Brachypodium sylvaticum: Habitat Suitability Modeling

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Background Information

- Invasive, native to Europe, Asia, and North Africa
- Known invasions in Oregon, Northern California, and New York
  - New York Invasions:
    - Bergen Swamp, Genesee County
    - Taughannock Falls, Thompkins County
    - Dutchess County
- Survives in very dry to very wet conditions
- Tolerant to direct sunlight, partial shade, and complete shade

Past Work on *B. sylvaticum*

- Oregon
  - First recorded in 1939 near Eugene, OR
  - Has become naturalized in Willamete National Forest
  - Logging equipment thought to be active dispersal agent
  - Appears to be self-fertile
  - Quickly becomes the dominant species in forest understories
    - Great shade and drought tolerance seen
  - Created suitability map for future spread
    - Largely based on natural vegetation, temperature, and precipitation

Past Work on *B. sylvaticum*

- San Jose State University
  - Attempted to utilize multiple data layers to create a future spread prediction model
    - Temperature
    - Annual precipitation
    - Elevation
    - Slope
    - Aspect
    - Soil
    - Land cover
- Too early to tell how useful the model will be, requires further study

Preferred Conditions of *B. sylvaticum*

- Information from a UK nursery website regarding *B. sylvaticum*
  - Predominantly a plant of woodland and other shady habitats including railway banks and roadsides
  - Prefers well-drained, neutral to calcerous soils
  - Competes strongly for early-season moisture
- Other known preferred conditions
  - Avoids extremely continental climates and dry soils
  - Prefers partial shade
    - Competes best in partial shade, high nutrient situation
  - Spread rates estimated to about 100ft/5 yrs

Expected Data Layers and Current Progress

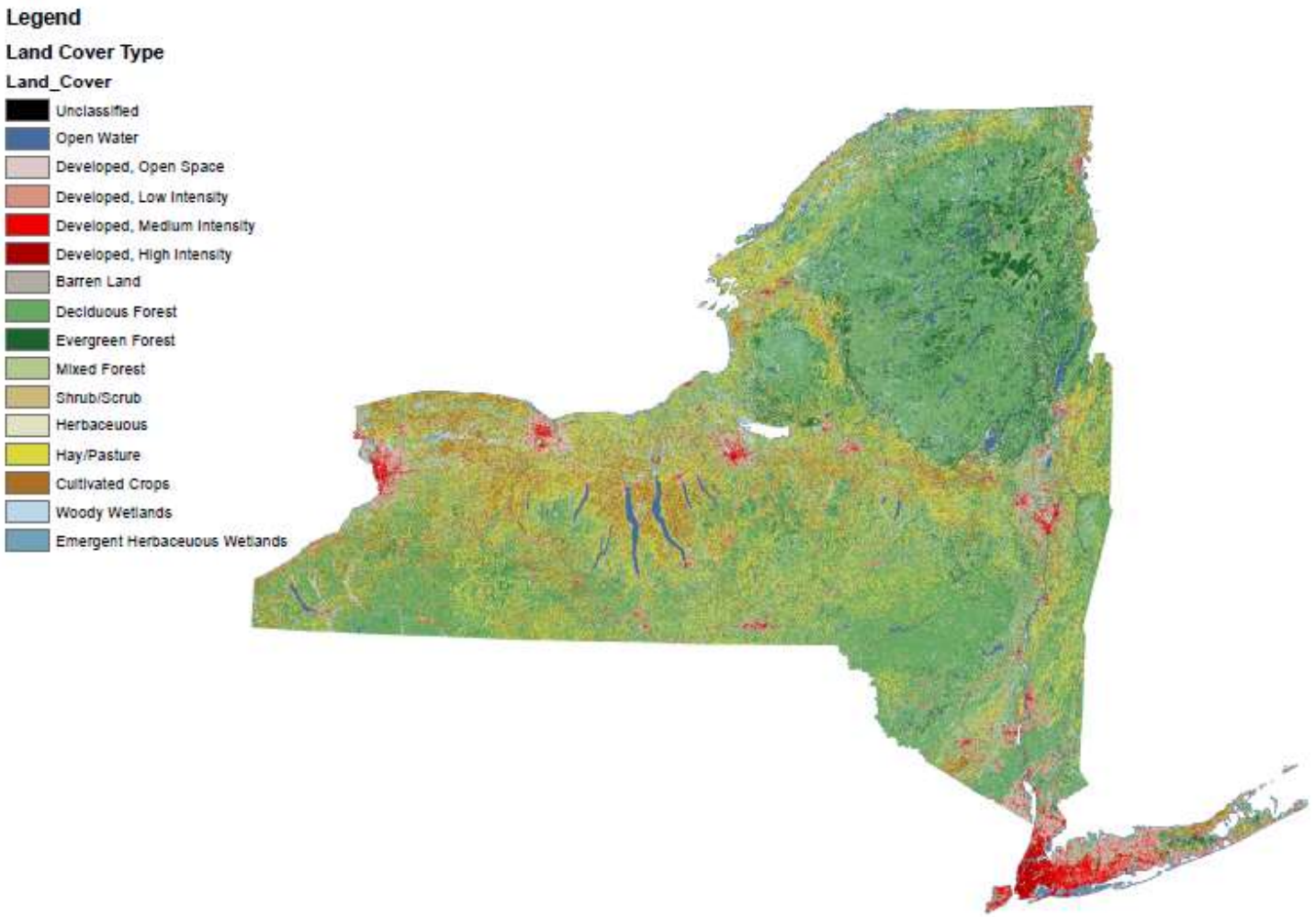
Expected Layers for Modeling

- Confirmed Locations of *B. sylvaticum* in NY
- Average Annual Max/Min Temperatures across NY
- Average Annual Precipitation across NY
- Elevation across NY
- Soil Types across NY
- Land Cover across NY

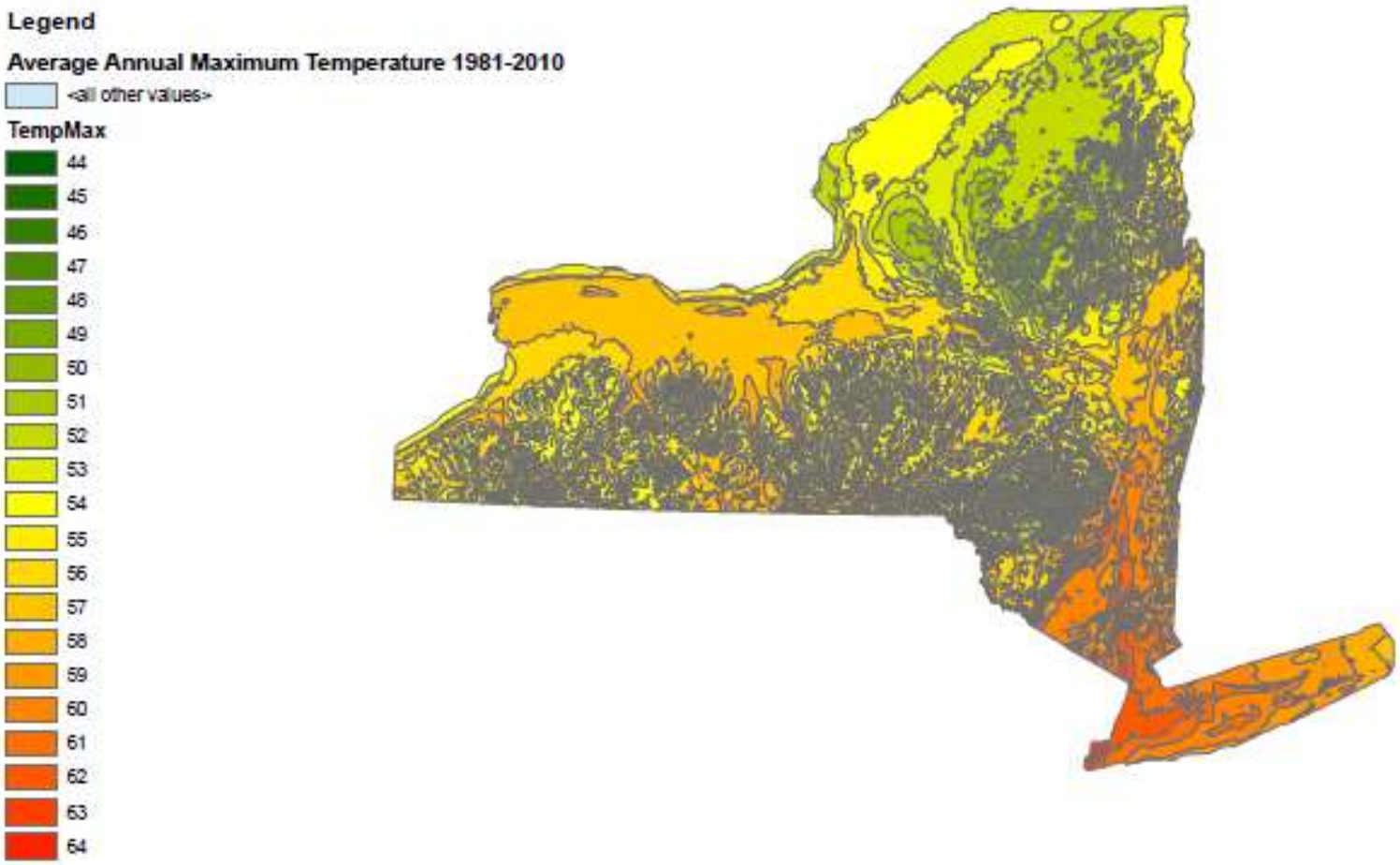
Current Progress

- **Data received, inputting into ESRI's ArcGIS program**
- **Both layers complete, ready for modeling**
- **Layer Complete, ready for use in modeling**
- **Building layer by county**
- **Layer Complete, ready for modeling**
- **Layer Complete, ready for modeling**

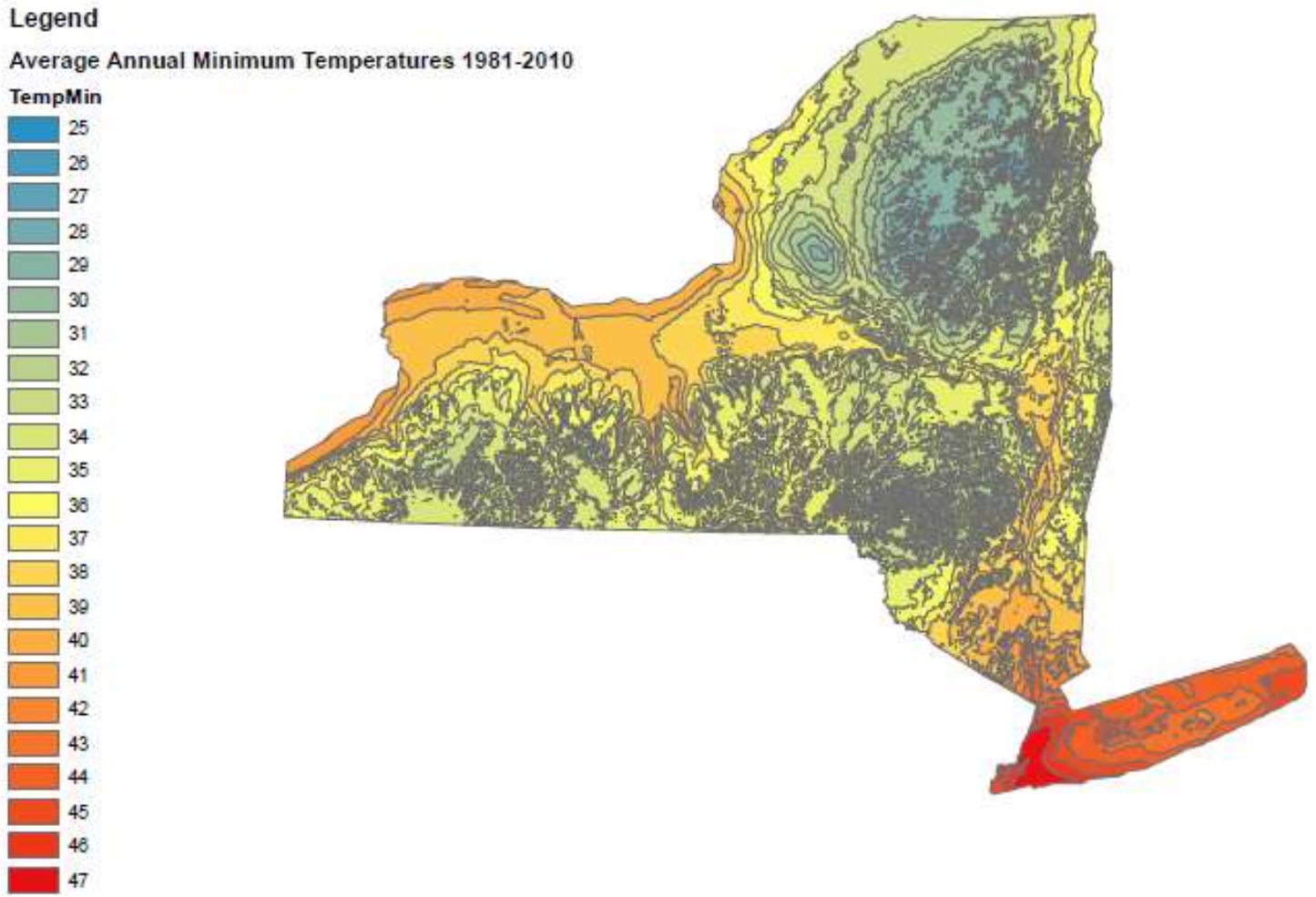
Land Cover Layer



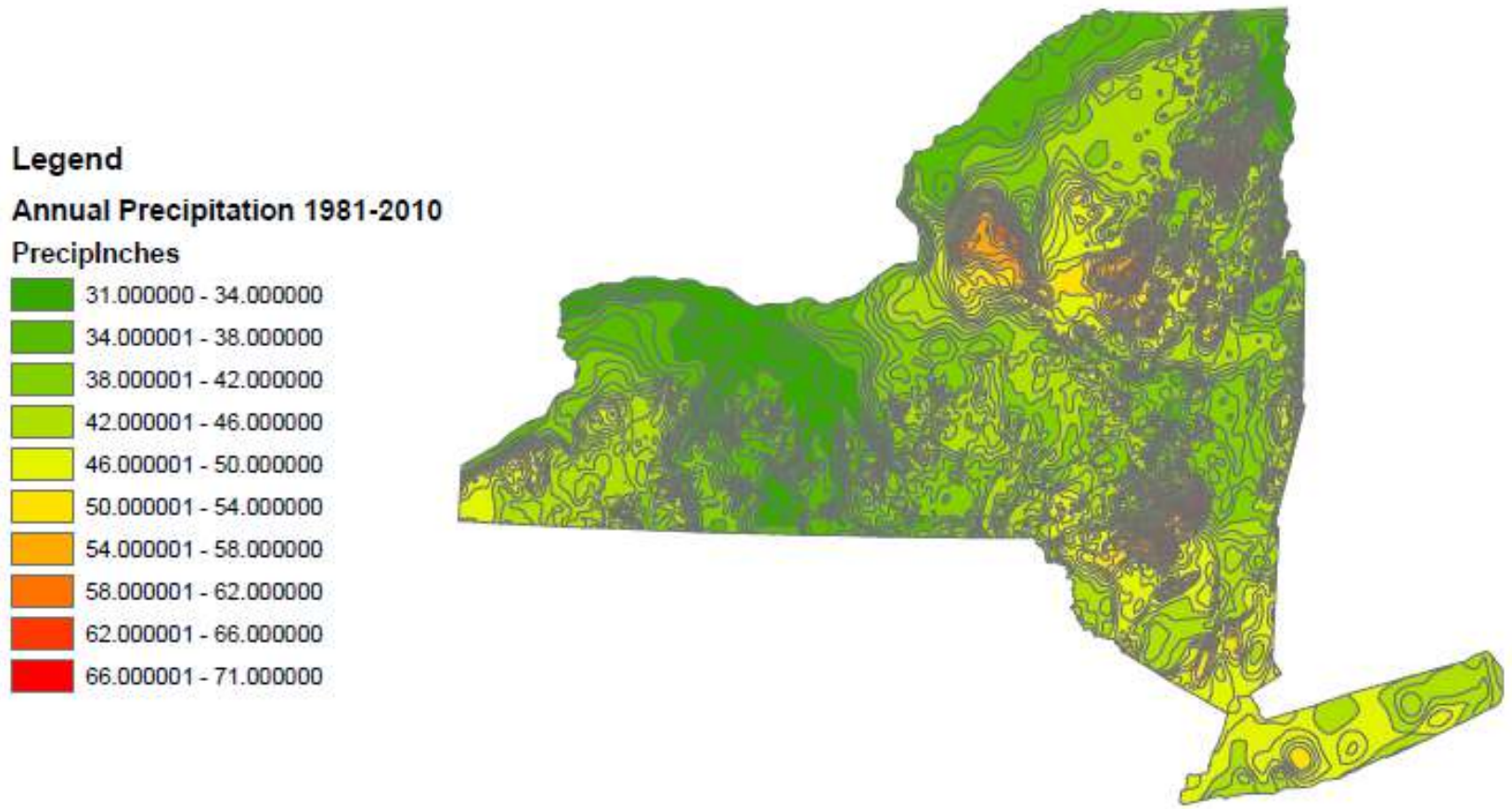
Average Annual Maximum Temperatures



Average Annual Minimum Temperatures



Average Annual Precipitation



Soils Layer

What's Next for the Project?

- Classify the appropriate collected layers to a 5 category system
  - Temperatures (lowest, low, moderate, high, highest)
  - Precipiation (Least, lower, moderate, higher, most)
- Classify land cover layer to 2 category system
  - Disrupted, Undisturbed

What's Next for the Project?

- Run model looking for areas with the most favorable scores from each category that *B. sylvaticum* would most prefer
- Analyze confirmed invasion sites to see where known organisms fall in each data layer
- Create detailed maps of invasion sites
- Incorporate pathways layer into model to locate the most suitable areas with the closest connection to known invasion sites
- The goal of this project is to provide a foundation in GIS to be built upon as we continue to study the growth habits and constraints for *B. sylvaticum*

Questions or Comments?