. J., 2006, Preliminary geologic map of the Sexton Mountain, Murphy, Applegate, and Mount Isabelle 7.5' quadrangles, Jackson and Josephine Counties, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-05, scale 1:24,000.
WileTJ2006c	1:24,000	Wiley, T. J., 2006, Preliminary geologic map of the Gold Hill and Rogue River 7.5' quadrangles, Jackson and Josephine Counties, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-06-18, scale 1:24,000.
WileTJ2007	1:24,000	Wiley, T. J., 2007, unpublished data, Preliminary geologic map of southwestern Curry County, Oregon: Oregon Department of Geology and Mineral Industries, scale 1:24,000.
WileTJ2011	1:8,000	Wiley, T.J., McClaughry, J.D., and D'Allura, J.A., 2011, Geologic database and generalized geologic map of Bear Creek Valley, Jackson County, Oregon: Oreg Department Geol and Min Ind, Open-File Report O-11-11, 75 p., 1 pl., scale 1:63,360, geodatabase, scale 1:8,000.
WileTJ2014	**1:8,000**	**Wiley, T. J., McClaughry, J. D., Ma, L., Mickelson, K. A., Niewendorp, C. A., Stimely, L. L., Herinckx, H. H., and Rivas, J., 2014, Geologic map of the southern Oregon coast between Port Orford and Bandon, Curry and Coos counties, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-14-01, 66 p., 3 pl., scale 1:24,000, geodatabase.**
WileTJ2015	**1:8,000**	**Wiley, T. J., McClaughry, J. D., Niewendorp, C. A., Ma, L., Herinckx, H. H., and Mickelson, K. A., 2015, Geologic map of the southern Oregon coast between Bandon, Coquille, and Sunset Bay, Coos County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-15-04, 57 p. 4 pl.**
WileTJunpub	1:100,000	Wiley, T. J., Hladky, F. R., D'Allura, J. A., and Mertzman, S. A., unpublished data, Preliminary geologic map of the Medford 30 x 60 minute quadrangle, Oregon and California: Oregon Department of Geology and Mineral Industries, scale 1:100,000.
WilkRM1986	1:24,000	Wilkening, R. M., 1986, The geology and hydrothermal alteration of the Bear Creek Butte area, Crook County, central Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.
WittRC2007	1:9,600	Witter, R. C., Allan, J. C., and Priest, G. R., 2007, Evaluation of coastal erosion hazard zones along dune and bluff backed shorelines in Lincoln County, Oregon: Seal Rock to Cape Perpetua: Oregon Department of Geology and Mineral Industries Open-File Report O-07-03, 42 p., scale 1:9,600.
WittRC2009	1:9,000	Witter, R. C., Horning, T., and Allan, J. C., 2009, Coastal erosion hazard zones in southern Clatsop County, Oregon: Seaside to Cape Falcon: Oregon Department of Geology and Mineral Industries Open-File Report O-09-06, scale 1:9,000.
WoodJD1976	1:24,000	Wood, J. D., 1976, The geology of the Castle Rock area, Grant, Harney and Malheur Counties, Oregon: Portland, Oreg., Portland State University, thesis, scale 1:24,000.
YeatRS1996plate2a	1:100,000	Yeats, R. S., Werner, K. S., and Popowski, T. A., 1996, Geologic map of the northern Willamette Valley, Clackamas, Marion, Multnomah, Polk, Tillamook, Washington and Yamhill Counties, Oregon: Reston, Va., U.S. Geological Survey Professional Paper PP-1560, Plate 2a, scale 100,000.
YeatRS1996plate2b	1:100,000	Yeats, R. S., Graven, E. P., Werner, K. S., Goldfinger, C., and Popowski, T. A., 1996, Geologic map of the central and southern Willamette Valley, Benton, Lane, Linn, Marion and Polk Counties, Oregon: Reston, Va., U.S. Geological Survey Professional Paper PP-1560, Plate 2b, scale 100,000.
YogoGM1985	1:24,000	Yogodzinski, G. M., 1985, The Deschutes Formation – High Cascades transition in the Whitewater River area, Jefferson County, Oregon: Corvallis, Oreg., Oregon State University, thesis, scale 1:24,000.

Reference Identification Code	Original Mapping Scale	Reference
YuleJD1996plate10	1:24,000	Yule, J. D., 1996, Geologic and tectonic evolution of Jurassic marginal ocean basin lithosphere, Klamath Mountains, Oregon: Pasadena, Calif., California Institute of Technology, dissertation, plate 10, scale 1:24,000.
YuleJD1996plate11	1:24,000	Yule, J. D., 1996, Geologic and tectonic evolution of Jurassic marginal ocean basin lithosphere, Klamath Mountains, Oregon: Pasadena, Calif., California Institute of Technology, dissertation, plate 11, scale 1:24,000.
YuleJD1996plate2	1:24,000	Yule, J. D., 1996, Geologic and tectonic evolution of Jurassic marginal ocean basin lithosphere, Klamath Mountains, Oregon: Pasadena, Calif., California Institute of Technology, dissertation, plate 2, scale 1:24,000.
YuleJD1996plate8	1:24,000	Yule, J. D., 1996, Geologic and tectonic evolution of Jurassic marginal ocean basin lithosphere, Klamath Mountains, Oregon: Pasadena, Calif., California Institute of Technology, dissertation, plate 8, scale 1:24,000.
YuleJD1996plate9	1:24,000	Yule, J. D., 1996, Geologic and tectonic evolution of Jurassic marginal ocean basin lithosphere, Klamath Mountains, Oregon: Pasadena, Calif., California Institute of Technology, dissertation, plate 9, scale 1:24,000.

APPENDIX C. SLIDO GEODATABASE UPDATE PROCEDURE

Geodatabase stewards at DOGAMI use the following method when updating the SLIDO geodatabase. For more detailed field information, refer to the SP-42 protocol (Burns and Madin, 2009) and the SLIDO-4.0 metadata.

Note about the REF_ID_COD field. The REF_ID_COD format identifies the reference author by the first four letters of the last name, followed by first and middle initials, followed by the year of work or the unpublished status (*unpub*), followed by the plate or figure information (if any). Add a sequential letter (b, c, ...) to the end of the REF_ID_COD if more than one publication by the same author in the same year is being added or if one already exists in the database. Attach a map identifier, e.g., sheet1, figure3, plate2a, etc., to the end of Ref_ID_COD only if there is more than one separate map from a publication that includes several maps that are to be used.

If the material being added is unpublished, the year the work was done may be added to after *unpub*. Examples:

BurnWJ2012 — *note: if you know there is a second 2012 reference, you may optionally add "a" to the first one*
BurnWJ2012b
BurnWJ2012cbplate1
BurnWJ2012cplate2a
BurnWJunpub
BurnWJunpub2013
BurnWJunpub2014
BurnWJunpub2014b

C.1 Historic Landslide Points

When adding new historic points to the SLIDO-4.0 geodatabase, update two datasets.

- *References Table* – Update the References table by adding a new record for each new historic point study. Each record must have a REF_ID_COD, map SCALE, full REFERENCE citation formatted in U.S. Geological Survey reference style, and DATE. If the citation in the REFERENCE field exceeds 255 characters, abbreviate as needed.
- *Historic_Landslide_Points* (feature class) – First, make sure the new study dataset is formatted to match the Historic_Landslide_Points feature class structure. Take care that field matching is done in a way that does not misplace or delete data. Add the REF_ID_COD to each landslide record and populate a UNIQUE_ID. Be sure to fill in the DATA_ SOURC and LOC_METHOD fields. You can generally find this information by reading the report attached to the new dataset.

  Once the new input data are correctly formatted, open ArcGIS ArcCatalog, right-click on the Historic_Landslide_Points feature class and click on Load > Load Data… in the dropdown menu. Click through the Simple Data Loader wizard, making sure to match the correct Matching Source Fields (new data) with the Target Fields (existing data).

C.2 Landslide Inventory

When adding new landslide deposits to the SLIDO-4.0 geodatabase, update up to five datasets. Depending on the source data, there may or may not be data for all five of these datasets.

- *References Table* – Update the References table by adding a new record for each new historic point study. Each record must have a REF_ID_COD, map SCALE, full REFERENCE citation formatted in U.S. Geological Survey reference style, and DATE. If the citation in the REFERENCE field exceeds 255 characters, abbreviate as needed.
- *Inventory Map Index* (feature class) – For each new study, add the polygon of the extent of the new study to the index reference map feature class dataset. Open ArcGIS ArcCatalog, right-click on the feature class and click on Load > Load Data… in the dropdown menu. Click through the Simple Data Loader wizard, making sure to match the correct Matching Source Fields (new data) with the Target Fields (existing data). Fill in the REF_ID_COD, map SCALE, mapping PURPOSE, LIDAR, SP-42, and DATE fields as necessary.
- *Landslide Inventory* (feature classes) – Historically, two types of datasets go into this feature class: 1) data created by following the DOGAMI Special Paper 42 protocol (Burns and Madin, 2009), and 2) data from other mapping sources (geologic mapping, for example). Currently, most data added to SLIDO-4.0 were created using the SP-42 protocol. Future inventory datasets added to SLIDO are expected to follow the SP-42 protocol.
    - Non-SP-42 landslide inventory data: Inventory data created not using the SP-42 protocol will typically include only the *Deposits* feature class dataset. The attribute table should already be in a database format that matches SLIDO. The new deposit polygons can be added over existing deposit data. To add the new deposits, open ArcGIS ArcCatalog, right-click on the feature class and click on Load > Load Data… in the dropdown menu. Click through the Simple Data Loader wizard, making sure to match the correct Matching Source Fields (new data) with the Target Fields (existing data). After the new data have been loaded, fill in the DESCRIPTION field, as appropriate.
    - SP-42 landslide inventory data: This type of source data will include three feature class datasets: *Deposits*, *Scarp_Flanks*, and *Scarps*. The data attribute tables should already be in a database format that matches SLIDO. Add the REF_ID_COD field and populate with the study area's reference ID if this field does not already exist.

      Before adding new data to SLIDO, remove existing (and less accurate) Deposits data within the new study extent. Some older Deposits polygons will likely cross from inside to outside the extent. Cut these so that only the outside portions of the previous polygons remain. Then inspect the outside boundary of the study extent for cases where new deposits are mapped inside and cross outside the study extent. In these areas where there is new data, the old deposit polygon (which should already be cut so that only the part outside the new study extent remains) should be deleted completely.

  For each of the three landslide feature class types, open ArcGIS ArcCatalog, right-click on the feature class and click on Load > Load Data… in the dropdown menu. Click through the Simple Data Loader wizard, making sure to match the correct Matching Source Fields (new data) with the Target Fields (existing data). After the new data have been loaded, fill in the DESCRIPTION field, as appropriate.

C.3 Detailed Landslide Susceptibility

Landslide susceptibility datasets included beginning with the SLIDO-4.0 update. When adding new detailed landslide susceptibility data to the SLIDO geodatabase, update these four datasets:

- *References Table* – Update the References table by adding a new record for each new historic point study. Each record must have a REF_ID_COD, map SCALE, full REFERENCE citation formatted in U.S. Geological Survey reference style, and DATE. If the citation in the REFERENCE field exceeds 255 characters, abbreviate as needed.
- *Detailed Susceptibility Map Index* (feature class) – This dataset includes study area polygons representing studies with detailed susceptibility data. Open ArcGIS ArcCatalog, right-click on the feature class and click on Load > Load Data… in the dropdown menu. Click through the Simple Data Loader wizard, making sure to match the correct Matching Source Fields (new data) with the Target Fields (existing data). Check that the study area polygons REF_ID_COD field is filled in with the appropriate information.
- *Detailed Shallow Landslide Susceptibility* (raster) – Two important factors should be checked before adding new raster data to the statewide dataset. The study susceptibility raster VALUE field should include three classes, which correspond to low (1), moderate (2), and high (3).

  Update the statewide raster dataset by using the Esri® ArcGIS tool Mosaic to New Dataset. Be sure to fill in the Spatial Reference for Raster and Number of Bands (=1) fields. The Mosaic Operator field should also be set so that the new raster data are overwriting the existing dataset. Finally, go into the Environments and, under the Processing Extent dropdown, enter the existing dataset into the Snap Raster field.
- *Detailed Deep Landslide Susceptibility* (feature class) – New studies added to this statewide dataset should have a Suscept field that includes three classes: High, Moderate, and Low.

  Update the statewide layer by merging the new study data using the ArcGIS tool Merge, then dissolve the merged output by Suscept field using the ArcGIS Tool Dissolve. The dissolved output should only have three rows in the Suscept field, which should correspond to each of the three classes.

C.4 Statewide Landslide Susceptibility Overview

This new dataset included in the SLIDO-4.0 update is based on DOGAMI Open-File Report O-16-02 (Burns and others, 2016) and will not be updated in future releases of SLIDO.