

Appendix S1: Descriptions of explanatory variables used for all three modeling approaches.

Climate Variables
(downscaled to 30m from PRISM climate data (Daly et al. 2008))

Mean annual precipitation (natural logarithm, mm)

Mean annual temperature (°C)

Maximum temperature of the hottest month (August)(°C)

Percentage of annual precipitation falling during the growing season (June - August)

Coefficient of variation in precipitation between July and December(°C)

Mean minimum temperature of the coldest month (December)(°C)

Difference in temperature between July and December(°C)

Indicates proximity to coast (adjusted for terrain influences) (km)

Summer Precipitation (mm)

Summer temperature (°C)

Growing season moisture stress: the ratio of mean temperature (°C) to precipitation(natural logarithm, mm) (May - September)

Soil Parent Material
(derived from SSURGO (Soil Survey Staff 2006), USFS Soil Resources Inventory, and other sources)

Total depth of ash deposited (feet), primarily from Mt. Mazama in the eastern Cascades (unpubl. data)

Spatial location of pyroclastic flow from Mt. Mazama in the eastern Cascades (unpubl. data)

Soil contains large rock component (binary – SSURGO/SRI)

Parent material is unconsolidated sand (binary – SSURGO/SRI)

Rocks with ultramafic parent materials including serpentine (binary – SSURGO/SRI)

Rocks with sedimentary origins (binary – SSURGO/SRI)

Rocks with mafic chemistry(binary – SSURGO/SRI)

Rocks with metamorphic origin (binary – SSURGO/SRI)

Parent material contains large pumice component (binary – SSURGO/SRI)

Topography
(derived from National Elevation Dataset (Gesch et al. 2009))

Aspect (degrees)

Cosine transformation of aspect (degrees)

Elevation (m)

Median Landform Index

Cumulative potential relative radiation during the growing season

Slope (%)

Topographic position index, calculated as the difference between a cell's elevation and the mean elevation of cells within a 150-m radius

Topographic position index, calculated as the difference between a cell's elevation and the mean elevation of cells within a 300-m radius

Topographic position index, calculated as the difference between a cell's elevation and the mean elevation of cells within a 450-m radius

Location

Latitude

Longitude

Reflectance
(tasseled cap transformation (Crist & Ciccone 1984))

Band 1 of Tasseled Cap Transformation of LANDSAT imagery from 2006

Band 2 of Tasseled Cap Transformation of LANDSAT imagery from 2006

Band 3 of Tasseled Cap Transformation of LANDSAT imagery from 2006