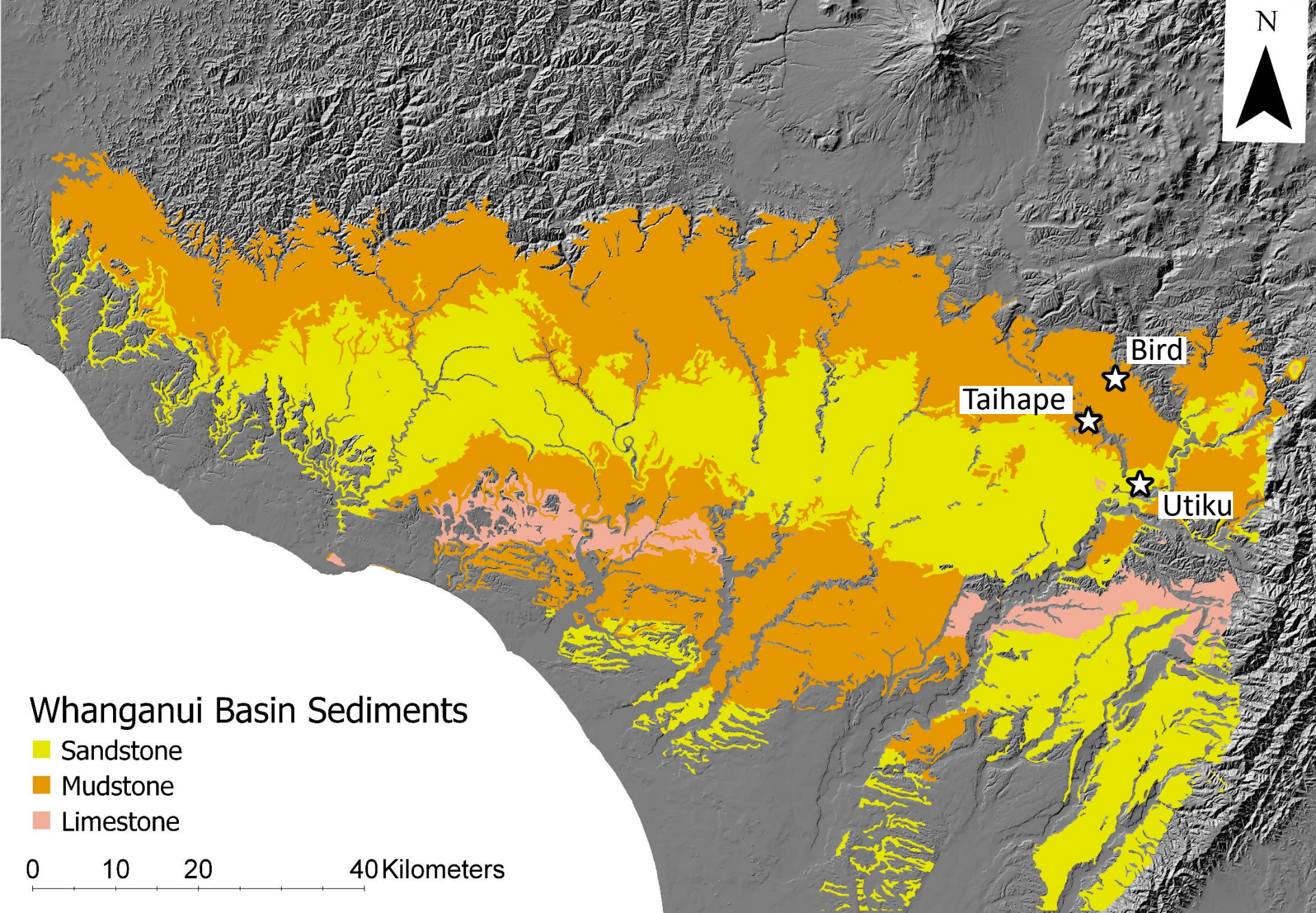




Susceptibility Factors Controlling the Occurrence of Slow-Moving Large Landslides in the Whanganui Basin Sediments, North Island



Thomson Awards Oct 28th, 2020





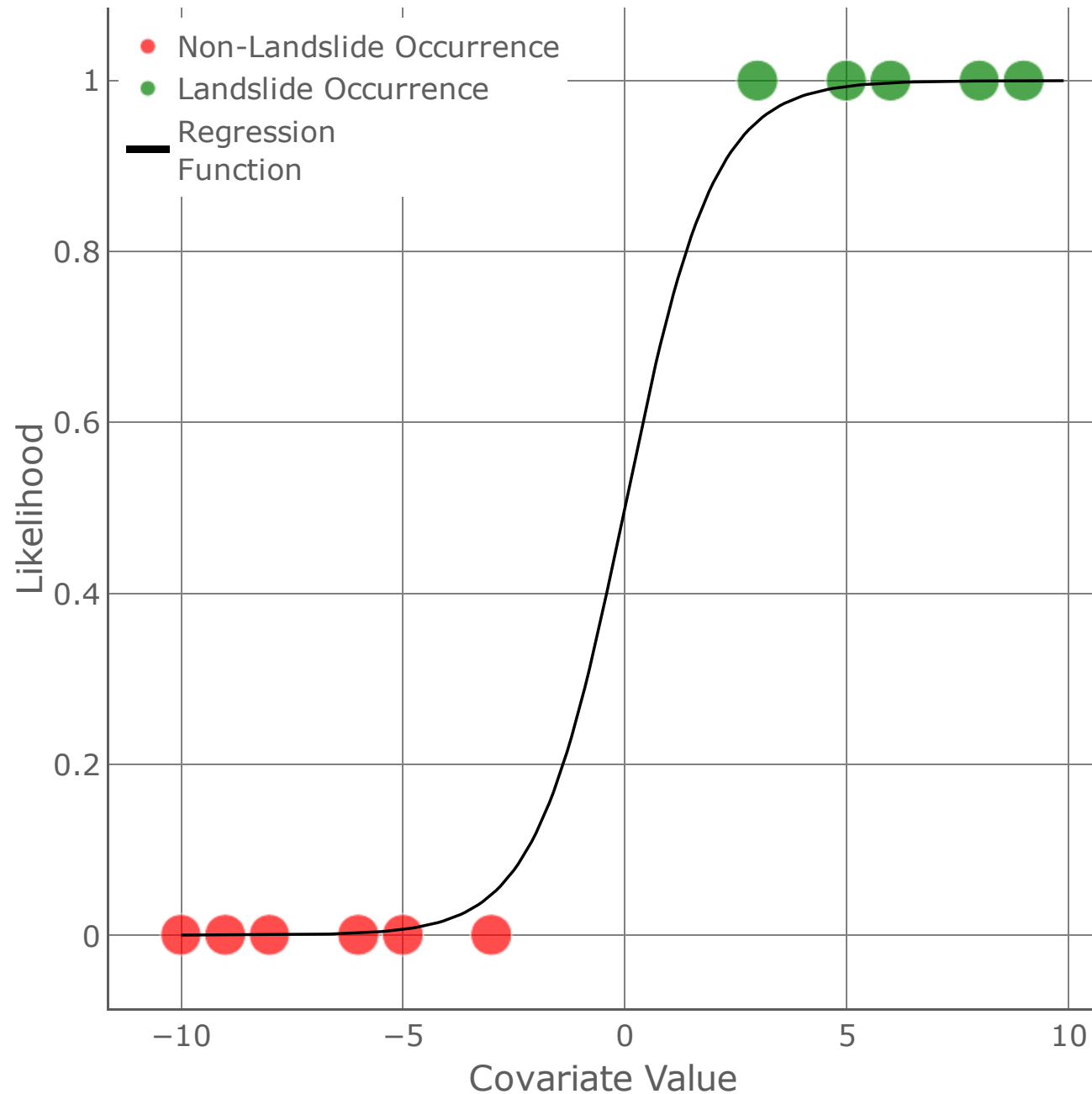
Rangitikei Landslide – July 2015 to May 2017



Logistic Regression Susceptibility Model

Components:

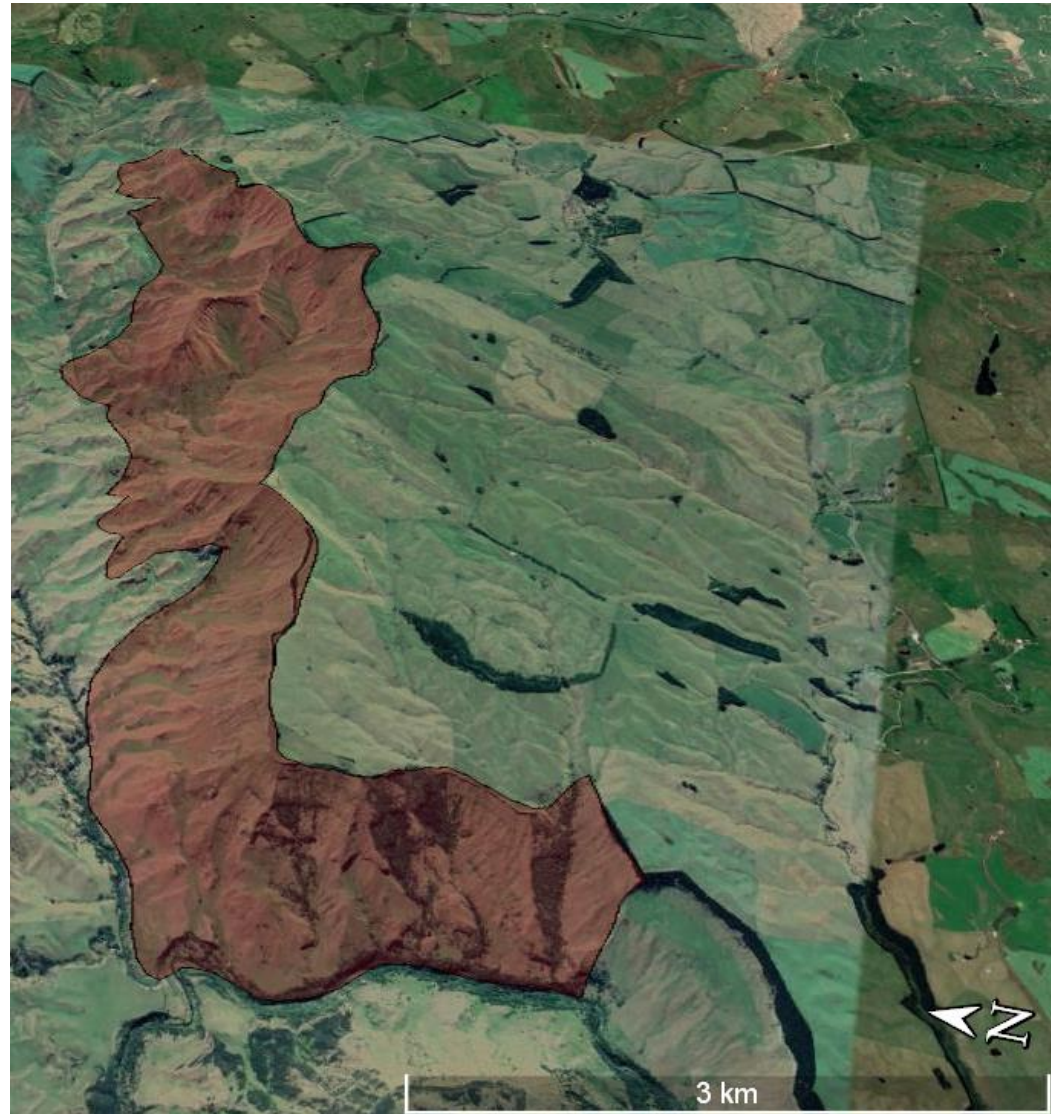
1. Landslide Observations
2. Non-Landslide Observations
3. Covariates

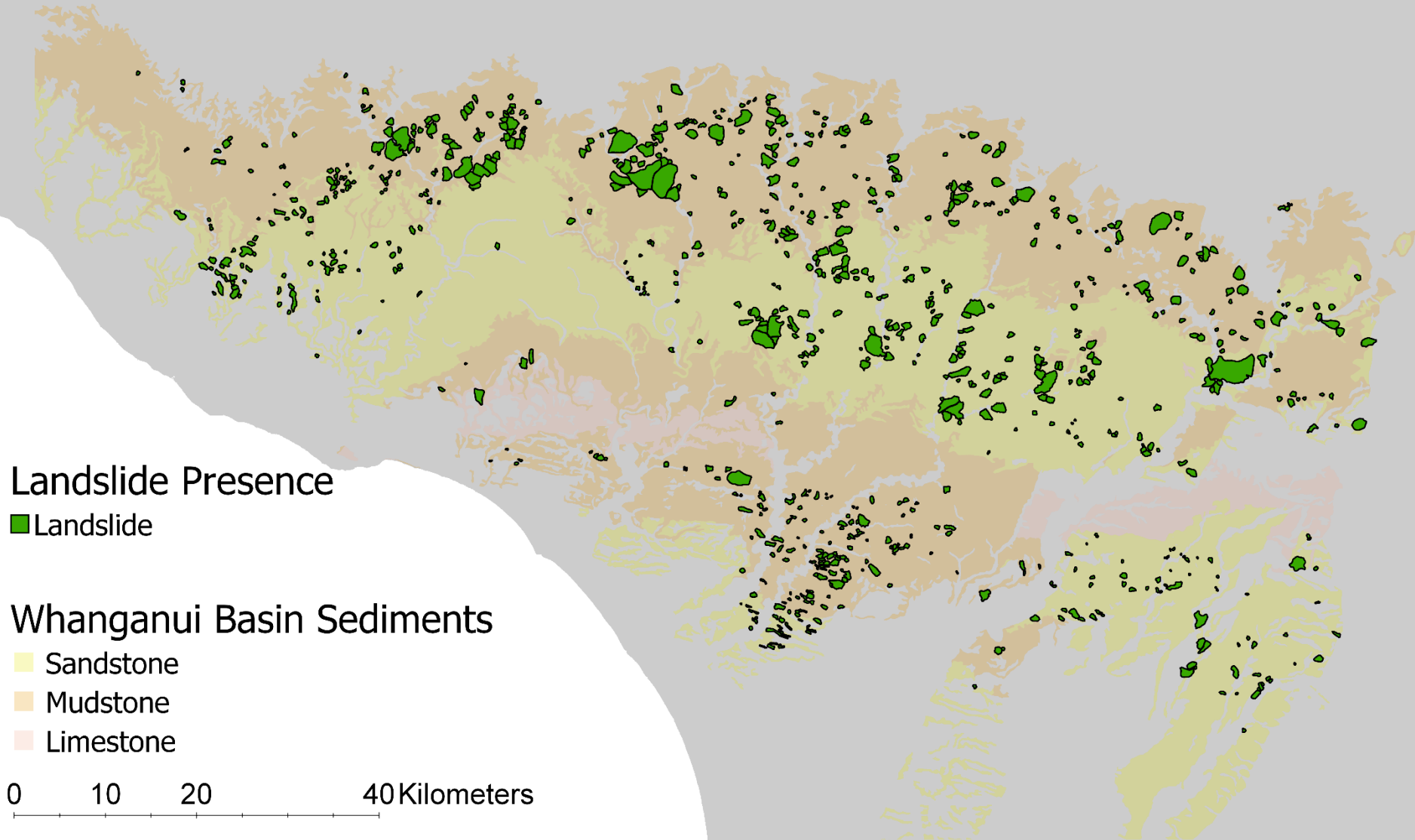


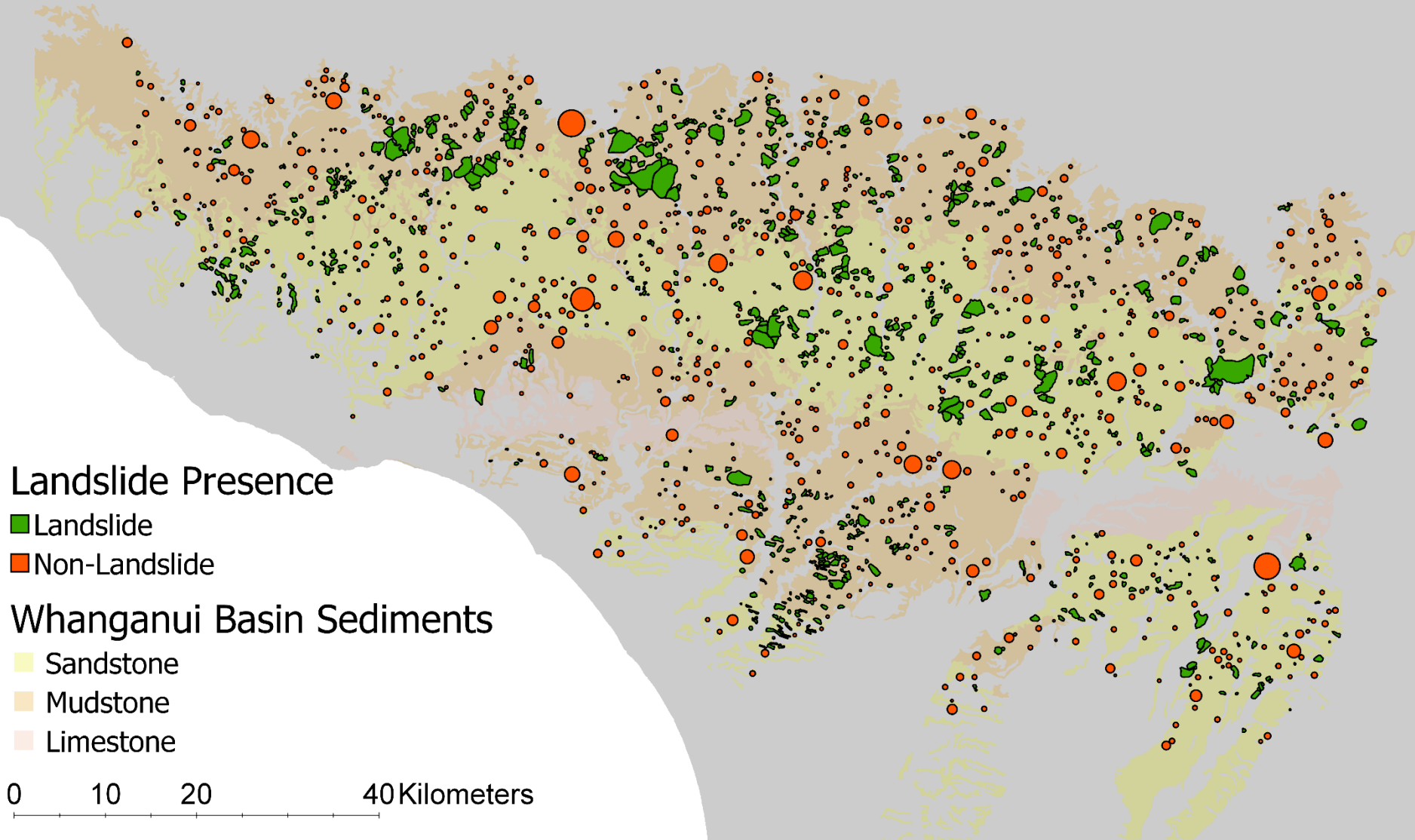
Available Landslide Maps

GNS Large Landslide Inventory:

- Inconsistent methodology
- Landslides missing
- Falsely mapped landslides
- Contains many undifferentiated landslide types







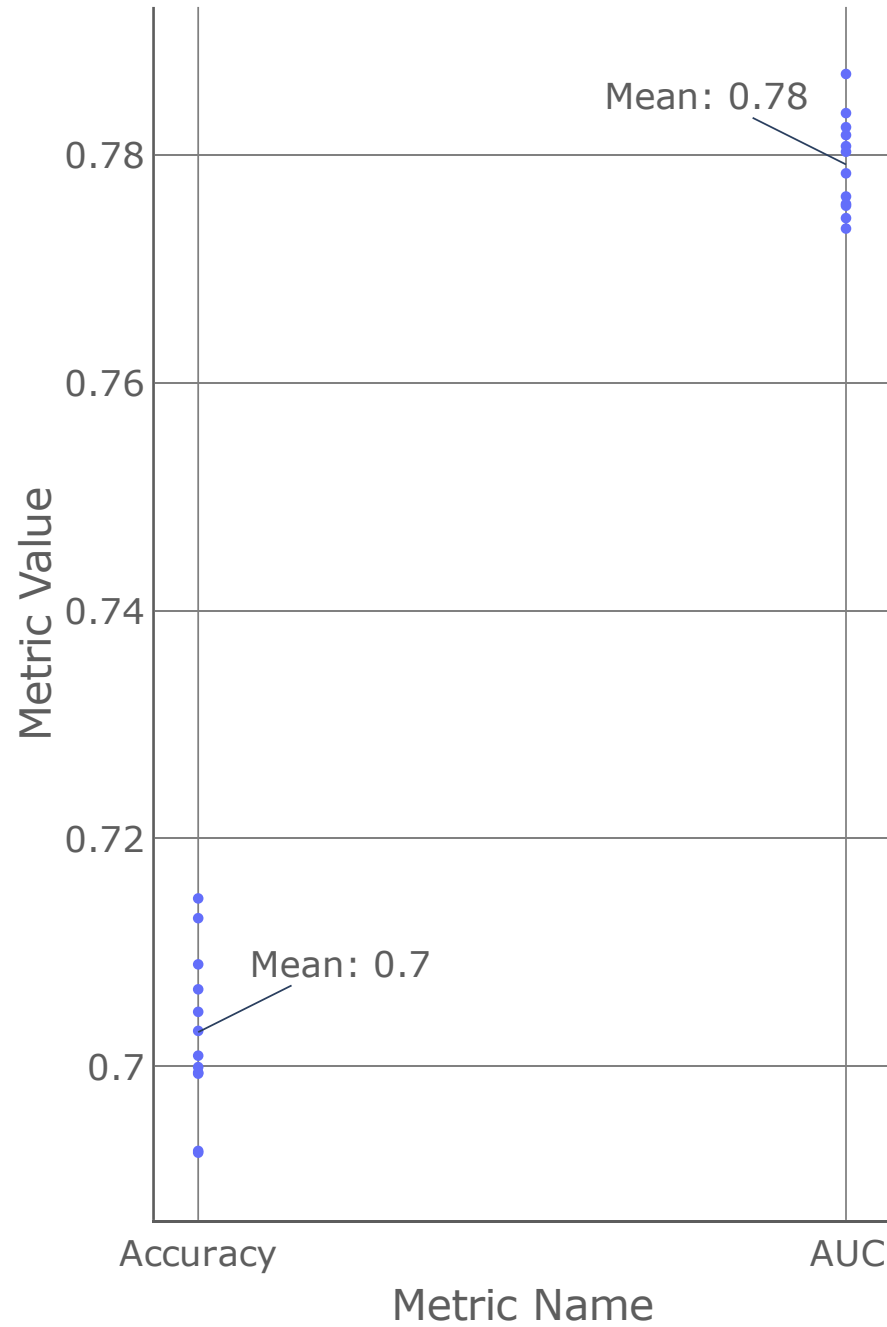
Covariate Preparation:

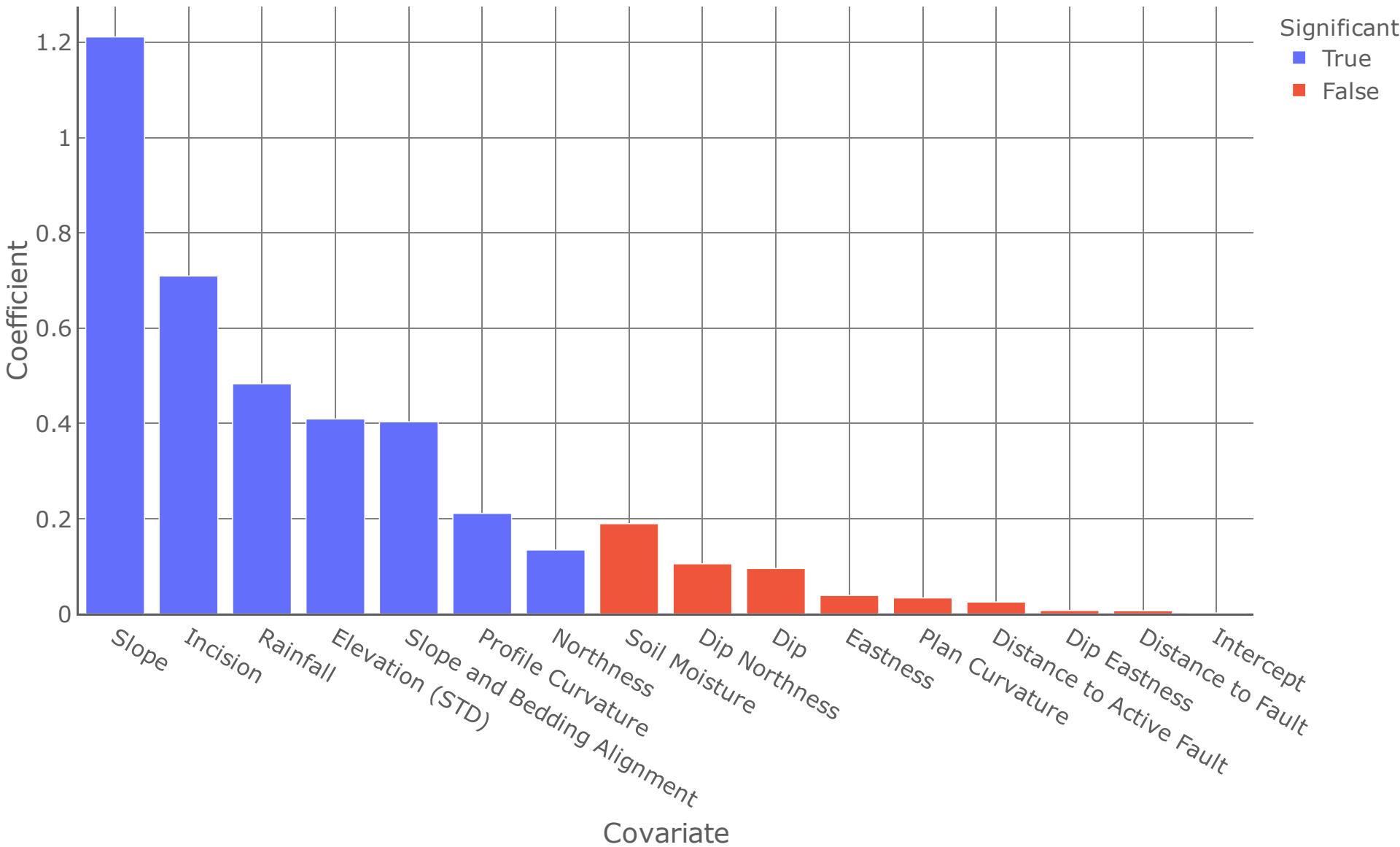
Susceptibility Factor	Class
Rainfall	Climate
Soil Moisture	Climate
Elevation (STD)	Descriptive
Plan Curvature	Descriptive
Profile Curvature	Descriptive
Dip	Geology
Dip Eastness	Geology
Dip Northness	Geology
Distance to Active Fault	Geology
Distance to Fault	Geology
Eastness	Terrain
Incision	Terrain
Northness	Terrain
Slope	Terrain
Slope and Bedding Alignment	Terrain

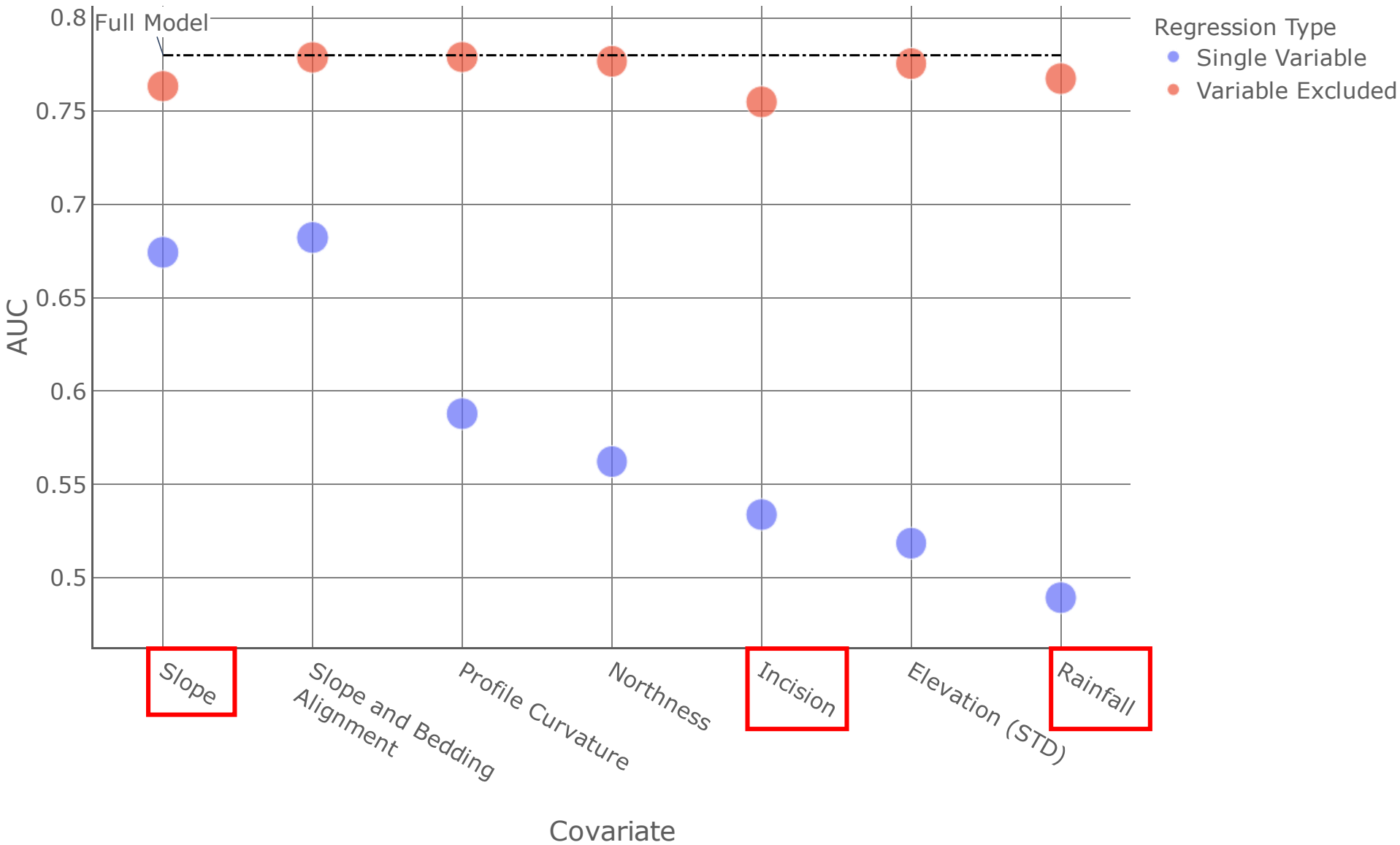
Susceptibility factors (covariates) are associated with each feature, then standardized using the formula:

$$Z = \frac{x - \bar{x}}{\sigma}$$

Standardization allows the regression coefficient magnitudes to be used as a measure of covariate importance







What have we learned?

- Slope, Slope and Bedding Alignment, Rainfall and Incision predict occurrence of large landslides
- Slope, Slope and Bedding Alignment, Rainfall are preparatory factors that are impossible to influence
- **INCISION IS KEY!!!**
- Efforts to control large landslide failure should focus on reducing river erosion