GIS Landscape Suitability Modeling

Project 2 -- Team Project

Learning outcomes
1. Develop suitability models that increase your understanding of landscape features and patterns—their potential opportunities and limitations for use
2. Explore advanced GIS modeling procedures involving landscape data about points, networks, surfaces, grids, and images
3. Make use of analysis functions in Spatial Analyst and other extensions
4. Convert feature themes to appropriate grid themes (continuous or discrete)
5. Apply the Weighted Overlay and Raster Calculator functions to integrate derived data developed with Spatial Analyst
6. Evaluate appropriate uses and limitations of ModelBuilder
7. Make effective modeling decisions and contributions in a team project situation
8. Document analysis procedures and results using MS PowerPoint
9. Practice presentation skills by sharing your results with the entire class

Expectations
1. We want your modeling work to be valuable to our class, by—
   A. Including both descriptive (inventory) and predictive (suitability) modeling
   B. Creating model scenarios that incorporate a variety of data concepts and analysis measures
   C. Comparing alternative models using a variety of weights and rankings
   D. Giving us some insight into your modeling interests
   E. Explaining your modeling work to our class in a clear, concise way
2. We want your modeling work to be valuable to you, even if it—
   A. Does not include all possible variables that could be included
   B. Does not use the most recent data available
   C. Does not include as much detail as you would like
3. We want you to use data management strategies that make your database efficient to use
4. We expect each team to have about an equal number of people
5. We expect you to
   A. Contribute data to your team’s project database
   B. Complete your fair share of modeling
6. We expect you to make appropriate use of ArcGIS 9, Spatial Analyst and ModelBuilder functions
Project
Suppose you work for a public agency charged with locating priority areas for attenuating floods and flood damages. With your knowledge of landscape modeling and GIS data sources, you are asked to develop site suitability models that help public officials (elected, appointed, and staff) make decisions about landscape changes and land management practices that attenuate flood damages. Examples include the following:

A. Watershed management practices
B. Floodplain evacuation (buyouts? resettlement?)
C. Restoration of native vegetation (wetlands, woodlands, grasslands)
D. Land uses compatible with flooding
E. Retrofitting ecological approaches to stormwater management

Develop suitability models that help answer the following spatial questions:

1. Where should the landscape be changed to minimize future damages due to flooding?
2. What landscape changes or management practices should occur in these locations to minimize flood damages?

Procedure
2. Develop a list of flood attenuation location issues (current/recent news sources, Web)
3. Meet with your team members and make a list of potential data sources
4. Meet with me to refine your list of issues and data and to develop priorities
5. Select your study area (all or part of Iowa)
6. Locate and acquire appropriate data; organize it in folders and databases
7. Import, convert, edit, or modify your data to meet your modeling needs
8. Develop alternative models by consulting sources: literature, interviews, Web
9. Define your modeling procedures for using Spatial Analyst and ModelBuilder
10. Apply your modeling procedures to data in your database
11. Document your modeling procedures and results using PowerPoint
12. Present your modeling procedures and results to the class using PowerPoint

Requirements
1. Develop and compare at least three alternative suitability models (scenarios)
2. Use the “Notes Page” feature of PowerPoint to document details about each slide
3. Give us a copy of your PowerPoint file (we don’t need a hard copy)
4. Design your presentation for a 8-10 minute period, followed by 5-6 minutes of questions and discussion
5. Include in your presentation a thoughtful critique of Spatial Analyst and ModelBuilder
6. Incorporate concepts for both raster and vector data
7. Contribute data to your team database that meets team specifications:
   A. Cell size, coordinates and projection, clipped or masked to study area
   B. Discrete grid theme with appropriate classes
   C. Continuous grid themes (ex: distance, slope steepness)
   D. Feature themes for orientation (ex: roads, streams, towns) and context (location)
**Schedule**

- **Week 1:** Form teams; gather background info; list data needs, acquire and examine data
- **Week 2:** Convert to grid; Spatial Analyst and ModelBuilder functions, develop models
- **Week 3:** Evaluate results; revise models, prepare presentation
  Present to class on Friday, October 10

**Grading criteria**

- 25% Application of site suitability concepts to modeling
- 25% Contribution to team effort
- 10% Critique of ModelBuilder, Spatial Analyst, and other extensions
- 20% PowerPoint presentation (organization, illustrations, notes pages)
- 20% Oral presentation (organization, introduction, conclusions)