

Indiana LTAP Technology Showcase-Everyday GIS for Public Works

Abstract:

Embracing technology can be challenging for everyone. Indiana LTAP understands and we plan to help by focusing on technologies that can improve your operations and create a positive change in your agency. Understanding GIS is at the top of the list. Starting from the basics our presenter will show you how to get started, how to get the most out of this technology and what tools are available for you and your crew every day.

Speaker:

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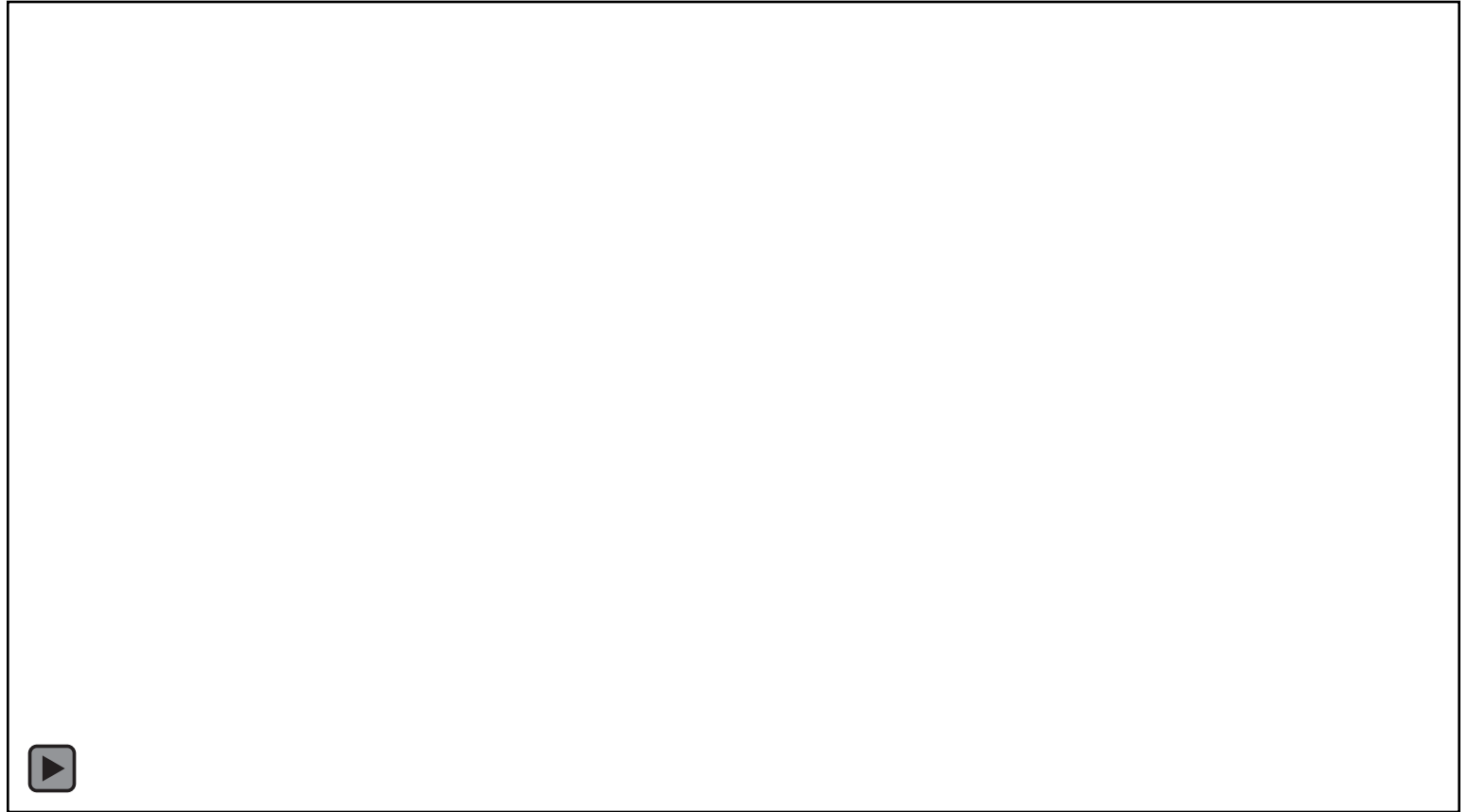
Date:

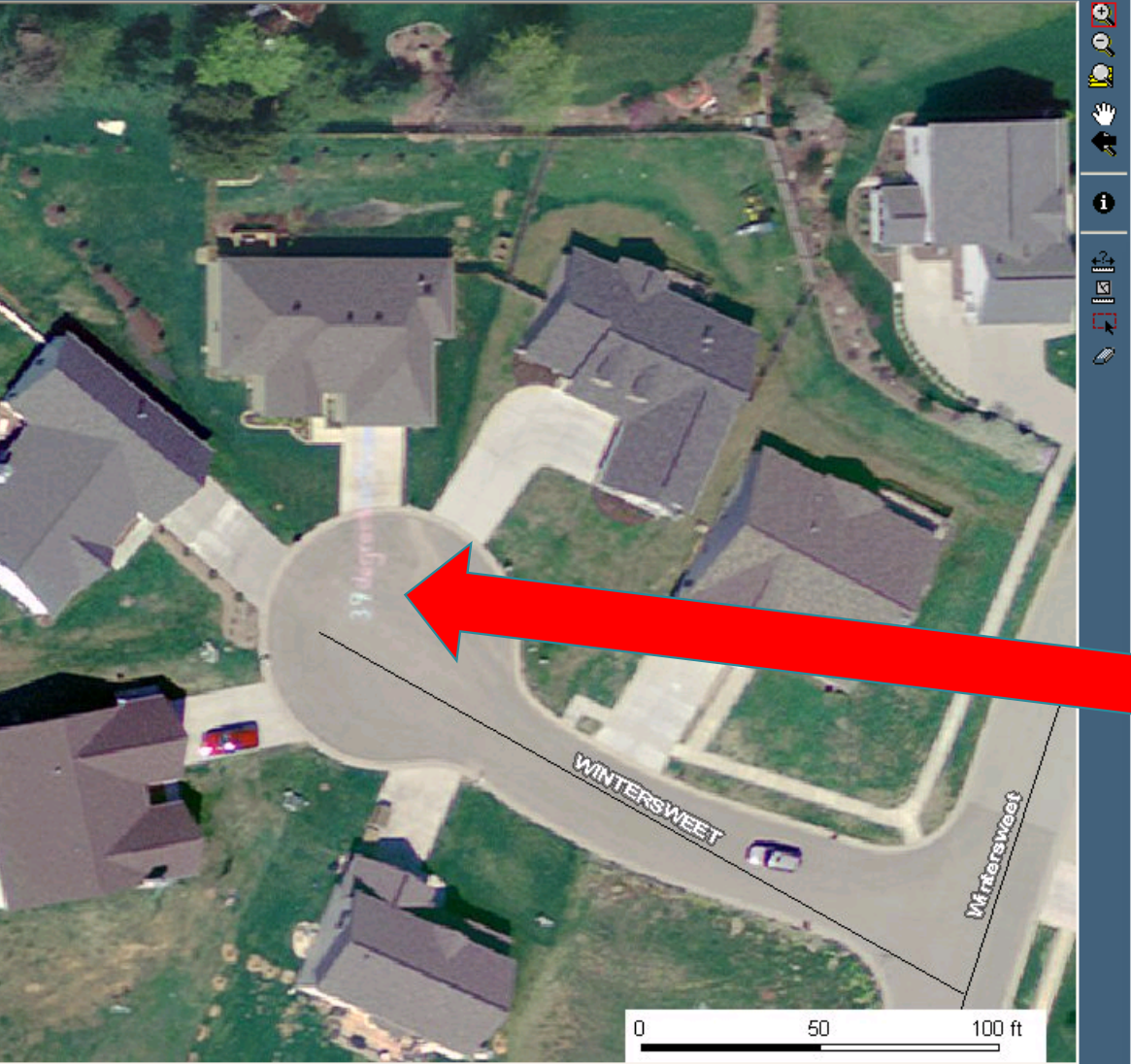
Wednesday, March 7, 2018

Time Period:

10:00 – 10:50

Why Is Geography Important?





Active Layer:

Counties

Contours, Imagery, & Other

- m d r Aerial Photos - 2008 (NAIP)
- m d r Aerial Photos - 2007 (NAIP)
- m d Aerial Photos - 2007 (Central
- m d r Aerial Photos - 2006 (NAIP)
- m d s r Aerial Photos - 2005

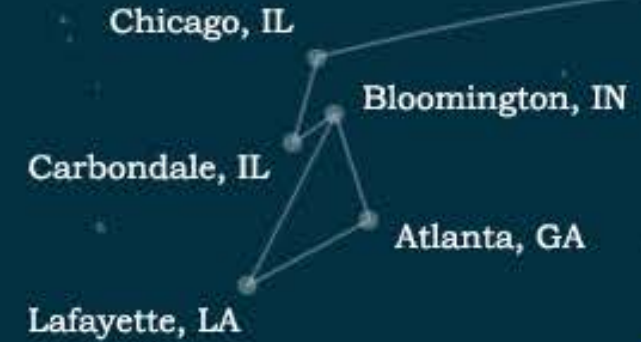
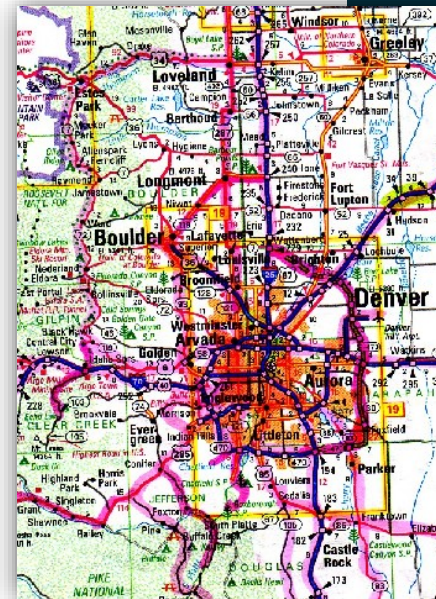
Having fun with Geography!



My interest in
Geography
began at an
early age...



Professional Golfer vs. Professional Geographer



When did I decide to pursue a career in GIS and Geography?

- Started in the Kelly School of Business at IU in 1992
- Dropped out in 1994
- Re-enrolled in 1997
- Took 4 random classes... one of them being Geography
- My first GIS explanation... a Tree...
- Made the decision that night to change my major from Business to Geography.



The call
home...



“Son! What in the hell are you going to do with a Geography degree?”

Fast forward a couple years...
The year 2000.



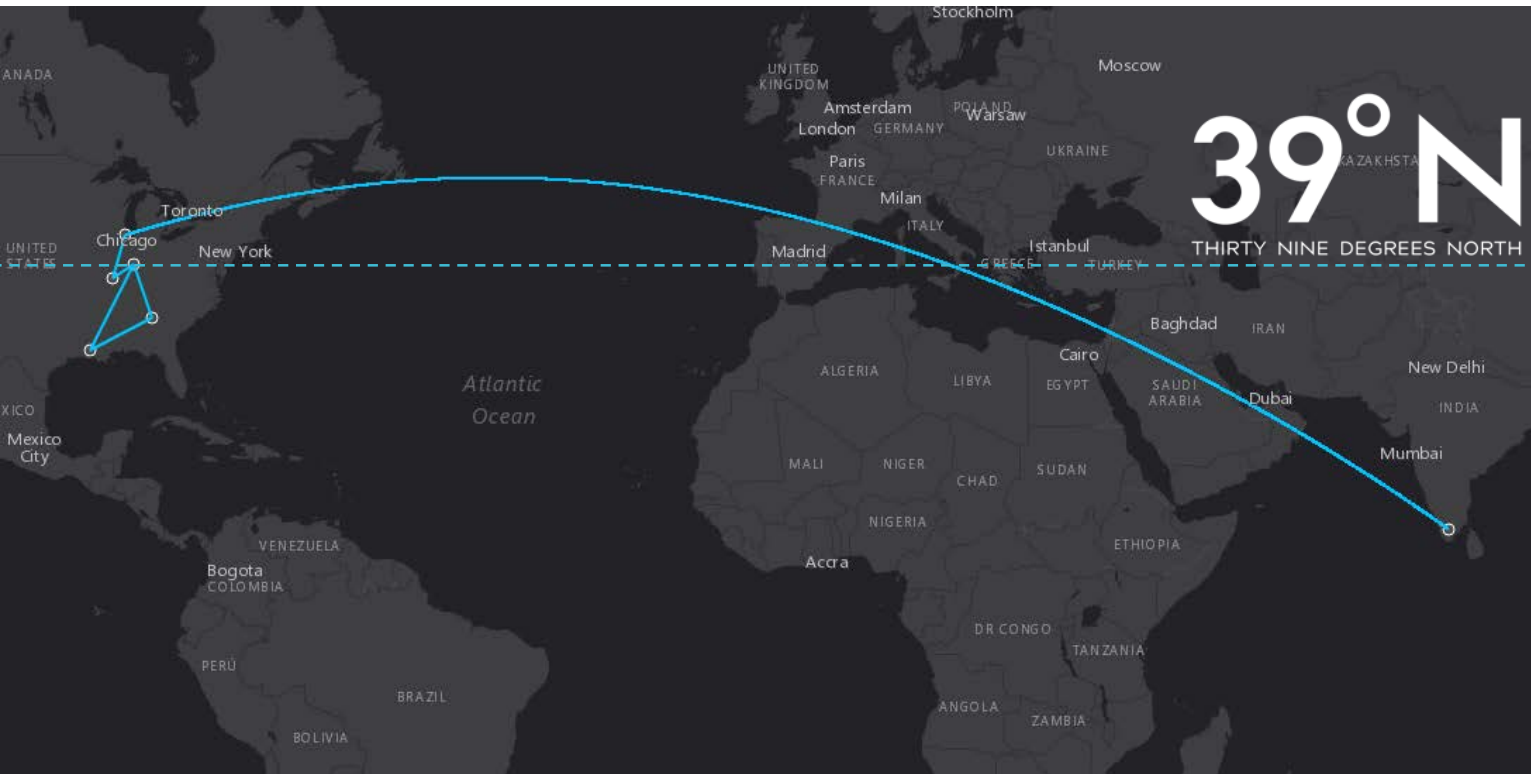
GIS Technician –
\$10/hr. (includes no benefits)
Indiana Geological Survey



A GIS Atlas for Indiana receives international recognition in 2004.

- - Over 250 map layers
- - Available to the public
- - More on this in a few slides...





The birth of 39°N.

THIRTY NINE DEGREES NORTH

Introduction to Geographical Information Systems (GIS)

- **Geo** = Earth
- **Geography** = Study of earth and where things are located.
- **Information** = For capturing, managing, analyzing and understanding information.
- **System** = A set of Software, Hardware and Data.
- Putting it all together, a GIS is a computer-based information system used to digitally represent and analyze the geographic features present on the Earth's surface and the events that take place on it.

A GIS Can...

- **Display Locations:** What is a particular location? Where is?
 - For example... how many people used google maps last evening to find the nearest ~~restaurant~~-pub?
- **Find Conditions:** Find locations where certain conditions exist...
 - For example... show me all of the roads with a PASER rating of 5 that exists in Commissioner District 3.
 - Furthermore... give me a report displaying the total miles of roads making up the example above.
- **Analyze Trends:** What has changed since...?
- **Display Patterns:** What things are related to...?
- **Model:** What if scenarios?
 - For example, How will traffic be impacted if a new shopping center is built?

A working GIS
seamlessly
integrates 5
key
components...

- People
- Software
- Data
- Hardware
- Methods

People

- GIS users range from the technical specialists who design and maintain the system to those who use it to help them perform their everyday work.

A working GIS
seamlessly
integrates 5
key
components...

- People
- Software
- Data
- Hardware
- Methods

Software

- Tools for entering and manipulating geographic information such as roads, culverts, bridges, etc.
- More on software in a moment...

A working GIS seamlessly integrates 5 key components...

- People
- Software
- Data
- Hardware
- Methods

Data

- A GIS associates tabular data to geographical features in order to analyze and assess real-world situations.
- We call this associated data – attributes.
- Bringing data together... For example, This building and floorplan is the geographic (spatial) data and the name of this building and room would make up the attribute data.
- More on Data in a few moments.

A working GIS
seamlessly
integrates 5
key
components...

- People
- Software
- Data
- Hardware
- Methods

Hardware

- Computer
- Tablet
- Phone
- Servers

A working GIS
seamlessly
integrates 5
key
components...

- People
- Software
- Data
- Hardware
- **Methods**

Methods

- A successful GIS operates according to a well-designed plan and achieves business goals and are unique to each organization.

Data and Software

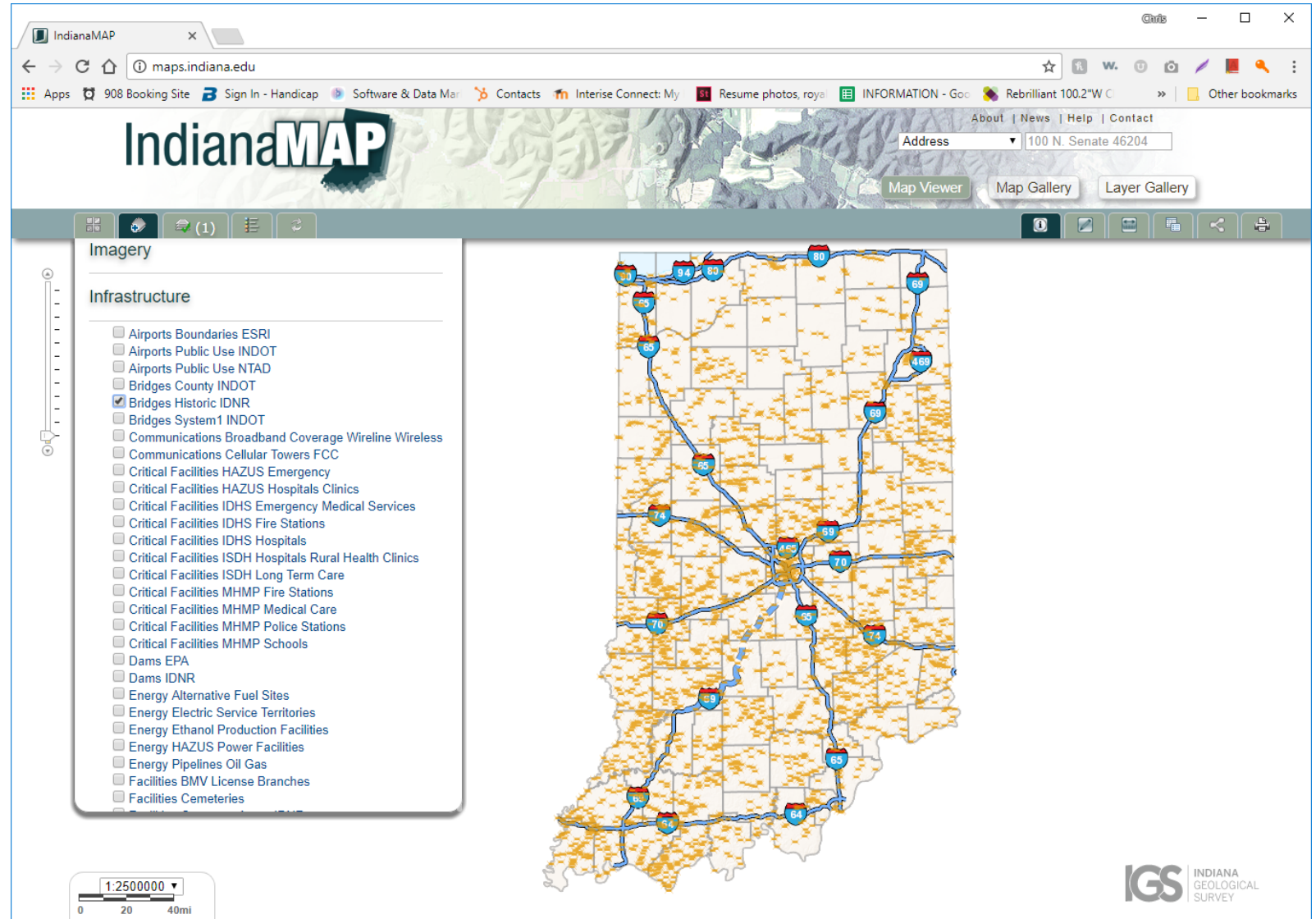
- Since our time is limited today... we are going to focus on Data and Software.
- People, Hardware and Methods are important but as an individual, you can be up and running after this session with some data, software and minimal hardware.

Data – Easily Available

- As Hoosiers, we are very fortunate.
- We have a plethora amount of data available at our fingertips.
- Higher Education (namely Indiana University) and the State of Indiana have everything from roads to aerial photography for our use... and its free!

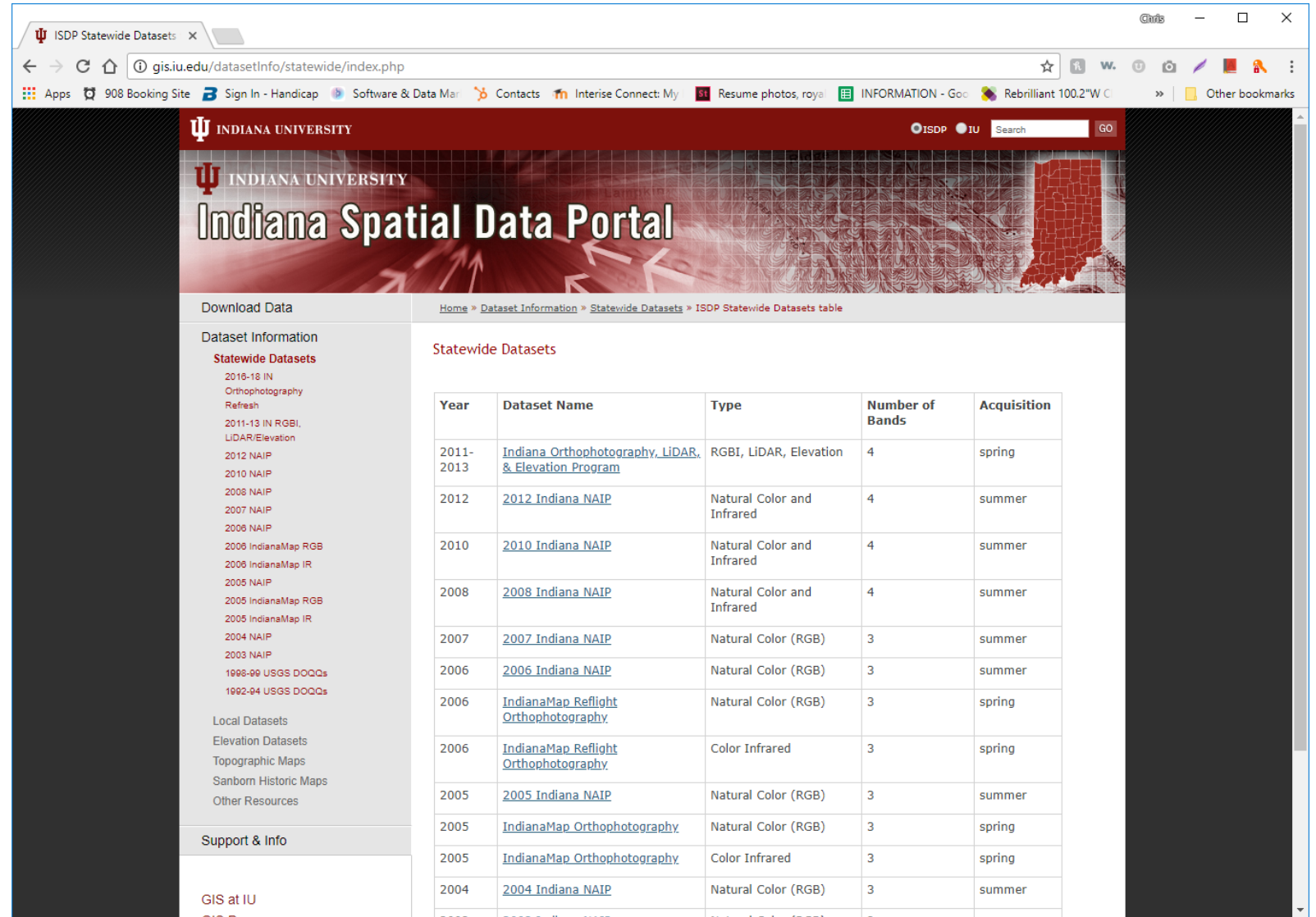
Data – The IndianaMap

Over 270
different layers
of information



Data – The Indiana Spatial Data Portal

Mostly aerial photography and elevation datasets.



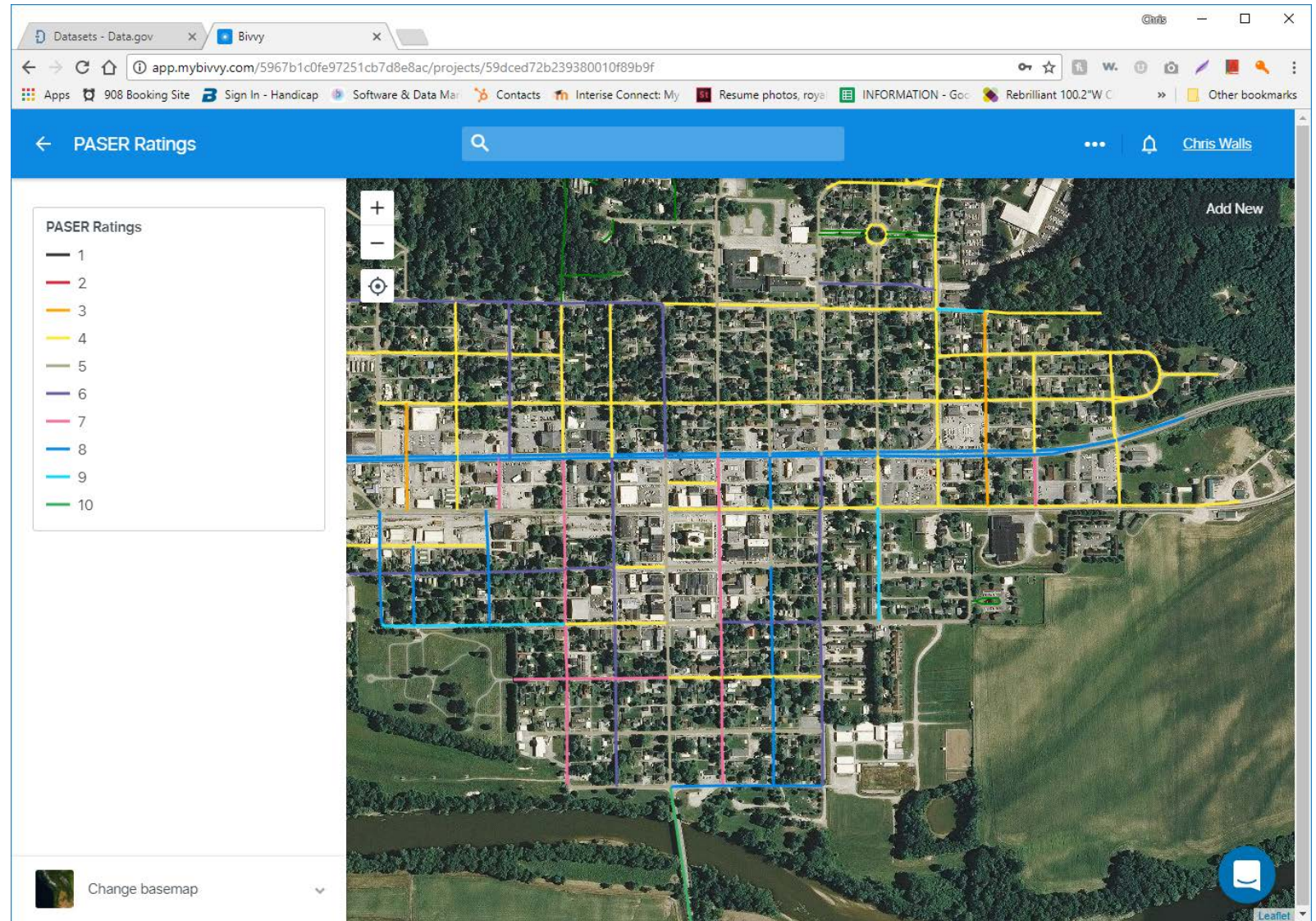
The screenshot shows the Indiana Spatial Data Portal website. The page title is "Indiana Spatial Data Portal". The main content area displays a table of "Statewide Datasets". The table has five columns: Year, Dataset Name, Type, Number of Bands, and Acquisition. The table lists datasets from 2004 to 2013, including NAIP (National Aerial Imagery Program) and Orthophotography datasets.

Year	Dataset Name	Type	Number of Bands	Acquisition
2011-2013	Indiana Orthophotography, LIDAR, & Elevation Program	RGBI, LIDAR, Elevation	4	spring
2012	2012 Indiana NAIP	Natural Color and Infrared	4	summer
2010	2010 Indiana NAIP	Natural Color and Infrared	4	summer
2008	2008 Indiana NAIP	Natural Color and Infrared	4	summer
2007	2007 Indiana NAIP	Natural Color (RGB)	3	summer
2006	2006 Indiana NAIP	Natural Color (RGB)	3	summer
2006	IndianaMap_Reflight Orthophotography	Natural Color (RGB)	3	spring
2006	IndianaMap_Reflight Orthophotography	Color Infrared	3	spring
2005	2005 Indiana NAIP	Natural Color (RGB)	3	summer
2005	IndianaMap Orthophotography	Natural Color (RGB)	3	spring
2005	IndianaMap Orthophotography	Color Infrared	3	spring
2004	2004 Indiana NAIP	Natural Color (RGB)	3	summer

Data – If Indiana doesn't have enough data... the Federal Government can be a resource too.

The screenshot shows the Data.gov website interface. At the top, there is a search bar with the text "Search Data.Gov" and a magnifying glass icon. Below the search bar is the Data.gov logo and a navigation menu with links for DATA, TOPICS, IMPACT, APPLICATIONS, DEVELOPERS, and CONTACT. The main content area is titled "DATA CATALOG" and features a search bar with the text "Search datasets..." and a magnifying glass icon. To the right of the search bar is a dropdown menu for "Order by:" with "Popular" selected. Below the search bar, it says "Datasets ordered by Popular". On the left side, there is a "Filter by location" section with a "Clear" button and a dropdown menu for "Enter location...". Below this is a map of the United States with a zoom-in (+) and zoom-out (-) button. At the bottom of the filter section, it says "Map tiles & Data by OpenStreetMap, under CC BY SA". Below the map is a "Topics" section with a "Clear All" button and two circular icons labeled "A-Z" and "1-9". Below the topics section is a list of categories: Local Government (16597), AAPI (1109), Climate (616), and Agriculture (561). The main content area displays "233,660 datasets found" and lists several datasets with their titles, descriptions, and view counts. The datasets listed are: "Demographic Statistics By Zip Code" (1540 recent views) by City of New York, "College Scorecard" (1411 recent views) by Department of Education, "ZIP Code Data" (1287 recent views) by Department of the Treasury, and "U.S. Chronic Disease Indicators (CDI)" (1262 recent views) by U.S. Department of Health & Human Services. Each dataset entry includes a list of available file formats (e.g., CSV, RDF, JSON, XML, HTML) and a "Federal" label on the right side.

If Indiana and the Federal Government doesn't have what you need, you will likely need to create it yourself.

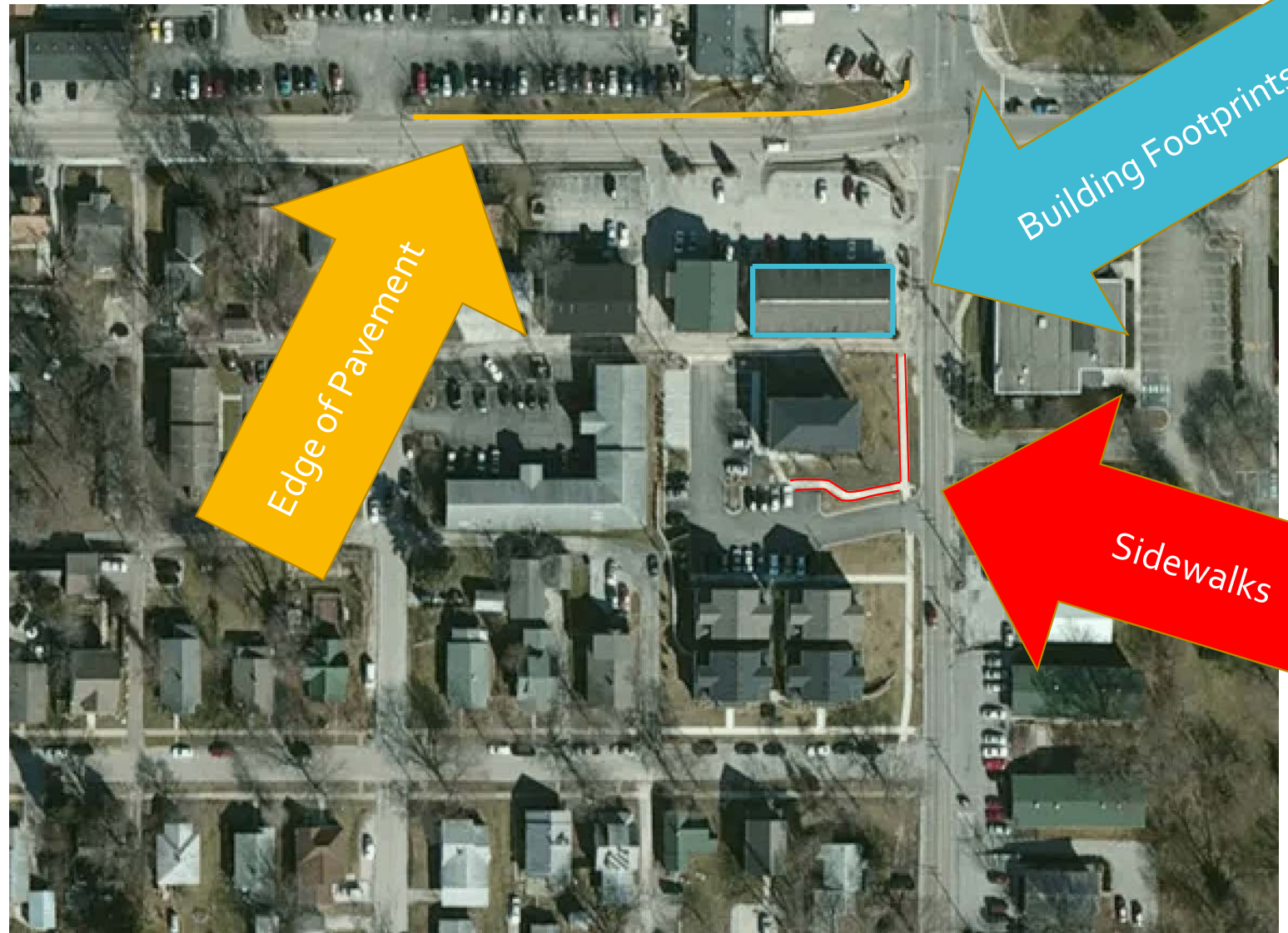


New data can
be created
from a variety
of sources...

- From Aerial Photography
- From Tables Containing Geographic Locations
- From GPS Equipment

New data can be created from a variety of sources...

Aerial Photography



New data can be created from a variety of sources...

Tabular Data

AutoSave Off | Results.xls - Excel

File Home Insert Page Layout Formulas Data Review View Developer Help Tell me what you want to do

Get Data From Text/CSV From Web From Table/Range Recent Sources Existing Connections Refresh All Queries & Connections Properties Edit Links Sort Filter Filter Clear Reapply Advanced Text to Columns Flash Fill Remove Duplicates Validation Data Tools

	A	B	C	D	E
1	OWNER	PROPERTY_STREET	PROPERTY_CITY_ST_ZIP		
2	OEI Inc	100 E 5th ST	Bloomington IN 47404		
3	Spannuth Enterprises Inc	100 N Walnut ST	Bloomington IN 47404-4911		
4	CGI Real Estate Holdings LLC	100 S College AVE	Bloomington IN 47404		
5	Naderpoor Anwar Mary	100 W 6th ST	Bloomington IN 47404		
6	Board Of Commissioners Monroe County The	100 W Kirkwood AVE	Bloomington IN 47404		
7	Omega Center and Lofts 103 LLC	101 N College AVE	Bloomington IN 47404-3947		
8	CFC Inc	101 W Kirkwood Ave	Bloomington IN 47404		
9	OEI Inc	102 W 6th ST	Bloomington IN 47404-3910		
10	Allen Bldg LLC	104 E Kirkwood AVE	Bloomington IN 47408-3399		
11	Thatcher Avery III	105 E 6th ST	Bloomington IN 47404		
12	Goldwater Alan J Jones Stanley C Leslie J Polit	105 N College AVE	Bloomington IN 47404-3947		
13	TDDM LLC	105 N Dunn ST	Bloomington IN 47408-4021		
14	McDaniel Rentals LLC	105 W 7th ST	Bloomington IN 47404-3971		
15	McDaniel Rentals LLC	105 W 7th ST	Bloomington IN 47404-3971		
16	Jupiter Investments Inc	106 N Walnut ST	Bloomington IN 47404		
17	Jupiter Investments Inc	106 N Walnut ST	Bloomington IN 47404		
18	107 North College Avenue LLC	107 N College AVE	Bloomington IN 47404-3975		
19	Stardust Development LLC	107 N Dunn ST	Bloomington IN 47408-4021		
20	Telko Inc	108 E 14TH ST	Bloomington IN 47404		
21	Stardust Development LLC Seeber T M Spicer K Seeber Thomas M	108 E 6th ST	Bloomington IN 47408-3311		
22	Tarter Gary A Gary H Tarter	108 E Cottage Grove AVE	Bloomington IN 47408-3302		
23	ERL-5 LLC	108 E Kirkwood AVE	Bloomington IN 47408-3330		
24	Otten Properties LLC	108 N Grant ST	Bloomington IN 47408-4026		
25	TIR Group LLC	108 S Rogers ST	Bloomington IN 47404-4934		

Sheet1

Ready

New data can be created from a variety of sources...

Tabular Data

The image displays two overlapping software interfaces. The top interface is Microsoft Excel, showing a table with columns for OWNER, PROPERTY_STREET, and PROPERTY_CITY_ST_ZIP. A red oval highlights the first three rows of data. The bottom interface is ArcGIS, showing a map with a street grid and a geocoding result table. A red oval highlights a specific location on the map, and a red arrow points from this location to the corresponding entry in the geocoding result table. The geocoding result table has columns for OWNER, PROPERTY_STREET, and PROPERTY_CITY_ST_ZIP, matching the Excel table.

OWNER	PROPERTY_STREET	PROPERTY_CITY_ST_ZIP
OEI Inc	100 E 5th ST	Bloomington IN 47404
Spannuth Enterprises Inc	100 N Walnut ST	Bloomington IN 47404-4911
CGI Real Estate Holdings LLC	100 S College AVE	Bloomington IN 47404
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Board Of Commissioners Monroe County The	100 W Kirkwood AVE	Bloomington IN 47404

OWNER	PROPERTY_STREET	PROPERTY_CITY_ST_ZIP
OEI Inc	100 E 5th ST	Bloomington
Spannuth Enterprises Inc	100 N Walnut ST	Bloomington
CGI Real Estate Holdings LLC	100 S College AVE	Bloomington
Naderpoor Anwar Mary	100 W 6th ST	Bloomington
Board Of Commissioners Monroe County The	100 W Kirkwood AVE	Bloomington
OEI Inc	101 W Kirkwood Ave	Bloomington
Allen Bldg LLC	102 W 6th ST	Bloomington
Thatcher Avery III	104 E Kirkwood AVE	Bloomington
Goldwater Alan J Jones Stanley C Leslie Polt	105 E 8th ST	Bloomington
TDDM LLC	105 N College AVE	Bloomington
McDaniel Rentals LLC	105 N Dunn ST	Bloomington
McDaniel Rentals LLC	105 W 7th ST	Bloomington
Jupiter Investments Inc	105 W 7th ST	Bloomington
Jupiter Investments Inc	106 N Walnut ST	Bloomington
Jupiter Investments Inc	106 N Walnut ST	Bloomington
107 North College Avenue LLC	107 N College AVE	Bloomington

New data can
be created
from a variety
of sources...

GPS Devices



Now that we know about data availability, how do we use existing datasets or create new ones?

- Desktop?
- Web?

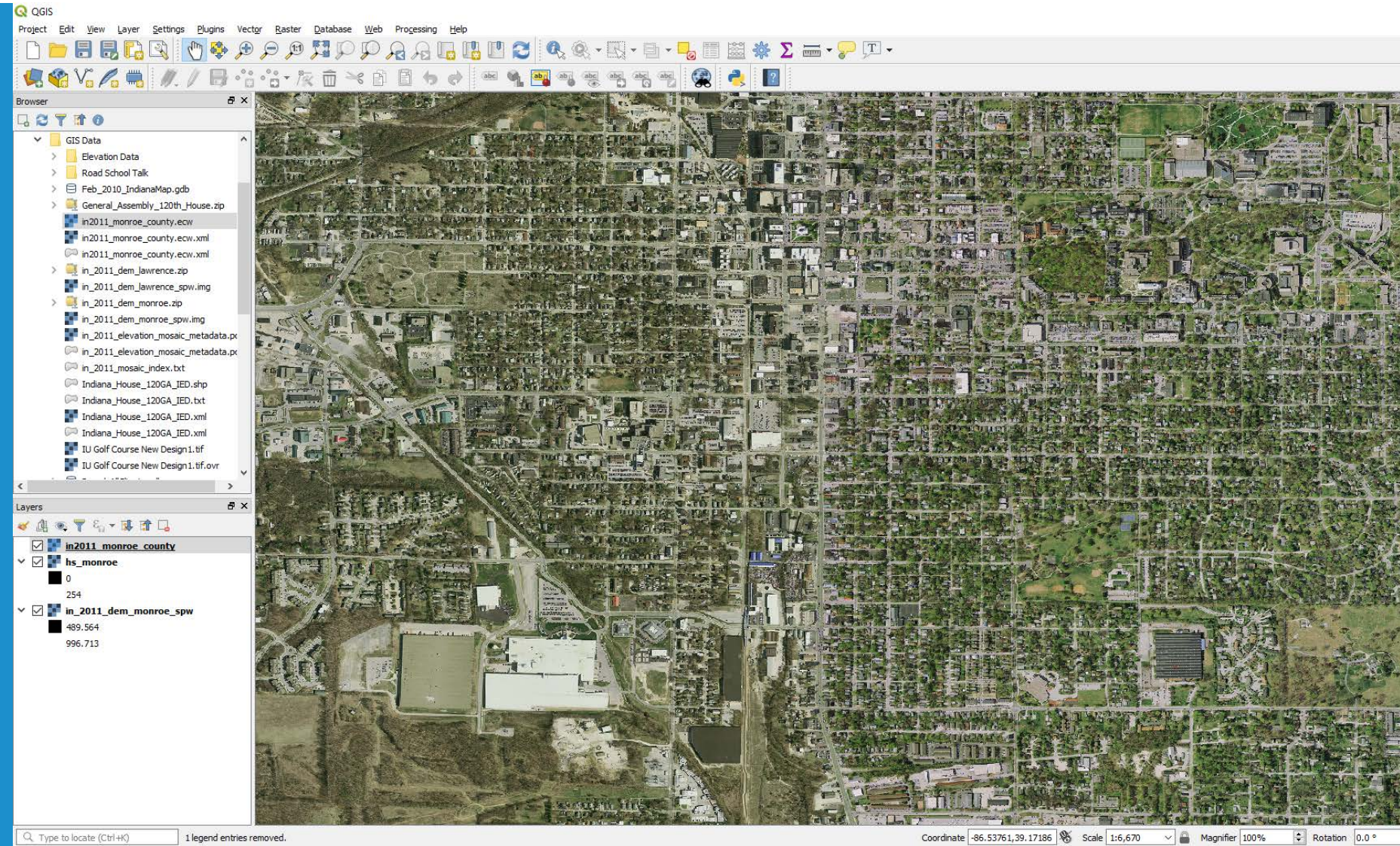
- GIS Desktop Software
 - Can be costly (in time, money or both)...
 - Commercial Off-the-Shelf
 - Open Source
 - Can be difficult to learn...
 - Often limited to a single computer
 - Difficult to use in an Enterprise environment without a lot of specialized staff.

Now that we know about data availability, how do we use existing datasets or create new ones?

- Desktop?
- Web?

- Web GIS Desktop Software
 - Easy-to-use
 - More limited than Desktop editing capabilities
 - Can be accessed on any computer connected to the Internet.
 - Easy to be part of an Enterprise environment.

Example of Desktop GIS Software - QGIS



Example of Desktop GIS Software - QGIS

The screenshot displays a web browser window with the URL `app.mybivvy.com/5967b1c0fe97251cb7d8e8ac/projects/59dced72b239380010f89b9f`. The browser's address bar and tabs are visible at the top. The main content area features a blue header with the text "PASER Ratings" and a search bar. Below the header is a legend titled "PASER Ratings" with a color-coded key for ratings 1 through 10. The legend items are: 1 (black), 2 (red), 3 (orange), 4 (yellow), 5 (light green), 6 (purple), 7 (pink), 8 (blue), 9 (cyan), and 10 (green). The main map area shows an aerial photograph of a residential neighborhood with a grid of streets. A white rectangular overlay is visible on the map, indicating a selected area. On the left side of the map, there are navigation controls including a plus sign for zooming in, a minus sign for zooming out, and a center map icon. At the bottom left of the map area, there is a "Change basemap" button with a small thumbnail icon.

PASER Ratings

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

Change basemap

Questions?

- Thank you for your time!
- Chris Walls
 - Chris@39dn.com
 - 812-320-5467