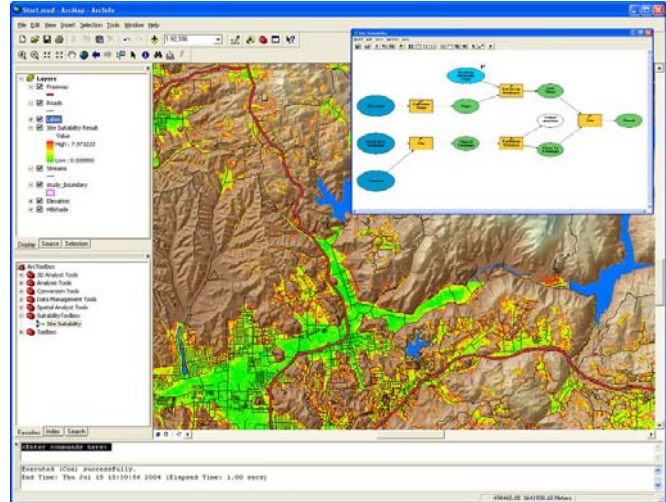


GIS Landscape Modeling Tools

Peer Teaching – Project 1

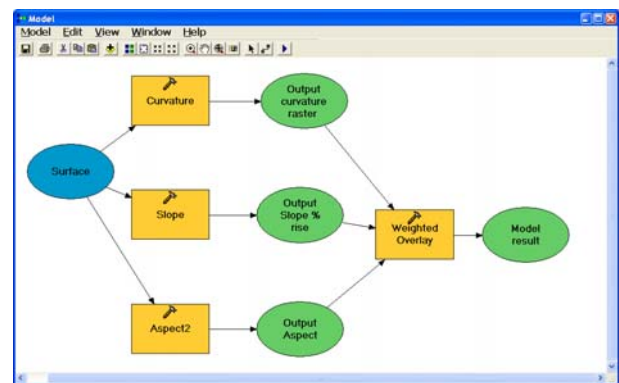
Learning outcomes

1. Understand the characteristics and potential applications of GIS landscape modeling tools and techniques
2. Evaluate appropriate uses and limitations of the tools and techniques
3. Explore advanced GIS modeling procedures involving landscape data about points, networks, surfaces, and grids, and images
4. Practice using modeling tools and techniques using ArcGIS 9.3, Spatial Analyst, ModelBuilder, other extensions, and software
5. Develop presentation skills by effectively communicating your knowledge of the tool or technique to class members
6. Practice teaching skills by guiding class members in a hands-on application of the tool or technique



Expectations

1. We want you to work at an advanced GIS level, rather than at a basic GIS level
2. We want your modeling work to be valuable to *our class*, by—
 - A. Selecting an advanced GIS modeling topic from the list below
 - B. Giving class members a well-organized hands-on experience with the tool or technique
3. We want your modeling work to be valuable to *you*, by—
 - A. Selecting an advanced GIS modeling topic that would help you in your individual project
 - B. Developing creative ways of teaching class members an application of the tool or technique
4. We expect you to make appropriate use of ArcGIS, Spatial Analyst, ModelBuilder, or other relevant software
5. We want you to develop a hands-on teaching activity that gives class members an experience that will give them an understanding of the potential applications and limitations
6. We want you to emphasize an aspect of your topic that will be most useful to class members
7. We want your presentation and hands-on activity to be well organized
8. We require you to complete your exercise within the time limitations



Peer teaching topics

1. **ModelBuilder** (functions, creating, editing, documenting)
2. **Density** (Kernel, line, point)
3. **Distance** (Euclidian, slope, buffers, Thiessen polygons)
4. **Cost surfaces** (least cost distance, path)
5. **Extraction and generalization** (Extract by ..., extract values, aggregate, nibble, reclass)
6. **Interpolation** (Inverse Distance Weighted, Kriging)
7. **Focal functions** (neighborhood analysis)
8. **Local functions** (cell statistics, rank, equal-to frequency)
9. **Zonal functions** (tabulate area, zonal statistics)
10. **Hydrologic functions** (fill sinks, drainage area, flow direction & accumulation)
11. **3D surfaces** (DEM, TIN, steepness, aspect, line of sight, seen area)
12. **Networks** (travel time, service area, routing, roads/streams)
13. **Landscape change** (change detection, time series, trend analysis)
14. **Geostatistics** (cluster analysis, principal components)
15. **Pattern analysis** (spatial autocorrelation, patch distribution, Fragstats)
16. **Cluster analysis** (nearest neighbor, Moran's I, G_i^*)
17. **Geographic relationships** (correlation, regression, coefficient of areal correspondence)
- 18.
- 19.
- 20.

Procedure

1. Select three peer teaching topics above and rank them in order of preference
2. Read *Modeling Essentials* (Chapter 5) in *GIS Modeling in Raster* (DeMers 2002)
3. Select three types of GIS models described on pages 113-118 (descriptive, prescriptive, stochastic, deterministic, holistic, atomistic, heuristic, algorithmic, static, dynamic, inductive, deductive) and rank them in order of preference
4. Meet with us to discuss the topics and types of GIS models and to finalize your selections
5. Define the scope of your topic and type of models; discuss with other class members who have related topics and model types
6. Find at least three sources that help you learn more about your topics
7. Describe at least three examples or case studies that apply to your topic and your type of GIS modeling
8. Develop ideas for hands-on activities
9. Locate the software and database that you need for your hands-on activities
10. Prepare teaching information and hands-on activity materials in electronic form
11. Present your materials and direct the hands-on activities

Requirements

1. Make your learning experience useful and practical for class members
2. Make your learning experience interesting—use many examples with familiar places and uses
3. Make your materials a quick reference that class members can use later in the semester and in other classes
4. Limit your information and activities to 25 minutes (5-10 minutes for information and 15-20 minutes for hands-on activities)
5. Keep it simple—be selective—don't try to do too much

Schedule

- Week 1: Select topic, define scope, locate information, metadata and documentation
- Week 2: Design the hands-on activity, select software and data
- Week 3: Presentations and hands-on activities
- Week 4: Presentations and hands-on activities

Grading criteria

- 15% Information about your topic (usefulness, relevance)
- 15% Hands-on activity (usefulness)
- 15% Electronic materials (organization, instructions/guidance, illustrations)
- 15% Oral presentation (organization, introduction, conclusions)
- 20% Time limit—25 minutes total
- 20% Participation in all other Project 1 hands-on activities