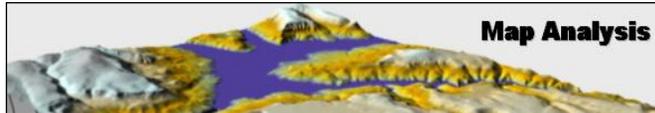


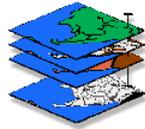
# Beyond Mapping II — Spatial Reasoning

Compilation of Beyond Mapping columns appearing in  
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written by [Joseph K. Berry](#)

posted by [BASIS Press](#)



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# Spatial Reasoning for Effective Solutions

## Description and Annotated Table of Contents

***Spatial Reasoning for Effective Solutions*** explores the basic concepts of map analysis and discusses the fundamental elements of GIS that make it different from traditional map structure, content, processing and use. The book encourages the reader to extend the historic role of maps telling us “Where is what?” to “So what?”

*It is an invitation to consider the expanded capabilities of GIS and relate them to current operations thereby fostering an appreciation of GIS as an effective analytical tool in solving many complex spatial issues. GIS is a new technology, and as such it presents new opportunities as well as new pitfalls.*

*This book engages the reader (both specialist and general user) through incisive and relaxed discussion that investigates why GIS technology is “as different from as it is similar” to traditional map processing. We are at the threshold of a new era— one that directly incorporates the complexity of geographic space in decision-making instead of simply applying a single solution throughout an entire area. The step isn’t so much rocket science as it is a new approach to problem solving. Sure, there are new and initially confusing tools, but the real challenge is in “thinking spatially.”*

**Introduction Where is GIS?** — Is the GIS technology cart in front of the horse? Data mining, predictive modeling and dynamic simulation are new applications of GIS used to uncover spatial relationships and sensitivities among mapped data. This section discusses the revolutionary procedures identifying the driving forces, trends and forecasts of the spatial paradigm.

**Topic 1 Understanding GIS** — As GIS moves from graphical inventories to spatial reasoning, new procedures must be developed to communicate the logic that supports GIS models. An end user must interact with a model—a spatial spreadsheet—that can present alternative perspectives. This section describes the interactive use of a map pedigree linking GIS commands to a flowchart of model logic.

**Topic 2 From Field Samples to Mapped Data** — In the simplest sense, statistics are merely a collection of numbers. Traditional statistical analysis characterize the “typical response” in a data set, whereas spatial statistics seek to map the data’s distribution in geographic space. This section compares the two approaches and investigates various techniques of spatial interpolation.

**Topic 3 Implementing GIS** — GIS technology begins with a thorough understanding of its intended applications and operating environment. This section presents an applications-driven procedure for assessing GIS information needs within an organization and establishes a hierarchy of questions it can address.

**Topic 4 Toward and Honest GIS** — By their nature, maps are abstractions of real conditions. They approximate the positioning of tangible or conceptual features on our landscape with varying degrees of certainty. This section introduces the concept of using a “shadow map” of certainty to track error propagation in GIS models.

**Topic 5 A Framework for GIS Modeling** — The use of GIS to model complex spatial relationships is increasing rapidly. Our understanding of the types and approaches of models, however, is based on decades of nonspatial modeling experience. This section presents a classification framework for GIS models and a flowcharting methodology.

**Topic 6 Alternative Data Structures** — At the heart of GIS is data. How data are structured, in large part, determines a system's performance, capabilities and breadth of applications. This section describes alternative approaches to vector and raster data structures.

**Topic 7 Organizing the Map Analysis Toolbox** — What GIS can do depends on the depth of the spatial information available to the computer, tempered by the depth of understanding of the analytical operations by those who use it. This section discusses spatial topology and its extension to the classification of analytical GIS operations.

**Topic 8 The Anatomy of a GIS Model** — Although GIS models address a wide diversity of applications, the basic structure of most models are quite similar. This section compares several GIS models to illustrate different modeling approaches and varying levels of results they generate.

**Topic 9 Putting GIS in the Hands of People** — The Global Positioning System (GPS) focuses on real-time positioning in space while remote sensing (RS) technology focuses on monitoring and classifying the landscape. This section covers the underlying principles of these related fields and their integration into a GIS/GPS/RS field unit.

**Topic 10 A Futuristic GIS** — Spatial Analysis is more than mapping and spatial database management. It involves deriving new information to express relationships based on the relative positions of map features. This section establishes a framework for spatial analysis and demonstrates several of its import aspects.

**Epilog The Human Factor in GIS Technology** — GIS technology is thought of as hardware and software. However, the "humanware" component often determines the usefulness of the system. This section discusses the human factor in GIS and the linkages and distinctions among data, information, knowledge and wisdom.

