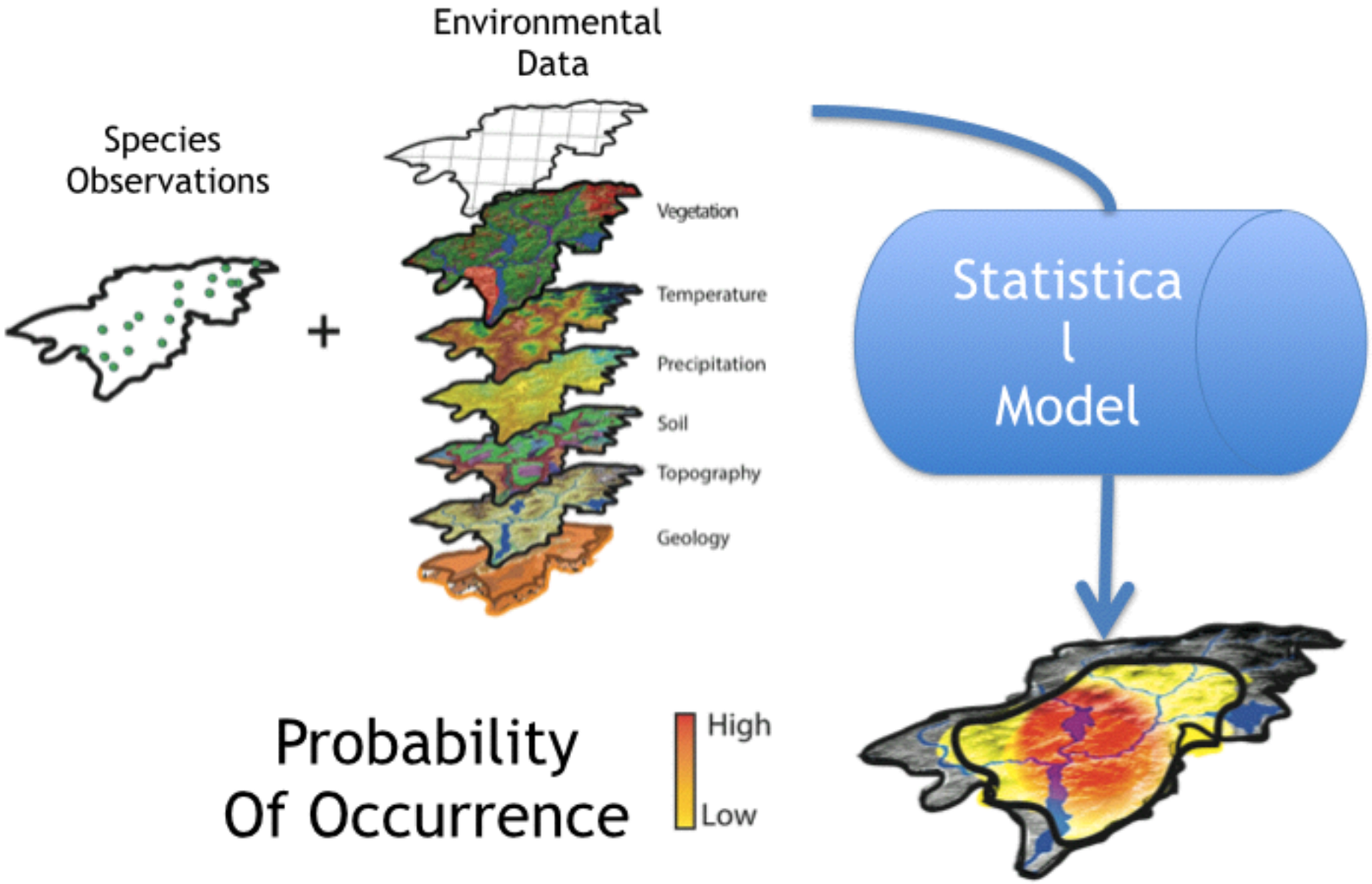
Species Distribution Modeling using R and QGIS

Please Download and Unzip to your Documents Folder:

https://github.com/patchdynamics/SDM-Lesson/archive/v.2.zip

(Also please install package rgdal in R)

The Goal


Species
Observations
Environmental
Data
Vegetation
Temperature
Precipitation
Soil
Topography
Geology
Statistica
l
Model
Probability
Of Occurrence
High
Low

The Process

1. Download Occurrence Data
2. Clean/QA Occurrence Data
3. Assemble Predictor GIS Layers
4. Create ‘Training Data’ Subset
5. Fit A Model (Logistic Regression or MaxEnt)
6. Visualize and Analyze Results

Preparation of data is the most time consuming, and tedious, part of the process.

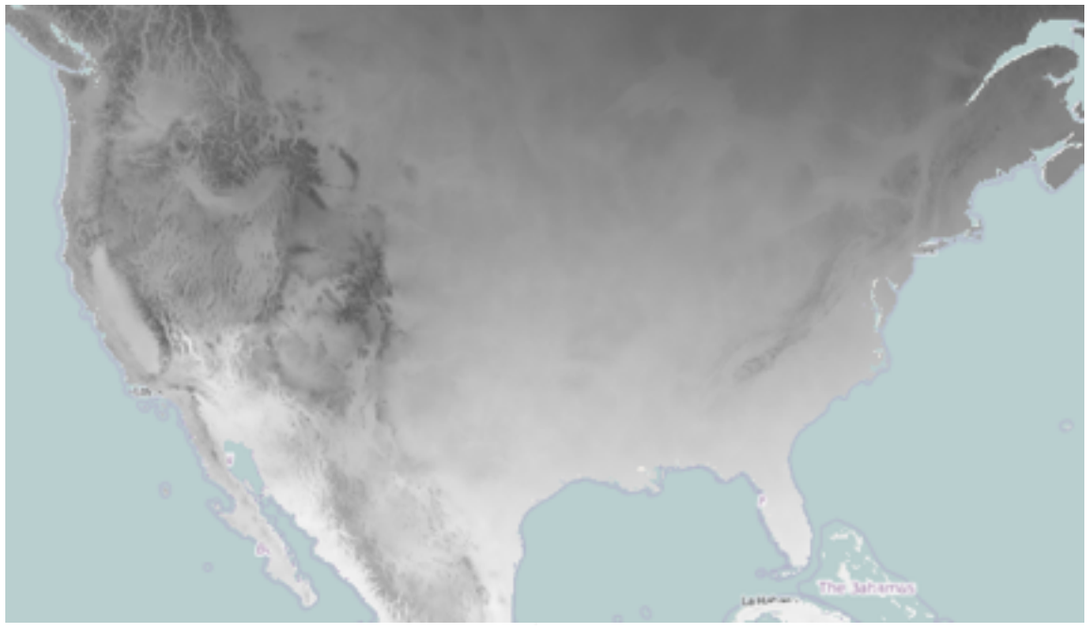
Fitting a model is the fun part and involves creativity

An Easy Dataset for Learning: BioClim

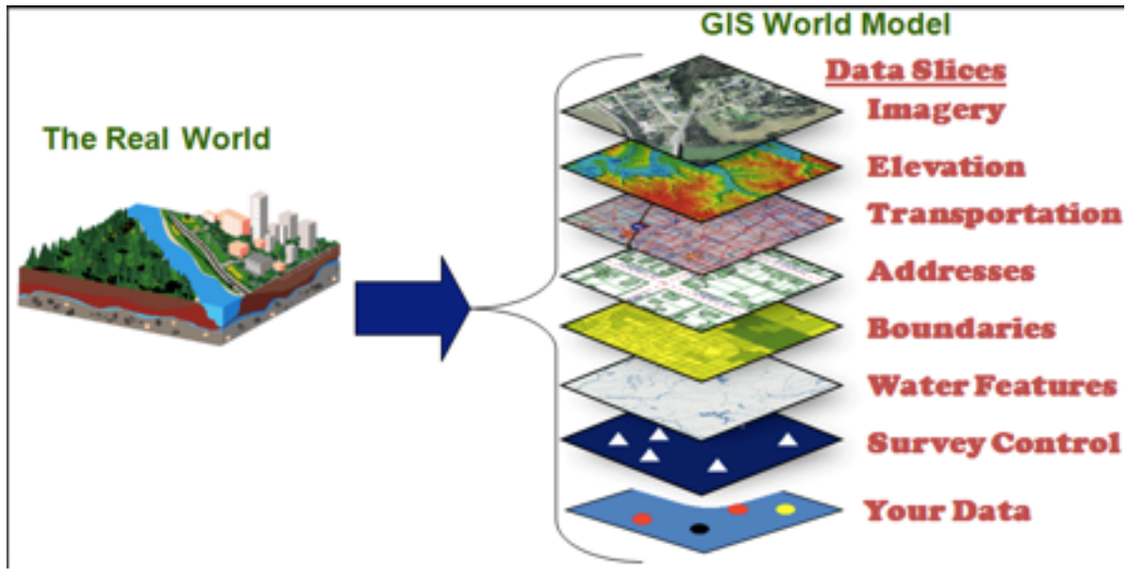
But many others exist and might be more useful

Raster Datasets

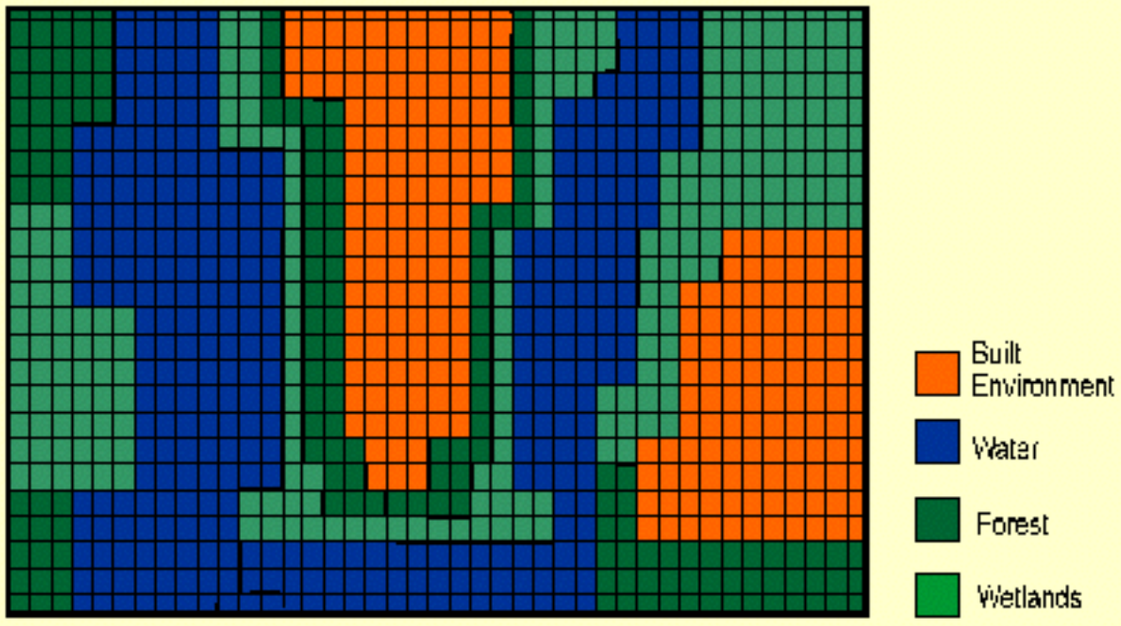
BIO1 = Annual Mean Temperature
BIO2 = Mean Diurnal Range (Mean of monthly (max temp - min temp))
BIO3 = Isothermality (BIO2/BIO7) (* 100)
BIO4 = Temperature Seasonality (standard deviation *100)
BIO5 = Max Temperature of Warmest Month
BIO6 = Min Temperature of Coldest Month
BIO7 = Temperature Annual Range (BIO5-BIO6)
BIO8 = Mean Temperature of Wettest Quarter
BIO9 = Mean Temperature of Driest Quarter
BIO10 = Mean Temperature of Warmest Quarter
BIO11 = Mean Temperature of Coldest Quarter
BIO12 = Annual Precipitation
BIO13 = Precipitation of Wettest Month
BIO14 = Precipitation of Driest Month
BIO15 = Precipitation Seasonality (Coefficient of Variation)
BIO16 = Precipitation of Wettest Quarter
BIO17 = Precipitation of Driest Quarter
BIO18 = Precipitation of Warmest Quarter
BIO19 = Precipitation of Coldest Quarter



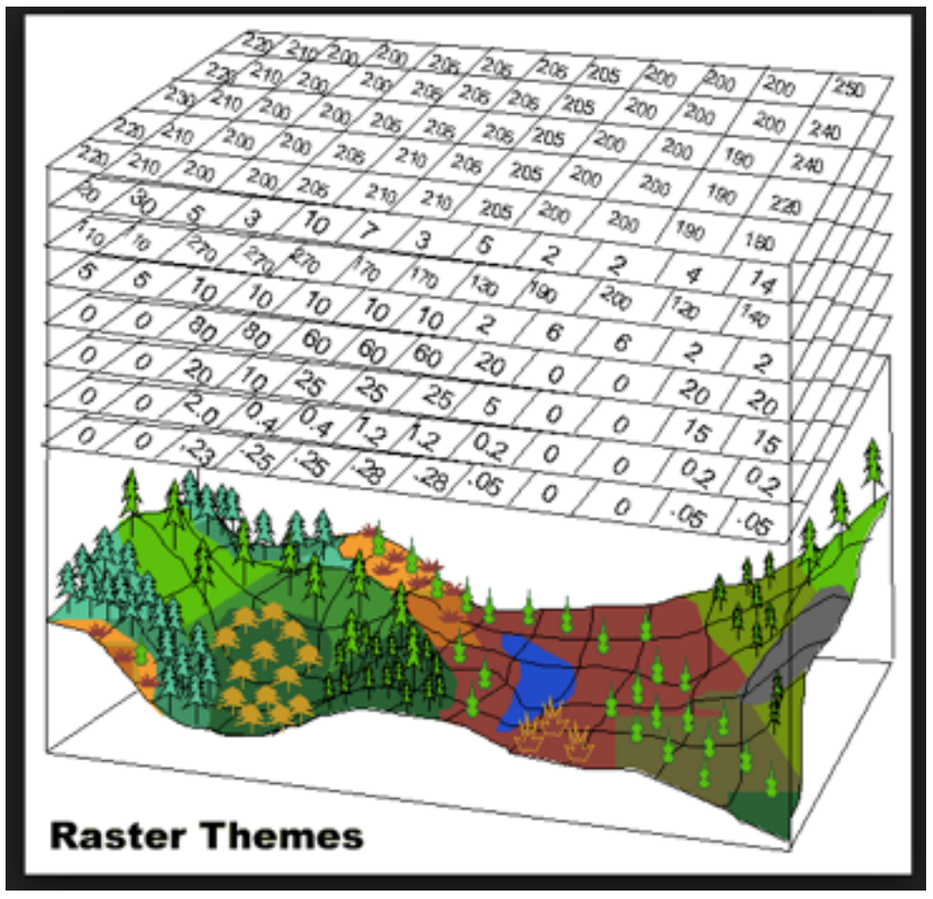
Raster Data Review



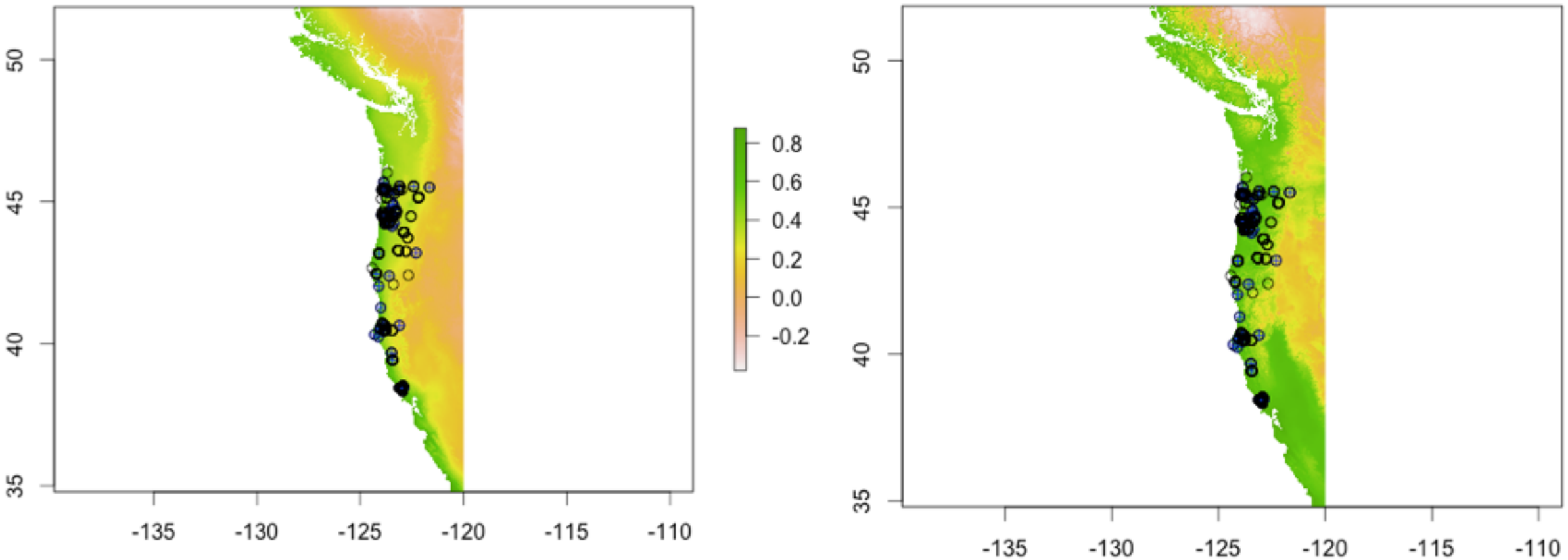
The Raster View of the World



The Raster GIS references phenomena by grid cell location in a matrix. The grid cell is the smallest unit of resolution and may vary from centimeters to kilometers depending on the application.

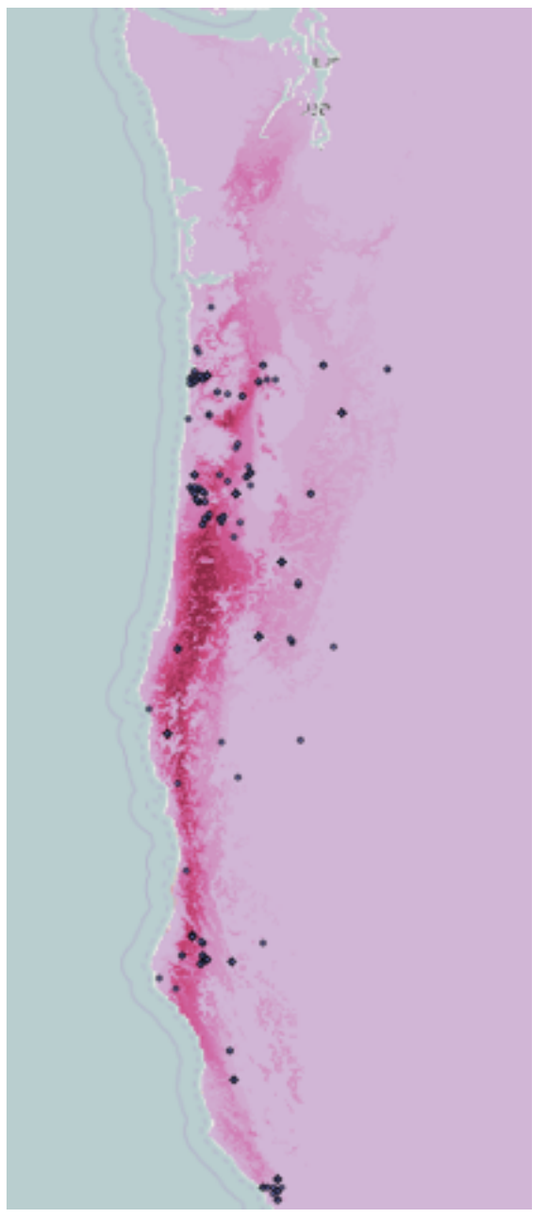


Which Model is More Reasonable ?



Red Tree Vole
Arborimus longicaudus

Comparing Modeling Methods



Climate Envelope (bioclim)

Custom GLM

MaxEnt