

Deep Landslide Susceptibility Map of Eugene and Springfield, Lane County, Oregon

2018

IMS-60 INTERPRETIVE MAP SERIES Landslide Hazard and Risk Study of Eugene-Springfield and Lane County, Oregon

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PLATE 3

NOTICE

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. See the accompanying text report for more details on the limitations of the methods and data used to prepare this publication.

ABOUT THIS PUBLICATION

The eastern portion of Lane County contains the cities of Eugene, Springfield, and Coburg. Because landslides are one of the most widespread and damaging natural hazards in the state, it is important to map and assess the risk in the study area. The purpose of this study is to assist the city and county in understanding the landslide hazard better and thus increase their ability to reduce future risk. The study publication consists of a text report, three map plates, and GIS data.

EXPLANATION

This map depicts susceptibility to deep landslides in this area. For the purpose of this map, deep landslides are defined as those with a depth to the failure plane of greater than 15 ft (4.5 m) (Burns and Madin, 2009).

This susceptibility map was prepared by combining three factors: 1) landslide inventory data taken from the corresponding inventory map, Lane Plate 1; and head scarp buffers, 2) minimal zone buffers, and 3) geologic susceptibility zone buffers. The combination of these factors comprises the relative susceptibility hazard zones. High, moderate, and low hazard zones are shown on this map. The deep landslide susceptibility data are displayed on top of a base map that consists of the lidar-derived digital elevation model. For additional detail on how this map was developed see the accompanying text report.

DEEP LANDSLIDE SUSCEPTIBILITY CLASSIFICATION

Each landslide susceptibility hazard zone shown on this map has been developed according to a classification scheme using a number of specific factors. The classification scheme was developed by the Oregon Department of Geology and Mineral Industries. The symbology used to display these hazard zones is explained below.

Deep Landslide Susceptibility Zones: This map refers to show the relative degree of hazard. Each zone is a combination of several factors (see Hazard Zone Matrix, below).

HIGH: High susceptibility to deep landslides.
Deposits mapped as historical and/or active are outlined in black.
MODERATE: Moderate susceptibility to deep landslides.
LOW: Low susceptibility to deep landslides.

Contributing Factors		Final Hazard Zone		
		High	Moderate	Low
Landslide, Head Scarp Buffer, Buffer		Included	Included	Included
Geologic Factors and Minimal Zone Buffer		Included	Included	Included
Minimal Geologic Factors		Included	Included	Included

Landslide Inventory

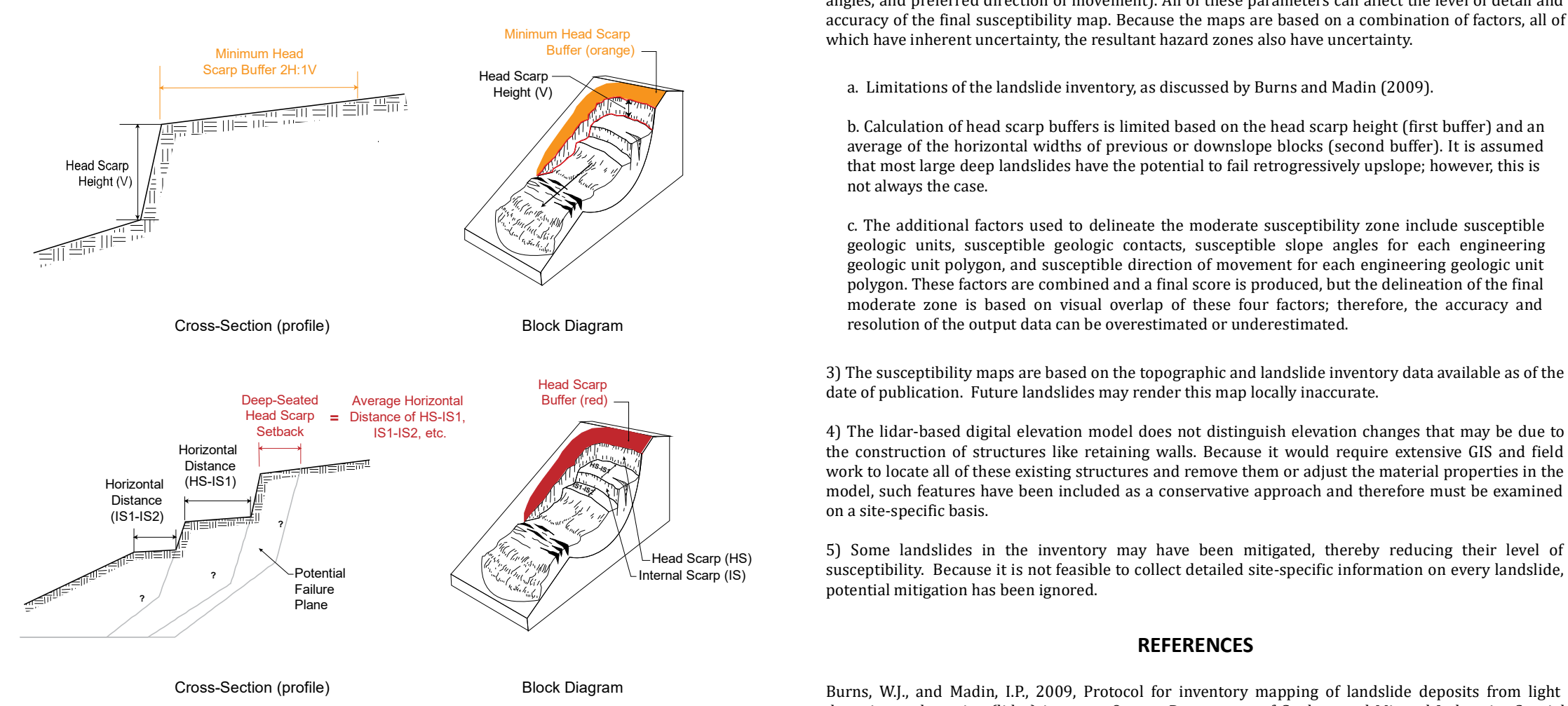
An inventory of all existing landslides in this area is shown on Plate 1. We prepared this inventory map by compiling all previously mapped landslides from published and unpublished geologic and landslide mapping, analyzing lidar-based geomorphology, and reviewing aerial photographs. We also attributed each landslide with classifications for activity, depth of failure, movement type, and confidence of interpretation. We created the inventory by using the protocol developed by Burns and Madin (2009). We extracted the deep landslides from the inventory and used them to create the deep landslide susceptibility map.

Head Scarp Buffers

Buffers were applied to all head scarps from the landslide inventory (Plate 1). In most cases the first buffer reveals a maximum buffer distance and the second buffer (described below) results in the maximum buffer distance. In all cases the greater of the two was used.

The first buffer (orange on diagram) consists of a 2.5 horizontal to vertical distance (2H:1V). This buffer is different for each head scarp and is dependent on head scarp height. For example, a head scarp height of 10 ft (3.0 m) has a 2H:1V buffer equal to 30 ft (9.1 m).

The second buffer (red on diagram) is different for each head scarp and is dependent on the average of the horizontal distance between internal scarps. For example, an average horizontal distance of 150 ft (45 m) has a 2H:1V buffer equal to 300 ft (91 m).



(Modified from Burns and Madin, 2009)

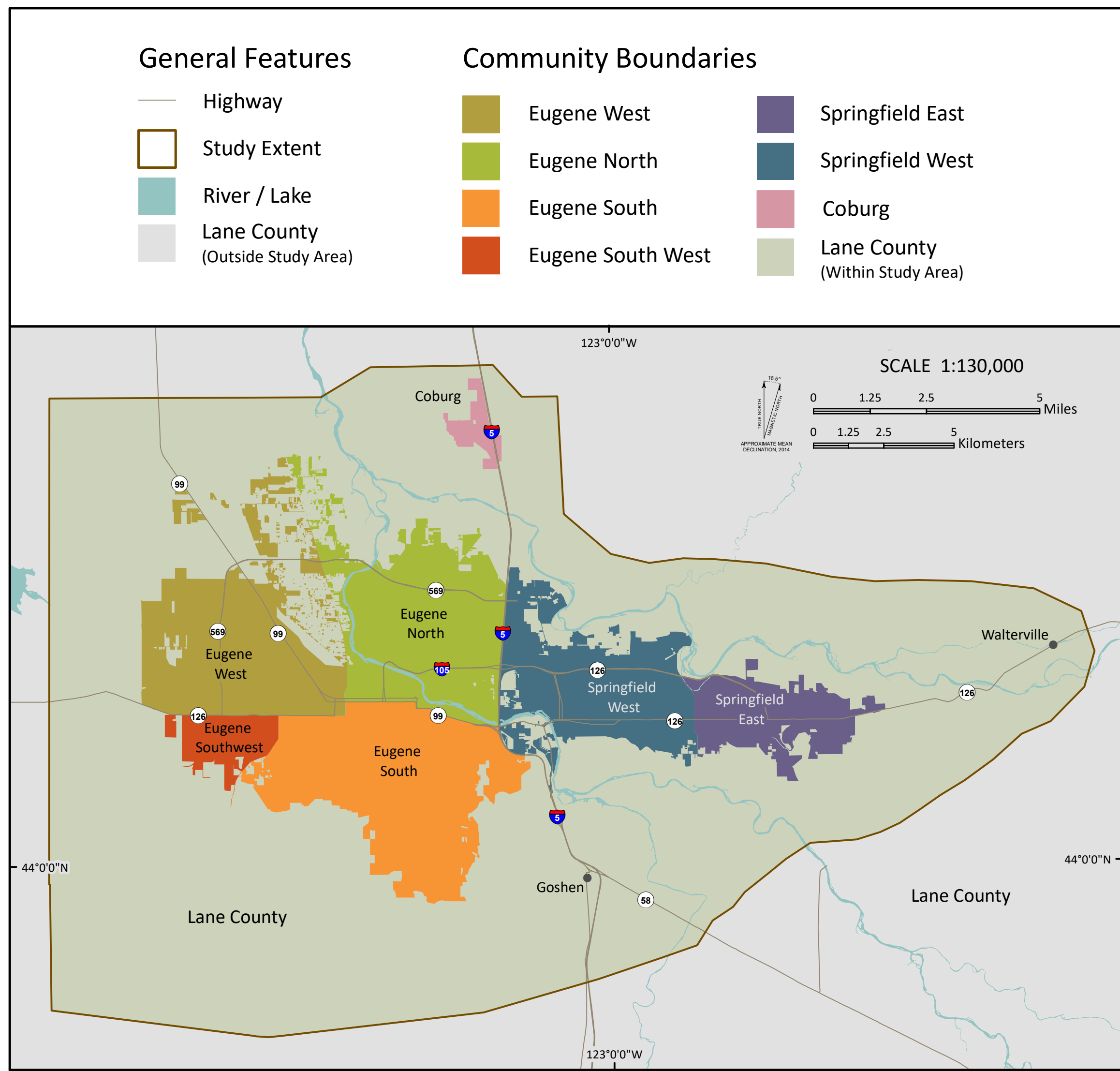
REFERENCES

Burns, W.J., and Madin, L.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, 38 p., <http://www.dgmi.org/pubs/sp42/>.

Burns, W.J., and Madin, L.P., 2016, Protocol for deep landslide susceptibility mapping: Oregon Department of Geology and Mineral Industries Special Paper 46, 49 p.

Burns, W.J., Madin, L.P., Jones, C.B., Pollock, S.G., Hughes, K.L., and Shetter, R., 2013, Landslide hazard and risk study of northeastern Clatsop County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report OF-14-06, 38 p., 74 p., scales 1:50,000, 1:80,000. <http://www.dgmi.org/pubs/ofr14-06/>.

Study Area Communities Map



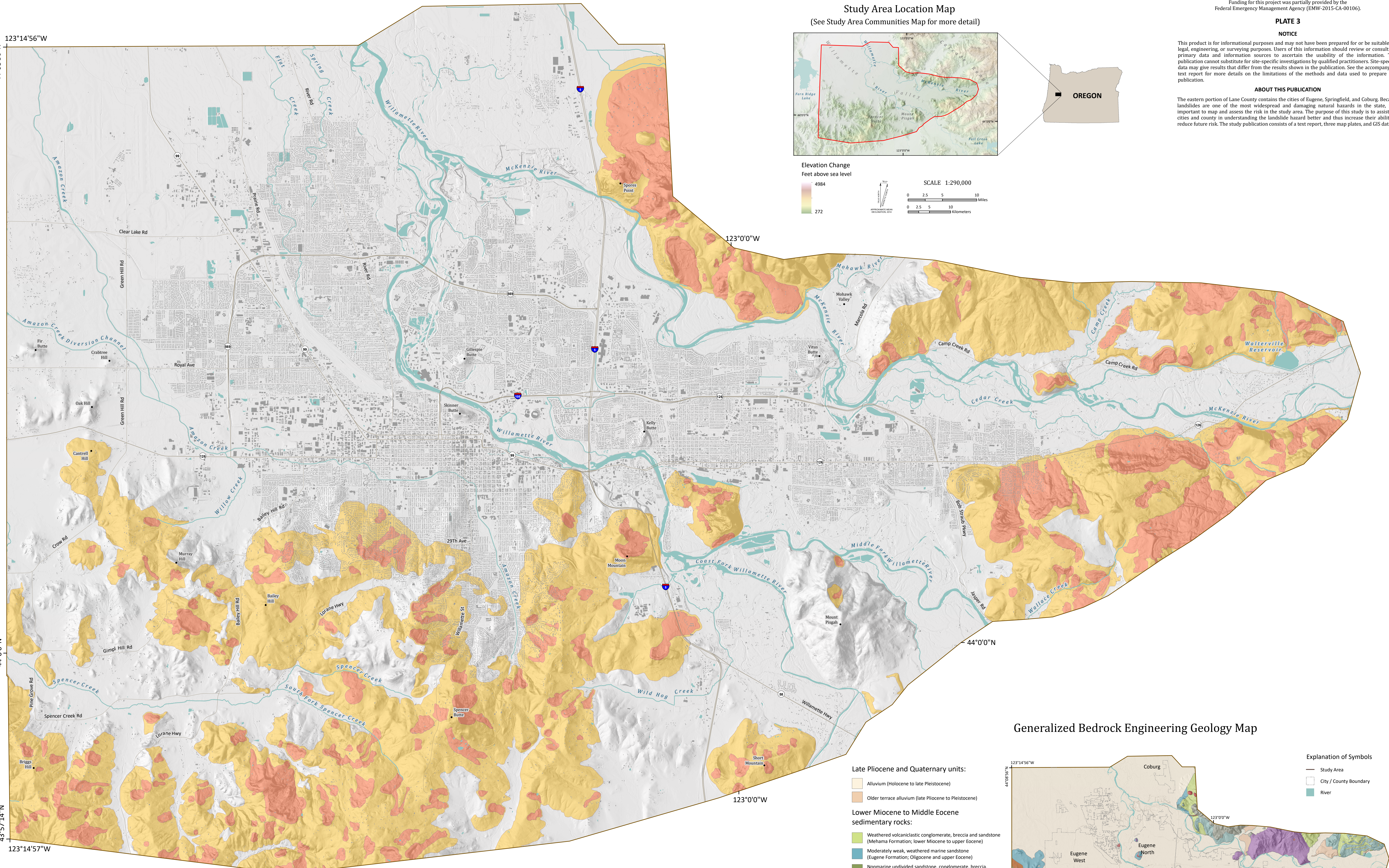
Source Data:
Oregon Lidar Consortium, 2008-2009 and 2013-2015, 3-foot bare earth lidar digital elevation model for Oregon (44223-81), Crow (43123-91), Eugene East (44223-83), Eugene West (44223-82), Fox Hollow (43123-82), Jasper (43123-86), Junction City (44223-82), Springfield (44223-82), Ash, Waterville (44223-82).

Water features are from the USGS National Hydrography Dataset (2015). Highways and signed routes are from the Oregon Department of Transportation (2015). Additional physical and cultural locations are from the Geographic Names Information System (GNIS), U.S. Geological Survey (2013). Eugene and Springfield community boundaries and building footprints are from Lane Council of Governments (2017).

Projection:
Oregon Statewide Lambert Conformal Conic, Unit: International Feet.
Horizontal Datum: NAD 1983 HARN, UTM Coordinates: Zone 10N, NAD83.

Software:
ESRI ArcMap® 10.6

Cartography:
Jon J. Franczyk



Late Pliocene and Quaternary units:

Alluvium (Holocene to late Pleistocene)
Older terrace alluvium (late Pliocene to Pleistocene)

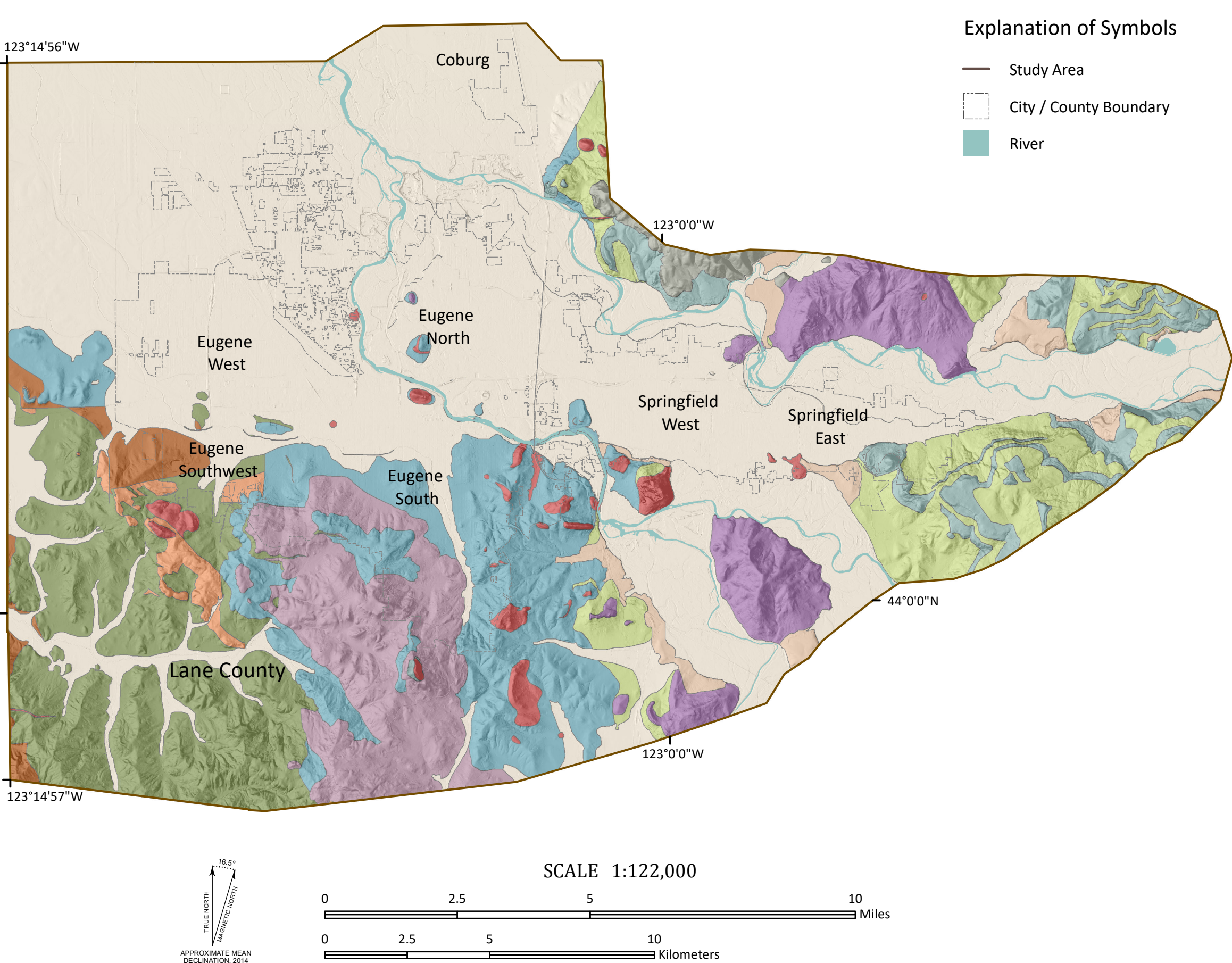
Lower Miocene to Middle Eocene sedimentary rocks:

Weathered volcaniclastic conglomerate, breccia and sandstone (Mehama Formation; lower Miocene to upper Eocene)
Moderately weak, weathered marine sandstone (Eugene Formation; Oligocene and upper Eocene)
Nonmarine undivided sandstone, conglomerate, breccia, siltstone and tuff (Fisher Formation; upper and middle Eocene)
Weakly weathered marine siltstone to sandstone to conglomerate (Spencer Formation; middle Eocene)

Lower Miocene to Eocene volcanic rocks of the early Western Cascades:

Non-welded to strongly welded tuff with clay alteration and zeolitization; intercalated tuff facies (Mohawk River caldera; lower Oligocene)
Medium weathered basaltic andesite intracanyon lavas, basalt lavas and basaltic andesite (Little Butte Volcanics; Oligocene)
Erosion-resistant, intermediate to mafic intrusions (Oligocene)
Deeply weathered to zeolitized basaltic andesite and basalt (basalt of Mount Tom; Eocene)
Ash-flow tuff (tuff of Fox Hollow; middle Eocene)
Deeply weathered basalt and basaltic andesite lavas (Fisher basalt; Eocene)

Generalized Bedrock Engineering Geology Map



Explanation of Symbols
Study Area
City / County Boundary
River