Spatial Analysis and Modeling

Michael Treglia

Landscape Analysis and Modeling

Course Number:

Instructor: Michael L. Treglia

Course Description: Understanding spatial relationships across landscapes can provide critical insight into evolutionary and ecological patterns and processes, ultimately necessary for biodiversity conservation. This course will focus on quantifying spatial relationships, using spatial interpolation techniques to estimate environmental variables at unmeasured points, and modeling connectivity across landscapes. The course will take advantage of powerfull free and open source software for GIS and statistical analyses.

Grading:

Grades will be assigned accord

Item	Due Date	Points
Participation	N/A	
Final Project	April XX	
Total		***100***

- Theory/background:
- What students should expect to learn
- What tools will be used In *Landscape Analysis and Modeling* we w

Schedule

Week 1: Intro to Landscape Ecology and GIS

Day 1

Assignment Due: None

- Readings:
  - None
- Agenda:
  - Introductions
  - Logistics
  - Lecture: Introduction to Landscape Ecology and GIS

Day 2

Assignment Due: (Something related to paper - simple and short, just to make sure they read)

- Readings: **Might Change to Turner 2005 Ecology**
  - Wiens, J.A., 1989. Spatial scaling in ecology. **Functional Ecology 3, 385-397.** {:target="_blank"}
  - test
- Agenda:
  - Discuss Wiens 1989
  - Notes about Free and Open Source Software (FOSS)
  - Exploring QGIS (Computer Exercise)
- Supplementary Material
  - List some useful references(?)

Week 2: Spatial Dependence and Spatial Autocorrelation; Introduction to R

Day 3

Assignment Due: (Basic GIS exercise to familiarize students with software)

- Readings:

– **Maybe Legendre et al 2002 Ecography** or ***Lichstein et al 2002 Ecological Monographs***

- Agenda:

   – Stationarity
   – Correlation and Autocorrelation
      * Introduce Correlograms, Variograms, Semi-variograms

Day 4

Assignment Due:

- Readings:

   – (A good Ripley's K paper?)

- Agenda:

   – Work through Nearest Neighbor and Ripley's K Analyses in QGIS/R
   – Maybe tutorial to R, depending on how much we'll use it

Week 3: Point Pattern Analysis (Ripley's K)

Day 5

Day 6

Week 4:

Day 7

Day 8

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Week 13

Week 14

Week 15