

Introductory Workshop on

Grid-based Map Analysis and Modeling:

Applying Raster Analysis in a Vector World—From Points, Lines and Polygons to Continuous Geographic Decision Space



ESRI Southwest User's Group Conference
October 19-23, 2009 in Pueblo, Colorado

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Situation: Most desktop mapping and GIS applications have focused on mapping and spatial data management responding to inventory assessments of "*Where Is What*" involving digital maps and linked databases (computer mapping and geo-query). Map analysis provides new processing structures and analytical tools for investigating and incorporating spatial relationships of "*Why and So What*" in both research and decision-making contexts. While the new tools of Spatial Analysis, Surface Modeling/Spatial Data Mining and GIS Modeling might at first seem daunting, their roots are in basic math/stat and are less challenging than balancing your checkbook. However, the extension of effective GIS applications from descriptive to prescriptive mapping involves new spatial reasoning concepts and skills that are not reflected in our paper map legacy, manual processing procedures or contemporary "spatial object" mindset. This workshop introduces the new map analysis approaches and procedures taking GIS well beyond mapping ... *to thinking with maps*.

Description: This 1.5 hour introductory workshop discusses and demonstrates numerous fundamental techniques for spatial analysis and statistics using application examples from *natural resources*, *infrastructure*, *geo-business* and *precision agriculture*. The discussion focuses on concepts, procedures and practical considerations in applying grid-based map analysis within a map-ematical framework. Considerable attention is given throughout the workshop to the similarities and differences between vector and raster processing and the relative advantages and disadvantages of the two approaches for investigating spatial patterns and relationships.

Topics: (for more information see online book *Beyond Mapping III* at www.innovativegis.com/basis/MapAnalysis/)

- **Characterizing Grid-based Data and Continuous Map Surfaces**— comparing vector-based objects defined by sets of discrete *Points*, *Lines*, and *Polygons* to grid-based map variables characterized as continuous *Surfaces* (see *Beyond Mapping III*, Topic 18, *Understanding Grid-based Data*)
- **Establishing a Framework for Map Analysis and Modeling**— Spatial Analysis investigates the "geographical context" of mapped data; Spatial Statistics investigates the "numerical context" of mapped data (see *Beyond Mapping III*, Topic 24, *Overview of Spatial Analysis and Statistics*)
- **Understanding Spatial Analysis Procedures**— uses examples from *Natural Resource* suitability modeling and *Infrastructure* routing applications (see *Beyond Mapping III*, Topic 23, *Suitability Modeling* and Topic 19, *Routing and Optimal Paths*)
- **Understanding Spatial Statistics Procedures**— uses examples from *Geo-business* competition analysis and *Precision Agriculture* prescription mapping applications (see *Beyond Mapping III*, Topic 28, *Spatial Data Mining in Geo-business* and Topic 16, *Characterizing Patterns and Relationships*)
- **Charting a Future Course for Map Analysis**— future directions in grid-based map analysis (see *Beyond Mapping III*, Topic 27, *GIS Evolution and Future Trends*)

Intermediate level workshop materials to include PowerPoint, Lecture Notes, Readings and links to hands-on exercise software and databases are posted online at http://www.innovativegis.com/basis/MA_workshop/. The material presented encapsulates numerous "Beyond Mapping" columns published in *GeoWorld* since 1989 and compiled into the book *Map Analysis: Understanding Spatial Patterns and Relationships* (Berry, 2007; GeoTec Media Publishers) and the online book *Beyond Mapping III* posted at www.innovativegis.com/basis/MapAnalysis/. Copies of the *Map Analysis* book with companion CD for hands-on experience will be available for author's discount at the workshop.

Who Should Attend: GIS managers and specialists who are interested in or currently involved in the development of systems that analyze spatial data should attend. The material presented is designed to illustrate the common threads of map analysis used in a wide range of applications. Prior GIS exposure and a basic familiarity with statistics are recommended.