

Landslide Inventory Map of the Headwaters of the Middle Fork of the Coquille River Watershed, Coos and Douglas Counties, Oregon

2026

INTRODUCTION

The Oregon Department of Geology and Mineral Industries (DOGAMI) received funding from the Bureau of Land Management (BLM) to develop a landslide inventory of the headwaters of the Middle Fork of the Coquille River Watershed on the border of Douglas and Coos Counties in Southwest Oregon. This landslide inventory represents an essential data layer for delineating regional landslide susceptibility. This map displays the inventory of existing landslides in the study area. The text below explains how we, the authors, developed this inventory and its intended use.

METHODS

We prepared this inventory map by following the Protocol for Inventory Mapping of Landslide Deposits from Light Detection and Ranging (LiDAR) Imagery developed by Burns and Madin (2009). The three primary tasks included compilation of previously mapped landslides (including review of the Statewide Landslide Information Layer for Oregon (SLILO) Release 4.1 (Prange and others, 2014)), lidar-based mapping of landslide features, and review of aerial photographs (NAIP, 1995–2023). We digitally compiled the landslides identified by these methods into a GIS database and included them in varying scales. As recommended by the protocol, this geodatabase contains data at 1:5,000 or better. For representation purposes, however, the map plate presents this data at 1:20,000.

We also attributed each landslide with classifications for activity, depth of failure, movement type, and confidence of interpretation. The landslide data appear on top of a base map that consists of an aerial photograph (orthorectified) overlaid on the lidar-derived hillshade image.

APPLICATIONS AND INTENDED USE

This landslide inventory map provides users with basic information regarding landslides within the study area. The geology, terrain, and climate conditions that led to landslides in the past may provide clues to the locations and conditions of future landslides. This map should provide useful information for the development of regional landslide susceptibility maps, for site-specific investigations for future developments, and for avoidance of regional planning and mitigation of existing landslides.

Please note that this inventory is not regulatory in nature. Additionally, the mapped area may contain unidentified landslides either because the mapping protocol did not identify them or because they occurred after the map was prepared. DOGAMI reserves the right to revise the inventory when new information regarding landslide status or when new landslides occur.

LANDSLIDE CLASSIFICATION

This map plate displays each landslide deposit in the mapped watershed and symbolizes them based on several key characteristics: landslide activity, landslide features, deep or shallow failure, confidence of landslide interpretation, and type of landslide movement. We determined these landslide characteristics from the geomorphic features, or landforms, observed for each landslide. The legend below explains the symbology we used to represent these characteristics. The digital geodatabase included with this publication also contains additional characteristics.

LANDSLIDE ACTIVITY: We classified each landslide according to the relative age of most recent movement. The map display uses color to show the relative age of activity.

HISTORIC and/or ACTIVE movement less than 150 years ago: The landslide appears to have moved within historic time or is currently moving actively.

PRE-HISTORIC or ANCIENT (movement greater than 150 years ago): Landslide features are slightly eroded and there is no evidence of historic movement. In some cases, the observed landslide features have been greatly eroded and/or covered with non-landslide deposits, for example, lava, which resulted in smoothed and subdued morphology.

LANDSLIDE FEATURES: The high resolution of the lidar-derived topographic data allowed the identification of additional landslide features. These include:

HEAD-SCARP ZONE and FLANK ZONE: The head scarp or uppermost scarp, which in many cases exposes the primary failure plane (surface of rupture), and flanks or shear zones.

HEAD-SCARP LINE and INTERNAL SCARP LINES: Uppermost extent of the head scarp and internal scarps within the body of the landslide. Hatching is in the down-dropped direction.

DEPTH OF FAILURE: We estimated the depth of landslide failure from scarp height. Failures less than 4.5 m (15 ft) deep are classified as shallow, and failures greater than 4.5 m (15 ft) deep are classified as deep.

SHALLOW LANDSLIDE: Estimated failure plane depth is less than 4.5 m (15 ft).

DEEP LANDSLIDE: Estimated failure plane depth is greater than 4.5 m (15 ft).

CONFIDENCE OF INTERPRETATION: We classified each landslide according to our “confidence” that the landslide actually exists. We mapped landslides on the basis of characteristic morphology, and the confidence of interpretation was based on how clearly visible that morphology is. In landslide ages, after the most recent movement, weathering (primarily through erosion) degrades the morphology produced by landsliding. With time, landslide morphologies may become so subtle that they resemble morphologies produced by other processes and conditions unrelated to landsliding.

Landslides may have several different types of associated morphologies, and we define confidence through a simple point system (see table below). The point system is based on a 0 to 10 point ranking of each of four primary landslide features. For example, if the head scarp and the depth of failure were difficult to see during mapping, the mapper would apply 10 points for the head scarp and 10 points for the toe, equaling 20 points, which would be associated with a moderate confidence of identification.

Differing line styles differentiate between this landscape characteristic as shown in the legend below.

	HIGH CONFIDENCE (≥ 30 points)	Landslide Feature	Points
	MODERATE CONFIDENCE (20 – 30 points)	Head scarp	0–10
	LOW CONFIDENCE (< 20 points)	Flanks	0–10
		Toe	0–10
		Internal scarps, sag ponds, compression ridges, etc.	0–10*
		* Applied only once so that total points do not exceed 40.	

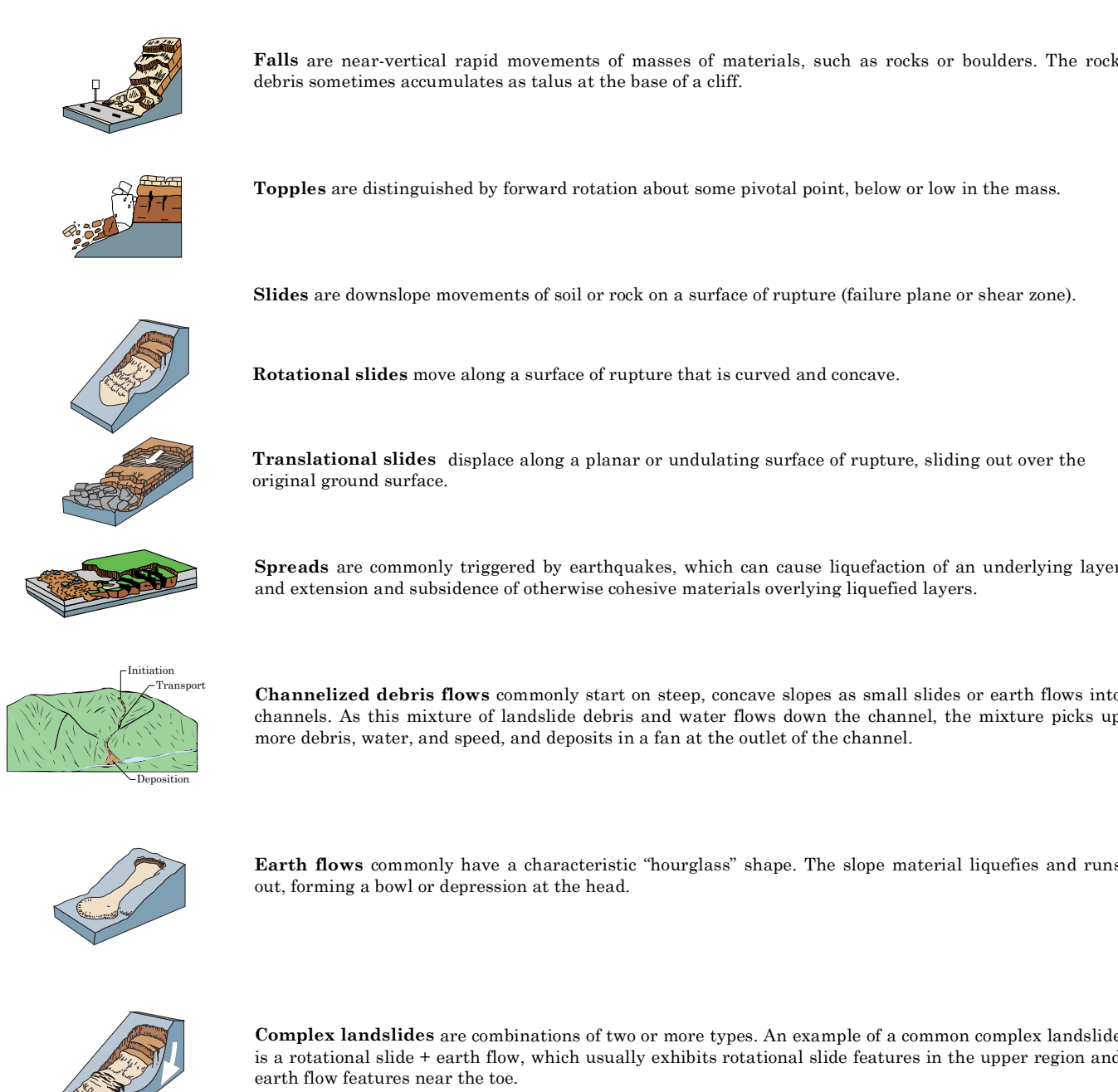
CLASSIFICATION OF MOVEMENT: We classified each landslide with its type of movement: slide, flow, topple, and spread (Varnes, 1978). The combination of movement types with material type (rock, debris, or soil) forms the landslide classification. Not all combinations are common in nature, nor are all present in this study area.

The table below displays the landslide movement types (Varnes, 1978). Illustrations (some modeled from Highland, 2010) and definitions of the types of movement are available below the table.

Type of Movement	Rock	Debris	Soil
Fall	RF: rock fall	DF: debris fall	EF: earth fall
Topple	RT: rock topple	DT: debris topple	ET: earth topple
Slide-rotational	RS-R: rock slide-rotational	DS-R: debris slide-rotational	ES-R: earth slide-rotational
Slide-translational	RS-T: rock slide-translational	DS-T: debris slide-translational	ES-T: earth slide-translational
Lateral spread	RSP: rock spread	DSP: debris spread	ESP: earth spread
Flow	RFL: rock flow	DFL: debris flow	EFL: earth flow
Complex	C: complex or combinations of two or more types (for example, ES-R + EFL)		

TYPES OF LANDSLIDES:

The following figures and definitions (modeled from Highland, 2010) illustrate the different types of landslide movement.

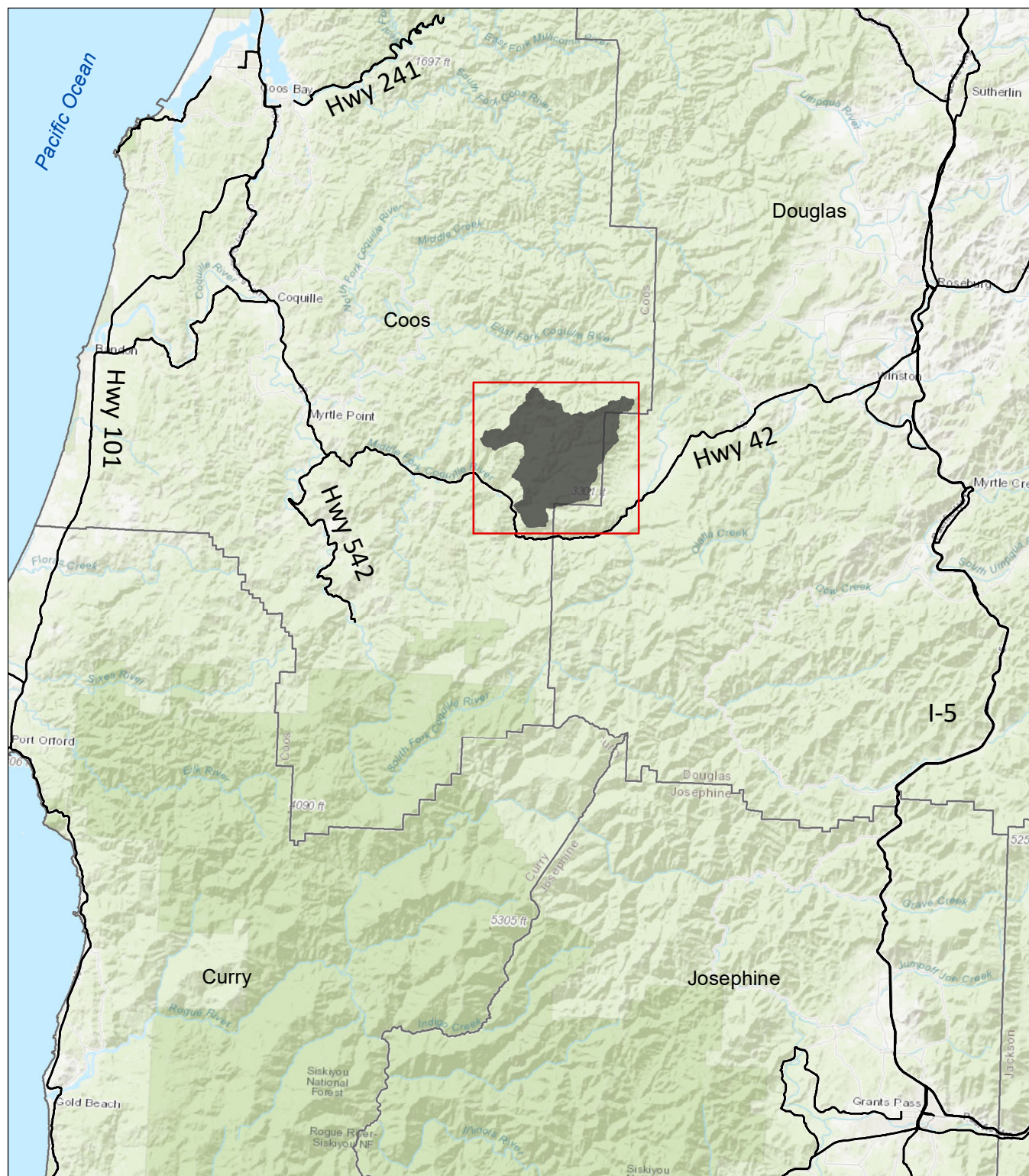


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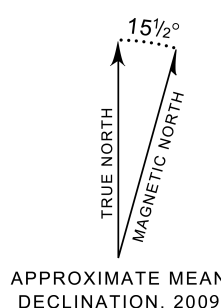
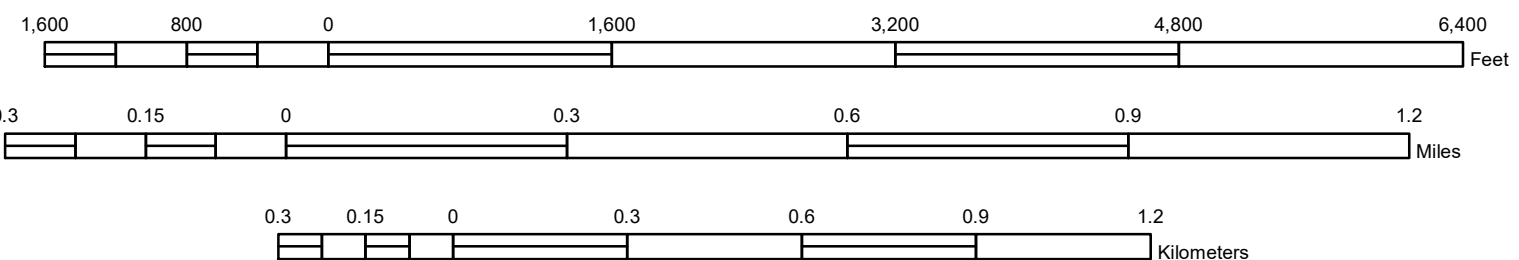
LOCATION MAP

The location map below shows key geographic locations in southwestern Oregon. The red box shows the extent of the map; the gray shaded area shows the area of detailed landslide inventory in the headwaters area of the middle fork Coquille River Watershed.



Base Map:
Lidar data for this publication from DOGAMI Lidar Data Quadrangles LDQ 42123_H7, 43123_A6, 43123_A7, and 43123_A8.
Digital elevation model (DEM) consists of a 3-foot-square elevation grid that was converted into a hillshade image with sun angle at 315 degrees at a 60-degree angle from horizontal. The DEM was multiplied by 2 (vertical exaggeration) to enhance slope areas.
2009 orthophoto imagery from Oregon Geospatial Enterprise Office and is draped over the hillshade image with transparency.
Projection: North American Datum 1983, UTM zone 10.
Software: ArcMap 10.7.1, Adobe Illustrator CS6.
Source File: BLMSBHeadwaters_middleForkCoquilleRiver

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