Raster vs. Vector GIS, Grids, TINs, DEMs, Schematic Modeling

Vector vs. Raster Model

VECTOR MODEL: uses points, lines, polygons

Examples of vector data: DLGs (digital line graphs), Tiger files (U.S. roads w/ a wide variety of associated census data)

Advantages of vector data:

- Requires less disk storage

- Topology easy to maintain

- Graphical maps more closely represent hand-drawn

Disadvantages of vector data:

- More complex data structure than raster data

- Not as compatible with remote sensing as raster data

- Overlay analysis more time-consuming than raster data

RASTER MODEL: uses imagery, photos, grids

Examples of raster data: DRGs, Remotely sensed data (imagery); DOQs (photos); DEMs (grids)

Advantages of raster data:

- Simple data structure

- Compatible w/ remote sensing

- Simple spatial analysis

- High spatial variability available

Disadvantages of raster data:

- Requires more storage space than vector data

- Boundaries has more blocky appearance than vector data

- Projection transformations are more difficult than vector data

- More difficult to represent topology than with vector data

GRIDS: a type of raster data having regularly spaced cells with values assigned to unique row and column locations

Examples of data that can be represented in a grid include: elevation, pollution concentrations in air or water, noise levels, incoming solar radiation

Types of operations performed on vectors vs. grids:

Examples of vector operations: Buffer, union, intersect, dissolve, merge, clip

Examples of grid operations:

Creating surfaces

- Interpolate a grid (creates a continuous surface from sampled input point values)
- Derive slope and aspect
- Create a TIN (requires Arc View's 3D Analyst extension)

Analyzing surfaces

- Find distance
- Summarize zones
- Reclassify (can convert continuous or floating point data to integer data)
- Calculate density