GIS in Forestry and Natural Resources:
Current Analytical Capabilities and Future Directions

Presentation for Delegation Visit from Wondo Genet College of Natural Resources, Hawassa University
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*Presentation by* **Joseph K. Berry**
Keck Scholar in Geosciences, Geography Department, University of Denver
Adjunct Faculty, Warner College of Resources, Colorado State University
Principal, Berry & Associates // Spatial Information Systems
Phone 970-215-0825 — Email jberry@innovativegis.com — Web www.innovativegis.com/basis/

*(See **http://www.innovativegis.com/basis/present/EthiopianDelegation/** to access support materials including PowerPoint)*
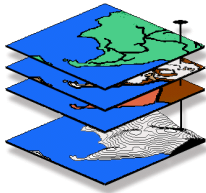
Situation: Most desktop mapping and GIS applications have focused on mapping and spatial data management responding to inventory assessments of "*Where Is What*" that involve digital maps and linked databases— a "**Technology Tool**" emphasizing computer mapping, geo-query and display. Map analysis and modeling provides a new set of analytical tools and processing structures for incorporating spatial patterns relationships that address "*Why, So What and What If*" within decision-making contexts— an "**Analytic Tool**" involving map analysis and modeling. The movement of GIS from *descriptive* to *prescriptive* mapping involves new spatial reasoning concepts and skills that are not reflected in our paper map legacy and desktop mapping procedures. This presentation discusses underlying concepts, capabilities, considerations and challenges facing natural resources faculty in moving beyond mapping and instilling the ability to "think with maps" in their students.

Online References:

– **Beyond Mapping Compilation Series** — *online compilation of Beyond Mapping columns appearing in GeoWorld magazine 1989 to 2013 with many of the columns addressing Natural Resources topics.*
  http://www.innovativegis.com/basis/BeyondMappingSeries/

– **Future Directions of GIS in Forestry:** *Extending Grid-based Map Analysis and Geo-web Capabilities — PowerPoint slide set and underline video of keynote presentation for Esri Forestry GIS Solutions Conference 2011.*
  http://www.innovativegis.com/basis/Papers/Other/Esri_Forestry2011/

– **A Brief History and Probable Future of Geotechnology** — *paper on the evolution and future directions of GIS.*
  http://www.innovativegis.com/basis/Papers/Other/Geotechnology/Geotechnology_history_future.htm

– **An Analytical Framework for GIS Modeling** — *paper presenting a conceptual framework for map analysis and GIS Modeling.*
  http://www.innovativegis.com/basis/Papers/Other/GISmodelingFramework/

– **GIS Modeling and Analysis** — *book chapter on grid-based map analysis and modeling.*
  http://www.innovativegis.com/basis/Papers/Other/ASPRSchapter/

– **Making a Case for SpatialSTEM**: Spatial Considerations in Science, Technology, Engineering and Mathematics Education — *paper describing a framework for grid-based map analysis and modeling concepts and procedures as direct spatial extensions of traditional mathematics/statistics.*
  http://www.innovativegis.com/basis/Papers/Other/SpatialSTEM/SpatialSTEM_case.pdf

– **Math/Stat Classification of Spatial Analysis and Spatial Statistics Tools** (Spatial Analyst by Esri) — *paper listing ESRI Spatial Analyst module operations by traditional mathematics and statistics categories.*
  http://www.innovativegis.com/basis/Papers/Other/Esri_Forestry2012/SA_SS_Operations_SpatialAnalyst.pdf

Joseph K. Berry is a leading consultant and educator in the application of Geographic Information Systems (GIS) technology. He is the principal of BASIS, consultants and software developers in GIS technology and the author of the "Beyond Mapping" column for GeoWorld magazine for twenty five years. Since 1976, he has written more than two hundred papers on the theory and application of map analysis techniques, and is the author of the popular books Beyond Mapping, Spatial Reasoning, Map Analysis and GIS Modeling. He has been writing, teaching and consulting in Natural Resources for over thirty years. Dr. Berry holds a B.S. degree in forestry from the University of California, Berkeley, a M.S. degree in business management and a Ph.D. emphasizing remote sensing and land use planning from Colorado State University. www.innovativegis.com/basis/basis/cv_berry.htm