

GIS in Natural Resource Education: Where are We Headed?

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Abstract: Over the past three decades, GIS education in natural resources has evolved from a focus on automated cartography, to spatial database management, to geo-web applications. Within these contexts, curricula have emphasized the mechanics of descriptive mapping (“Where is What”) involving acquisition, storage, retrieval, query and display of spatial objects. However, the future of GIS education is moving from a “down the hall and to the right” specialist’s role for providing mapped data, to a broader and more active role of providing spatial information for natural resource research, policy, planning and management. The instructional emphasis is shifting from data-centric tools to application-specific constructs of prescriptive mapping (*Why, So What and What If*) that infuses consideration of geographic patterns and relationships within problem-solving contexts. The paradigm shift replaces spatially-aggregated tools and models that assume uniform or random distribution in geographic space with spatial reasoning and analytical procedures that capitalize on the variation within and among map variables. The result is a “map-ematical” structure that enables natural resource professionals to better understand and communicate complex spatial interplay of edaphic, topographic, biological, ecological, environmental, economic and social considerations. It provides a common foothold for integrating dialog among the seemingly disparate disciplines within natural resources, as well as across campus. This paper describes a comprehensive instructional approach, framework and classroom materials for teaching grid-based map analysis and modeling concepts and procedures as direct spatial extensions of traditional mathematics and statistics to students with minimal or no GIS background.



About the Presenter: Dr. Berry is a leading consultant and educator in the application of GIS technology. He is the principal of Berry and Associates // Spatial Information Systems (BASIS), consultants and software developers in geotechnology and the author of the “Beyond Mapping” column for GeoWorld magazine since 1989, several books and over 200 papers on GIS theory and applications. He conducted basic research and taught courses in GIS for twelve years at Yale University’s Graduate School of Forestry and Environmental Studies, and is currently Keck Scholar in Geosciences at the University of Denver and Adjunct faculty in Natural Resources at Colorado State University.

Additional Readings:

- [SpatialSTEM: Extending Traditional Mathematics and Statistics to Grid-based Map Analysis and Modeling](#) — white paper describing an innovative approach for teaching map analysis and modeling fundamentals within a mathematical/statistical context
- [An Analytical Framework for GIS Modeling](#) — white paper presenting a conceptual framework for map analysis and GIS Modeling
- [GIS Modeling and Analysis](#) — book chapter on grid-based map analysis and modeling
- [A Brief History and Probable Future of Geotechnology](#) — white paper on the evolution and future directions of GIS technology
- [Beyond Mapping III](#) — an online book containing Introduction, 29 Chapters and Epilog as a compilation of the popular Beyond Mapping columns published in GeoWorld magazine from 1996 through present, BASIS, Fort Collins, Colorado, 2010. J.K. Berry.

www.innovativegis.com/basis/MapAnalysis/

Online Presentation Materials and References

www.innovativegis.com/basis/Papers/Other/NReduction2012
Handout, PowerPoint and Online References
...also see www.innovativegis.com/basis/, online book Beyond Mapping III

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