

Precision Agriculture: A Transformative Teaching Moment for Geotechnology

Presentation by **Joseph K. Berry**

Adjunct Faculty, Department of Geography, University of Denver and Warner College of Natural Resources, Colorado State University
Principal, Berry & Associates // Spatial Information Systems

Email jberry@innovativegis.com — Website www.innovativegis.com/basis/

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To many, *Precision Agriculture (PA)* seems like an oxymoron. With mud up to the axles and 400 acres left to plough, precision seems worlds away. Yet site-specific management makes sense to a rapidly growing number of farmers. Mapping and analyzing variability in field conditions, and linking such spatial relationships to management action, places production agriculture at the cutting edge of GIS applications— all this from an industry that just two decades ago only used maps for hunting elk.

Now that PA is entering its third decade, where is it? Yield mapping is commonplace for many crops and locales. Site-specific management of field fertilization has a large and growing number of users. Remote sensing applications are maturing. Irrigation control, field leveling, variable rate seeding, disease/pest modeling, stress maps and a myriad other computer mapping uses are edging over the horizon. Location-aware intelligent

implements seem to be everywhere. However, it is important to keep in mind that site-specific farming *isn't just a bunch of pretty maps, but a set of new and evolving technologies and practices that link mapped variables to appropriate management actions.*

It is within this technological and analytical framework that Precision Agriculture (and its new offshoot, *Precision Conservation*) serves as an ideal educational space for teaching fundamental GIS concepts and procedures as it involves most aspects of the spatial triad (RS, GIS, GPS) within real-world application settings that resonate with most students.

Online References:

- **Plenary and Breakout Sessions on Precision Agriculture**, fully annotated slide sets presented at Precision Ag 2.0 Conference, Calgary, Alberta, Canada, February 2014. http://www.innovativegis.com/basis/present/PAconf_Calgary2014/
- **Beyond Mapping Compilation Series** is an online compilation of Beyond Mapping columns appearing in GeoWorld magazine 1989 through 2013 with many addressing Precision Ag topics. <http://www.innovativegis.com/basis/BeyondMappingSeries/>
- **Making a Case for SpatialSTEM: Spatial Considerations in Science, Technology, Engineering and Mathematics Education**, is a white 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/>
- **Applying Spatial Analysis for Precision Conservation across the Landscape**, J. of Soil and Water Conservation, Nov/Dec 2005, Vol. 60, No. 6, pg 22-29. J.K. Berry, J. A. Delgado, R. Khosla and F.J. Pierce. <http://www.jswnonline.org/content/60/6/363>
- **Precision Conservation for Environmental Sustainability**, J. of Soil and Water Conservation, Nov/Dec 2003, Vol. 58, No. 6, pg 332-339. J.K. Berry, J. A. Delgado, R. Khosla and F.J. Pierce. <http://www.jswnonline.org/content/58/6/332>
- **Who's Minding the Farm**, GeoWorld, Adams Business Media, Chicago, Illinois, Feb 1998, 11:2 46-51. J.K. Berry. http://www.innovativegis.com/basis/present/GW98_PrecisionAg/GW98_PrecisionAg.htm
- **Site-Specific Farming Comes of Age**, FarmTech '98 Conference, Ricon Publishing, January, 1998, J.K. Berry. <http://www.innovativegis.com/basis/present/Fieldvariation.htm>



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 Precision Ag for over fifteen 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.

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