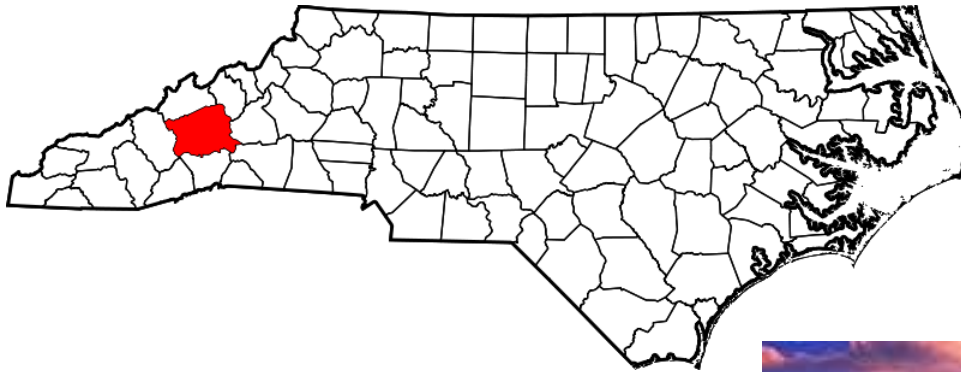




Landslides in Buncombe County

Brandi Martin

Where is Buncombe County?



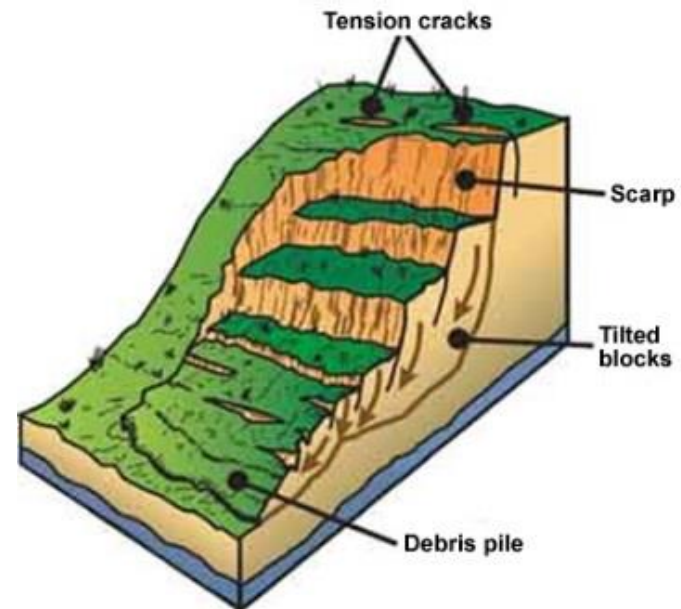
Landslides

- “perceptible downward and outward movement of slope-forming soil, rock, and vegetation under the influence of gravity”- Geological Survey of Alabama
- Areas Generally prone to landslides (USGS)
 - where landslides have occurred in the past
 - on or at the base of slopes
 - at the base or top of steep cut slope
 - on developed hillsides

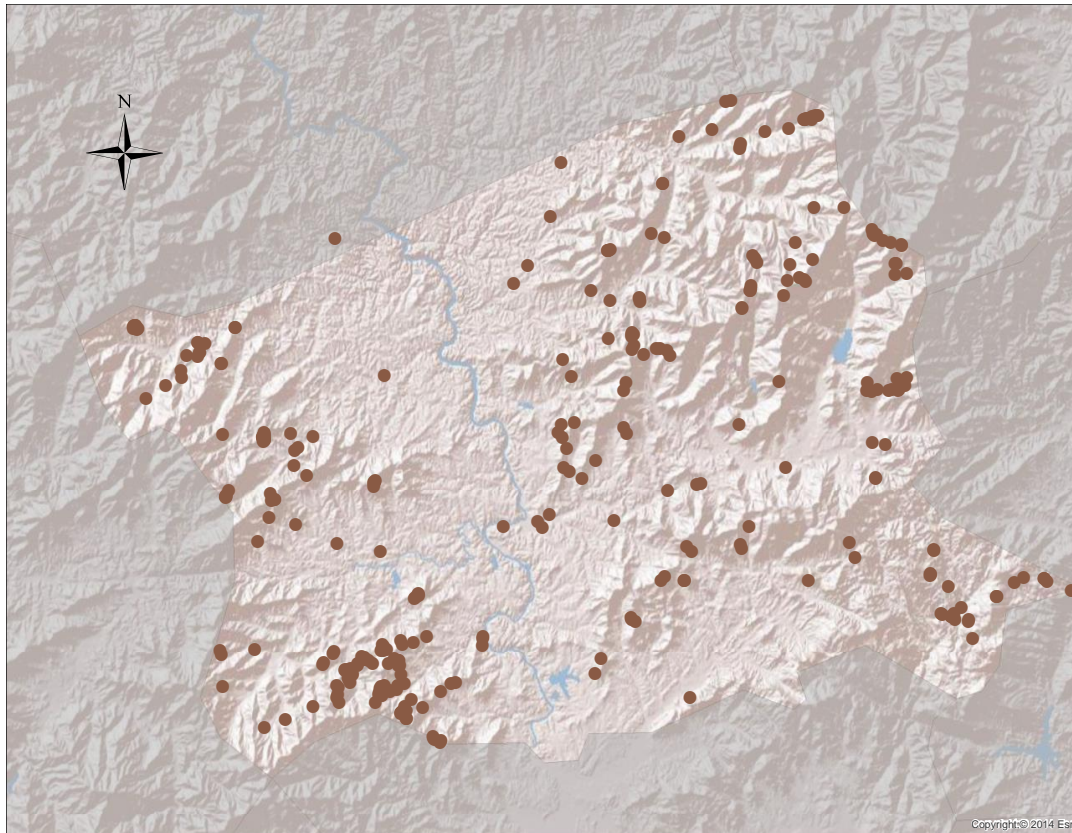
Other contributing factors

- Land use and vegetation
- Tension cracks (open fractures in the ground)
- Heavy precipitation

Which variables are the best predictors for future landslides?



Past landslides (1970-2014)



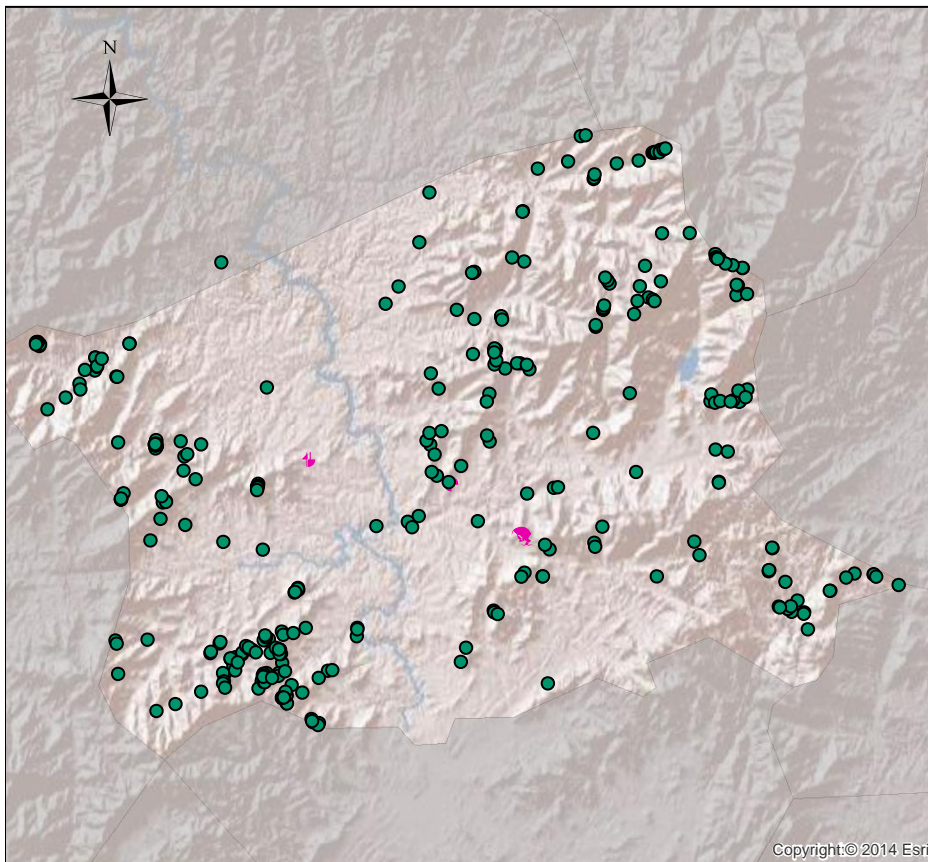
Legend

- ProcesspointsBuncombe
- U.S. Counties (Generalized)
- World Shaded Relief

Data from Rick Wooten of the North Carolina Geological Survey

Exploring relationships

Past landslides and tension cracks:

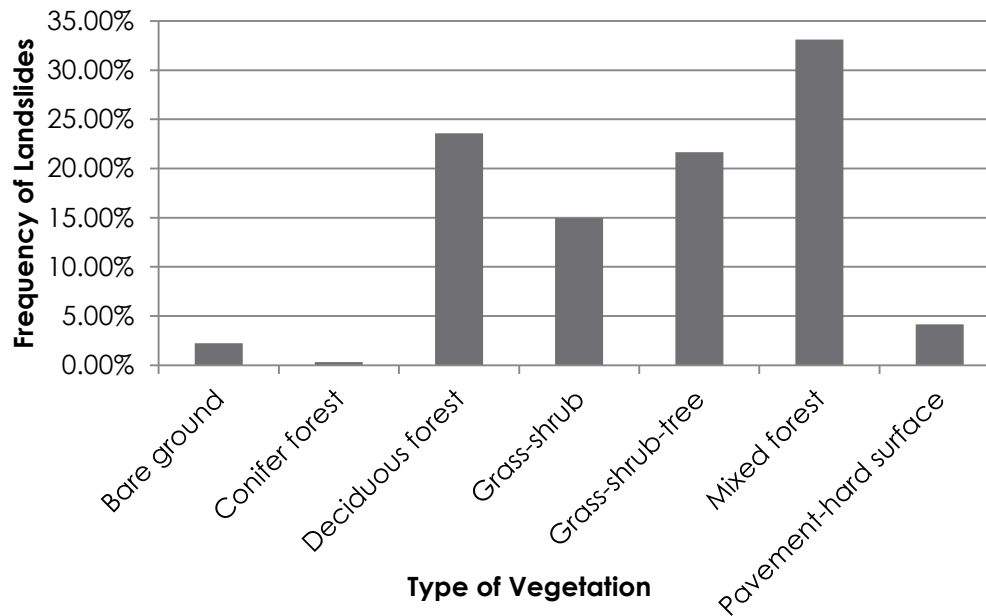


Legend

- ProcesspointsBuncombe
- Buncombecountytensioncracks
- U.S. Counties (Generalized)
- World Shaded Relief

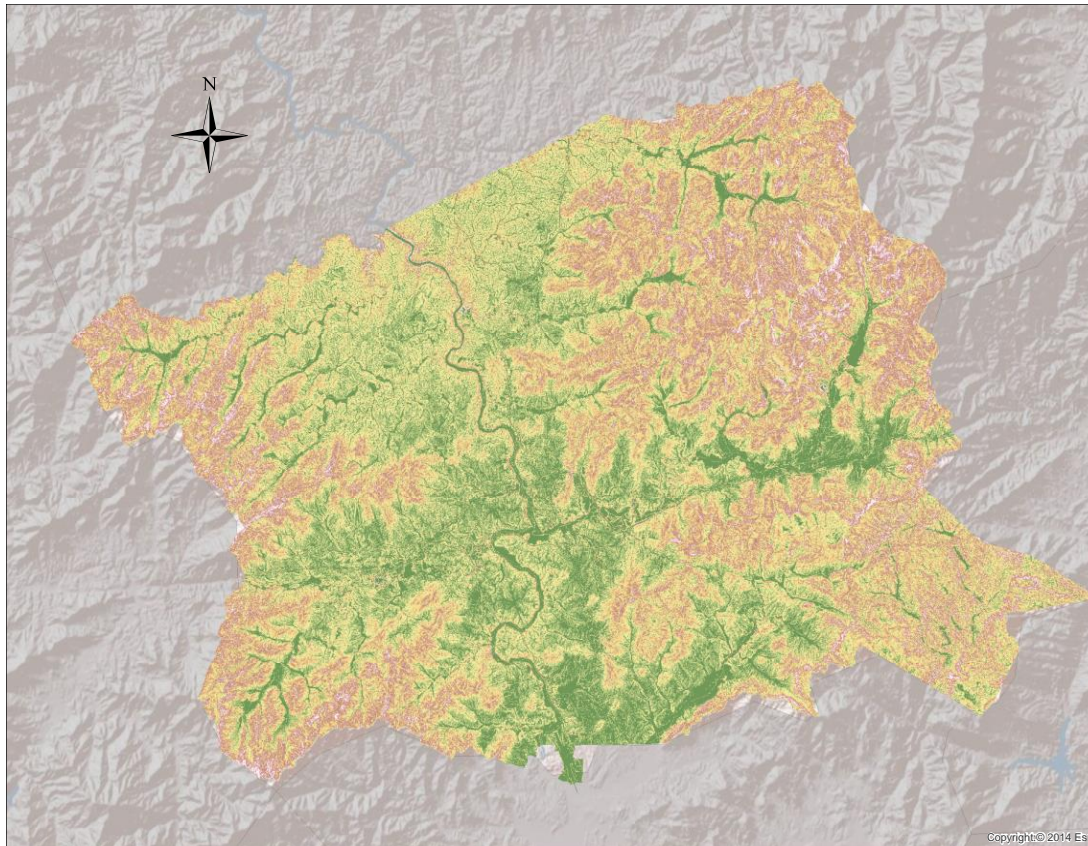
Vegetation

Frequency of landslides that occur on various types of vegetation



Slope (in degrees)

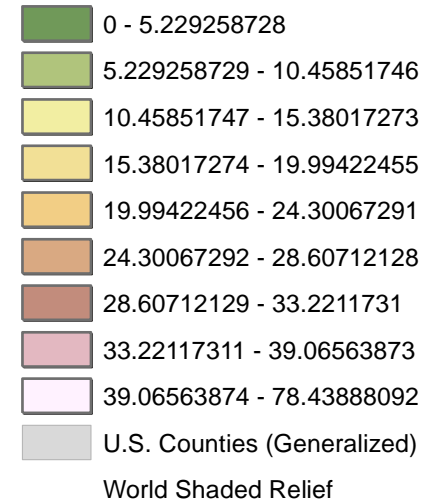
Slope calculated
from 30 m
elevation DEM from
NCDOT



Legend

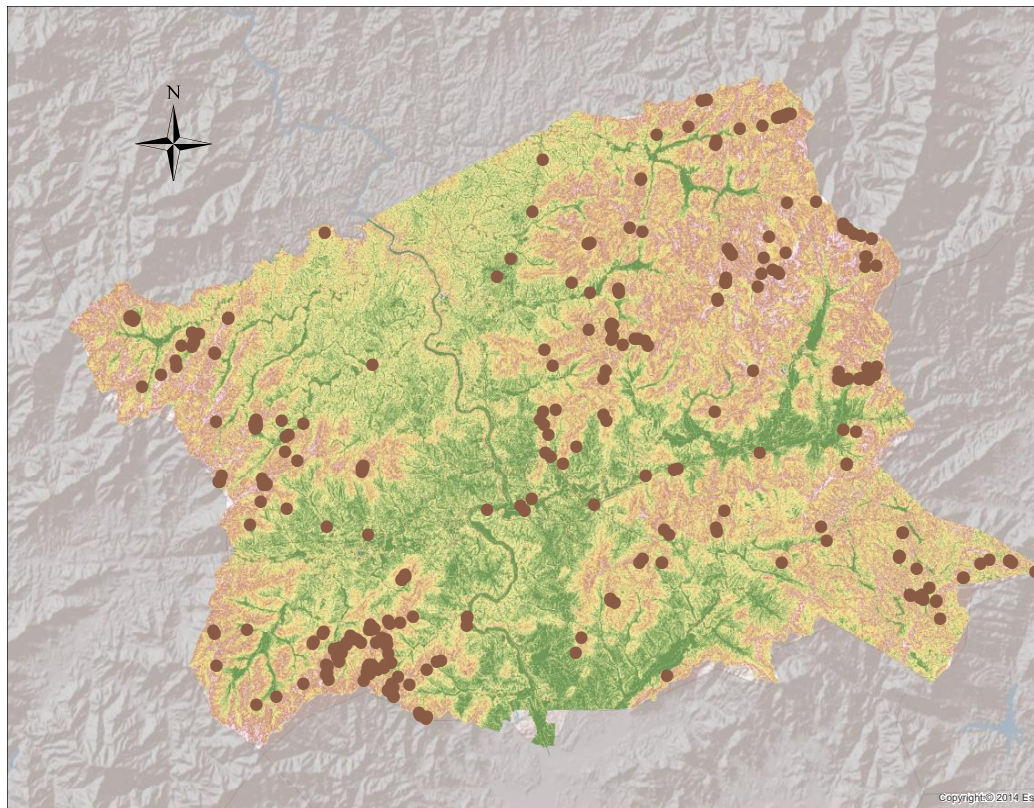
degreeslope

<VALUE>



Landslides and slope

“Landslides are most common in the mountain region of North Carolina because of steep slopes”- NCGS

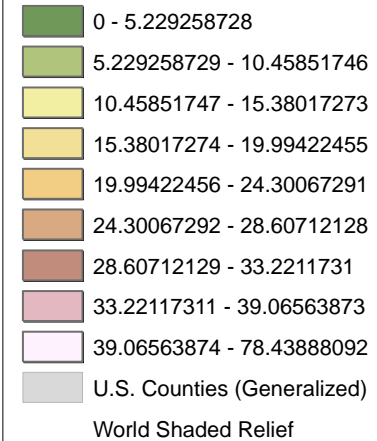


Legend

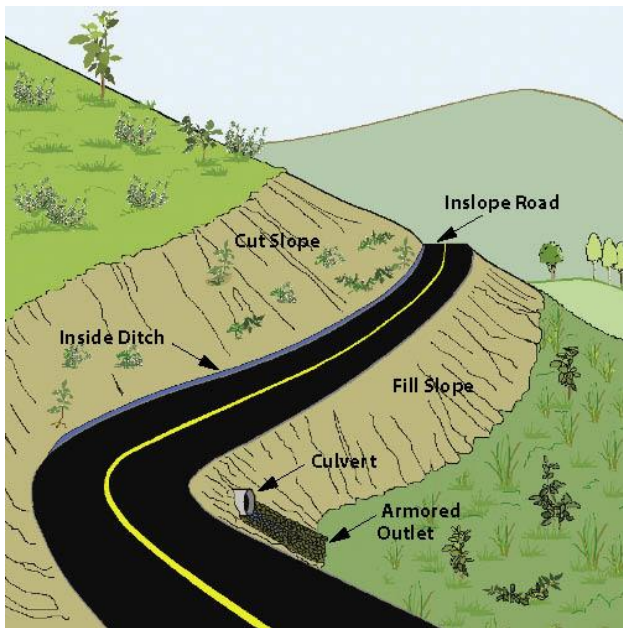
● ProcesspointsBuncombe

degreeslope

<VALUE>

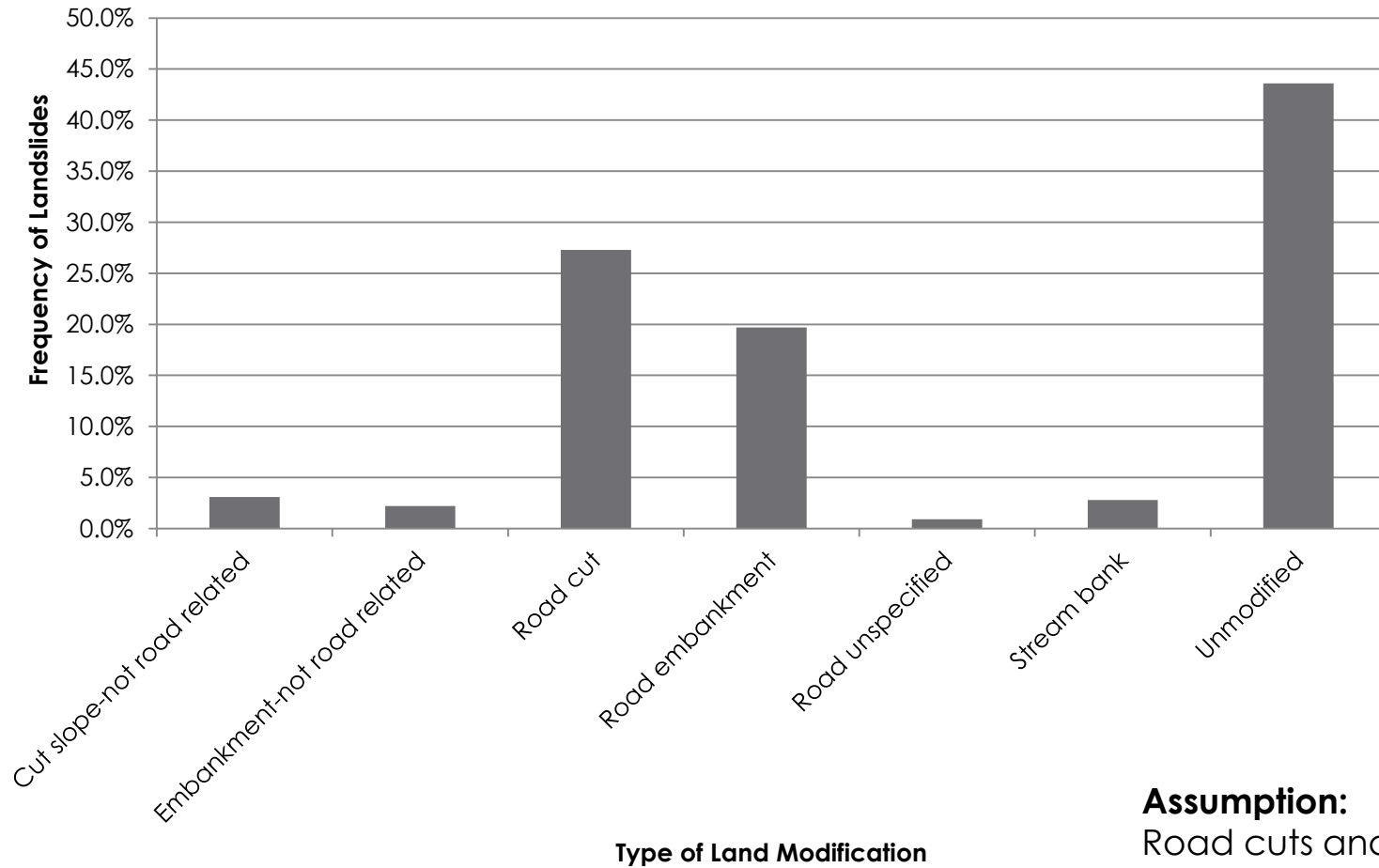


Road cuts and embankments



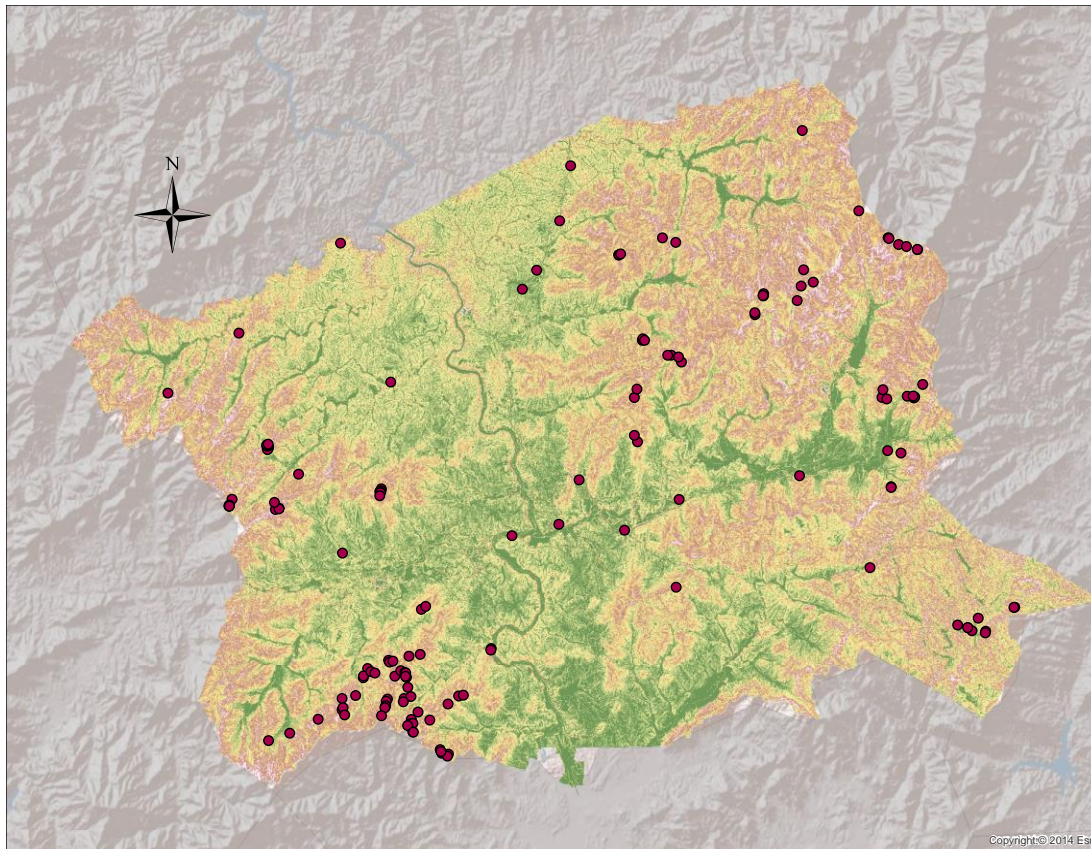
- What are they? Why do they contribute to landslides?
- Road cuts- Land is originally higher than needed → cuts in land → steep slopes
- Road embankments- land was originally lower than needed → land raised with embankment → steep slopes

Frequency of Landslides on Modified Land



Assumption:
Road cuts and
embankments
pose equal threats

Road cuts and embankments



Legend

● Roadcutsandembankment

degreeslope

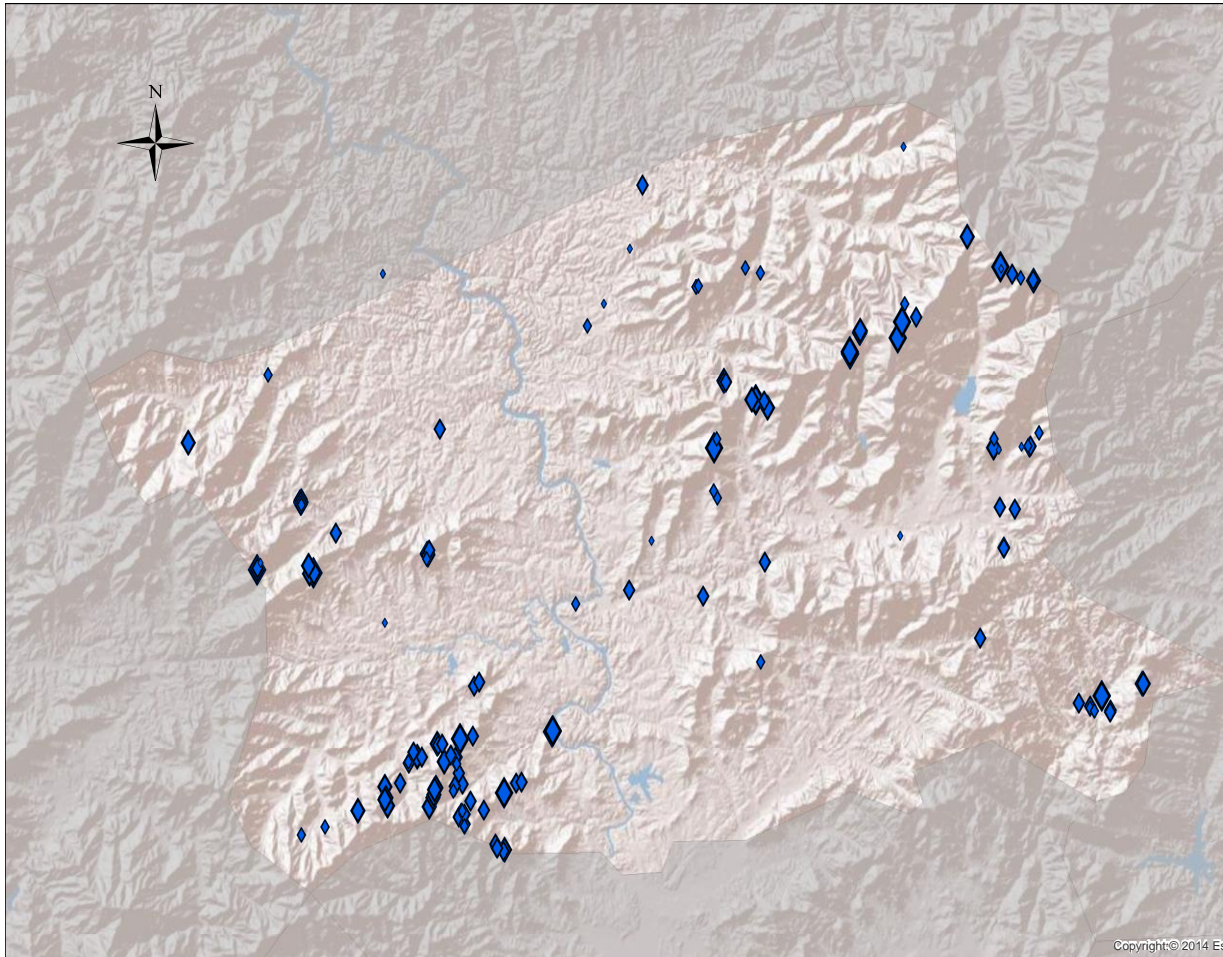
<VALUE>

- 0 - 5.229258728
- 5.229258729 - 10.45851746
- 10.45851747 - 15.38017273
- 15.38017274 - 19.99422455
- 19.99422456 - 24.30067291
- 24.30067292 - 28.60712128
- 28.60712129 - 33.2211731
- 33.22117311 - 39.06563873
- 39.06563874 - 78.43888092
- U.S. Counties (Generalized)

World Shaded Relief

Lat, long →
Display x,y

Hazard map



Legend

roadcutsandembankmentslope

RASTERVALU

- ◆ 0.506415 - 12.699304
- ◆ 12.699305 - 27.382292
- ◆ 27.382293 - 36.049000
- ◆ 36.049001 - 45.022366
- ◆ 45.022367 - 61.459202

- U.S. Counties (Generalized)
- World Shaded Relief

Convert raster
to point.
Larger
diamond →
steeper slope

Conclusion

- Nature is complicated!
- Takes a combination of variables to contribute to landslides
- Predicting natural hazards is not as easy as you might think
- Areas of past landslides, steep slope and road cuts/embankments are the best predictors for future landslides



“Landslide”—
Fleetwood Mac

Works Cited

- Research of Rick Wooten (NCGS)
- <http://saarc-sdmc.nic.in/pdf/landslide.pdf>
- <http://landslides.usgs.gov/learn/prepare.php>
- <http://gsa.state.al.us/gsa/geologichazards/Landslides.htm>
- https://connect.ncdot.gov/resources/gis/pages/cont-elev_v2.aspx