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Integrating Spatial Educational Experiences (Isee) – Mapping a New Approach to Teaching and Learning Soil Science

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Integrating Spatial Educational Experiences (Isee) Mapping a New Approach to Teaching and Learning Soil Science

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Teaching and Learning with Digital Soil Maps

Objective

- Develop the ability of our students to use digital maps
 - to learn how and why soils and landscapes vary spatially at scales ranging from fields, to counties, to states, and globally
 - to learn how the spatial distribution of soils and landscapes impacts the distributions of land use, and environmental and ecosystem services across various scales.

Audience

- Primary: undergraduate students in soil, crop, natural resource, and environmental science curricula in colleges and universities
- Secondary: natural resource professionals, general public

Products

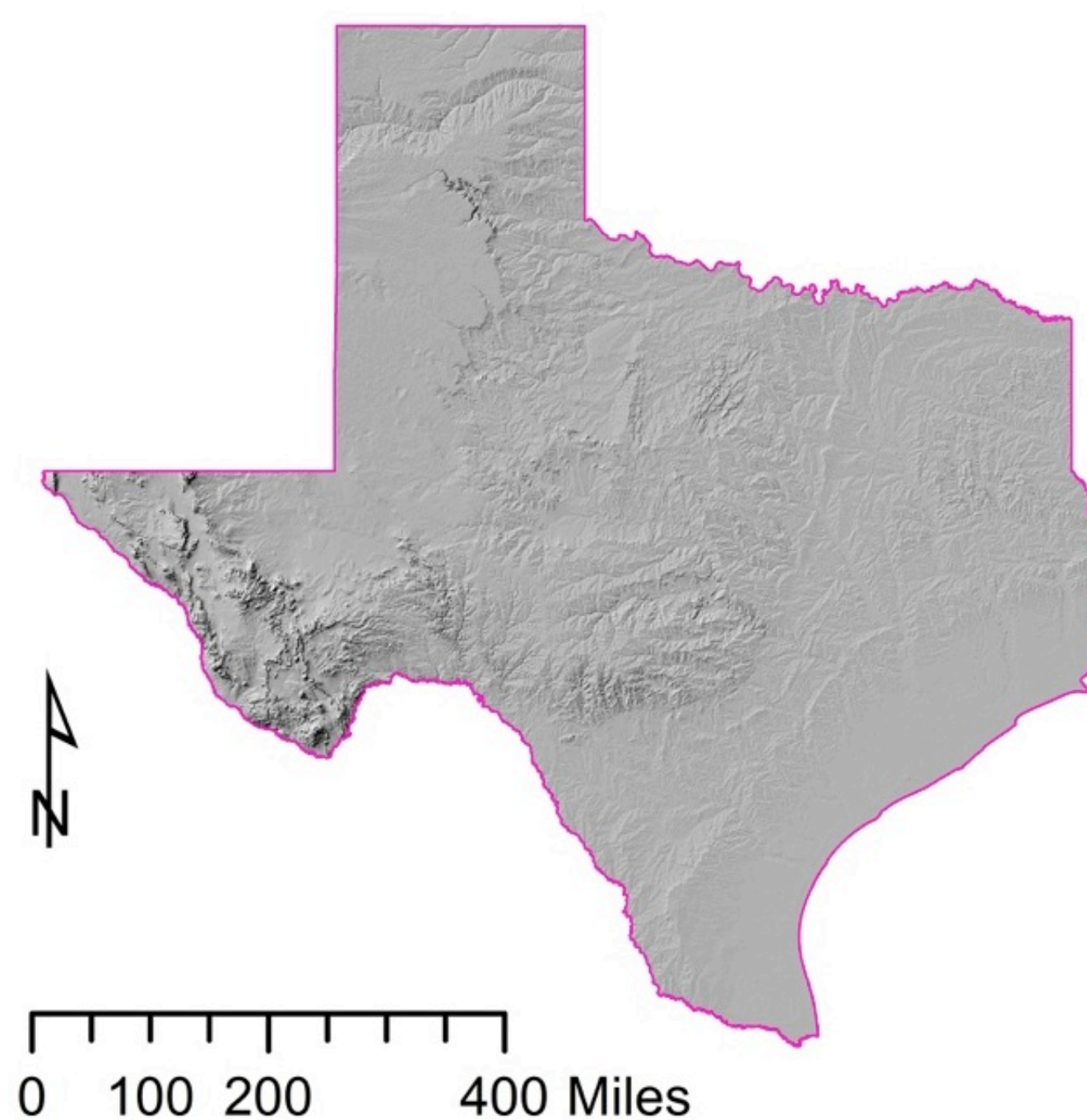
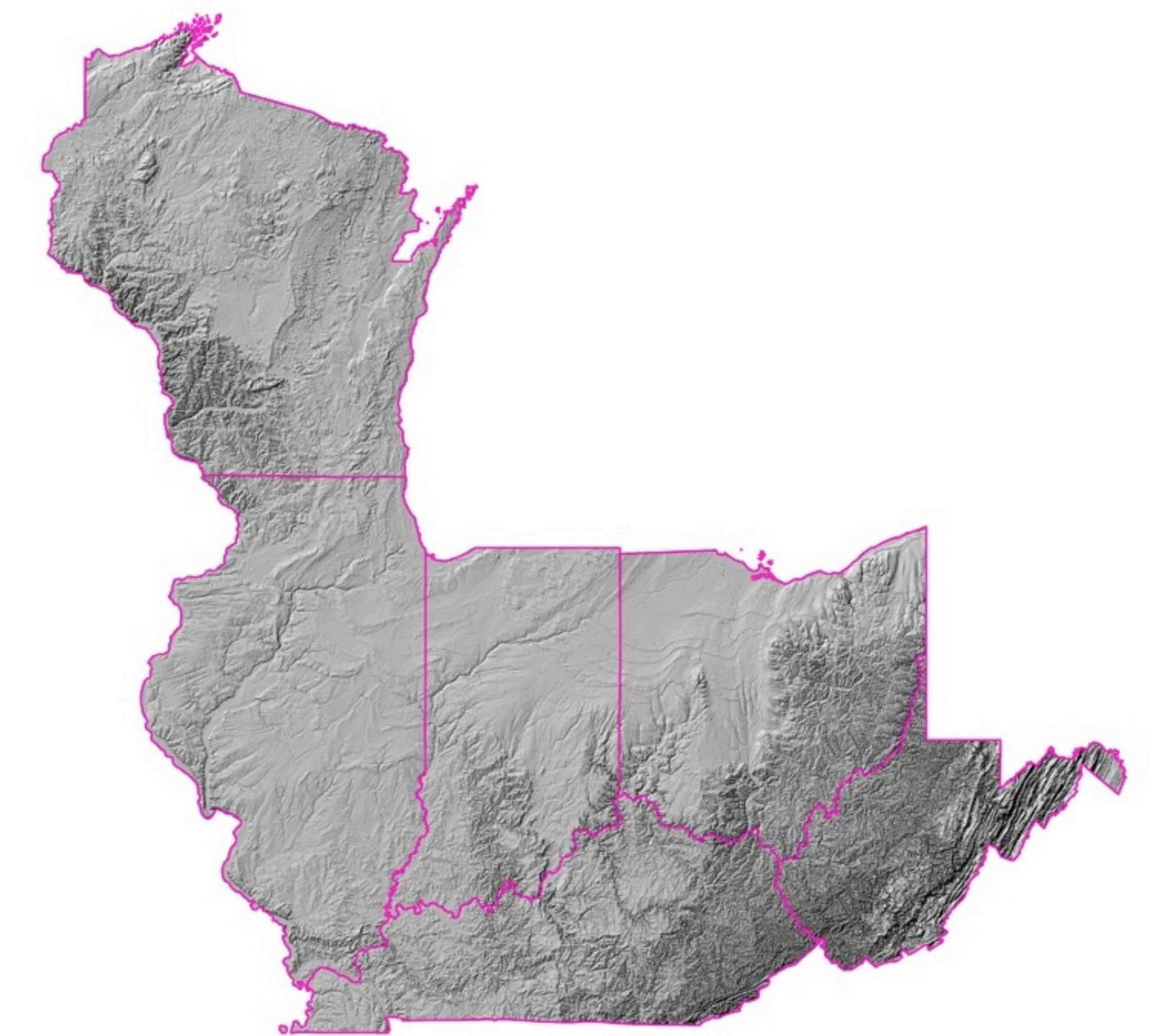
- a revised and expanded Isee web site and a new iPad app
- engaging, informative maps of soil properties for Indiana, West Virginia, Ohio, Kentucky, Illinois, Wisconsin, and Texas
- a community of practice dedicated to Integrating Spatial Educational Experiences in soil science education on STEMEdhub.org
- lessons, worksheets, exercises, and experiences shared with the Isee community of practice.

Students using maps ...



... on iPads in the classroom,

Project Area



... on a field trip.

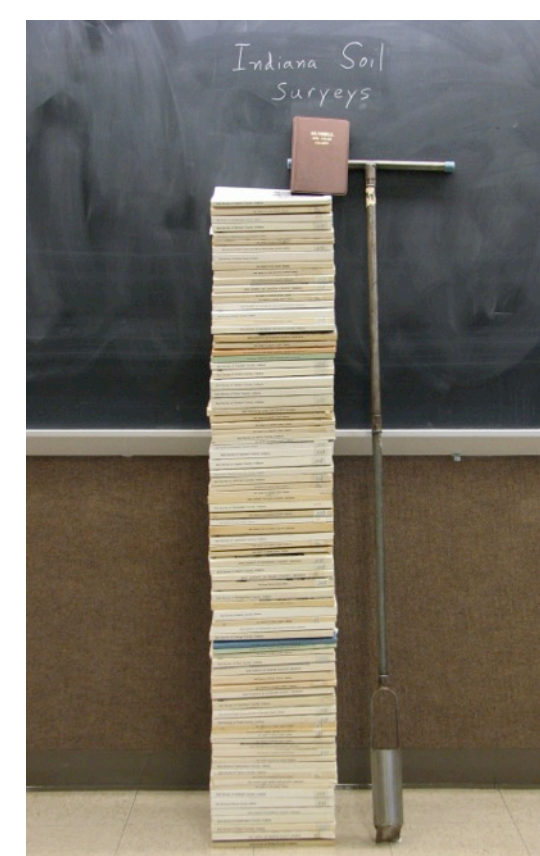
Leveraging Big Data for Teaching and Learning

SSURGO Soils Dataset for Indiana

- 100+ years of soil survey
- mapped at 1:20,000 or better for modern survey
- 1.3 million polygons, smallest ~2 acres
- 3.5 to 4.0 million ground truthed observations

Digital Elevation Models

- National Elevation Dataset (NED) – 3 meter pixel resolution
- Lidar data where available



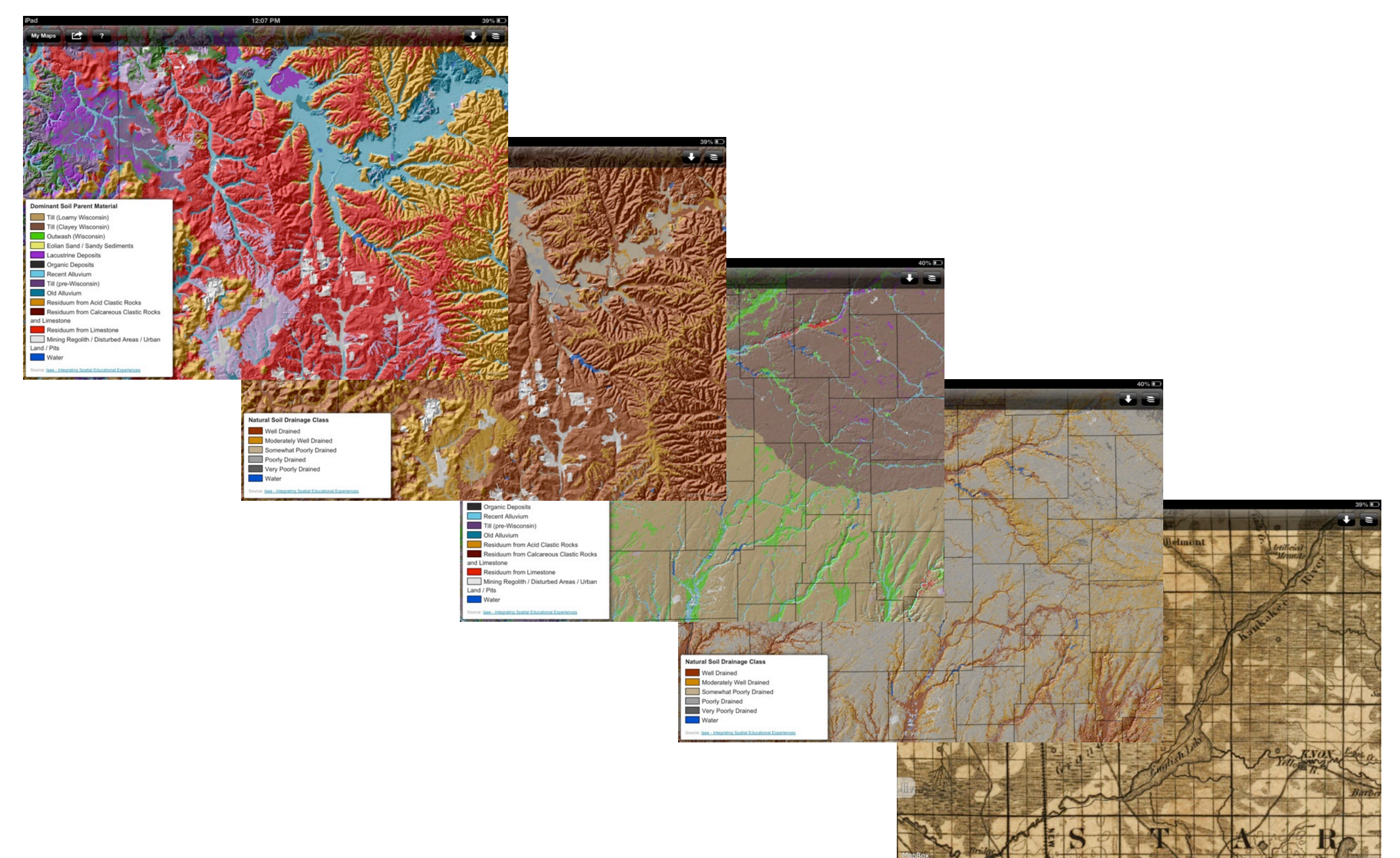
Big Data, Huge Maps

Cell Size on the Ground versus Map Size for Indiana

Cell Size (meters)	Pixels	Uncompressed Size up to	Map Size (@264 pixels / in.)*
640 x 640	456 x 696	310 KB	2 x 4 in
320 x 320	912 x 1,391	4.8 MB	3 x 5 in
160 x 160	1,824 x 2,782	19 MB	7 x 11 in
80 x 80	3,648 x 5,564	77 MB	14 x 21 in
40 x 40	7,298 x 11,128	306 MB	2 x 4 ft
20 x 20	14,591 x 22,255	1.2 GB	5 x 7 ft
10 x 10	29,181 x 44,510	4.8 GB	9 x 14 ft
5 x 5 M	58,362 x 89,020	19.1 GB	18 x 28 ft

* Resolution of Apple iPad Air

Examples of Maps on the iPad



Technologies

- ArcGIS Desktop and ArcGIS Server 10.1
- ArcGIS 10.1 iOS Software Development Kit
- Source data freely available on the Internet

Current Website



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