

Evaluating Landslide Risk in Multnomah County, Oregon

Ben Delyea

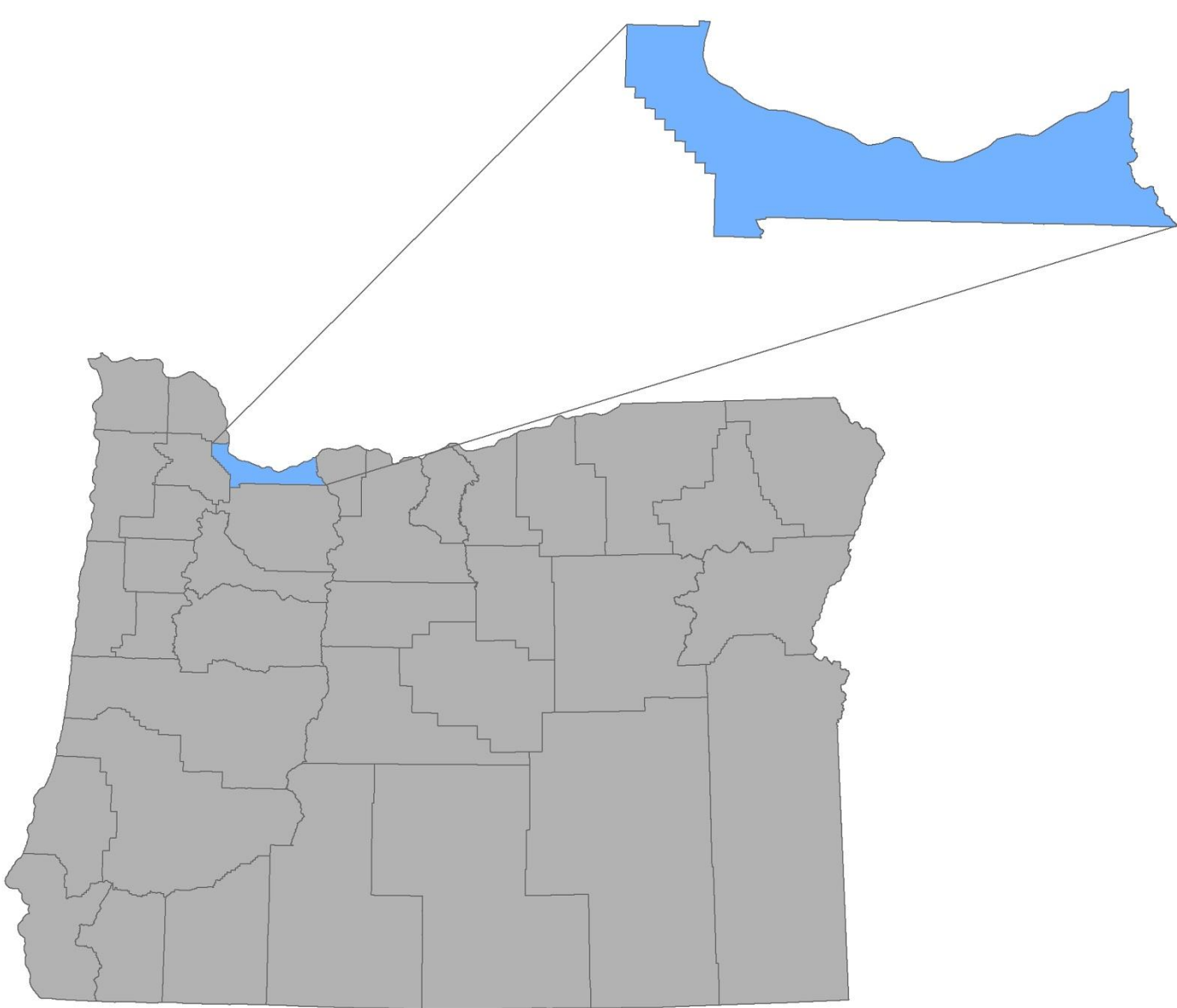
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Sara Miller

__Introduction__

"High risk areas for landslides are locations where landslides have occurred in the past or appear likely to occur in the future and there are buildings or infrastructure in these areas. The overlap of landslide hazard areas with developed areas is what results in risk - threats to buildings and infrastructure." (Oregon OEM)

This study addresses landslide risk only in "semi-quantitative" terms to identify areas of susceptibility within Multnomah County. The slopes and hills surrounding the Portland Metro Area are a great concern for city planners, natural and emergency resources alike. In order to identify and prioritize mitigation and response plans, analyses such as this prove to be invaluable tools to ensuring the protection of life, property, and community resources.



__Methodology__

Land Use__Reclassify//
water/developed/barren/forest/shrubland/cultivated/wetlands

Soils__Drainage Type__Reclassify// very poorly
drained/somewhat poorly/poorly/moderately well drained

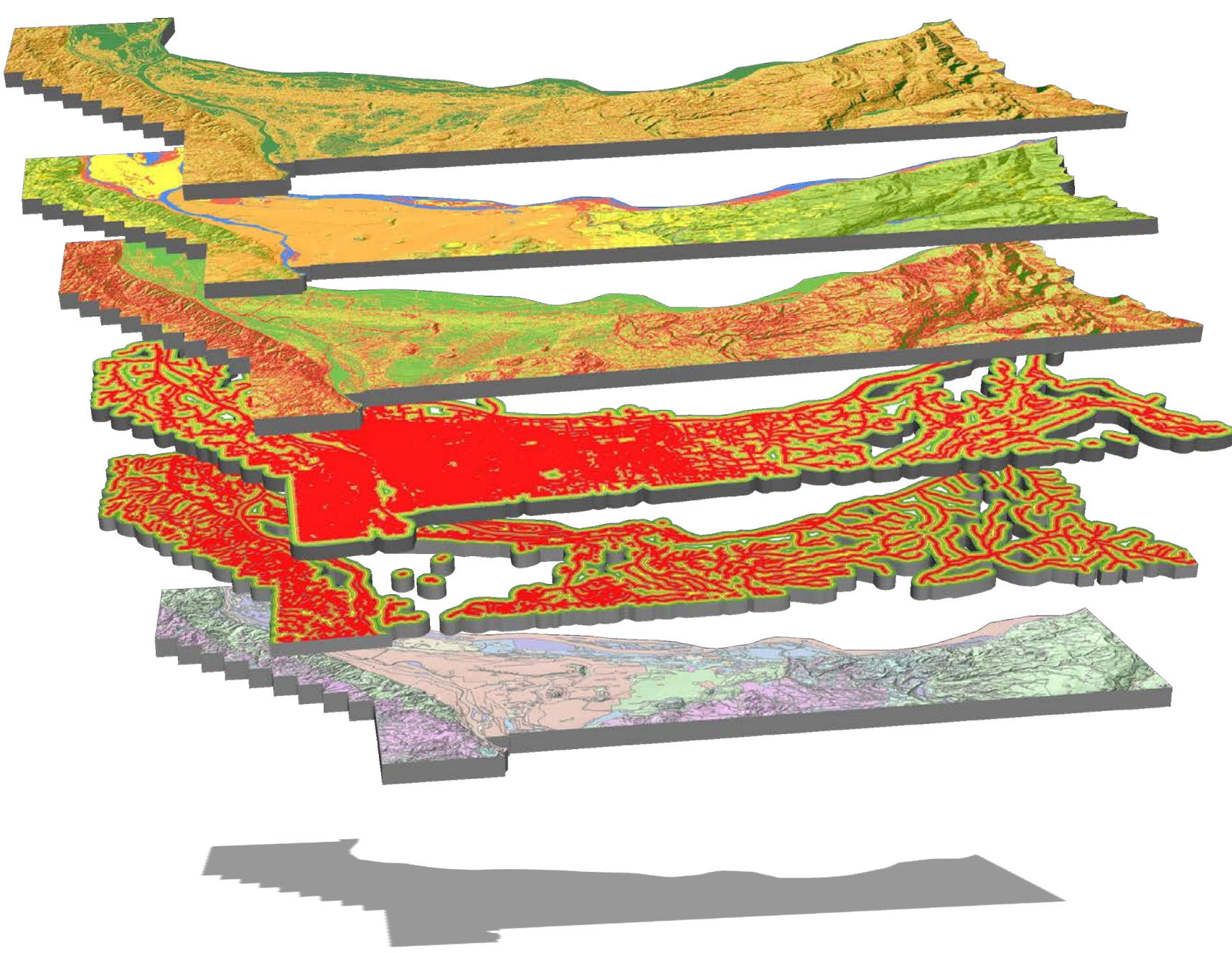
DEM__Slope__Reclassify//Degree_0-10/10-20/20-30/30-40/40-86
DEM__Aspect__Reclassify// Flat/North/West/South/East

Roads__Buffer// 500 ft/1000 ft/1500 ft/2000 ft/2500 ft

Streams__Buffer// 500 ft/1000 ft/1500 ft/2000 ft/2500 ft

Weighted Analysis//below

Raster to Polygon + Select by Location//below



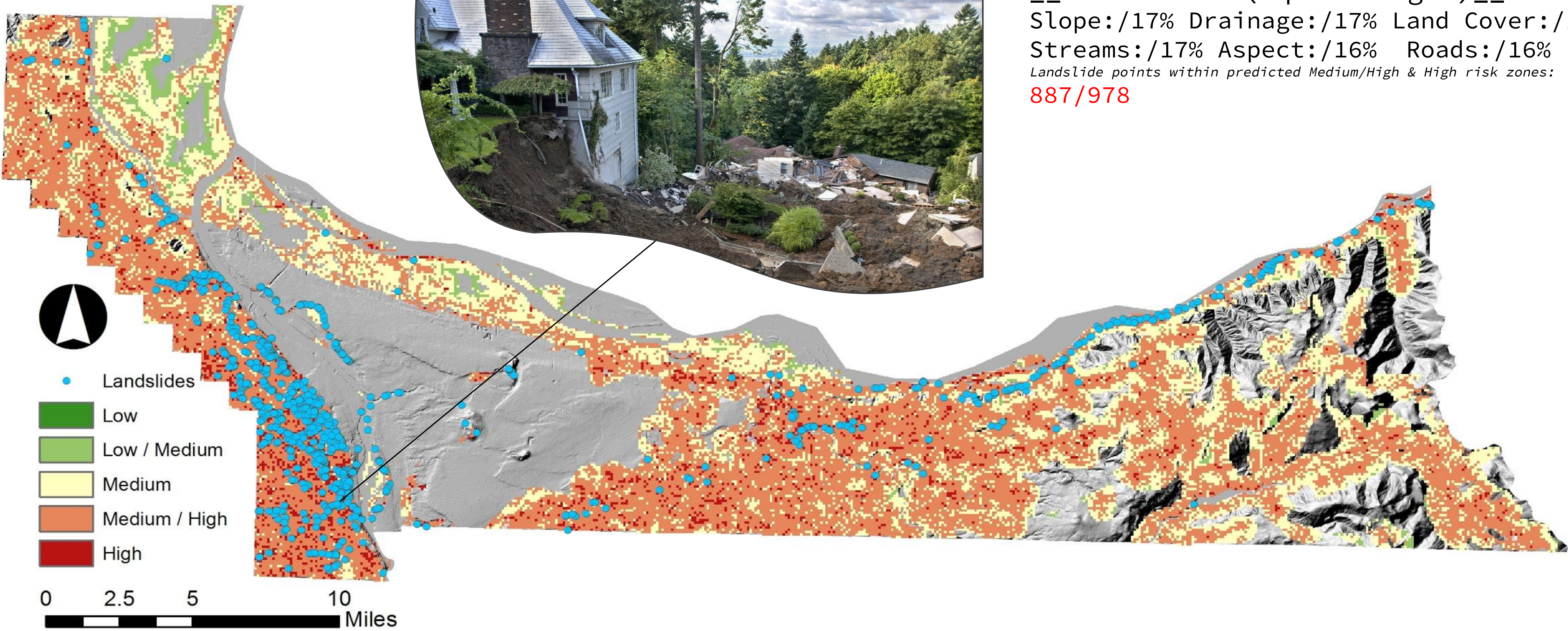
Left: Northwest Marlborough Avenue in Northwest Portland (Photo: Portland Fire 2015)
Above: SE Foster Road (Photo: KGW 2015)

__Conclusion__

This study provided insight into some reliable factors for analysis for landslide hazard prediction in Multnomah County, however more site-specific analysis should be conducted according to needs and goals for projects or predictions. A closer look at soil composition, micro-slope analysis, hydrology, and estimates of the return periods of landslides in specific locations will require more detailed analysis depending on site specific factors.

__References__

Literature:
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Shahabi, H., & Hashini, M. (2015). Landslide susceptibility mapping using GIS-based statistical models and Remote sensing data in tropical environment. *Scientific Reports*, 5, 9899. <http://doi.org/10.1038/srep09899>
Shit, P.K., Bhunia, G.S. & Meiti, R. Model. *Earth Syst. Environ.* (2016) 2: 21. <https://doi.org/10.1007/s40808-016-0078-x>
Data:
Oregon Spatial Data Library, DOGAMI



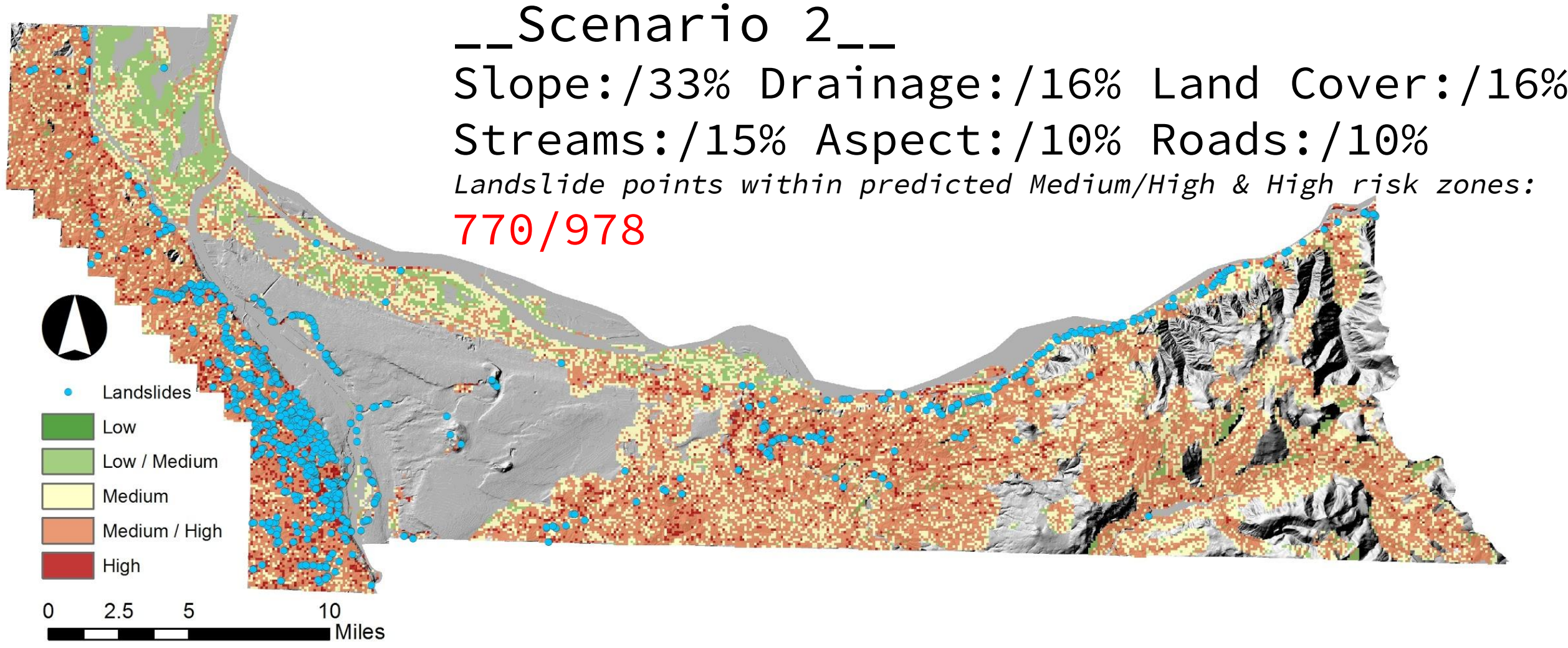
__Scenario 1 (Equal Weight)__

Slope:/17% Drainage:/17% Land Cover:/17%

Streams:/17% Aspect:/16% Roads:/16%

Landslide points within predicted Medium/High & High risk zones:

887/978



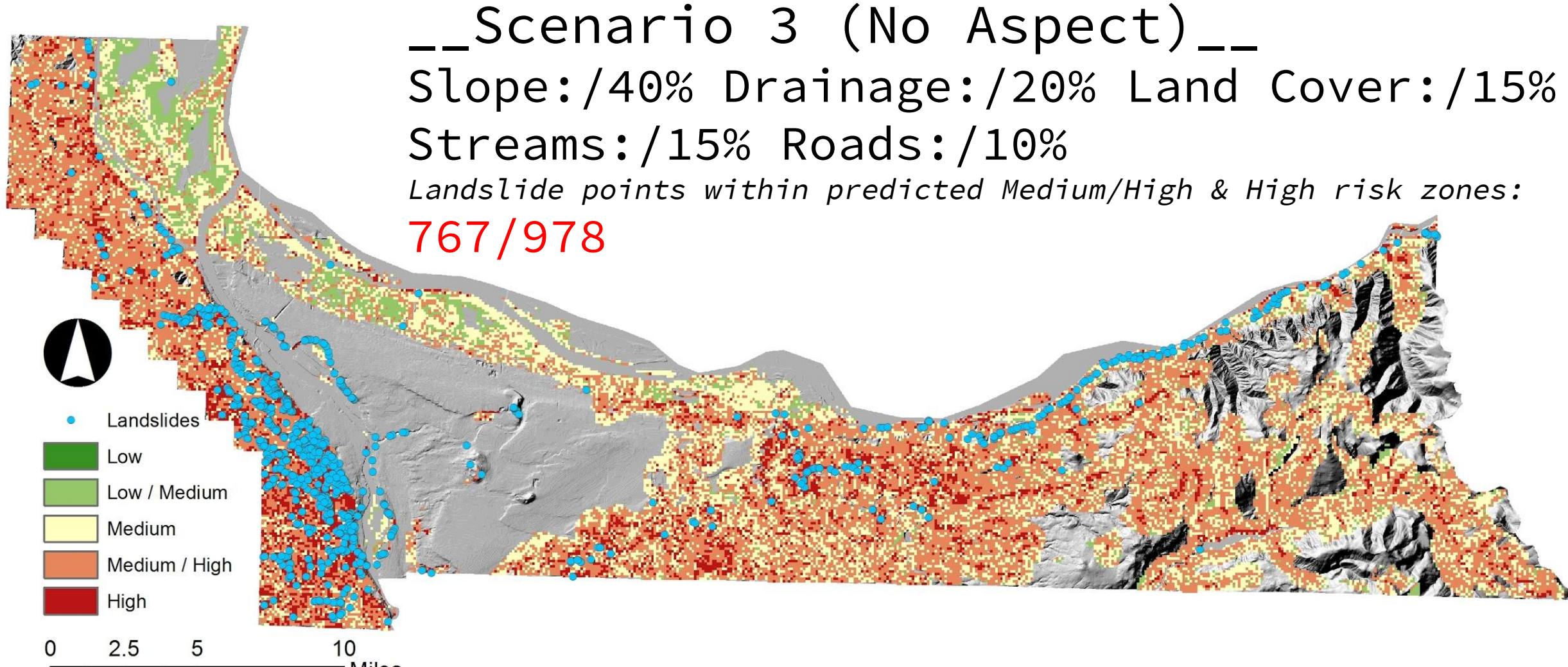
__Scenario 2__

Slope:/33% Drainage:/16% Land Cover:/16%

Streams:/15% Aspect:/10% Roads:/10%

Landslide points within predicted Medium/High & High risk zones:

770/978



__Scenario 3 (No Aspect)__

Slope:/40% Drainage:/20% Land Cover:/15%

Streams:/15% Roads:/10%

Landslide points within predicted Medium/High & High risk zones:

767/978