GEO 580 student
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Previous GIS Project Experience

I have taken several courses in GIS prior to this class, including GEO 565, FOR 521 (Spatial Analysis of Forest Landscapes), FOR 599 (Wildlife Landscape Ecology) and GEO 544. In each class, I completed a project relying heavily or entirely on spatial analysis within ArcGIS. For GEO 565, I analyzed the correlation between housing development and airport location in Central Oregon. For FOR 521, I analyzed landscape pattern of different vegetation and habitat maps for Central Oregon. For FOR 599, I looked at the distribution of lichens along a gradient from open to closed canopy. For GEO 544, I performed a multiple-ring buffer analysis of change in a vegetation index surrounding urban areas in Central Oregon. I am also currently a research assistant for Aaron Wolf working on a GIS analysis of transboundary river basins and climate variability.

Intended GEO 580 Project

The question I want to answer is "How does the pattern of habitat and vegetation change over time under certain assumptions of future land use change in Central Oregon?"

To answer this question, I will classify vegetation maps into habitat maps using defined wildlife-habitat associations for several species and then quantify the resulting spatial patterns using FRAGSTATS and some algorithms I will define myself. I also want to explore the use of second-order statistics such as Ripley's K to better capture the spatial isolation and configuration of the habitat maps. I will then quantify the temporal change in these measures and interpret the ecological significance of these changes.

The data I will be using come from the US Forest Service in Portland. They have undertaken a spatial modeling project to examine the ecological effects of three alternative development scenarios for a tract of land just west of Bend, OR. They have already generated a gradient-nearest-neighbor (GNN) imputation map of present vegetation and structure conditions in the study area, and will soon be generating projected vegetation and structure maps for time steps out to 50 years under three scenarios.

My thesis will involve analysis and comparison of all three scenarios, but for this project, I will analyze the change in landscape metrics and spatial statistics over time for just one of these.

Outline of Anticipated Steps

- Reclassify vegetation polygons into habitat maps for Mule Deer and one other species
- Convert vegetation polygons to raster grids
- Run Fragstats for patch-, class- and landscape-level metrics
- Bring these results back into ArcGIS for temporal analysis
- Explore using Ripley's K on polygons, or generate random points inside polygons and perform Ripley's K analysis on those points.
- Create maps depicting how connectivity and landscape configuration change over time
- Develop summary statistics of change over time
- Interpret ecological significance of changes in metrics using landscape ecological theory