



What is GIS and How to Leverage Spatial Data in County Government

Kaitlyn Bakken, NDACo and Rory Porth, Mountrail County

A little about me





Before we
begin...

Please take a quick survey





What is GIS?



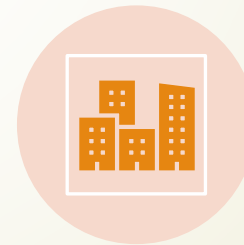
Geographic
Information Systems



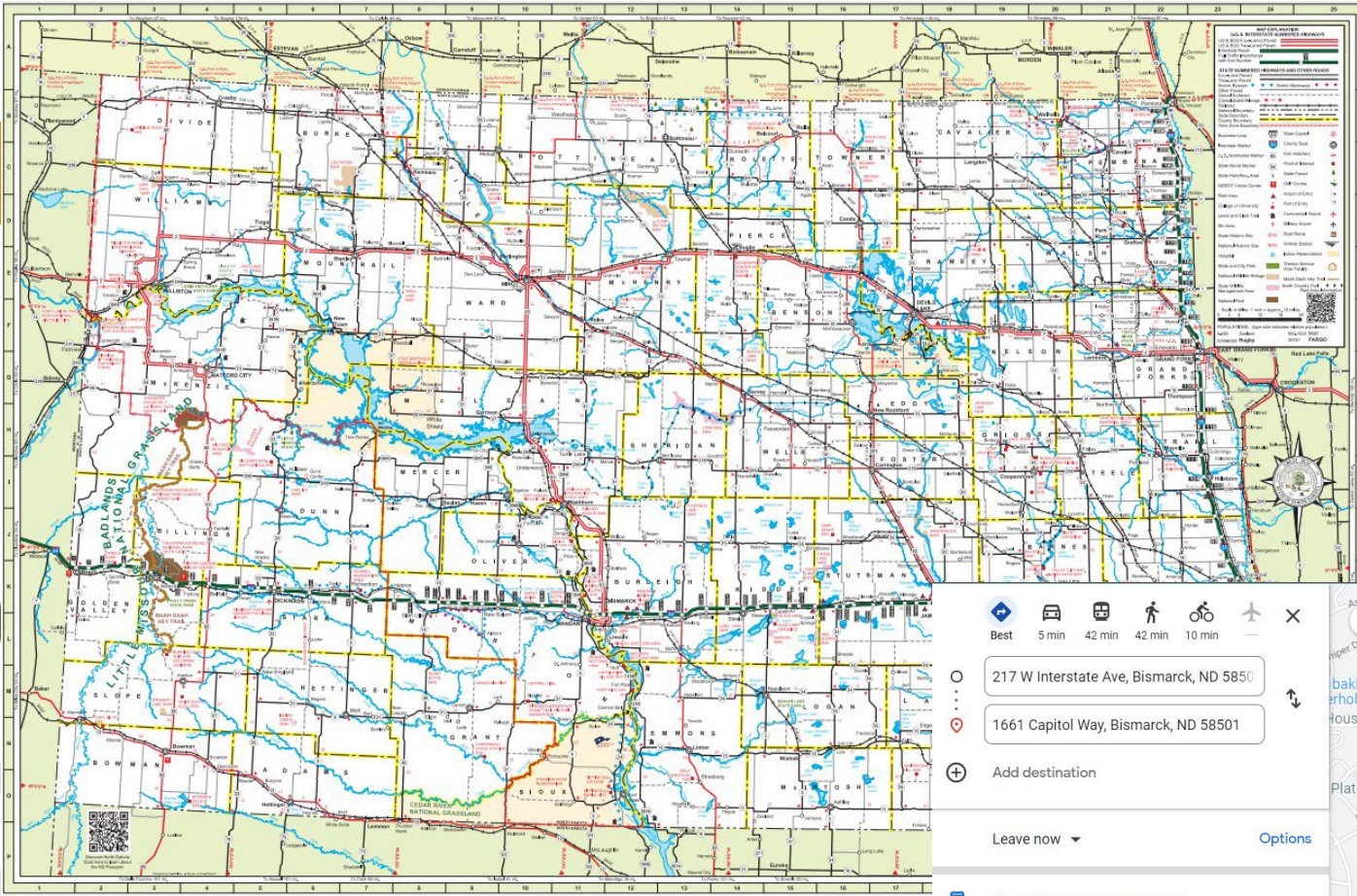
Purpose is to answer
questions and solve
problems.



Connects data and
location



Applications



GIS In Action

Best 5 min 42 min 42 min 10 min

217 W Interstate Ave, Bismarck, ND 58500
 1661 Capitol Way, Bismarck, ND 58501

Add destination

Leave now

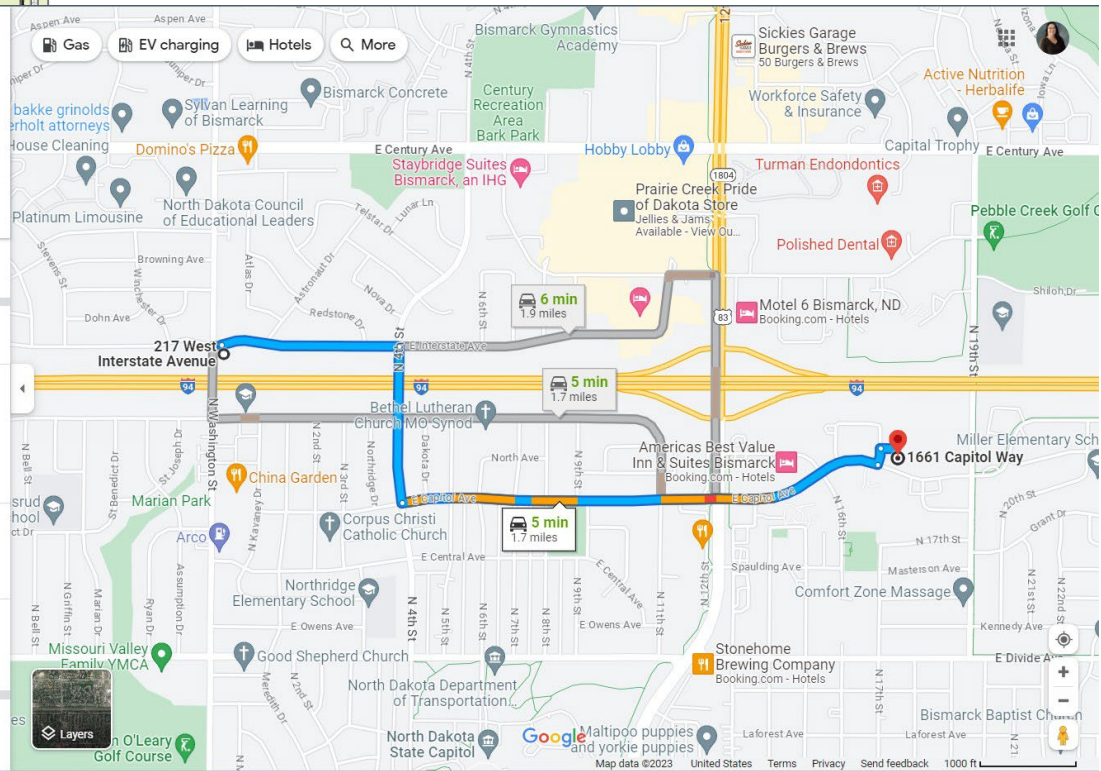
Send directions to your phone

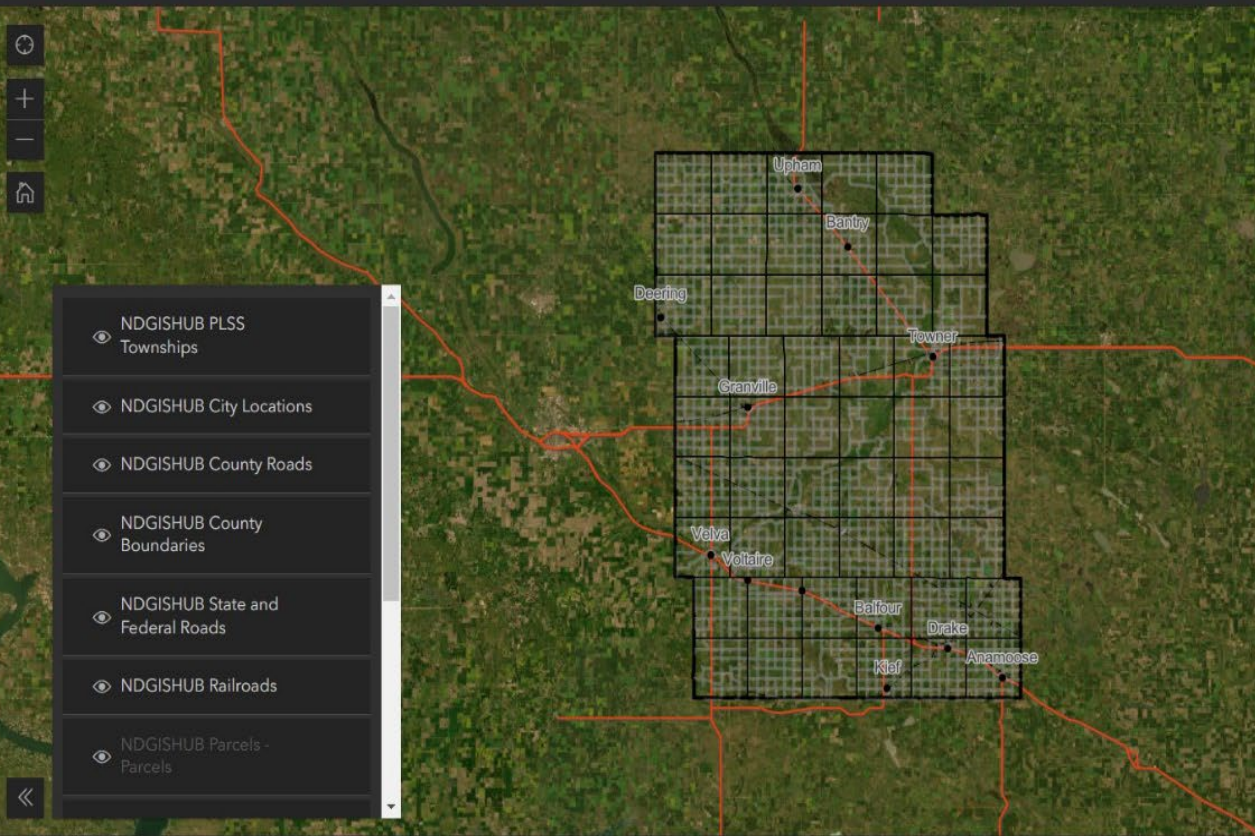
via E Capitol Ave **5 min**
 Fastest route now due to traffic conditions
 1.7 miles
[Details](#)

via W Turnpike Ave and E Capitol Ave **5 min**
 1.7 miles

via W Interstate Ave **6 min**
 1.9 miles

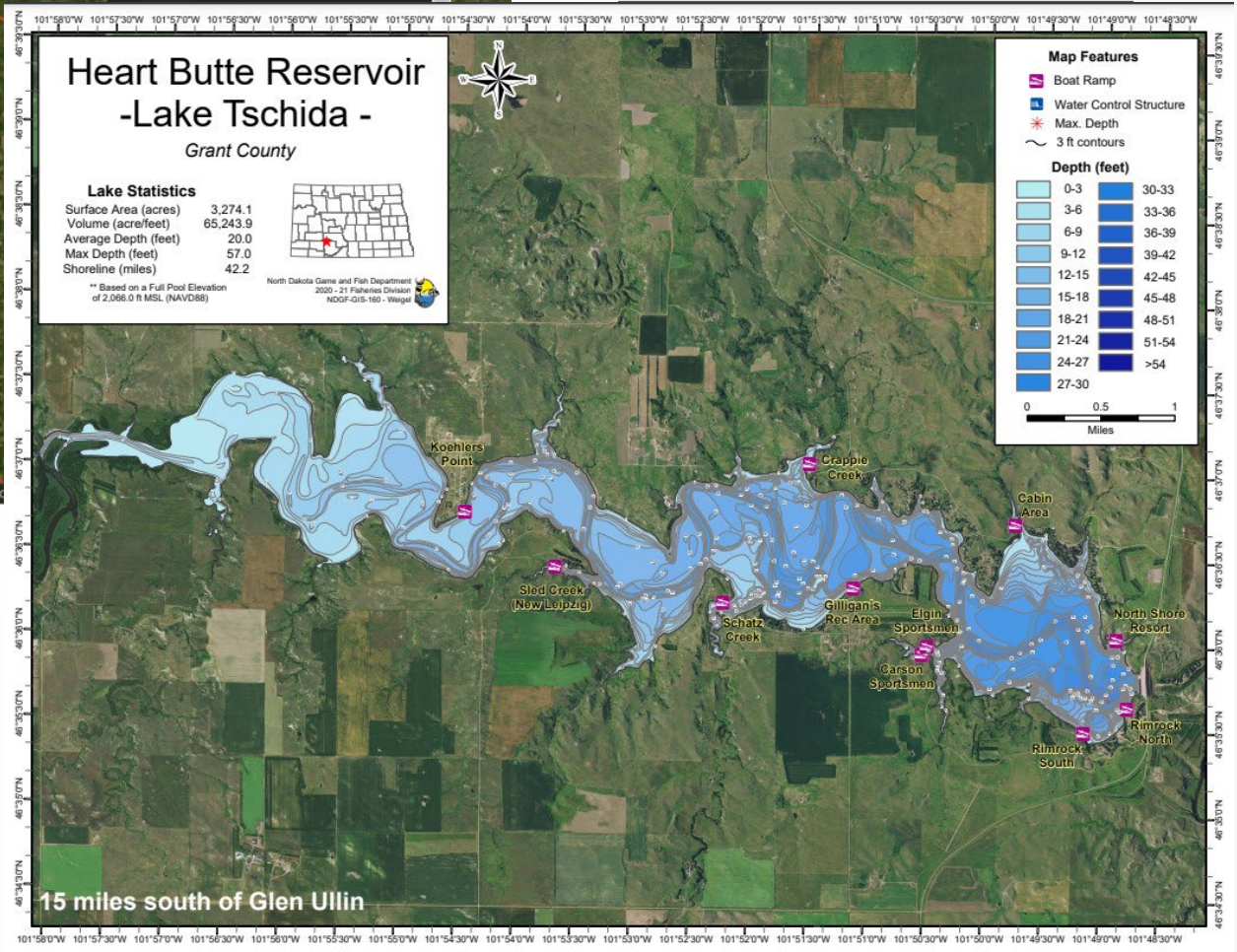
Explore nearby 1661 Capitol Way





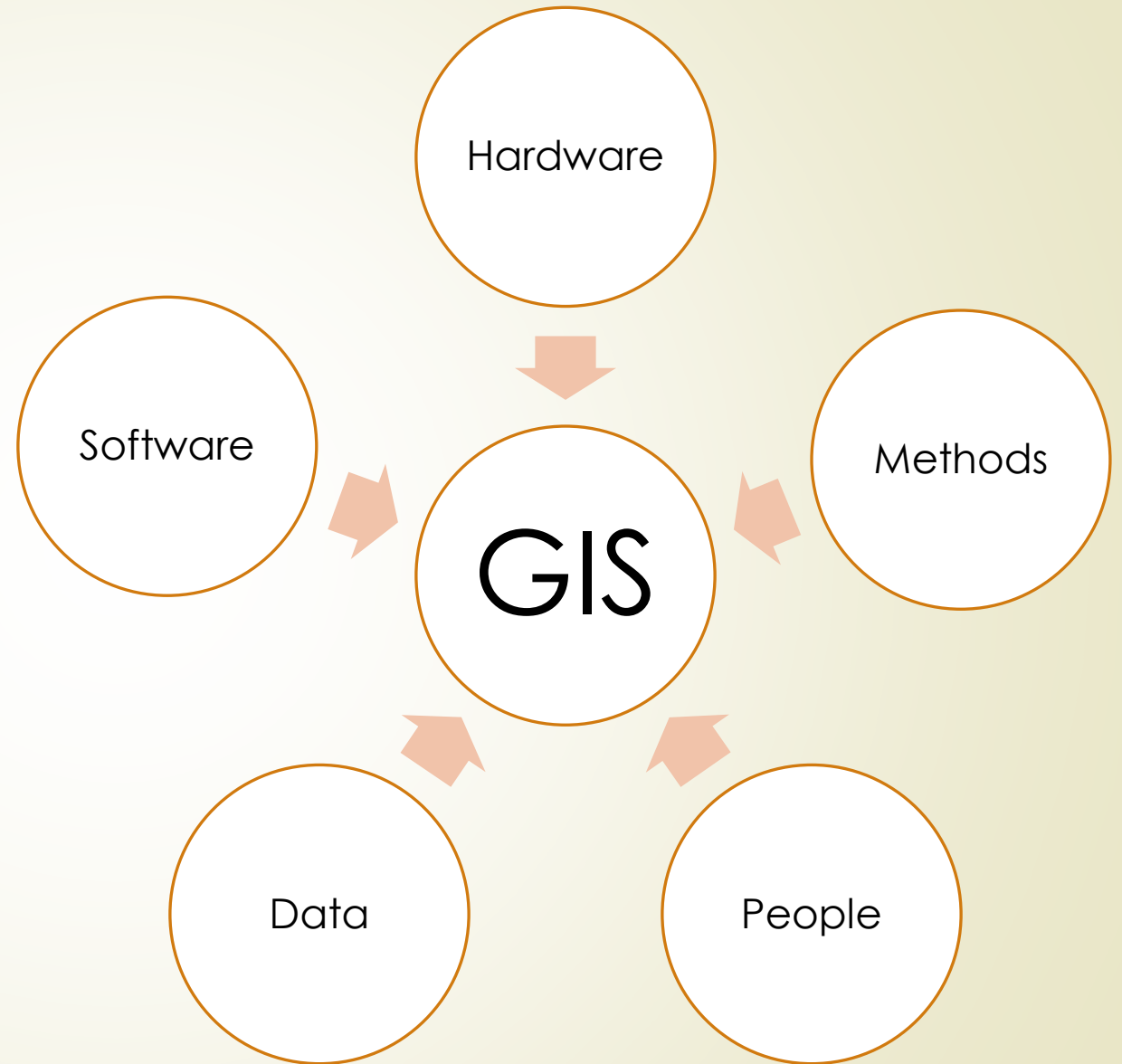
- NDGISHUB PLSS Townships
- NDGISHUB City Locations
- NDGISHUB County Roads

<https://ndaco.maps.arcgis.com/apps/instant/basic/index.html?appid=d5c12d449d324945bffe792b53c3067b>



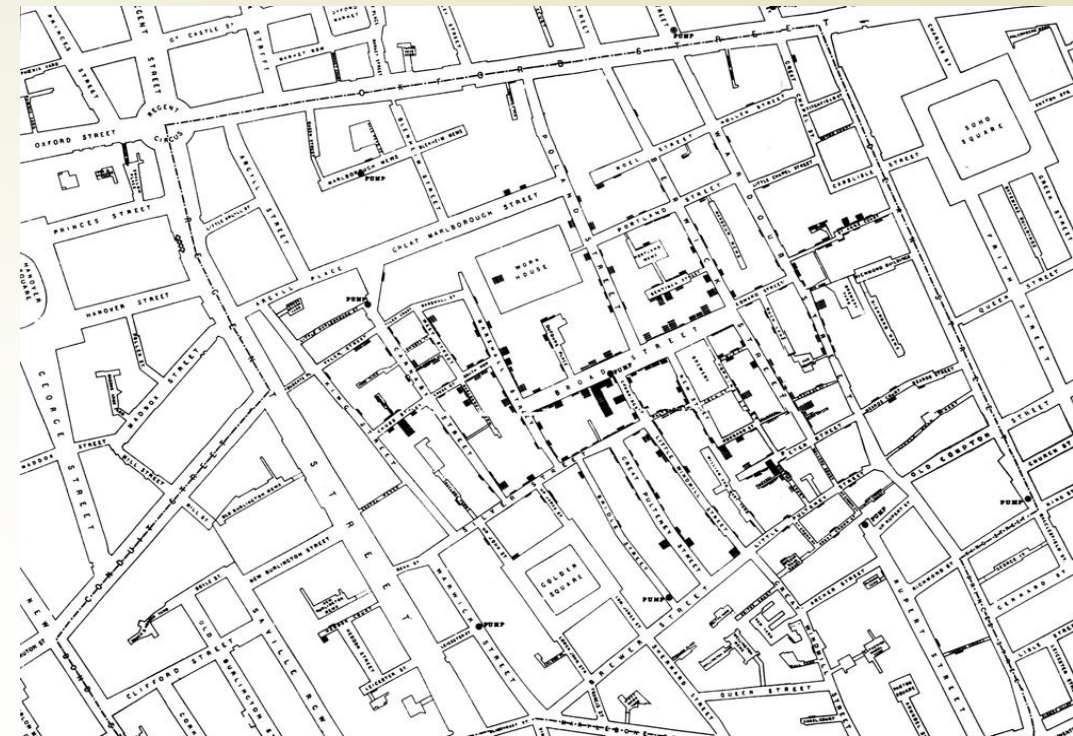
GIS In Action

Parts of GIS

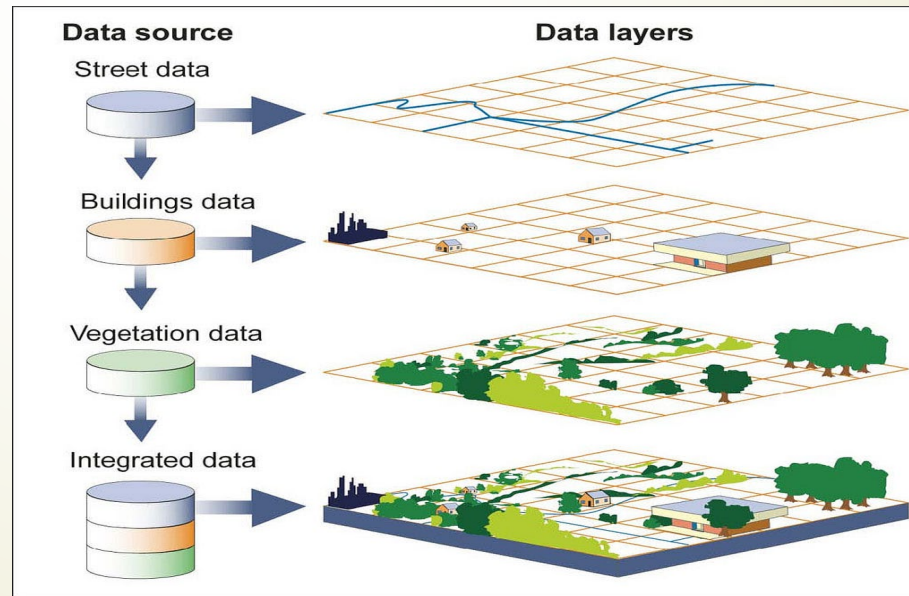


History of GIS

- ▶ Cholera Outbreak, Jon Snow (1854)
- ▶ Roger Tomlinson – “Father of GIS”
 - ▶ From static to dynamic
- ▶ Census adaptation to land surveys
- ▶ Web based open data



Cholera Outbreak Tracking, via National Geographic



Source: GAO.



Advantages



Strengthened
Communication



Effective
Decision-making



Versatile problem
solving



Clear view of
data



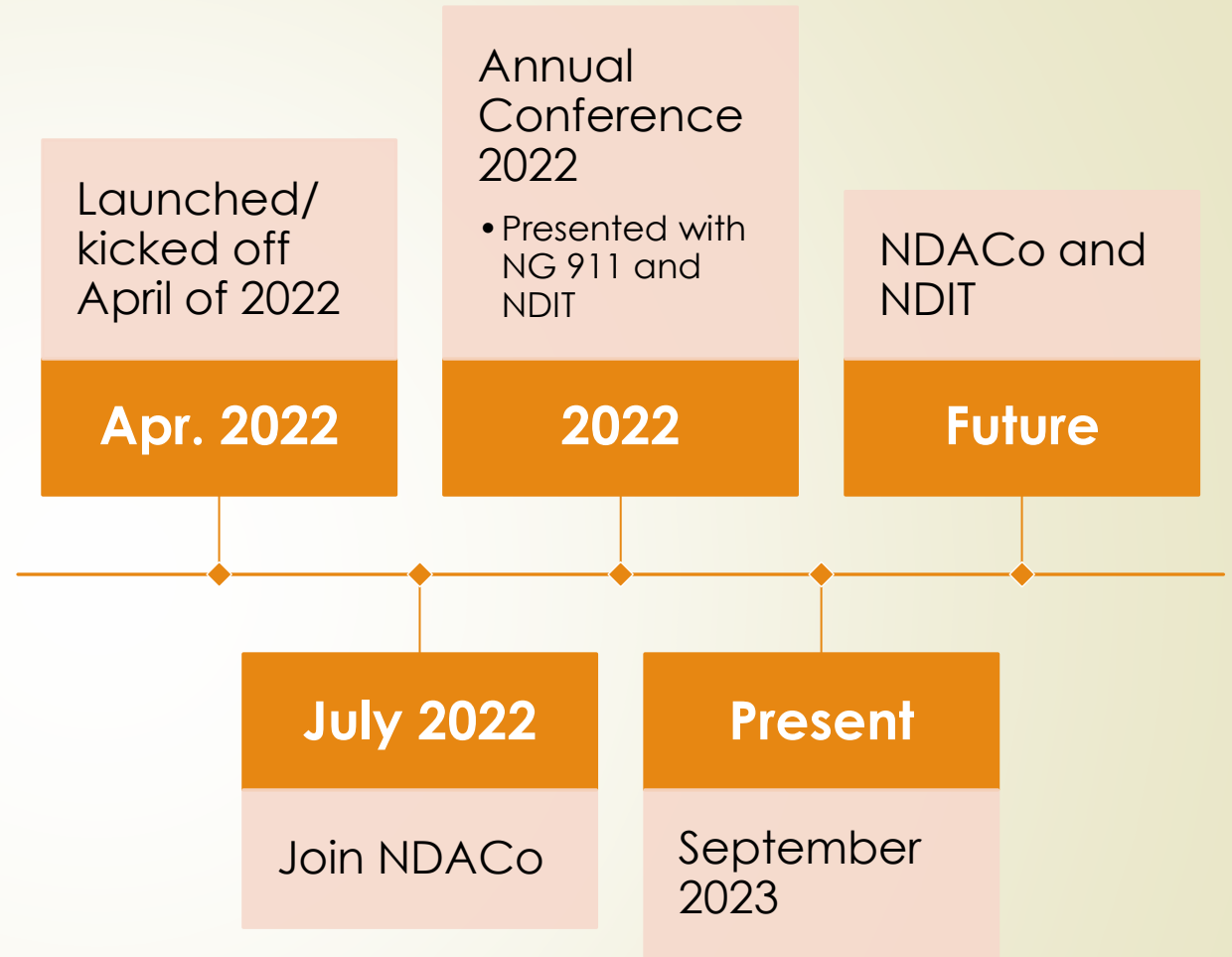
State of
preparedness



Program Objectives

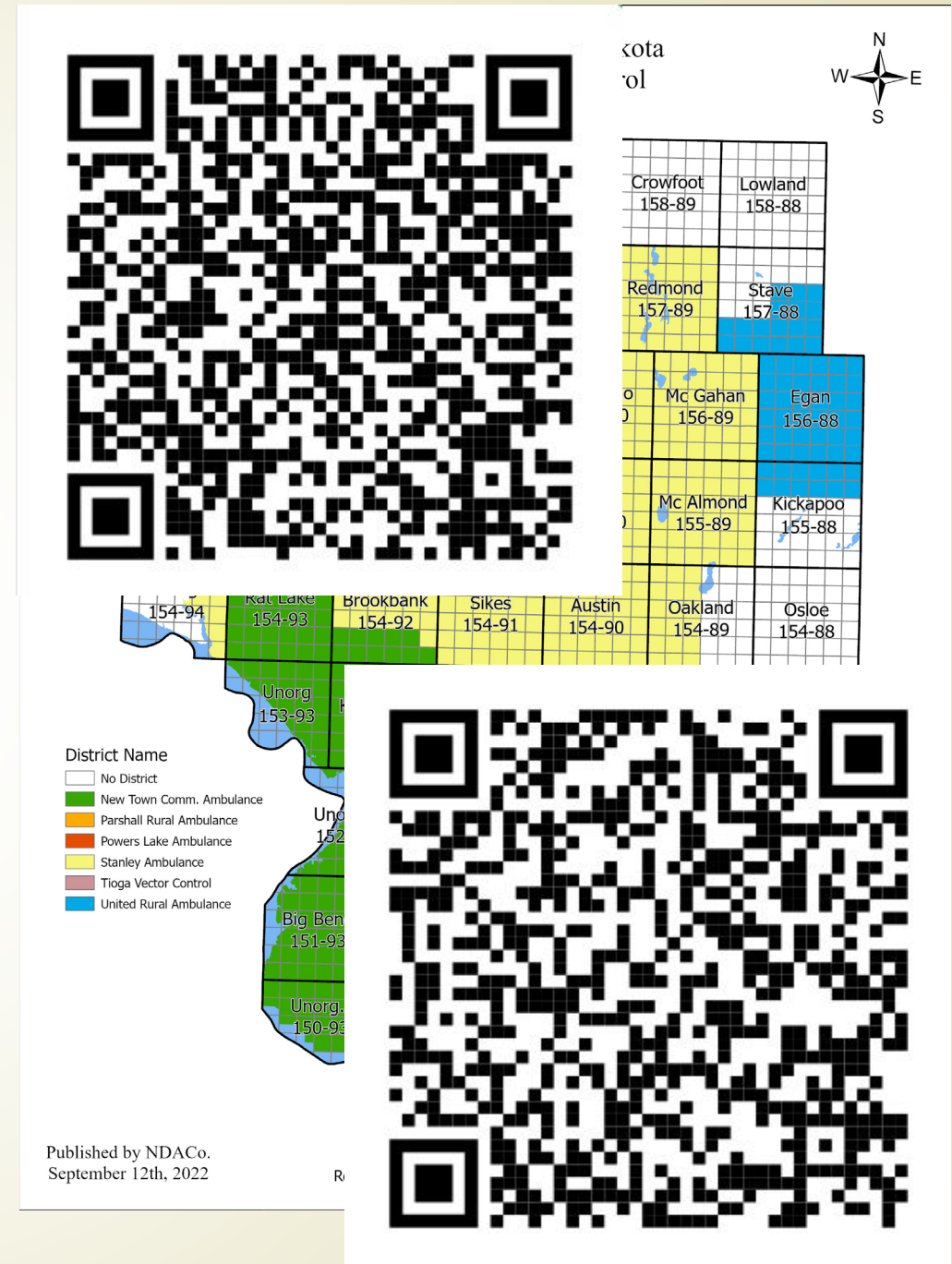
Support	Provide access to qualified GIS resources and services
Create and propose	Perform data analysis, create maps and propose solutions
Harness	Harness power of location, aide decision making and justification.
Serve	Serve as liaison for counties with state and federal partners

History of the program



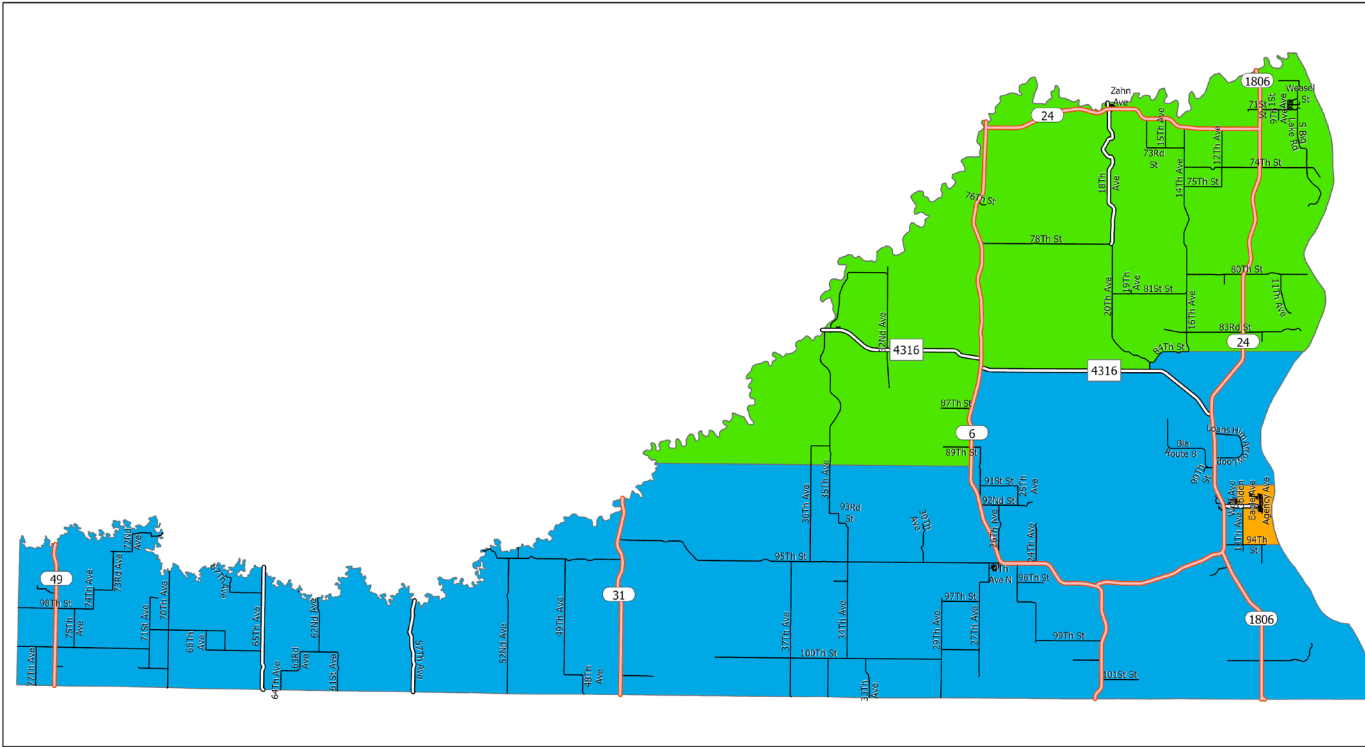
Program At work

- Updated district and boundary maps
- Created web resources for contracted counties
- Calculated acreage of districts



Program work

➤ Redistricting



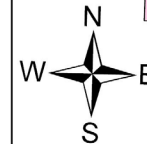
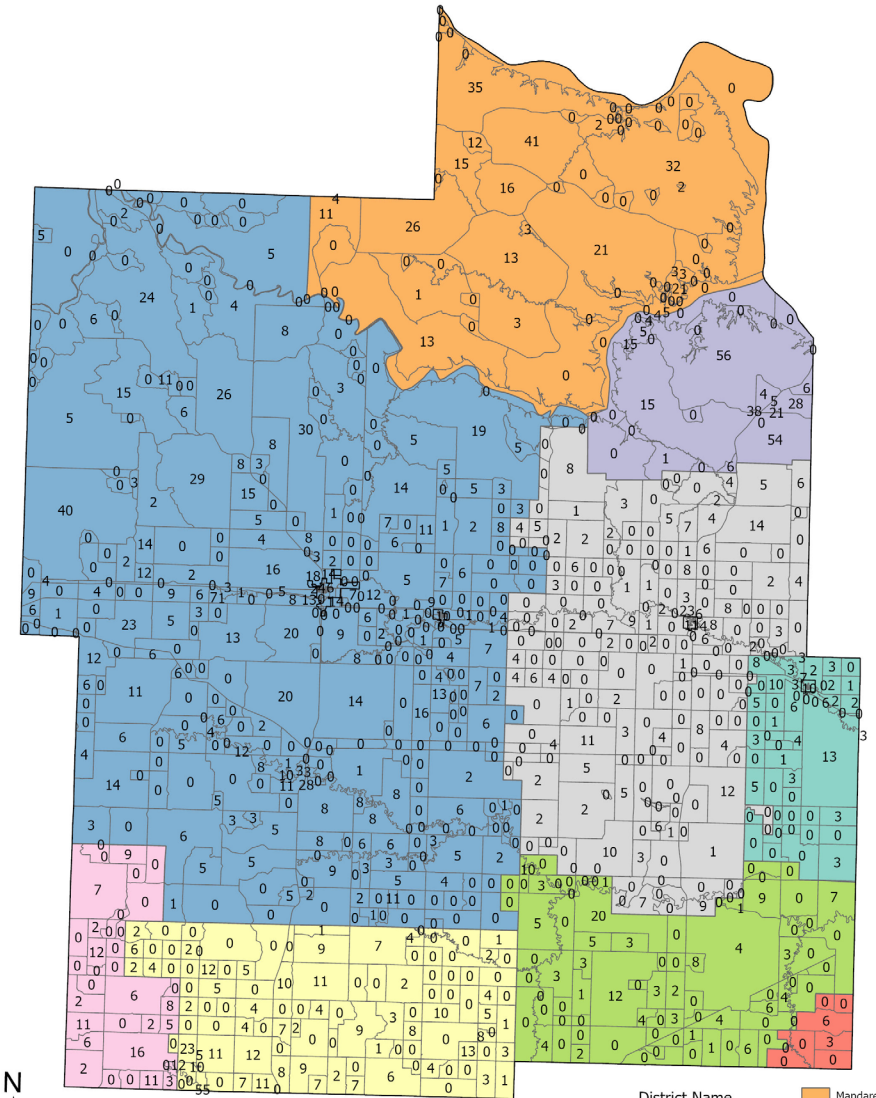
Commissioner District Boundaries



0 1 2 3 5 6 Miles

- Commissioner 1 Population 1,284
- Commissioner 2 Population 1,364
- Commissioner 3 Population 1,250

Population of School Districts Dunn County, North Dakota

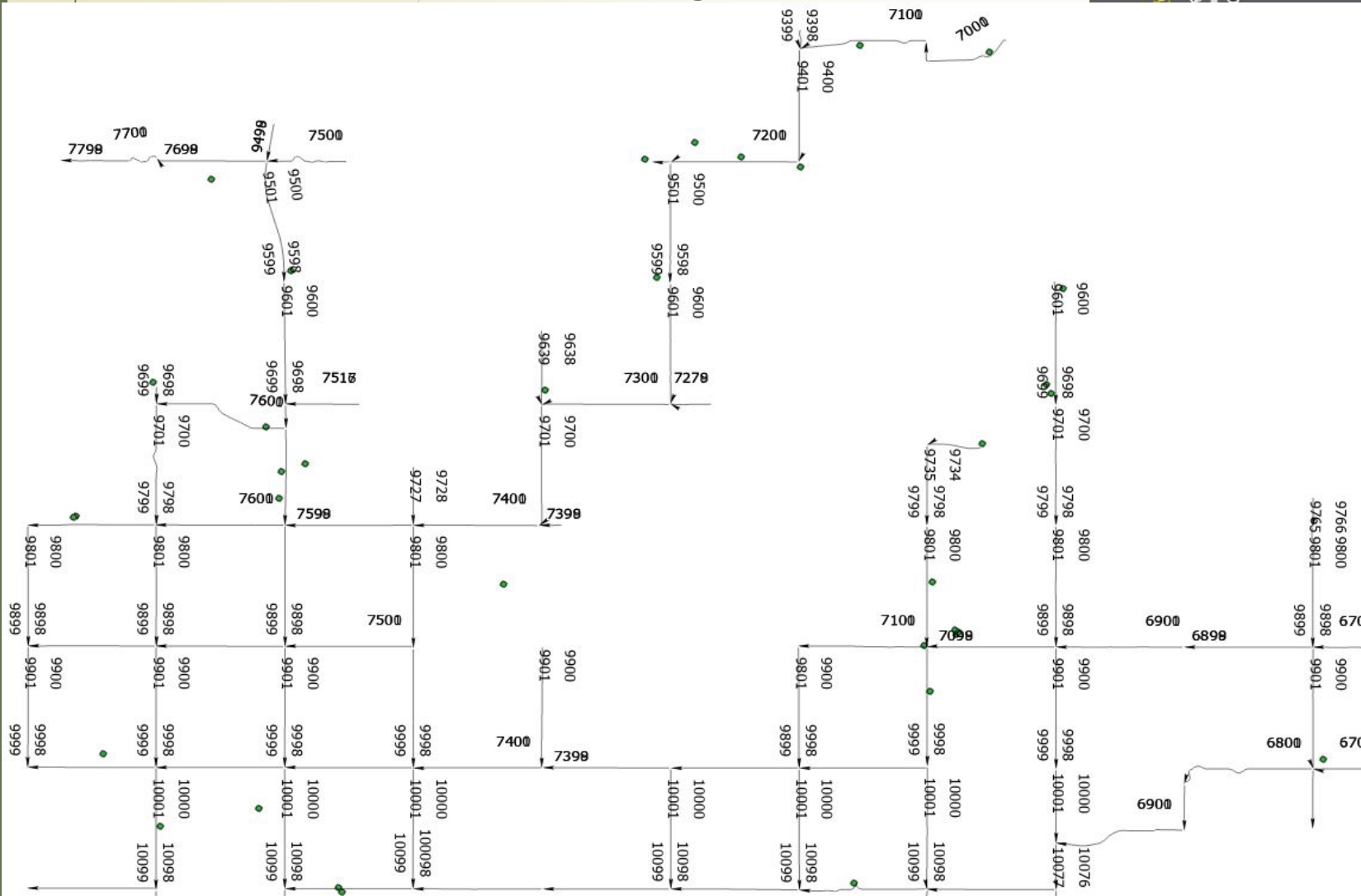


0 2 4 7 11 14 Miles

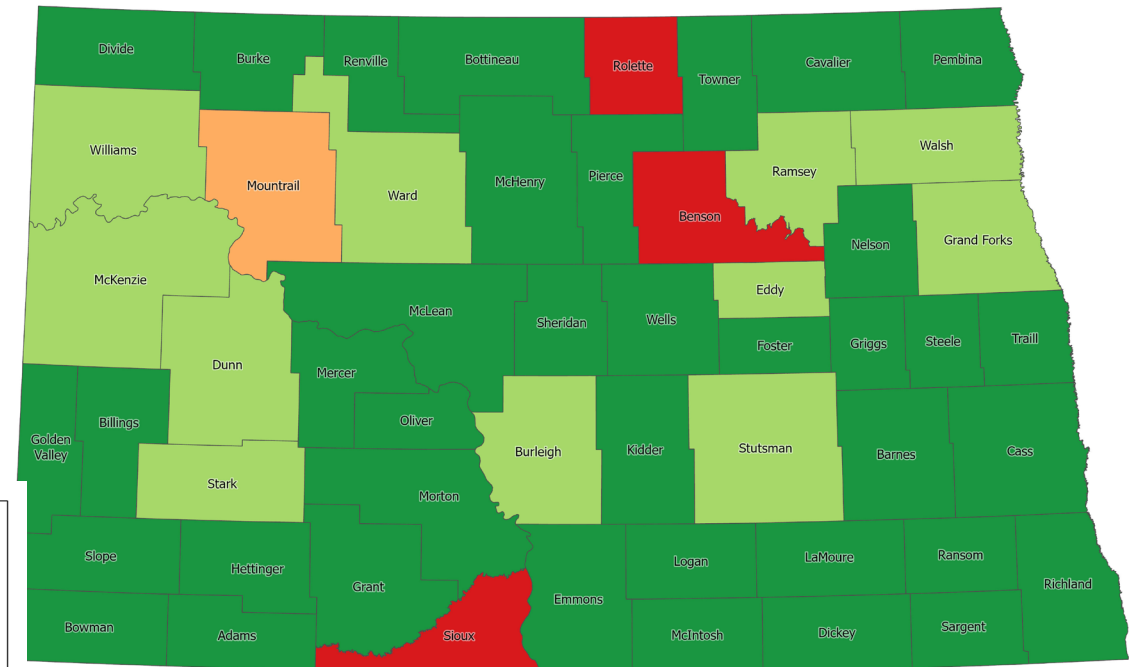
- Mandaree 36
- Richardson-Taylor 34
- South Heart 9
- Twin Buttes 37
- City Boundaries
- Hebron 13
- Killdeer 16
- Dickinson 1
- Halliday 19
- Beulah 27

Program work

Addressing and questions



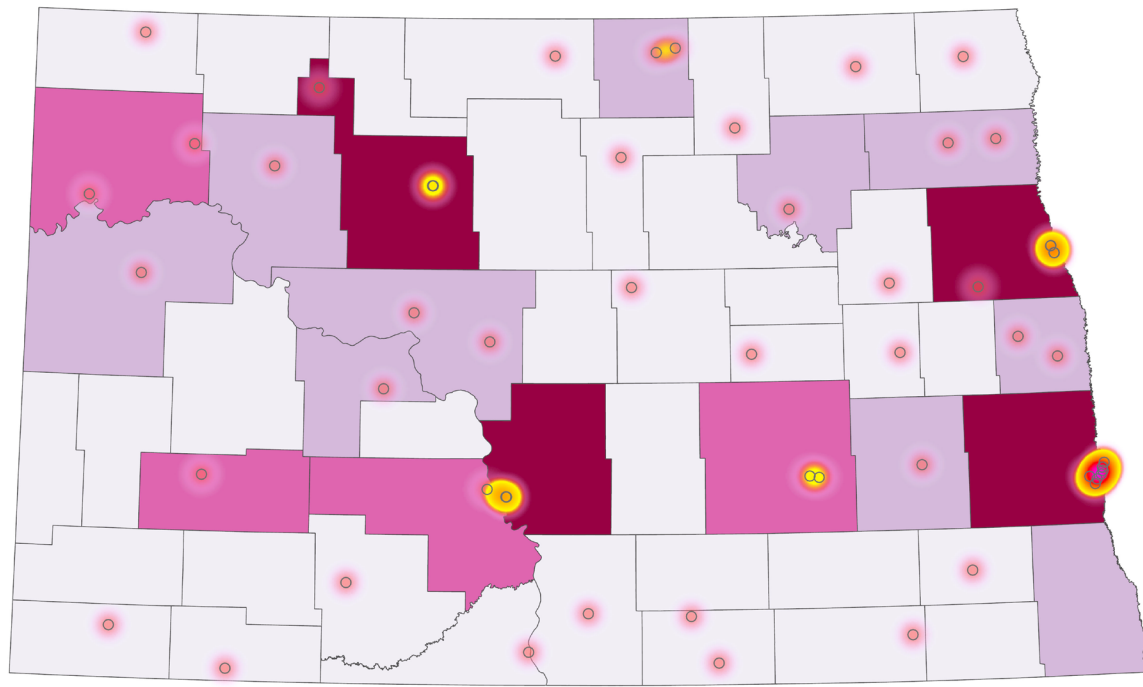
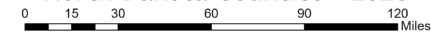
Program work



NACCHO Social Vulnerability Index,
North Dakota Counties - 2020

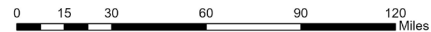
Overall percentile ranking
 0 - 0.25 | Lowest Vulnerability
 0.2501 - 0.5
 0.5001 - 0.75
 0.7501 - 1 | Highest Vulnerability

Created by NDACo. 2023



Hospital Locations vs. County Population
Throughout North Dakota

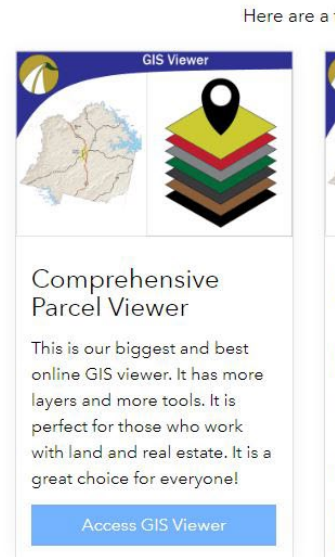
2020 Population
 706 - 7000
 7001 - 21000
 21001 - 42000
 42001 - 63000
 63001 - 184525
 Sparse
 Dense



Created by NDACo. 2023

Franklin County, Virginia

- ▶ Open Access to data
- ▶ Address request form
 - ▶ Survey 123-ArcGIS Online



Franklin County Address Request Form

Franklin County GIS Office

1255 Franklin St - Suite 103
Rocky Mount, VA 24151
540-483-3012

If you need a new address, please fill out this online form and click "Submit" and we will get back with you as soon as possible.

Do You Have Your Driveway Access Planned Out?*

Yes No

Required Questions

Today's Date

Please Enter Your Name:*

Please Enter The Property's Tax ID Number:*

This is the property's 10-digit PIN.

Please Enter Your Phone Number:*

Manatee County, Florida

Severe Weather Information Center Dashboard

ArcGIS Hub

Capital Improvement Website

ArcGIS Dashboard



Capital Project Dashboard

Adjust the filters or current map extent to refine the results

Type: No category selected

Phase: No category selected

Special District: No category selected

Half-Cent Sales Tax Funding: All Funding | Sales Tax Funded

Active Projects

641

- 11th Ave W and 75th St W Reclaimed Water Main Improvements (Wastewater)
- 12A Motor Control Center Rehabilitation (Wastewater)
- 13A Electrical Rehabilitation (Wastewater)
- 13A Wet Well Rehabilitation (Wastewater)
- 15th St E - 52nd Ave E to US 41 - Sewer (Wastewater)
- 15th St E - 52nd Ave E to US 41 - Water (Potable Water)
- 15th St E - US 301 (Transportation)
- 15th St E - Utility Relocation - Segment 2B - 60th Ave Dr E - 56th Ave Dr E - Potable (Potable Water)

Map showing project locations across Manatee County, Florida.

Force Main-Lift Station 33A and Lift Station 36A FM Replacements

Project ID: 6097880
CIP Key: 1360

On Budget **On Schedule**

Description
Replacement of force main from lift station 33A and force main from lift station 36A. Force main replacement for lift station 33A will terminate at the manhole at 3633 26th St. West and the force main replacement for lift station 36A will terminate at lift station 34A on 24th St. West. The scope of services will also include survey of potential locations for proposed lift station replacements or improvements at lift station 33A, 36A and the lift station at Lake Bayshore Condominiums.

Fiscal Year	Funding Source
2019	Utility Rates
Project Funding \$2,837,586	Actual Cost \$2,436,543
Estimated Start Date September 2018	Actual Start Date N/A
Estimated End Date December 2023	Actual End Date N/A

Phase

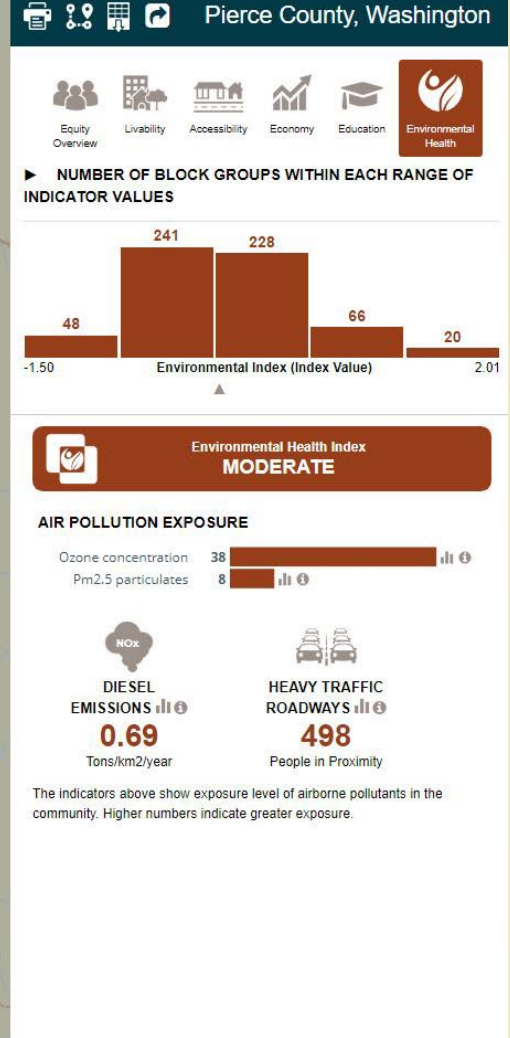
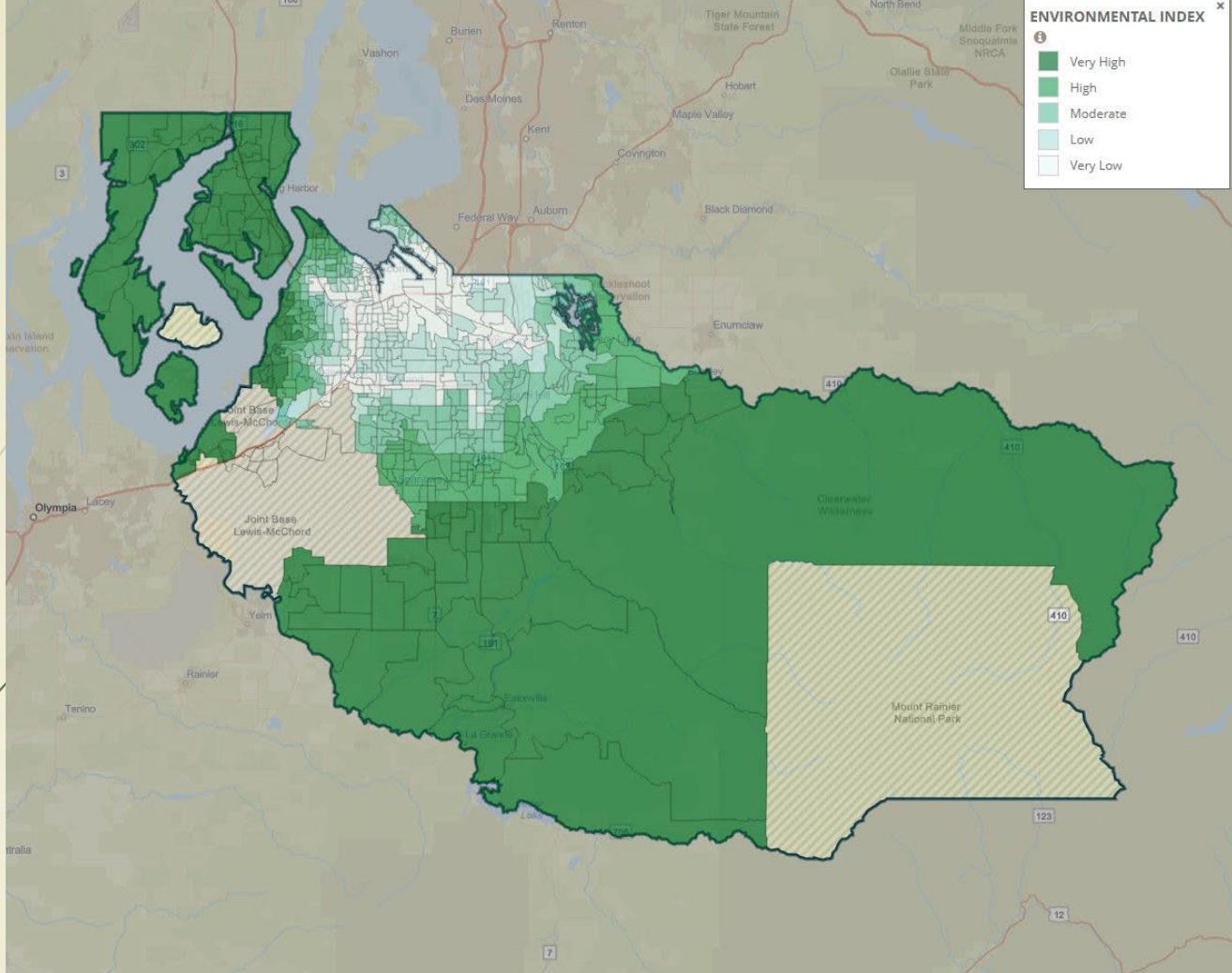
PreDesign | Design | **Construction** | Closeout

Status

Contact Manatee 311
In County: call 3-1-1
Outside Manatee County, call (941) 748-4501
Report issues online

[Click Here to Access the Project Sheet](#)

University of South Florida, FDEP, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS | This feature is ... Powered by Esri

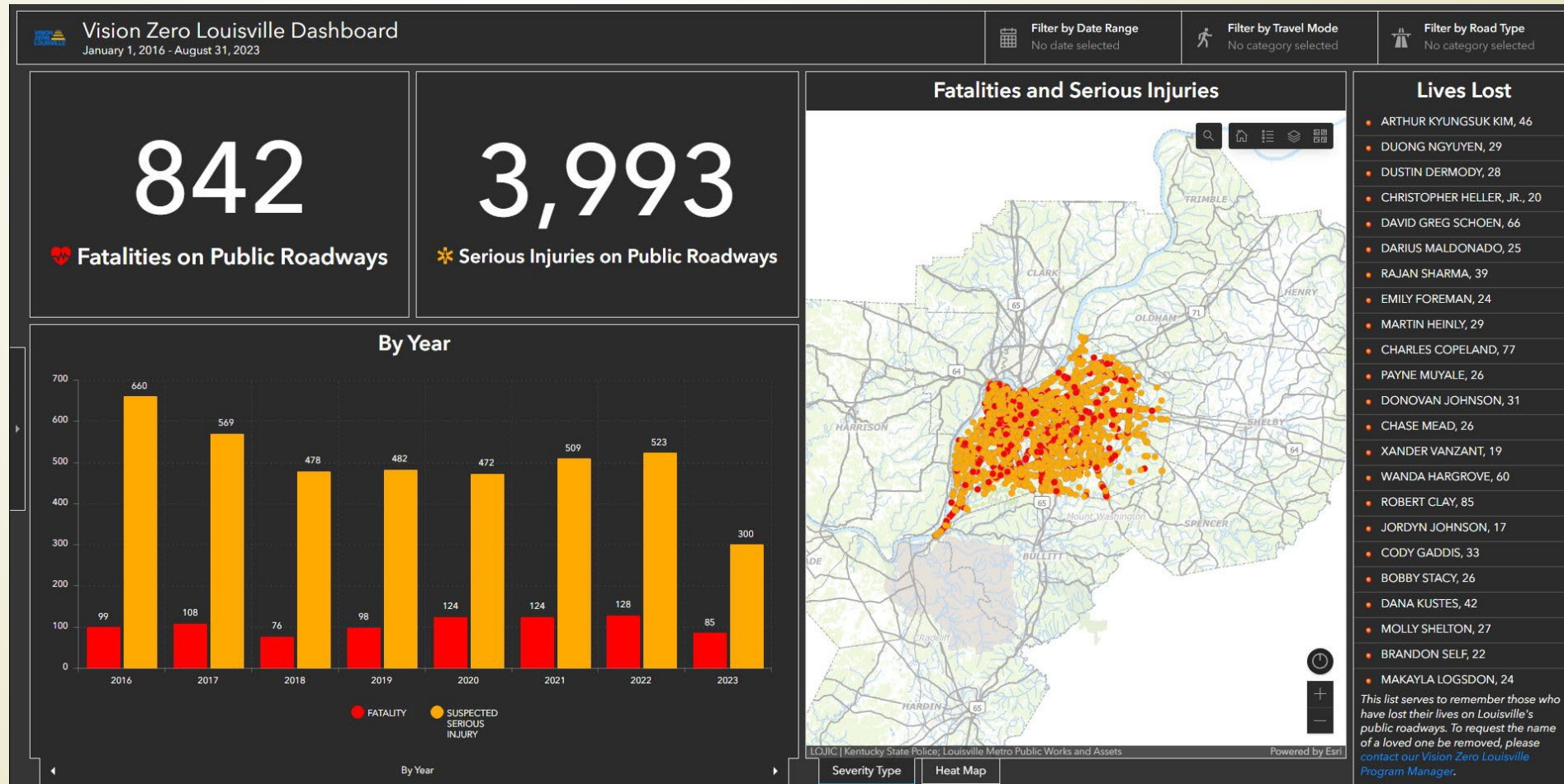


Pierce County, Washington

Data analysis for equity (census based)

Grant Funding

- Recovery, equity goals, stimulus funding, sustainability and monitor
 - Louisville, Kentucky Vision Zero – ArcGIS Dashboard



Disaster Management

- Mat-Su Borough, Alaska
 - ArcGIS Solutions

The screenshot shows the MSB Disaster Damage Reporter website. The header includes the Mat-Su Borough logo and the text "MSB Disaster Damage Reporter" and "Mat-Su Borough Windstorm Info Hub". There is a search icon and "Sign In" link in the top right. The main content area is divided into four quadrants, each with a title, a brief description, and a yellow button with a pencil icon.

- Report Property Damage (MSB)**: "Please fill out this survey to report damage to private or commercial property in the aftermath of a significant weather event or disaster. Information collected here will help borough officials determine the location and severity of damage impacts and make appropriate value assessments." Button: [Report Damage](#)
- Property Damage Tax Exemption (MSB)**: "If the damage to your property from the windstorm exceeded \$1000, you are eligible for a reduction of property assessment and abatement of taxes. Fill out this form and return it to the Borough, to start the process." Button: [Download Form](#)
- Apply for Individual Assistance (State)**: "Following the January 2022 severe wind event, you may be eligible for assistance by filing with the State of Alaska. Click the button below to learn more about eligibility and access the online form." Button: [Apply for Assistance](#)
- Small Business Testimony (State)**: "The Borough is seeking an Economic Injury Disaster Loan Declaration from the U.S. Small Business Administration. This secures money for local business that have suffered loss. Click the button below to make a brief statement about your experience." Button: [Small Business Testimony](#)

At the bottom, there is a white box with the text: "If you are experiencing an emergency please dial 9-1-1." Below this, it says "For severe weather information:" followed by a blue button labeled "Learn More". Finally, it says "For additional disaster-related information:" followed by the URL <https://ready.matsugov.us/>.



Real world examples



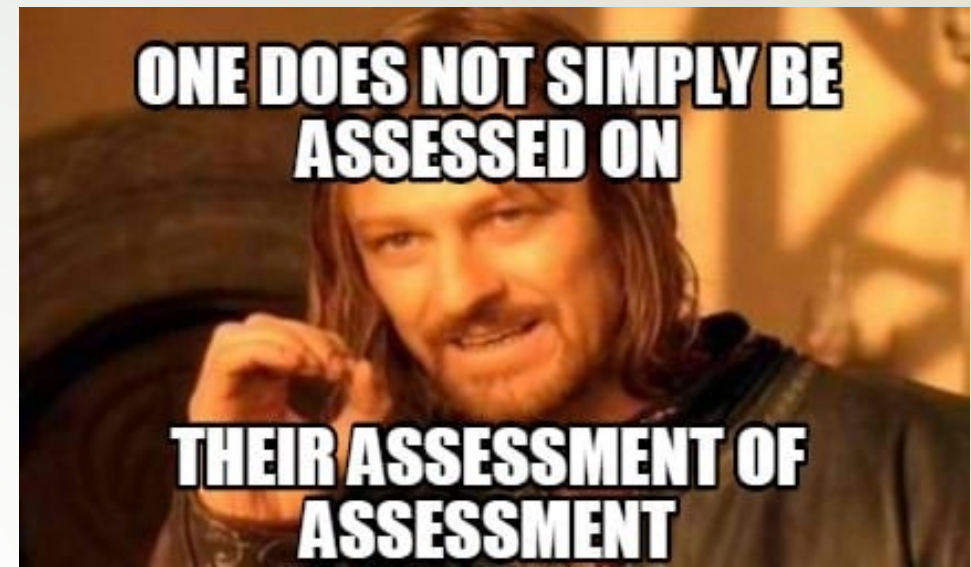
- ▶ Franklin County, Virginia
 - ▶ <https://data-franklincova.opendata.arcgis.com/>
- ▶ Manatee County, Florida
 - ▶ www.mymanatee.org/weather
 - ▶ www.mymanatee.org/CIPHub
- ▶ Pierce County, Washington
 - ▶ <https://www.cityoftacoma.org/cms/One.aspx?portalId=169&pageId=175030>
- ▶ Louisville, Kentucky
 - ▶ <https://www.arcgis.com/apps/dashboards/fd5f28d776b74a79bf8ccbc769f585a8>
- ▶ Disaster Management
 - ▶ <https://www.esri.com/en-us/lg/product/stories/alaska-community-uses-damage-assessment-solution-aid-recovery>



County Examples cont.

- ▶ Mountrail County, North Dakota
 - ▶ Ag Land Valuation
 - ▶ Land Use
 - ▶ Public requests
 - ▶ Aerial Photography

GIS Utilization in Mountrail County Property Assessment



Starting out...


- ▶ What is very unique about this picture?
- ▶ *Hint – Apollo 11 ‘Eagle’ lunar lander returning to command module from the historic first moon walk*
- ▶ **The astronaut who took this photo – command module pilot Michael Collins, is the only human, alive or dead that isn't in the frame of this picture, 1969**



Introduction

▶ Quick Bio

- ▶ Class 1 Property Assessor in Mountrail County – approx. 8 years
- ▶ Previously – complex systems integrator / consultant
- ▶ Certified Information Systems Auditor (CISA) – ISACA – Information Systems Audit and Control Association



Rory Porth
Property Assessor / GIS

Mountrail County Tax Equalization

101 North Main St.
PO Box 69
Stanley, ND 58784-0069

Phone: 701.628.2425
Fax: 701.628.2276
E-mail: roryp@co.mountrail.nd.us

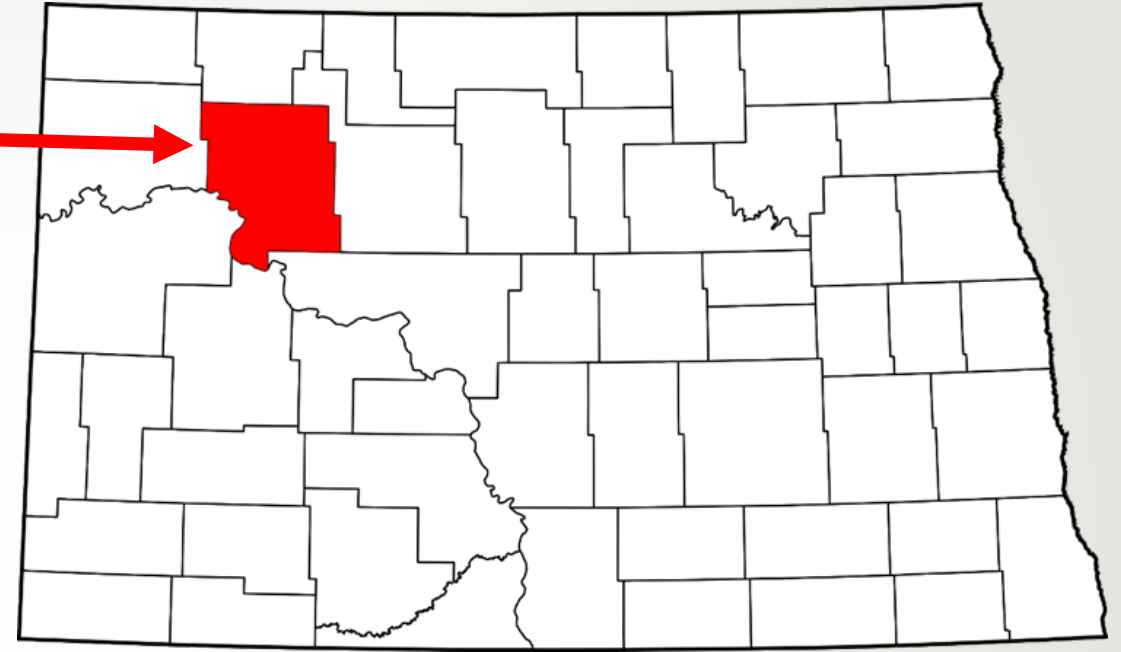
OK... the 'fam'...



Our Journey

- ▶ Where / what is Mountrail county?
- ▶ What is GIS?
- ▶ Using GIS in Property Assessment Office
 - ▶ Parcel Data – the Foundation
 - ▶ Ag Land Valuation
 - ▶ Gravel Pit Valuation
 - ▶ Identification of Properties
 - ▶ Public GIS and Reporting
 - ▶ Internal GIS Utilization
 - ▶ Valuation Visualization – Land, Structures

Mountrail County, North Dakota



- ▶ 9th largest County by mi² - 1,824
- ▶ Population – 9,576 (2021 Census est.)
- ▶ Density – approx. 5.25 persons per mi²

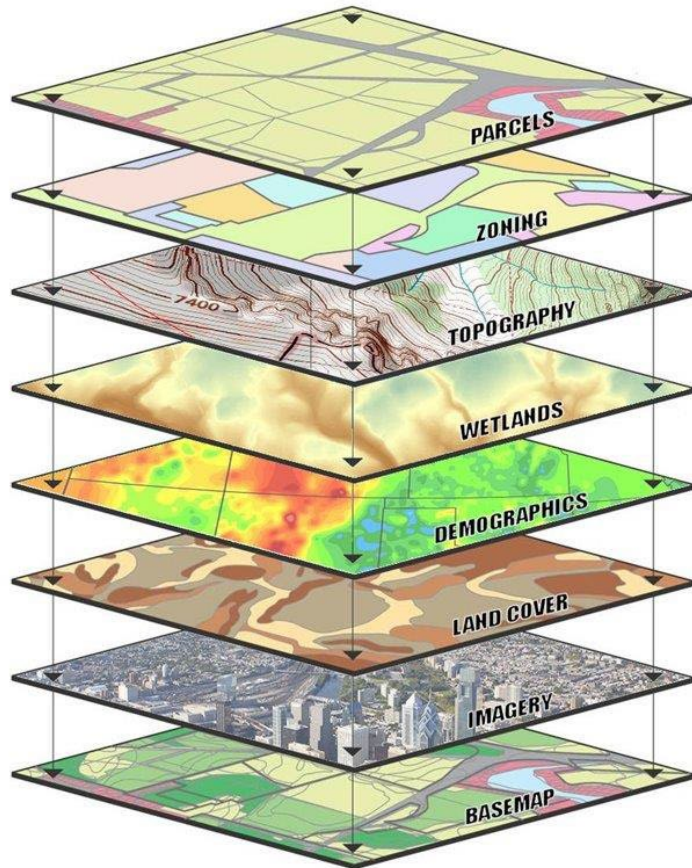
What does Mountrail look like?



The Bakken



What is GIS?

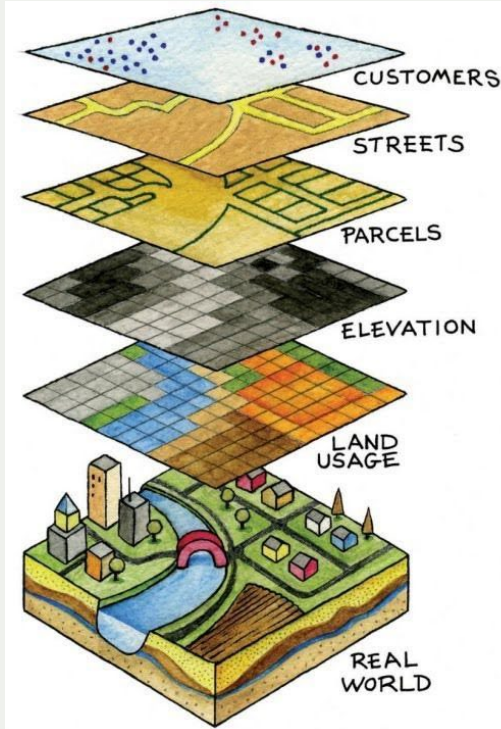


GIS DATA LAYERS

Many different types of data can be integrated into a GIS and represented as a map layer.

Examples can include: streets, parcels, zoning, flood zones, client locations, competition, shopping centers, office parks, demographics, etc.

When these layers are drawn on top of one another, undetected spatial trends and relationships often emerge. This allows us to gain insight about relevant characteristics of a location.



GIS

geographic information system



The application of GIS is limited only by the imagination of those who use it

— Jack Dangermond —

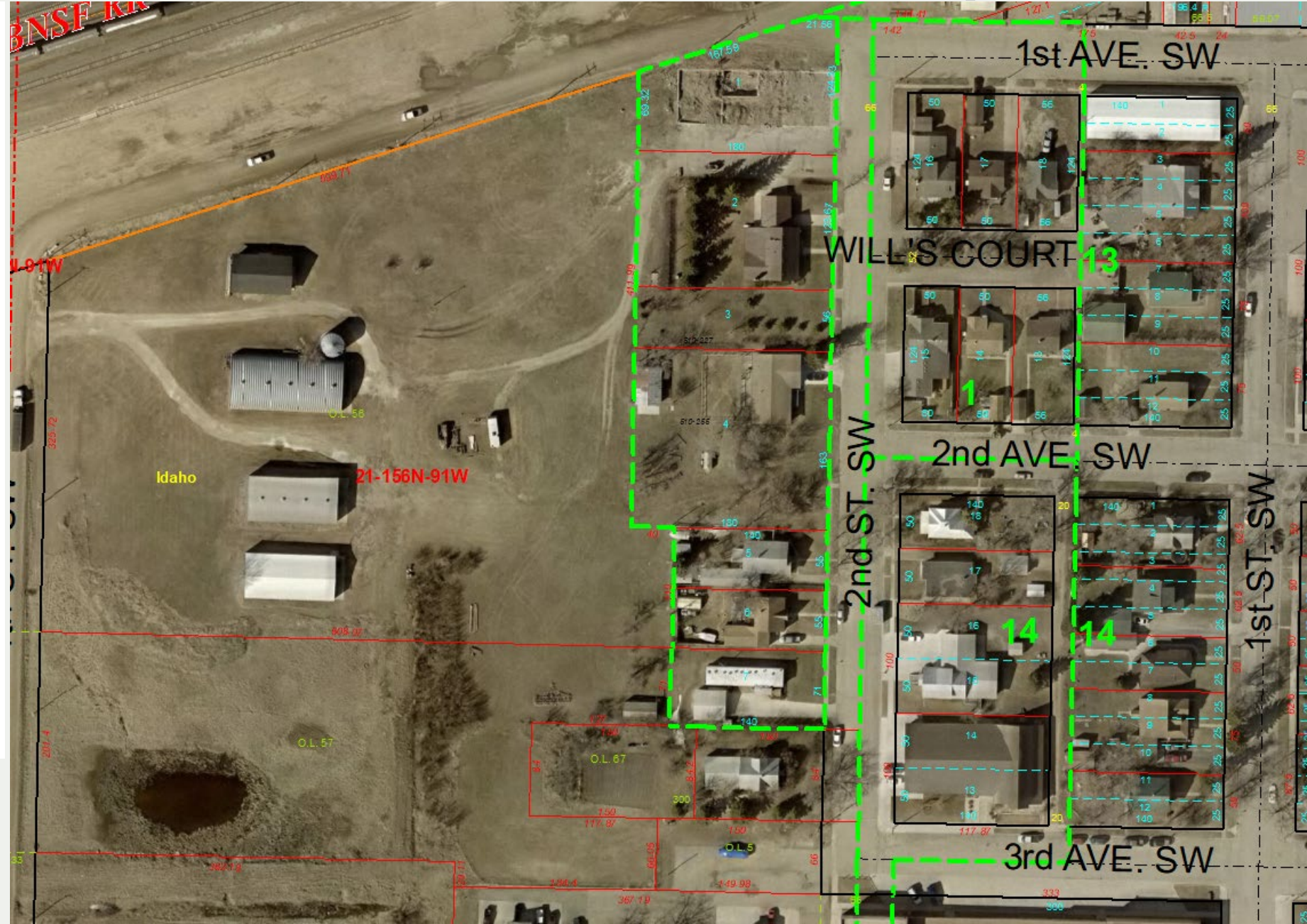
Parcel Data – the Foundation – GIS System

- Sidwell GIS
- Cadastral_Anno
- ParcelPoint
- ParcelPoint-Label Annotation
- ParcelPoly

- ParcelPoly-Label Annotation
- Cadastral_Line
- Section No. Center

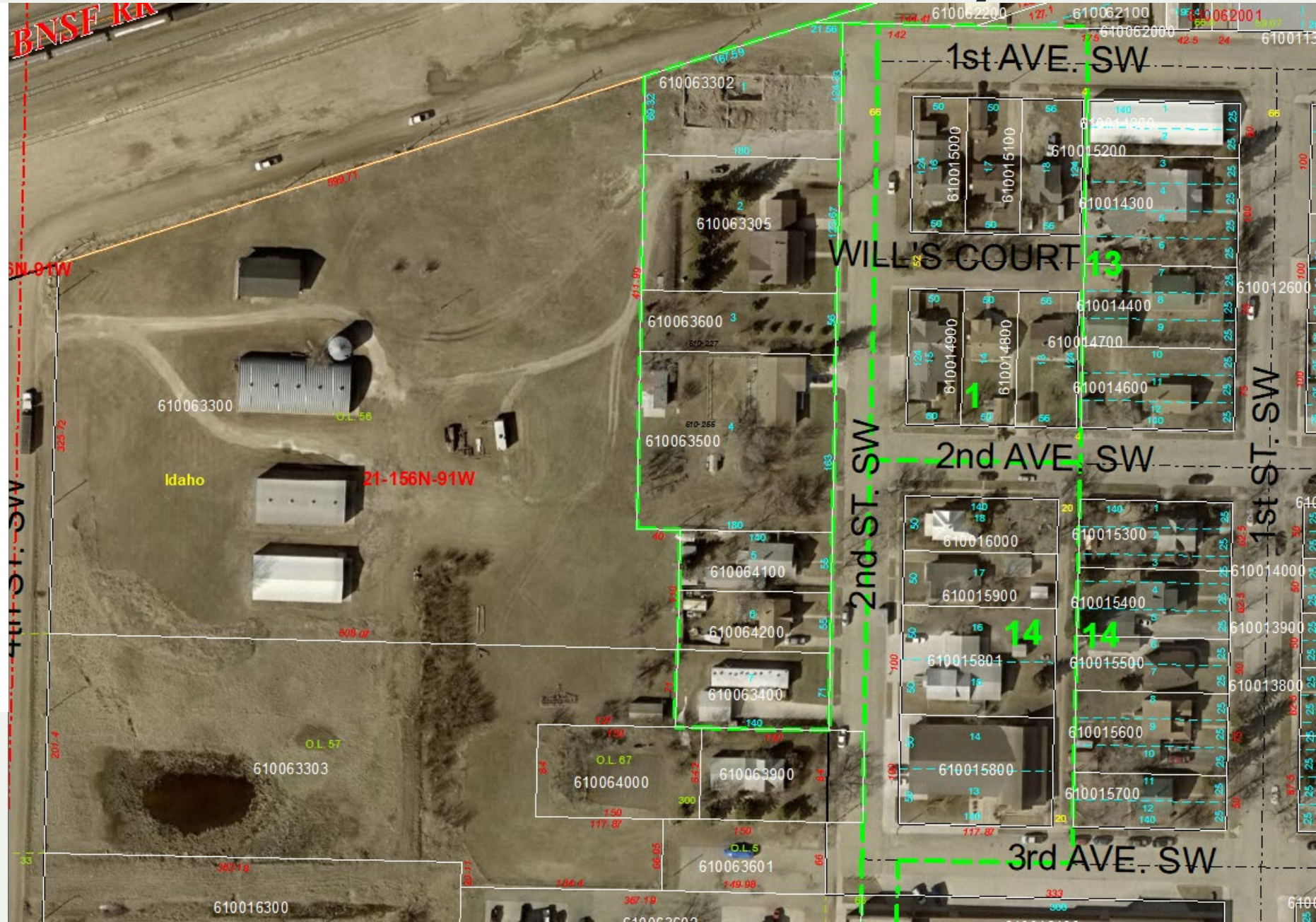
- Section No. Floating

- Cartography
 - <all other values>
- Cities
- Political Townships
- SubPoly
- GeoTwpPoly
- XYCoordinates
- Political Townships
- Zoning



Parcel Data – the Foundation – GIS System

- Sidwell GIS
- Cadastral_Anno
- ParcelPoint
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- ParcelPoly
- ParcelPoly-Label Annotation
- Cadastral_Line
- Section No. Center
- Section No. Floating
- Cartography
— <all other values>
- Cities
- Political Townships
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- GeoTwpPoly
- XYCoordinates
- Political Townships
- Zoning



Our Deep Foray into GIS

- Ag Land Valuation
- We will camp here a little before moving on

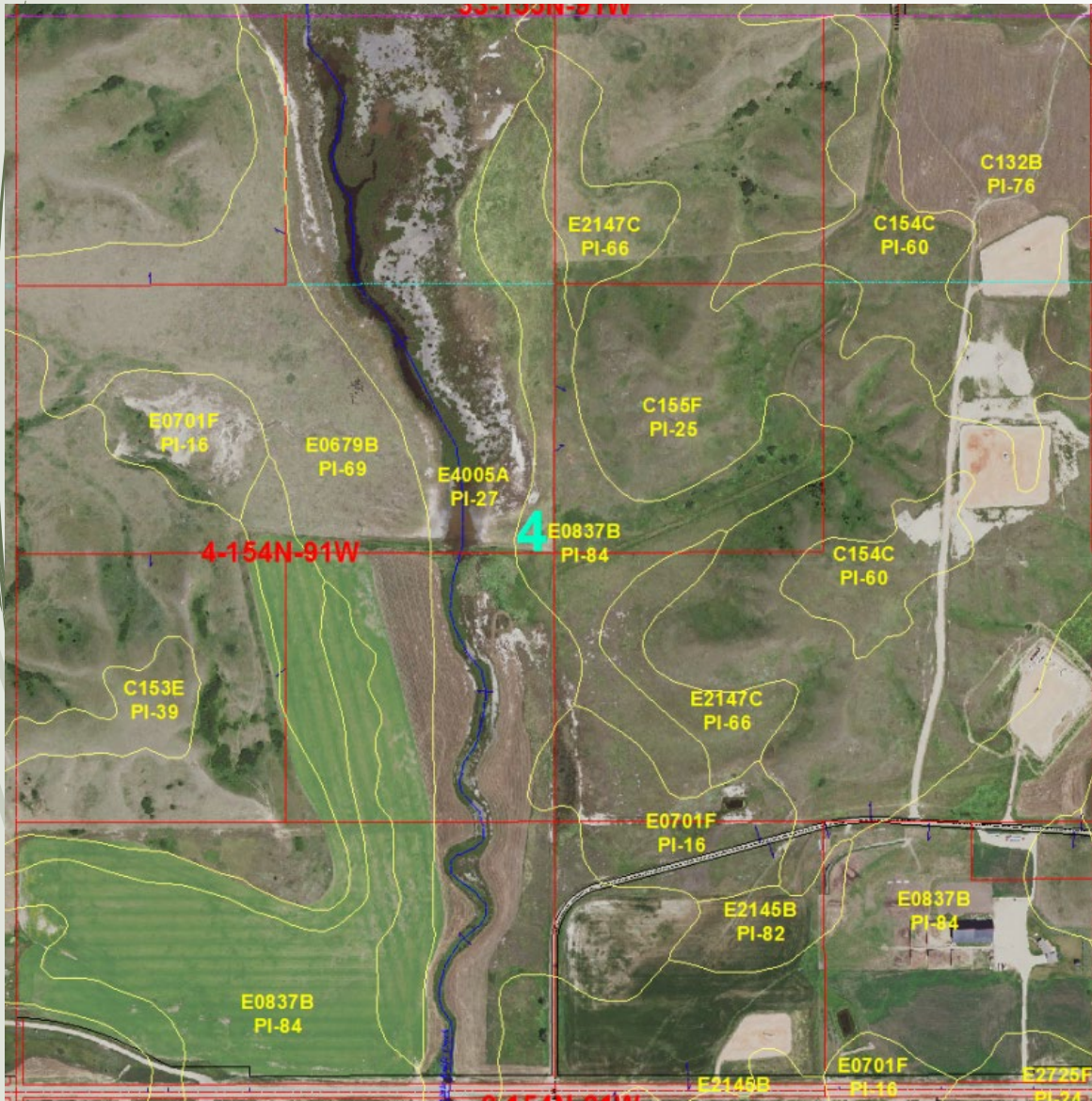
Valuation in Mountrail - 2022 Values

Assessment *	Description	Parcels	Parcel %	True & Full Value	Value %
101	Agricultural	9,061	58.99%	\$478,744,300	27.28%
201	Residential	3,551	23.12%	\$454,709,700	25.91%
233	Commercial	993	6.47%	\$793,695,700	45.23%
250	Vacant Land	1,754	11.42%	\$27,720,300	1.58%
	Total	15,359		\$1,754,870,000	

**NOTE: Centrally assessed properties are not included in the list*

Ag Land Valuation

Example Section



- ▶ Each parcel has various soil types within it
- ▶ Each soil type has a “Productivity index” associated
- ▶ Higher PI’s = better soil
- ▶ Higher PI’s have higher \$ value applied, lower PI’s have a lower \$ value applied

Actual Land Use – Bounding the Problem

Much to keep track of:

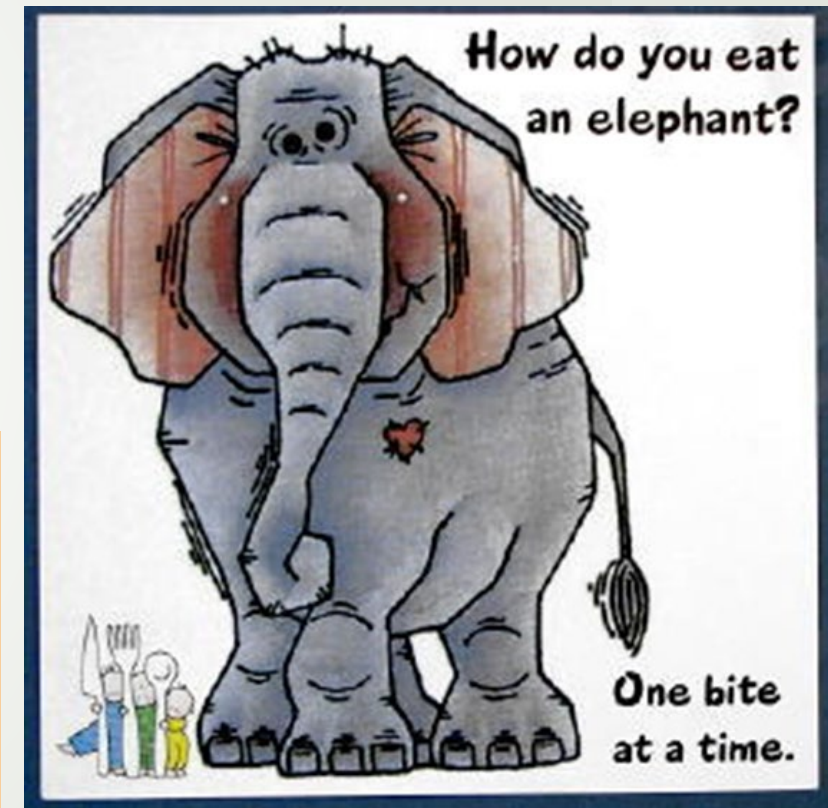
- ▶ Mountrail County Comprised of
 - ▶ 55 Townships – 7 cities
 - ▶ 1,803 Sections
 - ▶ 1,048,451.07 Ag related acres
 - ▶ 8,946 Ag related parcels
 - ▶ 2,200 Ag related parcel owners
 - ▶ 150 Soils Codes - \$ values applied
 - ▶ Where are those soils?
- ▶ How is each parcel being used?
 - ▶ Cropland
 - ▶ Non-Cropland
 - ▶ Farmstead
 - ▶ Commercial
 - ▶ Gravel Pit
 - ▶ Roads
 - ▶ Oilwell Sites
 - ▶ Saltwater disposal



Answer? – utilize a GIS system

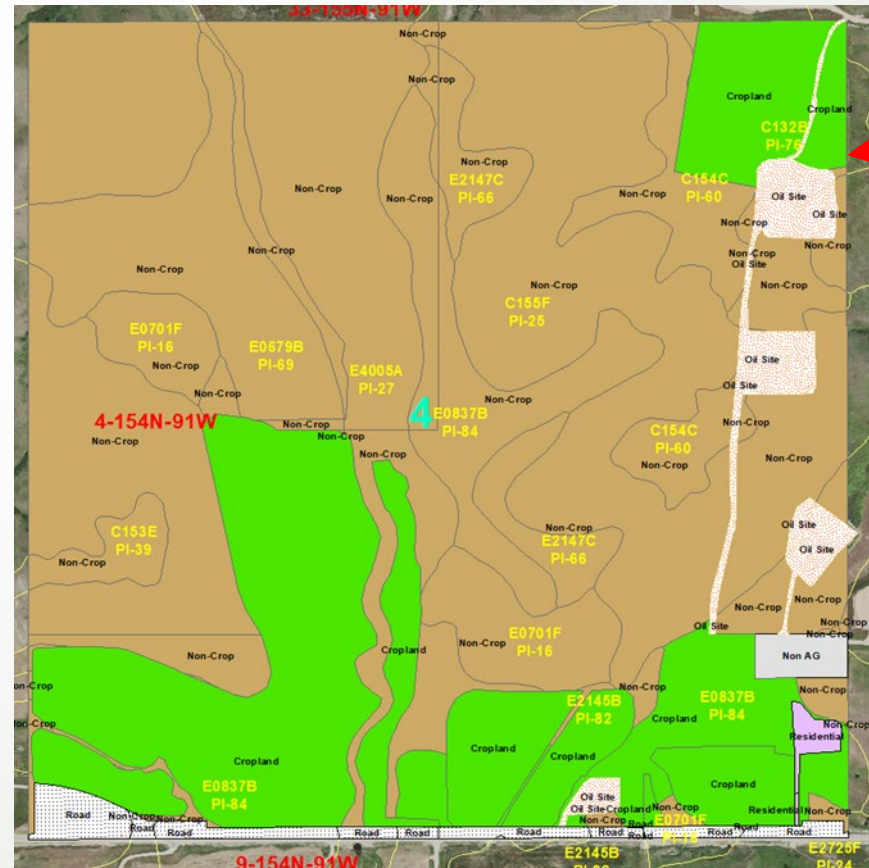
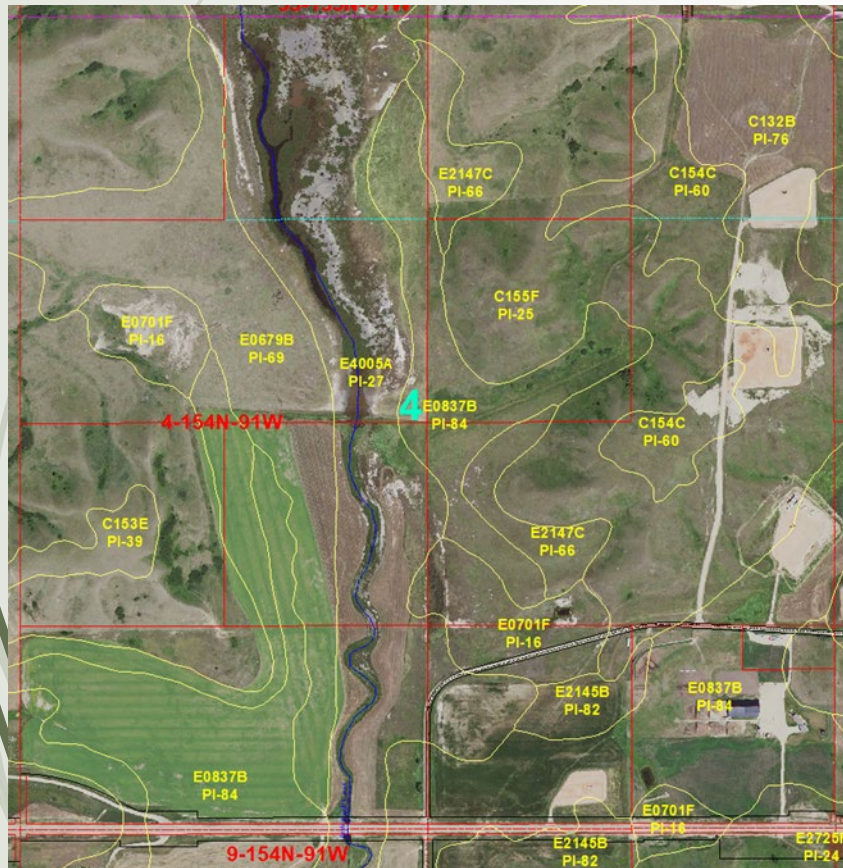
Problem – we were VERY new to GIS

Education needed – our office AND our constituents



What it looks like...

- Left – Section with NRCS Soil Layer
- Right – Same section with Actual Use drawn in
- Types – Cropland, non-cropland, Residential, Roads, Oil Sites, others



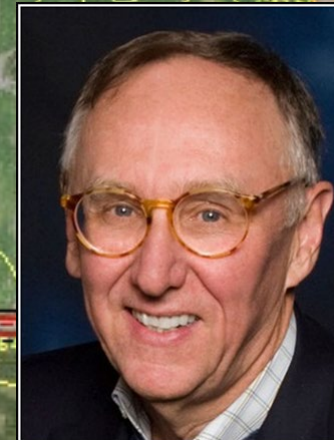
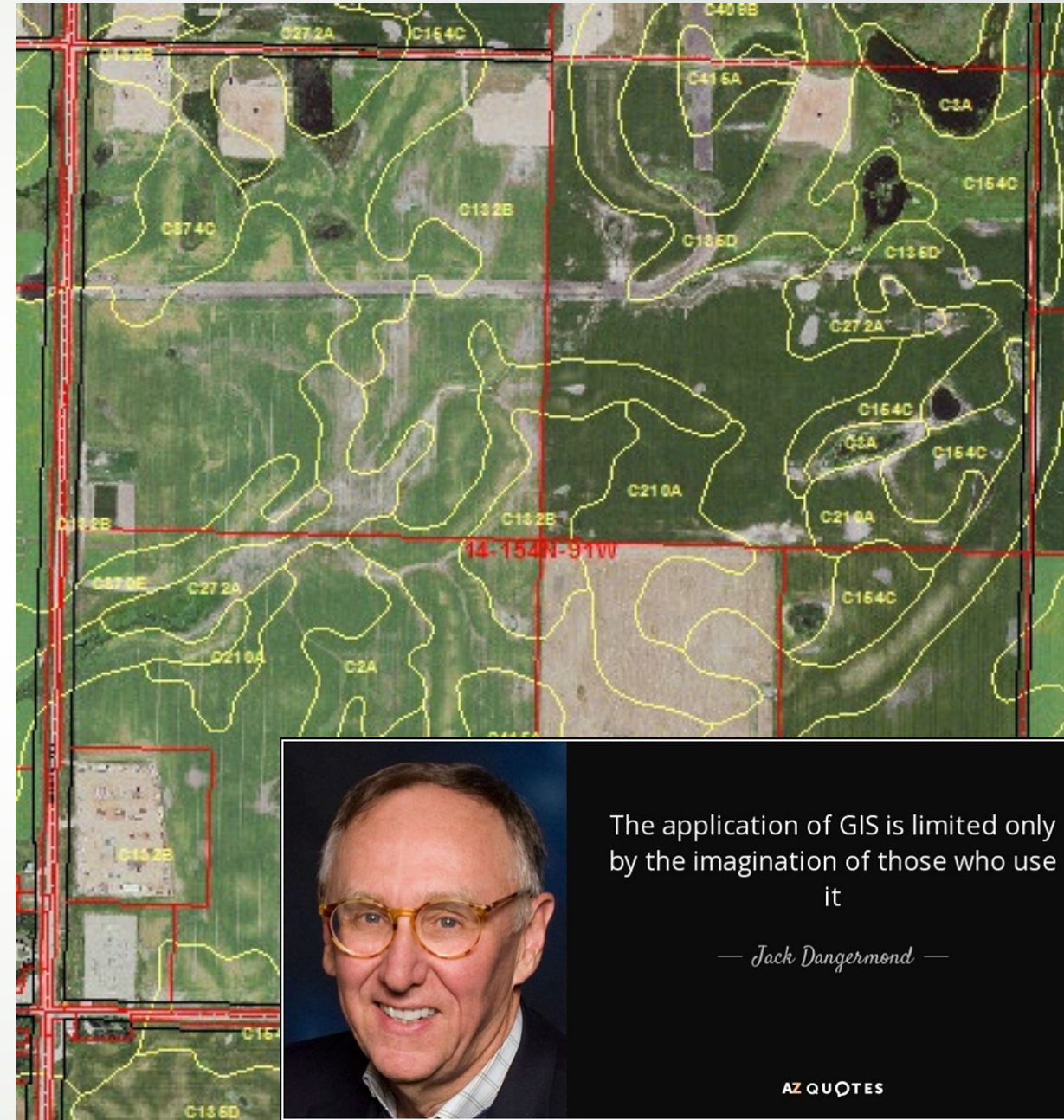
Note Portion
Of Oil Well
site

Envisioning Data An Idea!

NRCS Soils Info



Map unit symbol	Map unit name	PI	Acres in AOI
C2A	Tonka silt loam, 0 to 1 percent slopes	42	5,040.90
C3A	Parnell silty clay loam, 0 to 1 percent slopes	20	20,932.00
C5A	Southam silty clay loam, 0 to 1 percent slopes	5	12,561.50
C6A	Tonka-Parnell complex, 0 to 1 percent slopes	80	22.2
C64C	Wamduska, west-Mauvai complex, 1 to 9 percent slopes	32	15
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	37	3,237.70
C132B	Williams-Zahl loams, 3 to 6 percent slopes	76	168,009.50
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes	56	99,634.10
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes	56	1,706.80
C135D	Zahl-Williams loams, 9 to 15 percent slopes	43	201,198.10
C148C	Williams-Zahl-Parnell complex, 0 to 9 percent slopes	51	104.6
C149B	Williams-Bowbells-Tonka complex, 0 to 6 percent slopes	79	475.8
C153E	Zahl-Max loams, 15 to 25 percent slopes	39	4,003.70
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes	60	122,042.40
C155E	Zahl-Max-Arnegard loams, 9 to 25 percent slopes	36	400.2
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes	25	28,940.40

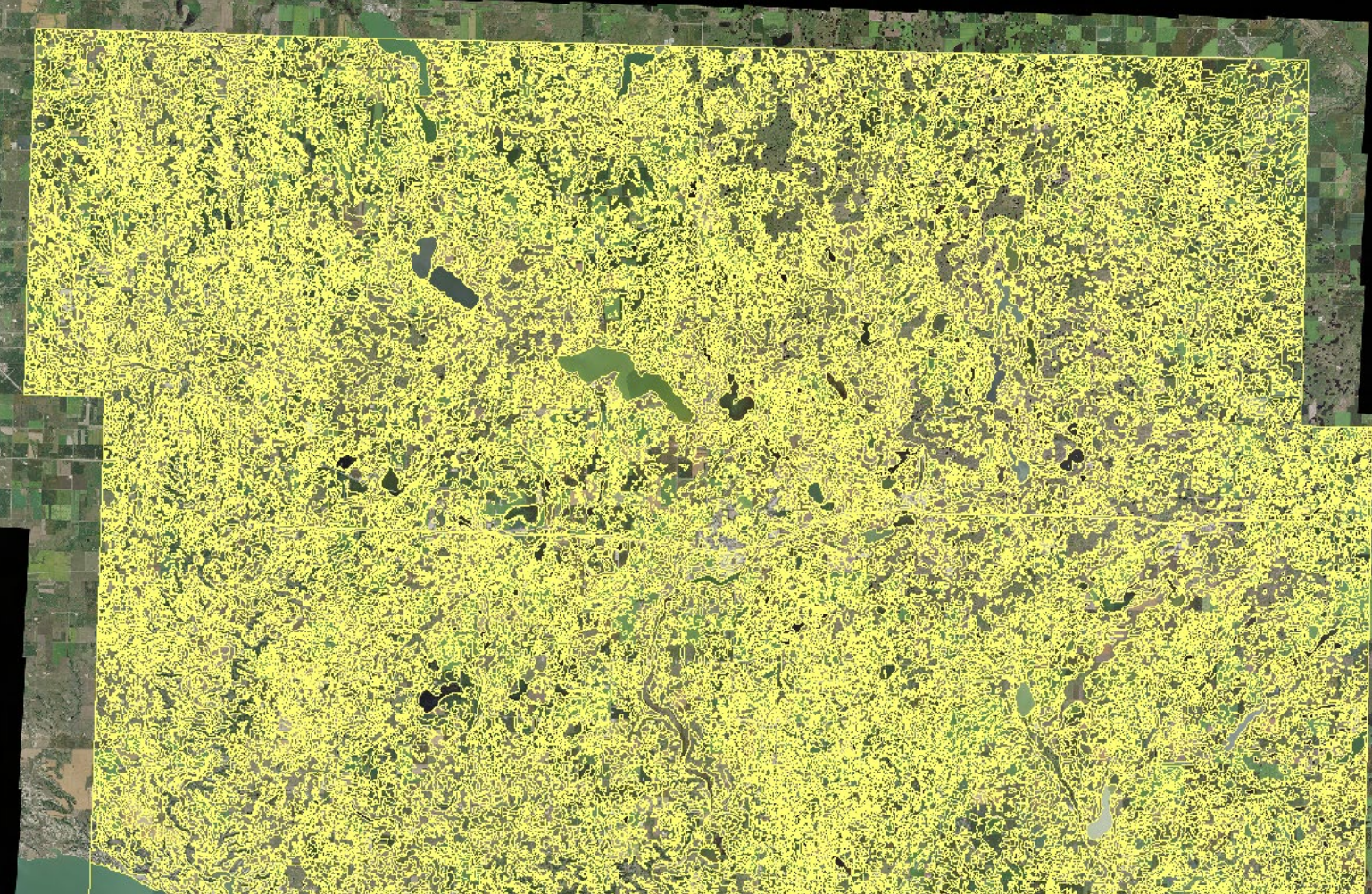


The application of GIS is limited only by the imagination of those who use it

— Jack Dangermond —

Soil Code 'Productivity Index'

- ▶ North Mountrail County with NRCS Soils Layer

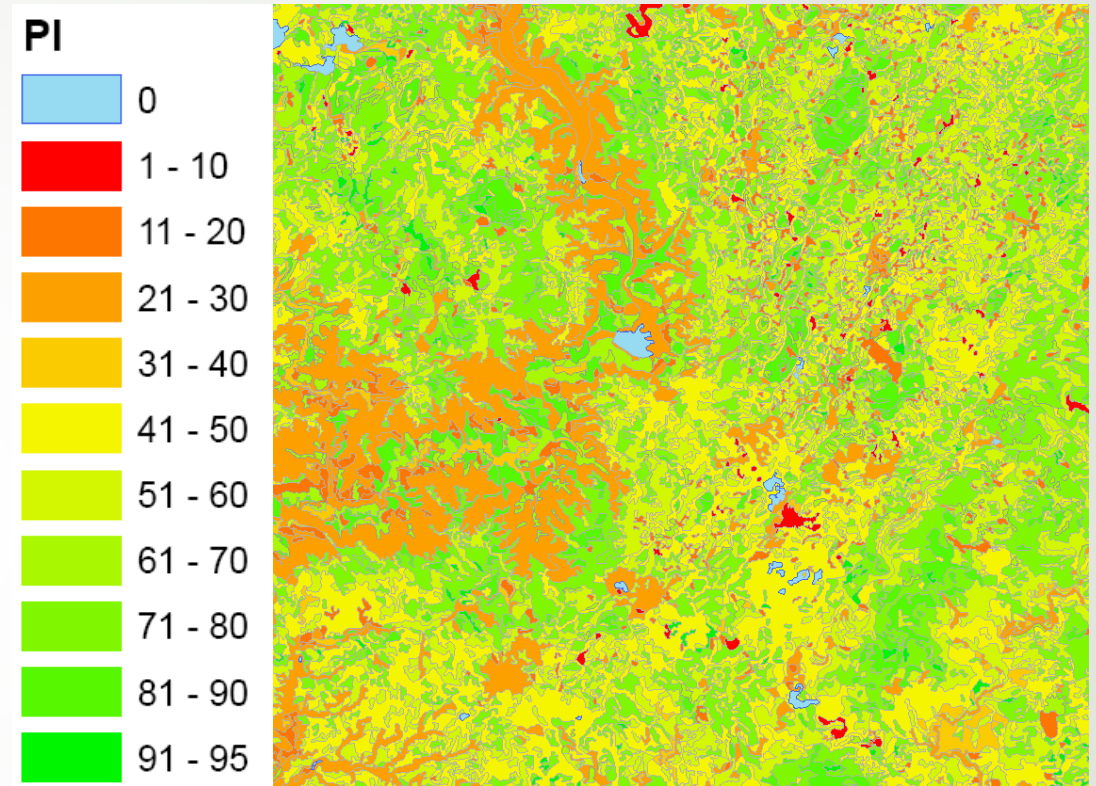
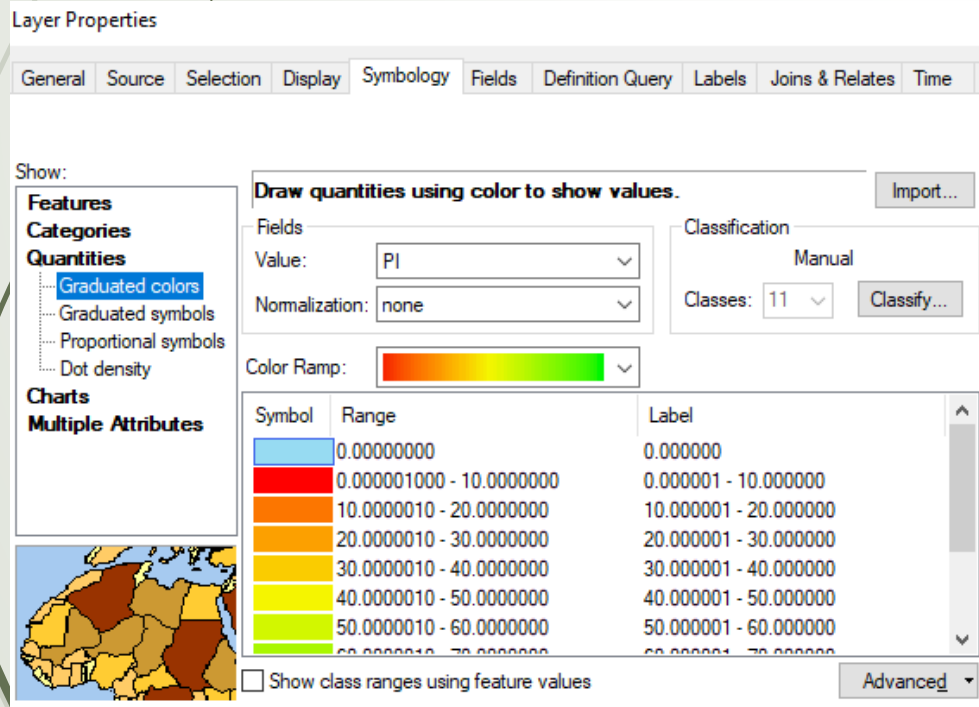


Map unit symbol	Map unit name	PI	Acres in AOI
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C5A	Southam silty clay loam, 0 to 1 percent slopes	5	12,561.50
C6A	Tonka-Parnell complex, 0 to 1 percent slopes	80	22.2
C64C	Wamduska, west-Mauvai complex, 1 to 9 percent slopes	32	15
C75A	Vallers loam, moderately saline, 0 to 1 percent slopes	37	3,237.70
C132B	Williams-Zahl loams, 3 to 6 percent slopes	76	168,009.50
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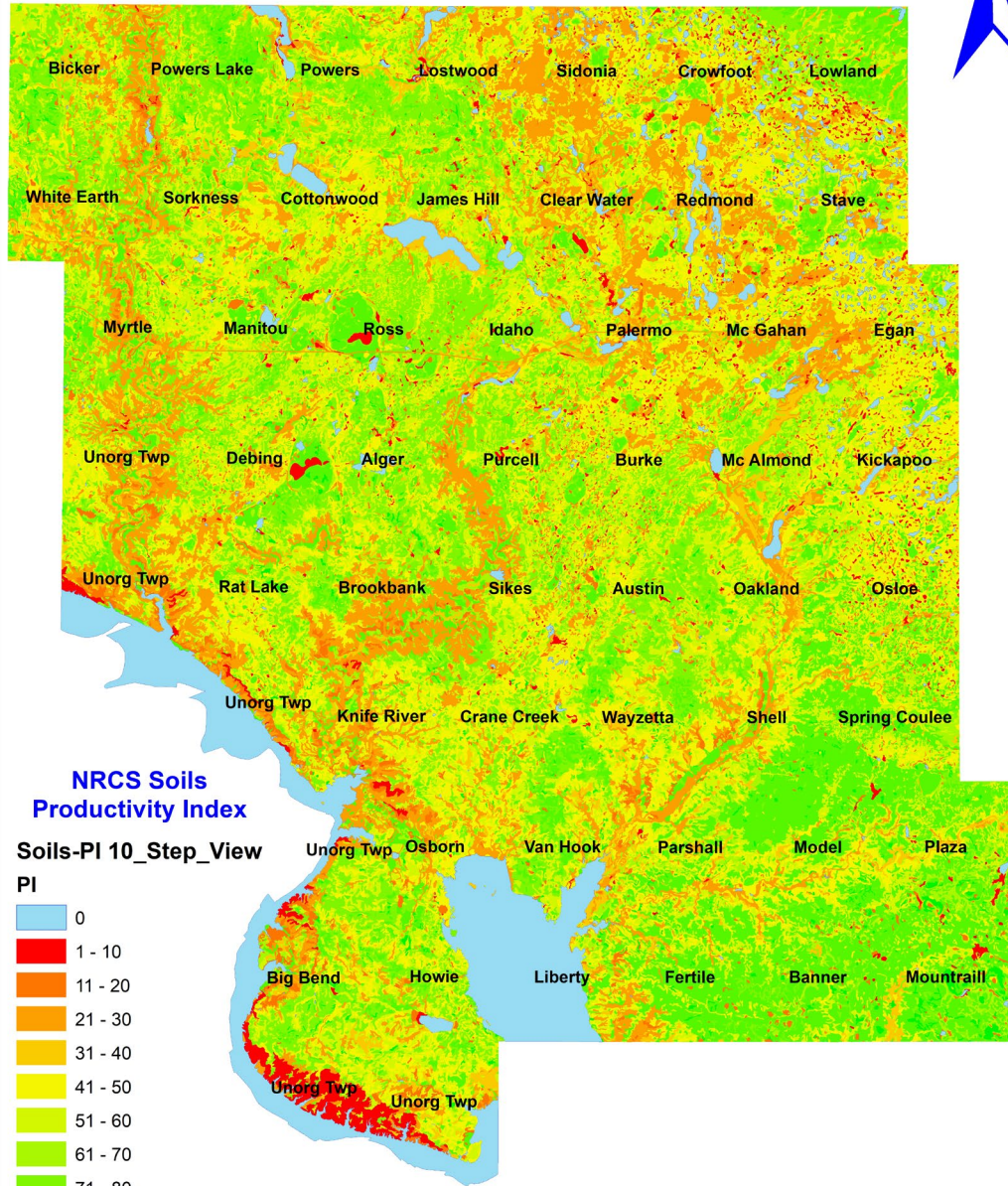
Soil Code by NRCS Productivity Index

► Symbology - PI Breakdown

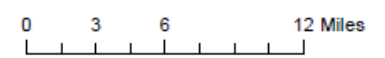
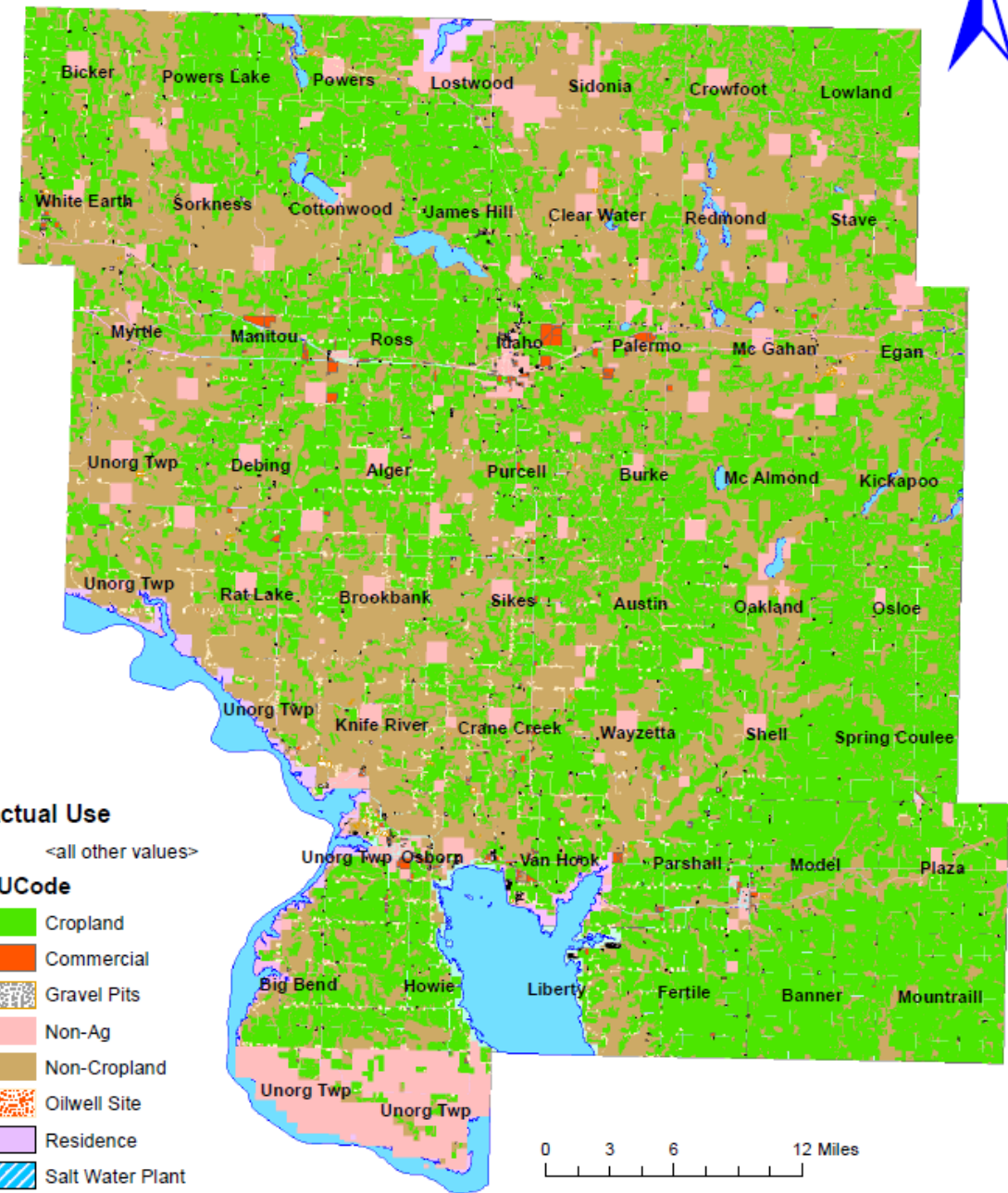
- 0-Blue-Water
- PI - 10 Step Color change
- Above 50 varying shades of green



Mountrail County - NRCS Soils



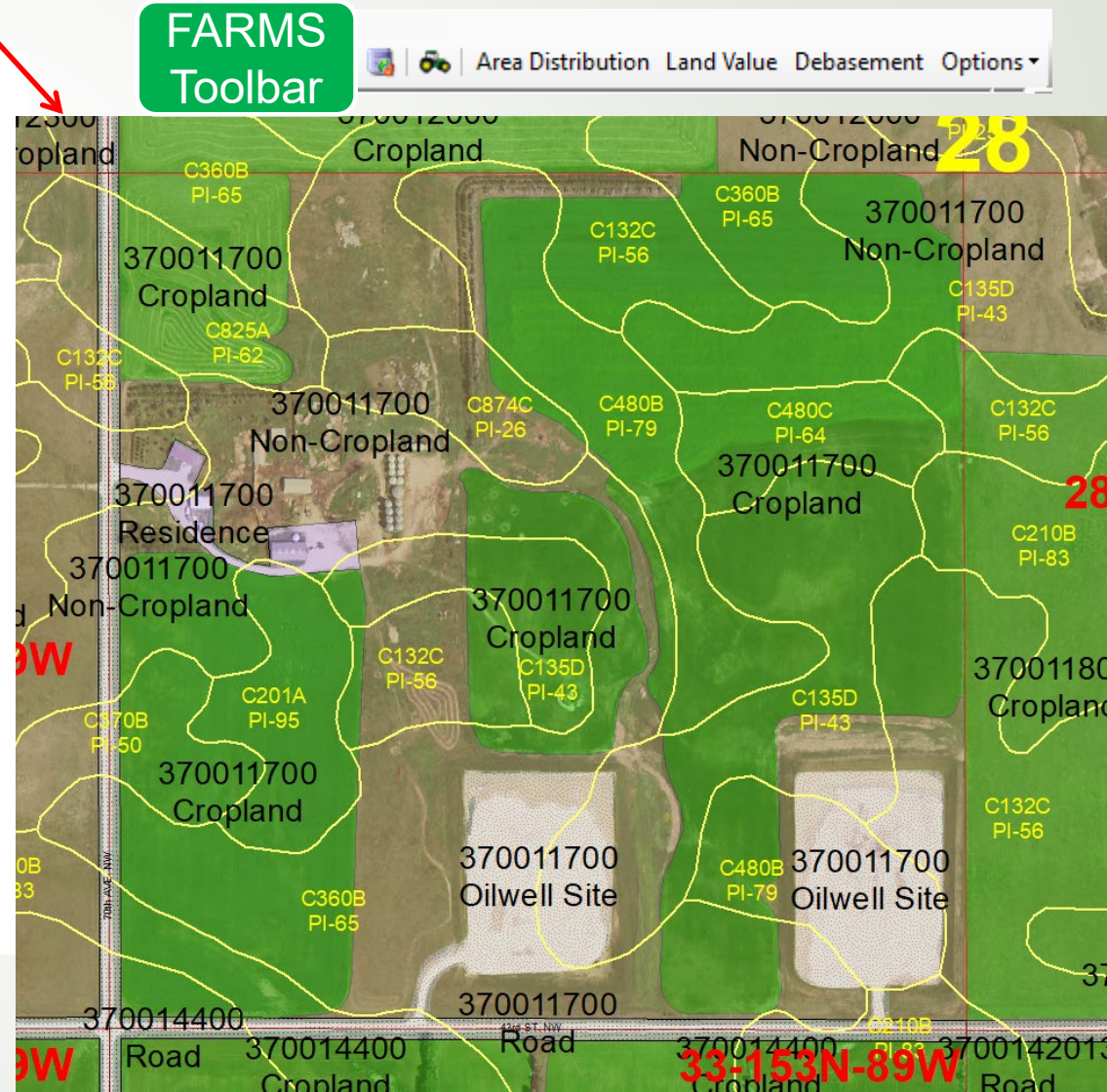
Mountrail County Ag Land Actual Use



FARMS Processing – FARMS Program

Sample Parcel
– SW ¼ Section

- ▶ Cropland, noncrop, Residence, Oil Site, Roads
- ▶ Utilizes Soil Types within Actual Land use
- ▶ “Slices” Actual Land use and Soil Type layers into acres – used for valuation
- ▶ Plenty of data provided
 - ▶ This parcel – 32 rows
 - ▶ Entire county – over 108,000 rows of data
 - ▶ [Pivot Tables are your friend!](#)



Soils Valuation Actual Land use – 2019 Values

Better Soils



Poorer Soils

Productivity Index (PI) or AUM	Land Valuation – Cropland	Non-Crop AUM
95	\$974	\$380
90	\$872	\$342
80	\$818	\$295
70	\$720	\$270
60	\$614	\$228
50	\$516	\$192
40	\$409	\$152
30	\$312	\$114
20	\$205	\$76
10	\$93	\$38
0 (Water)	\$16	\$16

2019 Values

NDSU Ag Land
Production Value
Average Ag - \$454.62
Cropland - \$692.46
NonCrop - \$156.54

Note:

Values in *BOTH* columns based off actual use.

FARMS Processed

1	ParcelNo	Soil_Code	Soil_Name	Recorded_Parcel_Ar	Distributed_Acre	Error_Per	Tax_Assessment	Units	SpotSymC	Landuse_Code	Landuse	Landuse_	CSR_unWeighte
2	010000100	F3A	Parnell silty clay loa	159.6	0.09	0.09	0.63	\$24.89	0.00	AG	Cropland	1.0000	\$276.56
3	010000100	F658A	Forman-Aastad loar	159.6	1.15	1.15	0.63	\$239.22	0.00	NCR	Non-Cropla	1.0000	\$208.02
4	010000100	F148F	Buse-Barnes-La Prai	159.6	1.46	1.45	0.63	\$555.23	0.00	AG	Cropland	1.0000	\$382.92
5	010000100	F658A	Forman-Aastad loar	159.6	1.45	1.44	0.63	\$0.00	0.00	RD	Road	1.0000	\$0.00
6	010000100	F661B	Forman-Buse loams	159.6	17.29	17.18	0.63	\$14,253.90	0.00	AG	Cropland	1.0000	\$829.68
7	010000100	F148F	Buse-Barnes-La Prai	159.6	40.38	40.13	0.63	\$6,615.43	0.00	NCR	Non-Cropla	1.0000	\$164.85
8	010000100	F658A	Forman-Aastad loar	159.6	98.79	98.16	0.63	\$96,059.38	0.00	AG	Cropland	1.0000	\$978.60
9	010000200	F3A	Parnell silty clay loa	120	0.06	0.06	0.59	\$21.19	0.00	NCR	Non-Cropla	1.0000	\$353.24
10	010000200	F658A	Forman-Aastad loar	120	1.69	1.7	0.59	\$353.63	0.00	NCR	Non-Cropla	1.0000	\$208.02
11	010000200	F148F	Buse-Barnes-La Prai	120	2.37	2.38	0.59	\$911.35	0.00	AG	Cropland	1.0000	\$382.92
12	010000200	F661B	Forman-Buse loams	120	4.33	4.36	0.59	\$3,617.40	0.00	AG	Cropland	1.0000	\$829.68
13	010000200	F3A	Parnell silty clay loa	120	14.23	14.31	0.59	\$3,957.57	0.00	AG	Cropland	1.0000	\$276.56
14	010000200	F148F	Buse-Barnes-La Prai	120	32.62	32.81	0.59	\$5,408.73	0.00	NCR	Non-Cropla	1.0000	\$164.85
15	010000200	F658A	Forman-Aastad loar	120	64	64.38	0.59	\$63,002.27	0.00	AG	Cropland	1.0000	\$978.60
16	010000201	F658A	Forman-Aastad loar	120.62	0.52	0.52	0.45	\$0.00	0.00	RD	Road	1.0000	\$0.00

Note- 108,426 rows of data

1	ParcelNo	Soil_Code	Soil_Name	Recorded_Parcel_Ar	Distributed_Acre	Error_Per	Tax_Assessment	Units	SpotSymC	Landuse_Code	Landuse	Landuse_	CSR_unWeighte
108420	620022500	E4139A	Korchea-Fluvaquen	23.5	10.25	10.5	2.53	\$1,978.20	0.00	NCR	Non-Cropla	1.0000	\$188.40
108421	620022600	E4139A	Korchea-Fluvaquen	48	0.36	0.37	2.98	\$177.10	0.00	AG	Cropland	1.0000	\$478.66
108422	620022600	E2725F	Anikara-Shambo-Cal	48	1.03	1.06	2.98	\$79.04	0.00	NCR	Non-Cropla	1.0000	\$74.57
108423	620022600	E4137A	Korchea loam, 0 to 2	48	1.58	1.63	2.98	\$0.00	0.00	RD	Road	1.0000	\$0.00
108424	620022600	E4139A	Korchea-Fluvaquen	48	8.02	8.26	2.98	\$1,556.18	0.00	NCR	Non-Cropla	1.0000	\$188.40
108425	620022600	E4137A	Korchea loam, 0 to 2	48	14.77	15.22	2.98	\$2,867.45	0.00	NCR	Non-Cropla	1.0000	\$188.40
108426	620022600	E4137A	Korchea loam, 0 to 2	48	20.85	21.46	2.98	\$19,402.63	0.00	AG	Cropland	1.0000	\$904.13

FARMS processed and overall Ag Land Values

Land Use	Actual Use Acres	Percent of Actual Use Acres	Total Value	Percent of Total Value
Commercial	334.80	0.03%	\$0	0.00%
Cropland	583,785.01	54.86%	\$391,166,486	84.57%
Gravel Pit	1,496.77	0.14%	\$0	0.00%
Non-Ag	123.23	0.01%	\$0	0.00%
NonCrop	457,047.22	42.95%	\$70,201,573	15.18%
Oilwell Site	7,618.84	0.72%	\$1,184,966	0.26%
Residence	790.80	0.07%	\$0	0.00%
Road	12,964.26	1.22%	\$0	0.00%
(blank)		0.00%		0.00%
Grand Total	1,064,160.93	100.00%	\$462,553,026	100.00%

***Note: Only Ag Related Acres are valued**

Land Use	Actual Use Acres	Percent of Actual Use Acres	Total Value
01-Lowland 158-88			
Cropland	16,906.39	15.67%	\$11,669,808
NonCrop	4,837.26	4.48%	\$705,233
Residence	3.97	0.00%	\$0
Road	343.95	0.32%	\$0
02-Crowfoot 158-89			
Cropland	10,858.88	10.06%	\$6,451,763
NonCrop	10,366.88	9.61%	\$1,647,974
Oilwell Site	17.07	0.02%	\$2,596
Residence	7.32	0.01%	\$0
Road	250.69	0.23%	\$0
03-Sidonia 158-90			
Cropland	4,662.05	4.32%	\$2,557,570
NonCrop	15,002.39	13.90%	\$2,650,996
Oilwell Site	98.18	0.09%	\$15,830
Residence	5.95	0.01%	\$0
Road	200.89	0.19%	\$0
34-Rat Lake 154-93			
Commercial	6.04	0.01%	\$0
Cropland	8,380.50	7.77%	\$5,551,158
Gravel Pit	60.42	0.06%	\$0
NonCrop	12,473.27	11.56%	\$1,931,692
Oilwell Site	295.64	0.27%	\$45,240
Residence	11.24	0.01%	\$0
Road	206.27	0.19%	\$0
48-Mountrail 151-88			
Cropland	19,619.87	18.18%	\$15,466,023
NonCrop	2,959.16	2.74%	\$527,571
Road	334.56	0.31%	\$0

FARMS Processed

1	ParcelNo	Soil_Code	Soil_Name	Recorded	Parcel_Ar	Distributed_Acre	Error_Per	Tax_Assessment	Units	SpotSymC	Landuse_Code	Landuse	Landuse_	CSR_unWeighte
2	010000100	F3A	Parnell silty clay loa	159.6	0.09	0.09	0.63	\$24.89	0.00	AG	Cropland	1.0000		\$276.56
3	010000100	F658A	Forman-Aastad loar	159.6	1.15	1.15	0.63	\$239.22	0.00	NCR	Non-Cropla	1.0000		\$208.02
4	010000100	F148F	Buse-Barnes-La Prai	159.6	1.46	1.45	0.63	\$555.23	0.00	AG	Cropland	1.0000		\$382.92
5	010000100	F658A	Forman-Aastad loar	159.6	1.45	1.44	0.63	\$0.00	0.00	RD	Road	1.0000		\$0.00
6	010000100	F661B	Forman-Buse loams	159.6	17.29	17.18	0.63	\$14,253.90	0.00	AG	Cropland	1.0000		\$829.68
7	010000100	F148F	Buse-Barnes-La Prai	159.6	40.38	40.13	0.63	\$6,615.43	0.00	NCR	Non-Cropla	1.0000		\$164.85
8	010000100	F658A	Forman-Aastad loar	159.6	98.79	98.16	0.63	\$96,059.38	0.00	AG	Cropland	1.0000		\$978.60

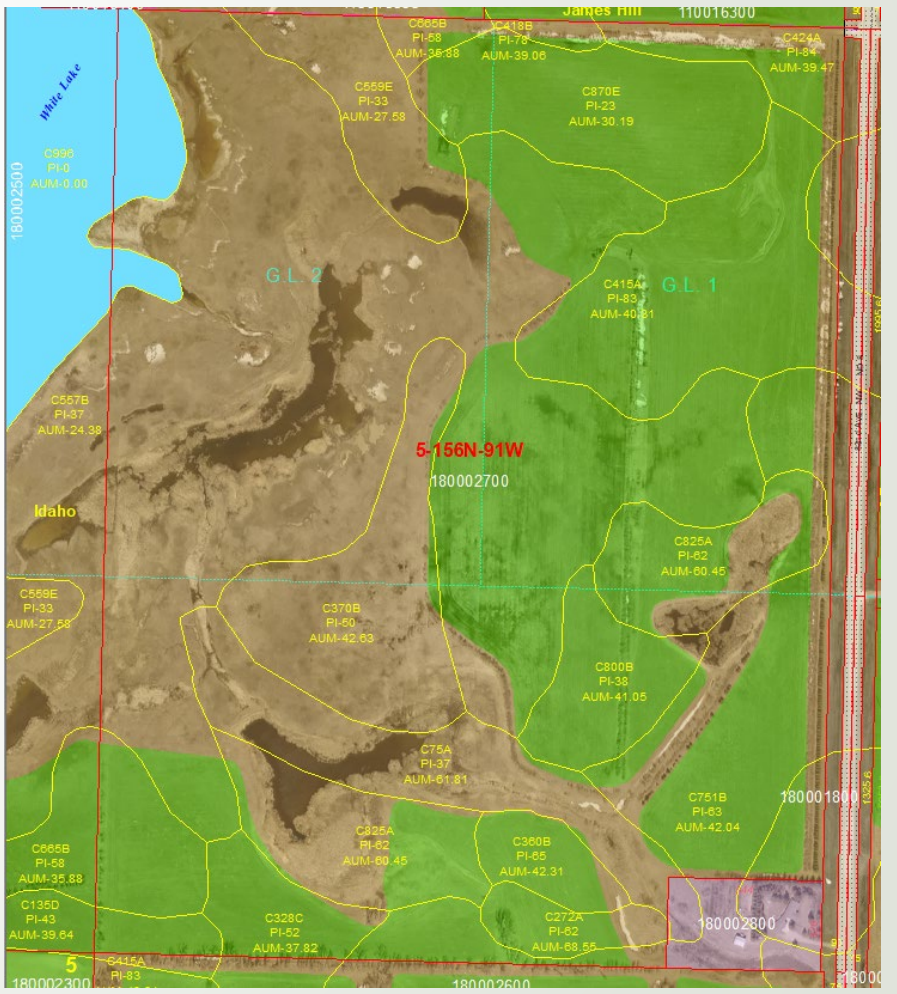
Pivot Table Utilization

3							Values		
4	Parcel	LastFirst	sec-twp-rng	LegalDesc	Landuse	SoilUseType	Value Per Acre	Sum of Acreage	Sum of Tax_Assessment
5	010000100	JOHNSON/WILLIAM A & PHYLLIS	1-158-88	NSW; WSE LESS RY	Cropland	F148F - PI 34	\$382.92	1.45	\$555.23
6						F3A - PI 25	\$276.56	0.09	\$24.89
7						F658A - PI 87	\$978.60	98.16	\$96,059.38
8						F661B - PI 74	\$829.68	17.18	\$14,253.90
9					Cropland Total			116.88	\$110,893.40
10					Non-Cropland	F148F - AUM 41.74	\$164.85	40.13	\$6,615.43
11						F658A - AUM 53.43	\$208.02	1.15	\$239.22
12					Non-Cropland Total			41.28	\$6,854.65
13					Road	F658A	\$0.00	1.44	\$0.00
14					Road Total			1.44	\$0.00
15	010000100 Total							159.60	\$117,748.05

Parcel	LastFirst	sec-twn-rng	LegalDesc	Landuse	SoilUseType	Value Par	Sum of Acreage	Sum of Tax_Assessment
FLADELAND/LIONELD & 2 LESS R/W &								
180002700	DANIELLE	5-156-9	TRACT	Cropland	C135D - PI 43	478.66	1.43	\$684.48
					C272A - PI 62	691.4	1.95	\$1,348.23
					C328C - PI 52	585.03	3.56	\$2,082.71
					C360B - PI 65	723.31	2.52	\$1,822.74
					C370B - PI 50	563.76	0.42	\$236.78
					C409B - PI 61	680.76	0.26	\$177.00
					C415A - PI 83	925.41	14.36	\$13,288.89
					C418B - PI 78	872.22	0.21	\$183.17
					C424A - PI 84	936.05	1.68	\$1,572.56
					C557B - PI 37	414.84	24.09	\$9,993.50
					C559E - PI 33	372.29	0.33	\$122.86
					C665B - PI 58	648.85	4.19	\$2,718.68
					C751B - PI 63	702.03	12.45	\$8,740.27
					C75A - PI 37	414.84	0.34	\$141.05
					C800B - PI 38	425.47	6.25	\$2,659.19
					C825A - PI 62	691.4	6.94	\$4,798.32
					C870E - PI 23	255.29	10.94	\$2,792.87
					Cropland Total		91.92	\$53,363.30
					Non-Cropland			
					C272A - AUM 68.55	270.82	0.54	\$146.24
					C328C - AUM 37.82	149.15	0.23	\$34.30
					C360B - AUM 42.31	164.85	0.30	\$49.46
					C370B - AUM 42.63	168.77	11.76	\$1,984.74
					C409B - AUM 35.86	141.3	0.63	\$89.02
					C415A - AUM 40.31	157	0.85	\$133.45
					C418B - AUM 39.06	153.07	0.46	\$70.41
					C424A - AUM 39.47	153.07	1.91	\$292.36
					C557B - AUM 24.38	94.2	47.64	\$4,487.69
					C559E - AUM 27.58	109.9	5.98	\$657.20
					C665B - AUM 35.88	141.3	0.95	\$134.24
					C751B - AUM 42.04	164.85	4.68	\$771.50
					C75A - AUM 61.81	243.34	10.14	\$2,467.47
					C800B - AUM 41.05	160.92	0.97	\$156.09
					C825A - AUM 60.45	235.49	7.29	\$1,716.72
					C870E - AUM 30.19	117.75	0.28	\$32.97
					C996 - AUM 0	16.84	3.62	\$60.96
					Non-Cropland Total		98.23	\$13,284.82
					Road			
					C409B	0	0.41	\$0.00
					C415A	0	0.26	\$0.00
					C424A	0	0.33	\$0.00
					C751B	0	0.96	\$0.00
					C800B	0	0.54	\$0.00
					C825A	0	0.05	\$0.00
					Road Total		2.55	\$0.00
180002700 Total						192.70		\$66,648.12
Grand Total						192.70		\$66,648.12

FARMS Processed

– Parcel with many rows of data



A Couple of Years Ago....

“How do we do this....?”

$B > \frac{1}{N} \sum_{i=1}^N X_i$

JUST DO IT → 485K
534K

WHAT IS UNIQUE ABOUT THIS PICTURE?

MAX \$12,800
\$1600
\$1687
\$1380
\$1261
\$1970
\$1250
\$12600

12-1200 \$100 2016 AB VALUE

16-6515 AD-2016

NEW PLAN

VMS PROJECT - \$58.65
VMS VISIO - \$58,999 \$33,799
SIDWELL DISCUSSIONS
FARMS - \$1599 / \$999 MAINT.

ARC MAP - \$1250 / \$400-500 ANNUAL
- TRAINING - 1-1.5 DAYS
SW TOOLS INVESTIGATION
- OFFROAD - \$24-25K/ATR
- SIDWELL GIS - FARMS
- NAIP AIRPHOTO

CROP/NON CROP TOOLS
- CROPSCAPE
- ABSDATA
BTAX DEFT REPORTING TOOLS & FARMS SERVER

2 VALUES

RORY'S "BEAUTIFUL MIND"

SOILS LAYER - @ CDDE - not color
- ARCMAP
- FARM CROP
- FARM RES EX → NON CROP
- 2 AC RES
- OIL SITES / ROPS
- CRP
- GRAVEL
- SACRIFICIAL
- SACRIFICIAL
- TRACES & BOUNDS
- PRIVATE DRIVE

DISCUSS

SPACE

MUST ID ACRES BY LAYERS

TEST - A LAYER
POWERS
RAT LAXE

53 & 53 & 53 &

SIDWELL GIS

UPDATE AERIAL PHOTOGRAPHY - \$900 / 120 YR
- YEARLY ALSO

LAND USE LAYER(S?) \$86K
- CROP
- NON-CROP
- OTHERS

EXAMPLE COUNTY W/LAND USE
- WHAT IS PROVIDED

- FARMS QUARTERLY PULL - \$1500
- PORTICO ? WHEN
- WHEN TO ROUND SOIL CODES? PARCEL

LAYERS HISTORICAL PHOTOGRAPHY
CROPLAND CRP
NONCROPLAND 3A, 515
- RANGELAND
- PASTURE LAND
NON PRODUCTIVE
ALL MODIFIERS
INNOVATED TAMPROADS, CITY ROADS

COMMERCIAL
OIL SITES
SALT WATER
RESIDENTIAL
- ASMT CODES

VALUE SCHEDULES
Pi
AUM
NON PRODUCTIVE

TRG
IAAO-811-INTRO GIS - 18 HAS \$100
IAAO-812-ABU GIS - 18 HAS \$100
IAAO-10L-INC. APPROX 70 \$400
RODY

TRG
IAAO-811-INTRO GIS - 18 HAS \$100
IAAO-812-ABU GIS - 18 HAS \$100
IAAO-10L-INC. APPROX 70 \$400
RODY

VANGUARD ROCKS!

RON JOY SURF SHOP
ONE OF A KIND

"BRAIN BUBBLES"

D-U
D-U
D-P

DO NOT ERASE

2-132017

Soils' Good
\$421.83

8942
1,066,991.70
\$450,085,337.04

VALUE \$12.85

DO NOT ERASE

DIFF 8,515,837.04

\$422.13
422.93
450,114,400

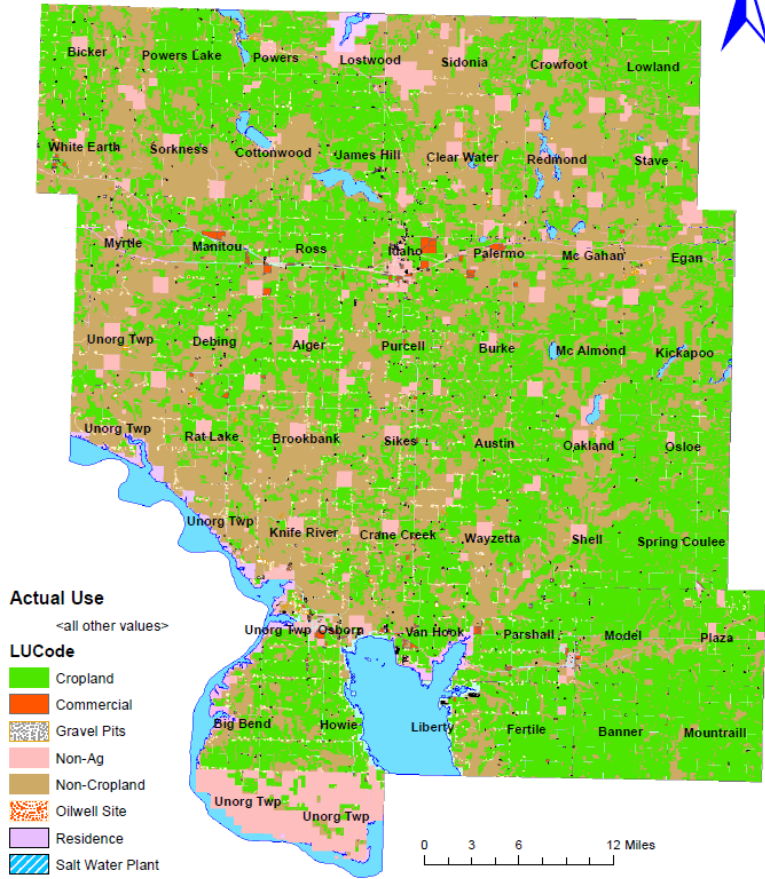
GO BACK - BTTF
w/ PARCELS
26,230
520

STATE AID
5510K
SECTIONS ≈ 1800
UGOs - 1

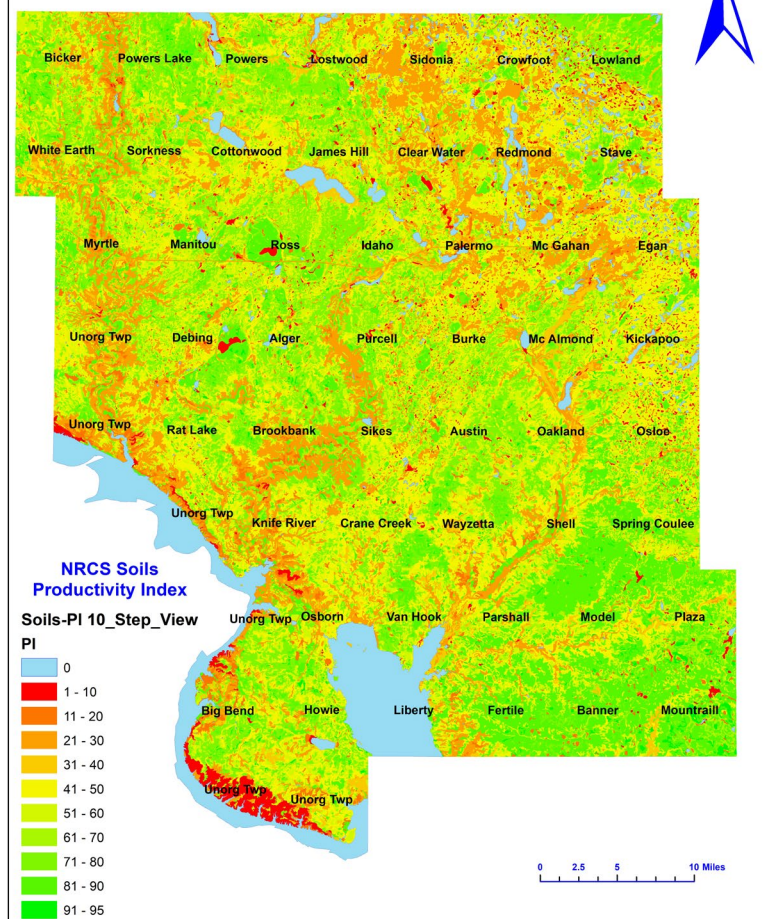
GIS is the Answer!

Actual Use Layer

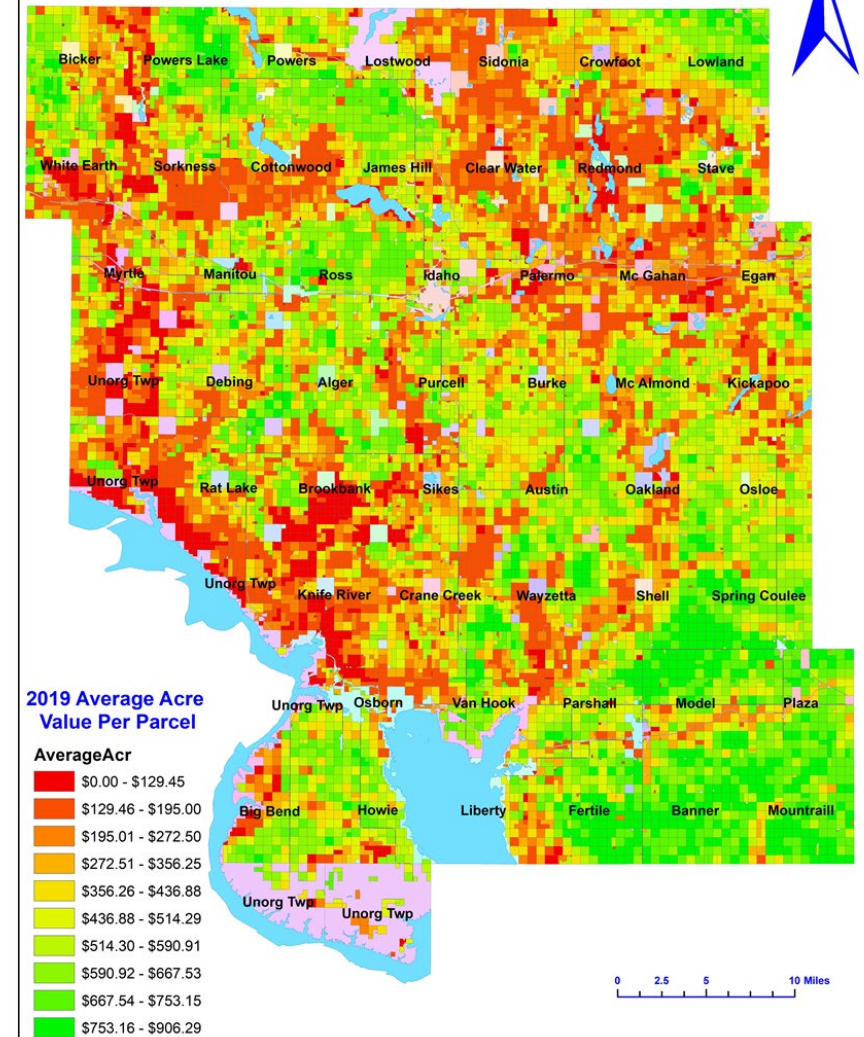
Mountrail County Ag Land Actual Use



Mountrail County - NRCS Soils



Mountrail County - Average Acre Value



GIS – Public Facing

- ▶ Various search capabilities
- ▶ Several NAIP Years Aerial Photography available
- ▶ Actual use Layer
- ▶ Soils Layer and information
- ▶ Valuation Reporting

Parcel: 320015000

Hyperlinks

- [Farms Soils Report](#)
- [NDPropertyTax](#)

Details

Parcel Number
320015000

Acreage
160

Owner
JORGENSEN/ELROY S & EMOJEAN S

Owner Address
4955 HIGHWAY 8 NEW TOWN ND 58763

Legal Description
NW

Sec Twp Rng
27 154 091

Township
SIKES TWP

Plat
N/A

The screenshot shows a web browser window with the URL <https://portico.mygisonline.com/html5/?viewer=mountraind>. The map displays a parcel with a yellow outline and a search bar containing '320015000'. The details panel on the right provides information about the parcel, including its number, acreage, owner, address, legal description, and township.

Layers

Filter Layers...

- Zoning (Not Current)
- Soils 2019 (NRCS)
- Property Asmt Purpose-Land Use
- Cadastral
- Imagery
 - 2022 Aerial (Hi-resolution)
 - 2021 Aerial (NAIP)
 - 2019 Aerial (Hi-resolution)
 - 2017 Aerial (NAIP)
 - 2010 Aerial (NAIP)
 - 2003 Aerial (NAIP)
- BaseMap
 - World Imagery
 - World Street Map

The screenshot shows the same web browser window as above, but with the layers panel open on the left. The 'Layers' panel allows users to filter and toggle various map layers, including zoning, soils, property assessment, cadastral, and imagery. The 'Imagery' section is expanded, showing options for different aerial photography years and resolutions. The 'BaseMap' section is also expanded, showing options for 'World Imagery' and 'World Street Map'.

Land Valuation Reporting



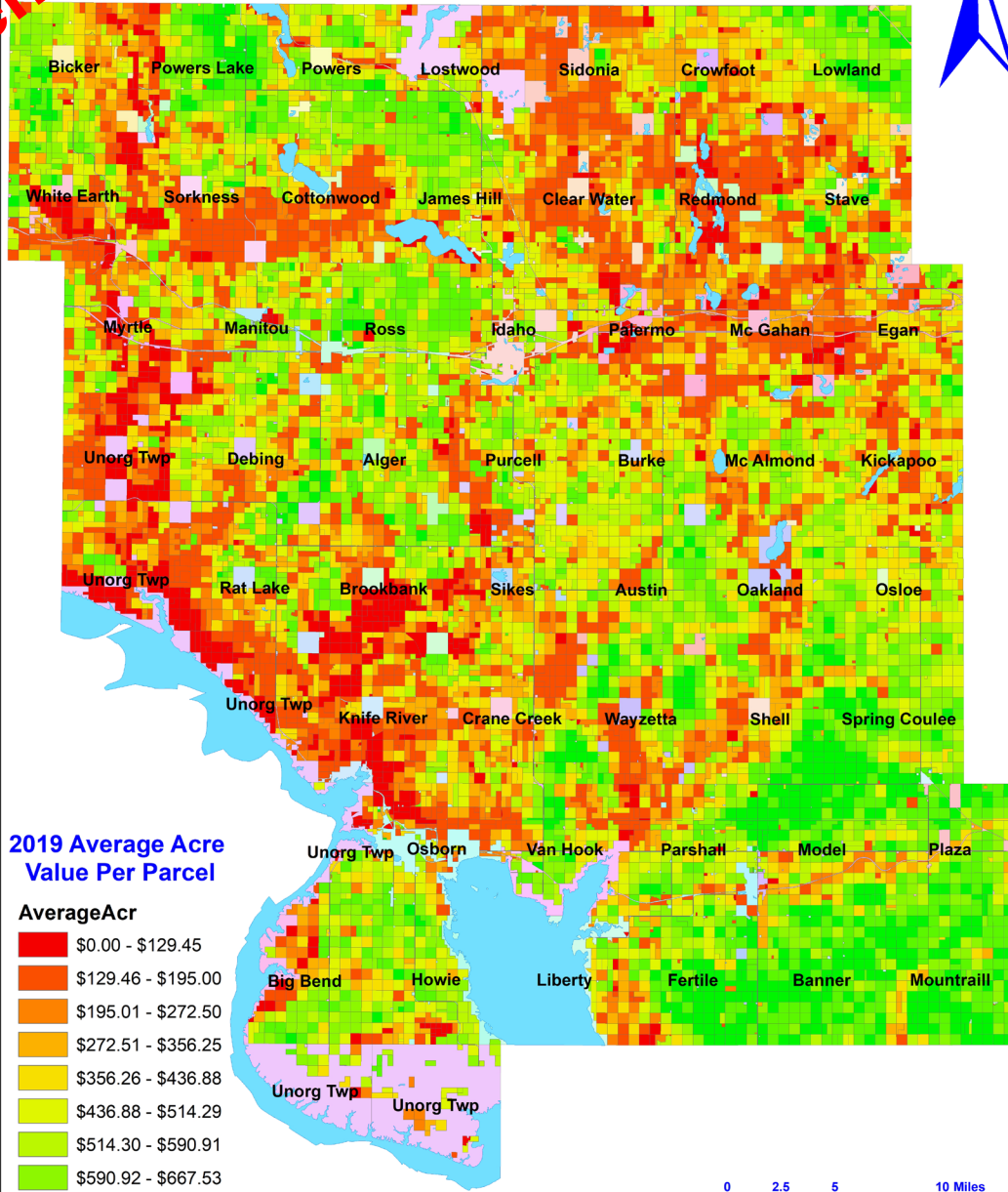
Mountrail Final Calculation Report

Parcel	32-00-150-00	Assessed Acres :	160.00		
LAND USE	SOIL CODE	SOIL NAME	NET ACRES	PRICE PER ACRE	TRUE & FULL VALUE
Cropland					
	C132B	Williams-Zahl	11.24	808.01	9,082.03
	C132C	Williams-Zahl	43.98	646.41	28,429.11
	C135D	Zahl-Williams	7.31	454.50	3,322.40
	C424A	Nutley west,	0.09	888.81	79.99
	C816B	Lehr loam, 2	0.74	464.60	343.80
			63.36		41,257.33
Non-Cropland					
	C132B	Williams-Zahl	0.59	158.54	93.54
	C132C	Williams-Zahl	44.47	158.54	7,050.27
	C135D	Zahl-Williams	29.38	154.68	4,544.50
	C424A	Nutley west,	0.86	150.81	129.70
	C810A	Bowdle loam,	0.84	150.81	126.68
	C816B	Lehr loam, 2	4.58	116.01	531.33
			80.72		12,476.02
Oilwell Site					
	C132B	Williams-Zahl	3.07	158.54	486.72
	C132C	Williams-Zahl	5.96	158.54	944.90
	C135D	Zahl-Williams	1.43	154.68	221.19
	C424A	Nutley west,	0.71	150.81	107.08
	C810A	Bowdle loam,	2.67	150.81	402.66
	C816B	Lehr loam, 2	0.08	116.01	9.28
			13.92		2,171.83
Road					
	C132C	Williams-Zahl	1.26	0.00	0.00
	C135D	Zahl-Williams	0.74	0.00	0.00
			2.00		0.00
Totals			160.00	\$	55,905.18



And then...

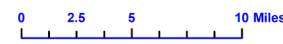
Mountrail County - Average Acre Value



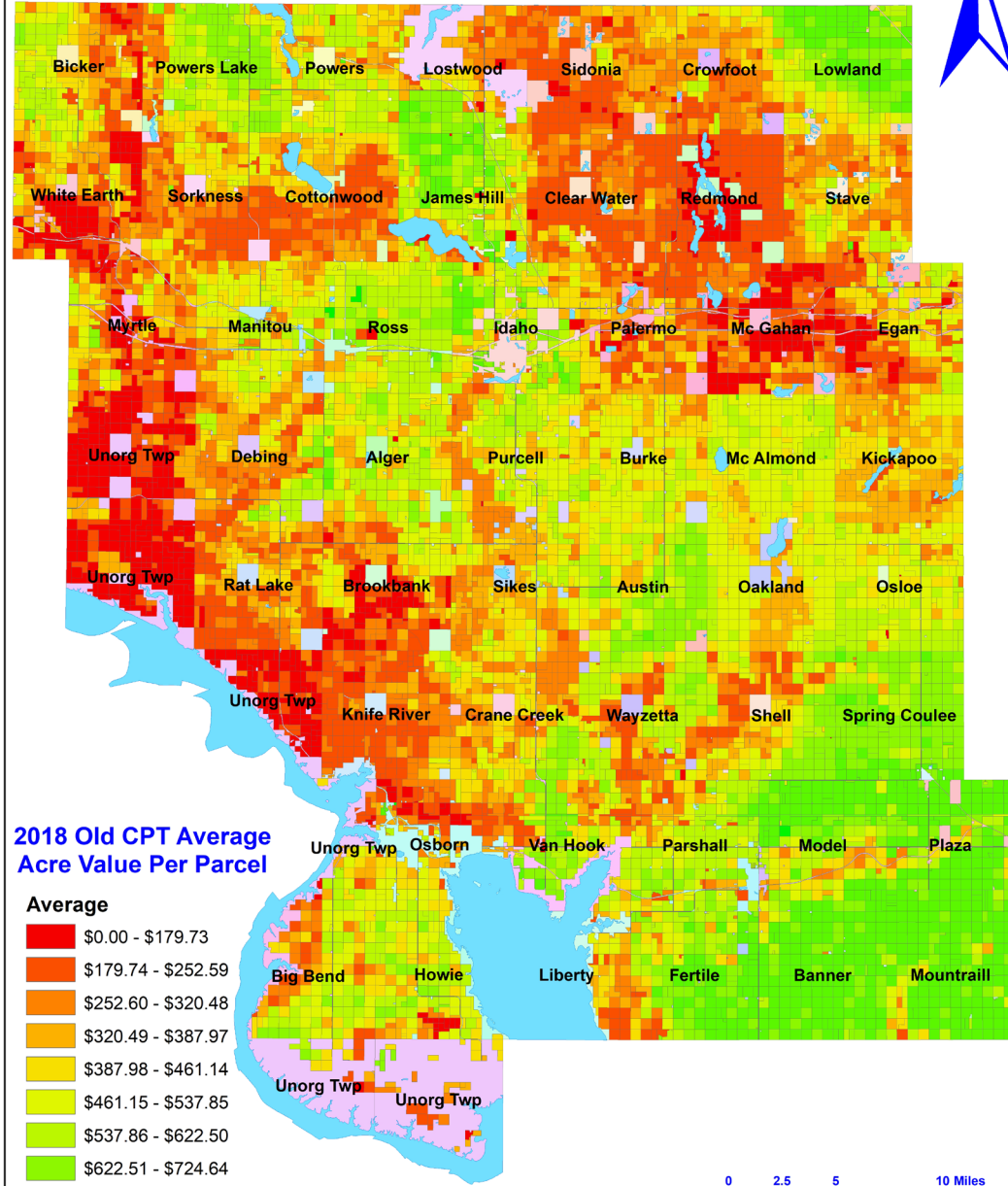
2019 Average Acre Value Per Parcel

AverageAcr

Red	\$0.00 - \$129.45
Dark Orange	\$129.46 - \$195.00
Orange	\$195.01 - \$272.50
Light Orange	\$272.51 - \$356.25
Yellow-Orange	\$356.26 - \$436.88
Yellow	\$436.88 - \$514.29
Light Green	\$514.30 - \$590.91
Green	\$590.92 - \$667.53
Light Green	\$667.54 - \$753.15
Dark Green	\$753.16 - \$906.29



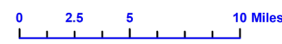
Mountrail County - Average Acre Value



2018 Old CPT Average Acre Value Per Parcel

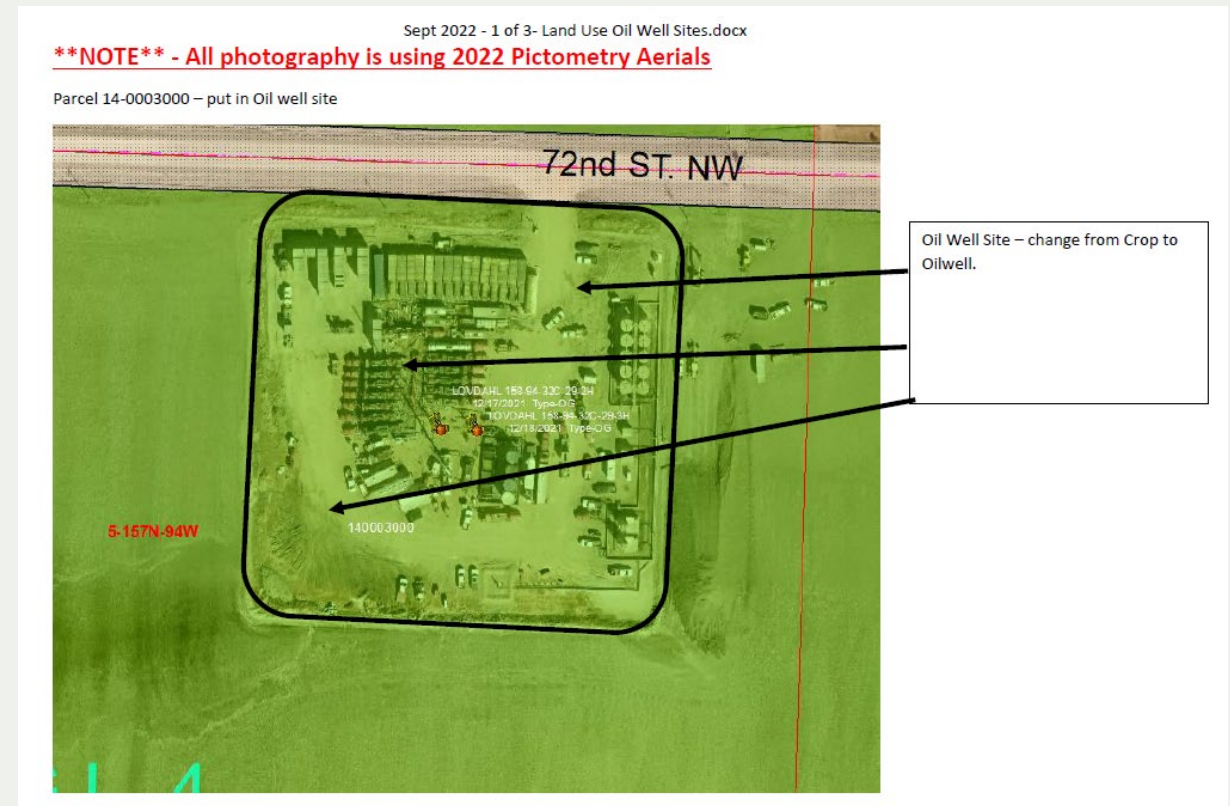
Average

Red	\$0.00 - \$179.73
Dark Orange	\$179.74 - \$252.59
Orange	\$252.60 - \$320.48
Light Orange	\$320.49 - \$387.97
Yellow-Orange	\$387.98 - \$461.14
Yellow	\$461.15 - \$537.85
Light Green	\$537.86 - \$622.50
Green	\$622.51 - \$724.64
Light Green	\$724.65 - \$1,231.88
Dark Green	\$1,231.89 - \$2,440.00



Maintaining Actual Use Layer

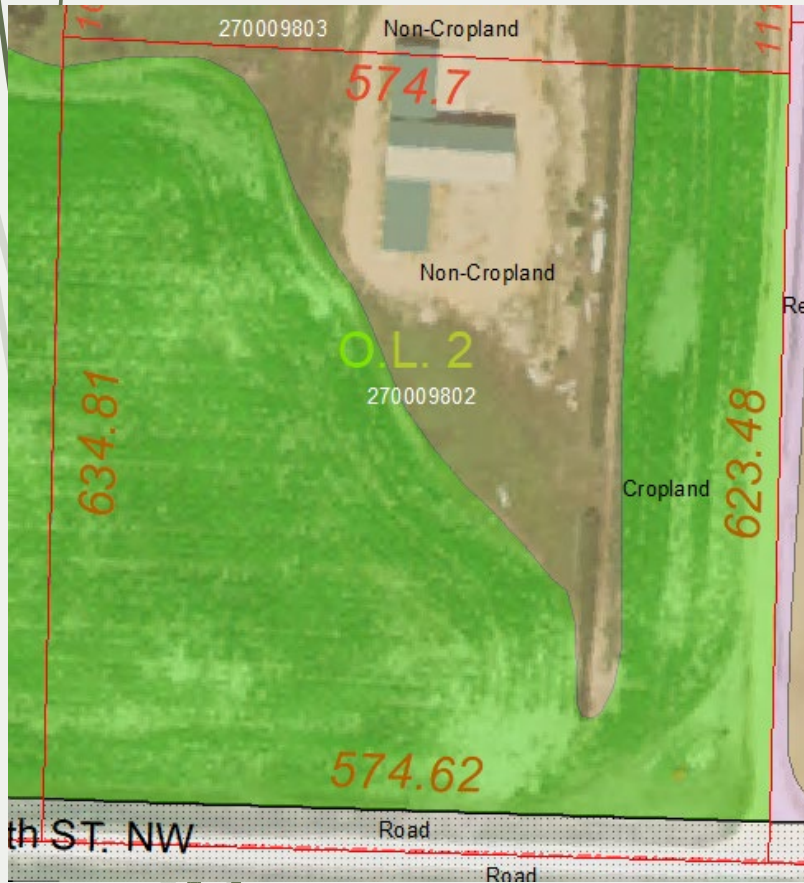
- Mountrail County uses Sidwell as GIS vendor
- Example of submittal of use change from cropland to Oil Well Site
- Your county may use in-house staff – good to have documented submittals



Maintaining Actual Use Layer

- Use Various years of Aerial Photography
- Comparison over a couple of years

2016 NAIP

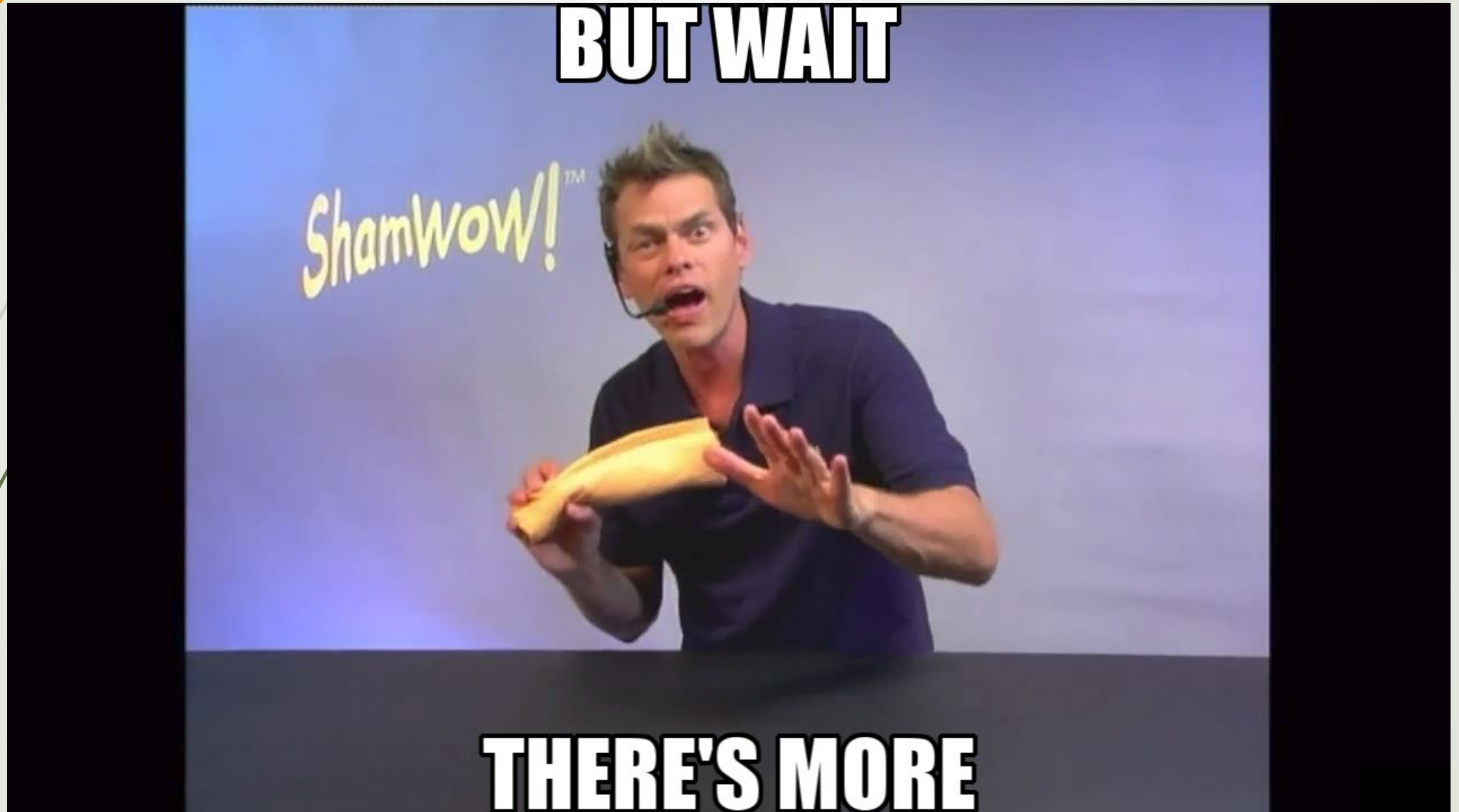


- Aerial Photography-NAIP and Pictometry
 - 2022 Aerial-NAIP
 - 2022 Pictometry NDMOUN22-ECW-AW-6INCH.ecw
 - 2022 Pictometry High-Res Mr. Sid-Regionals
 - 2021 Aerial-NAIP
 - 2020 Aerial-NAIP
 - 2019 Pictometry NDMOUN19-MOSAICS-ECW-3INCH
 - 2019 Aerial-NAIP
 - 2018 Aerial-NAIP
 - 2017 Aerial-NAIP .6 Meter
 - 2016 Aerial-NAIP
 - 2015 Aerial-NAIP
 - 2014 Aerial-NAIP
 - 2012 Aerial-NAIP
 - 2010 Aerial-NAIP
 - 2009 Aerial-NAIP_2
 - 2006 Aerial-NAIP
 - 2005 Aerial-NAIP
 - 2004 Aerial-NAIP
 - 2003 Aerial-NAIP
 - esri World Imagery
 - FSA-Imagery\AerialImage_ND_19951998
 - FSA-Imagery\AerialImage_ND_19571962

2022 High-Res



But wait...



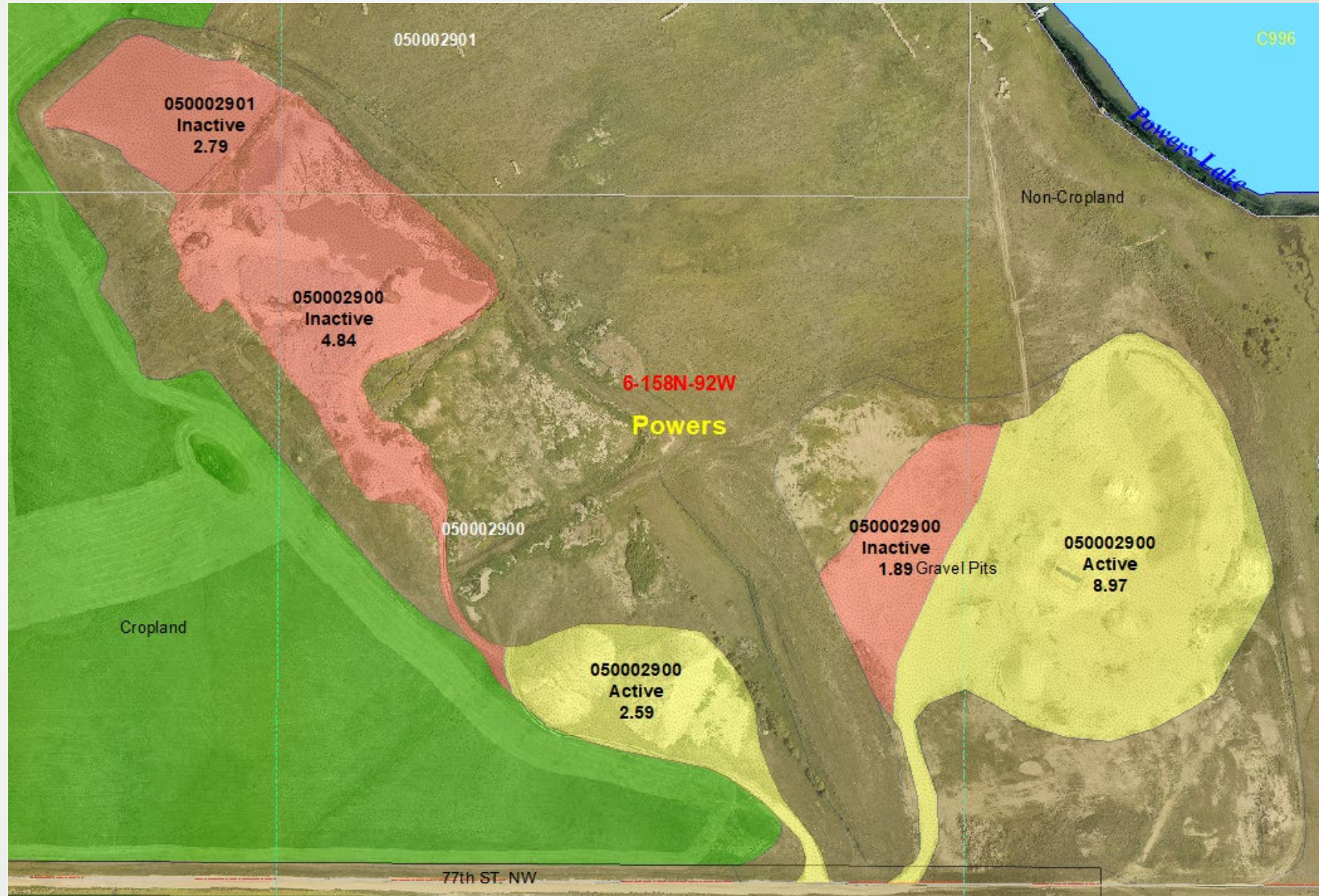
Value of GIS...

- GIS is used for many things
- “Extensible”
- “What if...?”

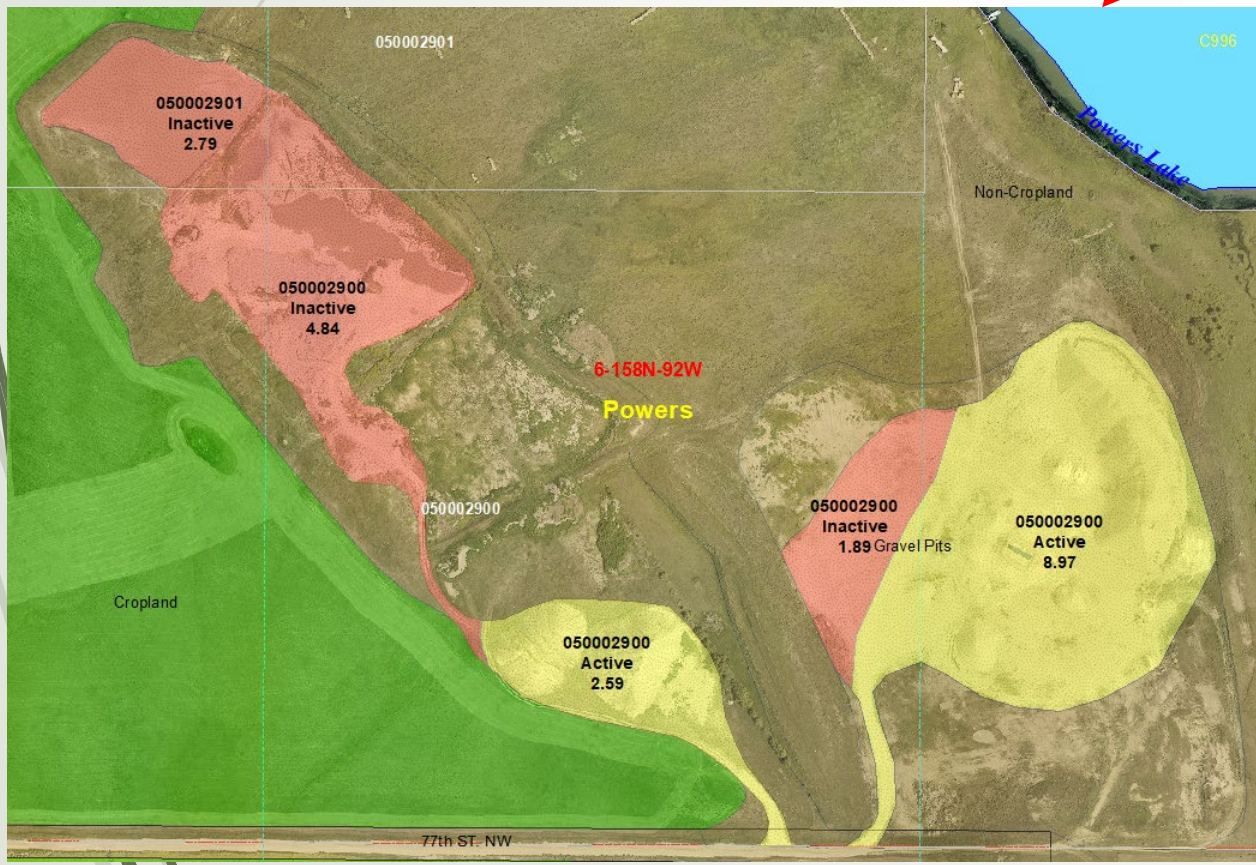
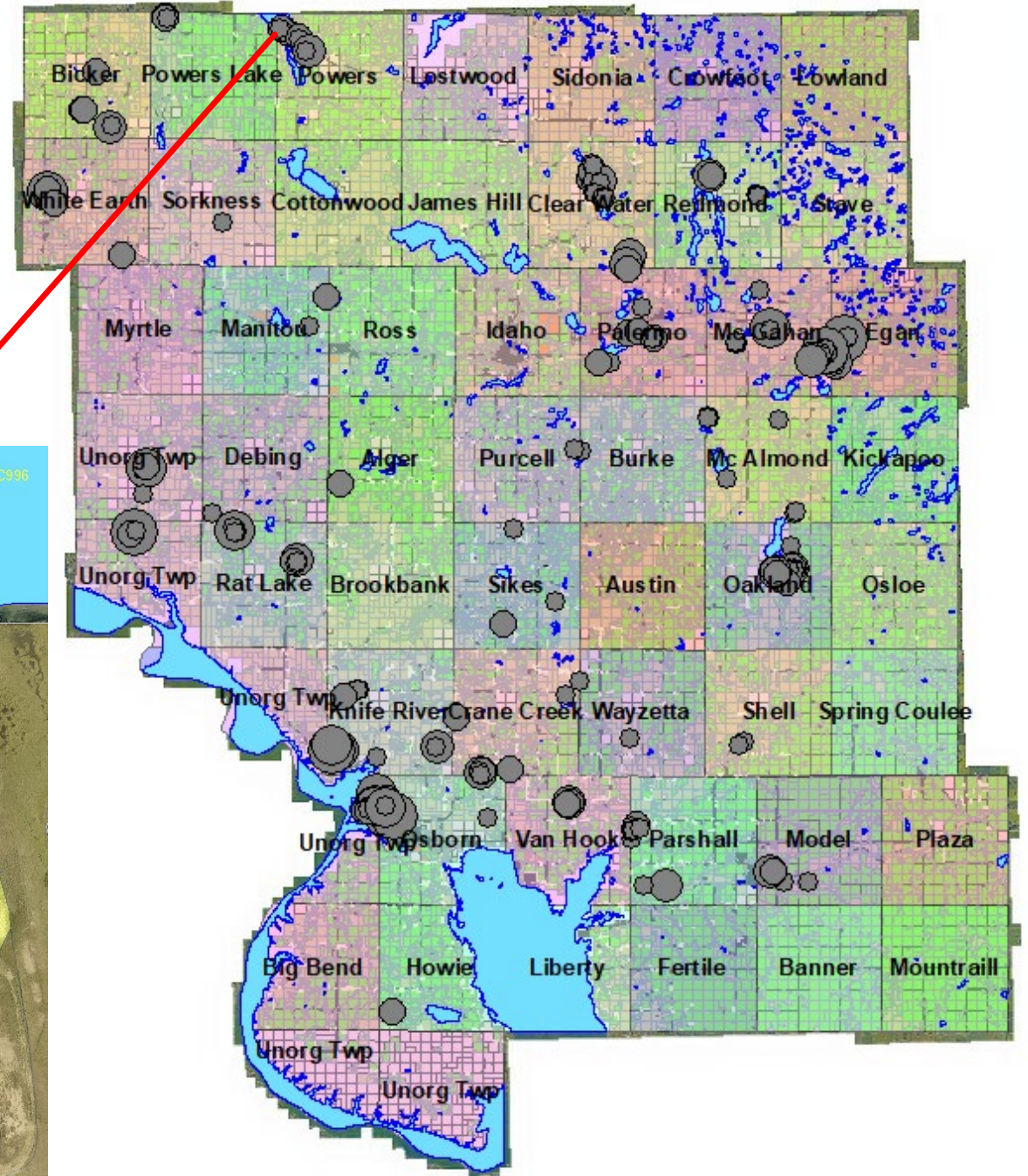


Gravel Pit Valuation

- Commercial Values
- “Active”
- “Inactive”



Gravel Pits – Where?

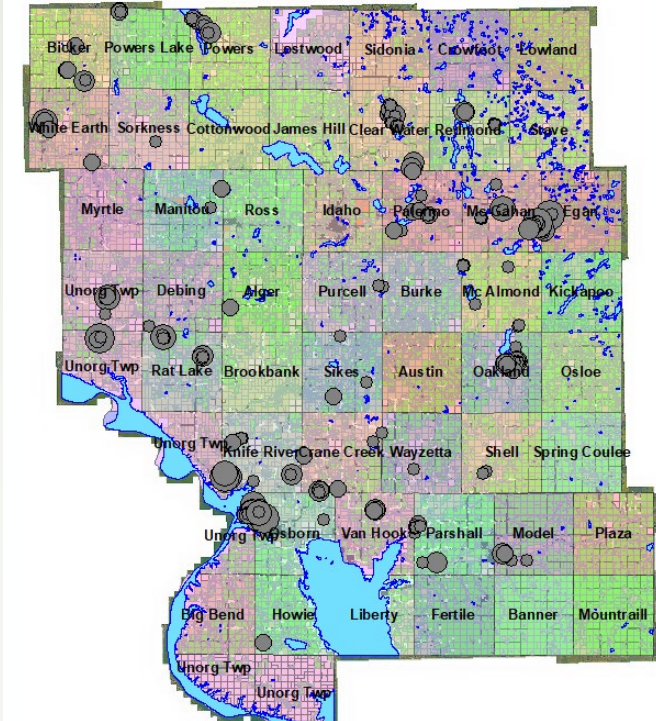


Gravel Pit Valuation

GP - ActiveOrInactive

Parcel	Activity	SHAPE_Area
340002400	Inactive	85739.16195
340002300	Inactive	36846.835202
340002300	Inactive	5377.102819
340002200	Inactive	33863.27371
340002200	Inactive	87022.767323
050002900	Active	390874.247842
050002900	Inactive	82234.015869
050002900	Inactive	210650.1509
050002900	Active	112931.066569
050004500	Active	213907.676844
050004500	Inactive	90169.244217
050004400	Active	90855.948514
050004301	Active	0.095425
050004301	Active	559929.086573
050004301	Inactive	95842.237275
070007800	Active	195192.443747
070018900	Active	591813.569584
070018900	Inactive	158190.371783
100004000	Inactive	142340.914884
100004000	Active	287262.484485
100004000	Inactive	103297.681381
100005000	Active	243211.891103
100004700	Active	52795.081943
100005000	Inactive	382401.370839
100004700	Inactive	219490.735887

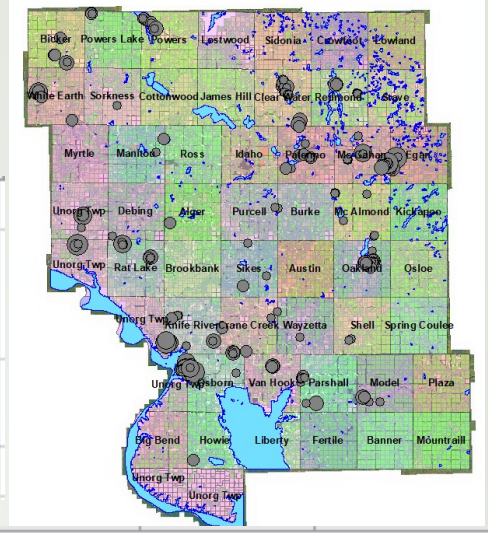
- Export Data
- Calculate Acres (SQ FT ÷ 43,560)
- Apply Active and Inactive values by Parcel based on 'Activity'
- Set up your table for using Pivot Tables
- **(Pivot Tables are your friend!)**



	A	B	C	D	E	F	G	H	I
	Parcel	ParcelNo	TWP	Activity	SHAPE_Area	Acres_Calc	Per_Acre	TotalValue	ValueRounded
1	Parcel	ParcelNo	TWP	Activity	SHAPE_Area	Acres_Calc	Per_Acre	TotalValue	ValueRounded
2	340002400	340002400	34-Rat Lake	Inactive	85739.16195	1.97	\$450	\$885.74	\$900
3	340002300	340002300	34-Rat Lake	Inactive	36846.835202	0.85	\$450	\$380.65	\$400
4	340002300	340002300	34-Rat Lake	Inactive	5377.102819	0.12	\$450	\$55.55	\$100
5	340002200	340002200	34-Rat Lake	Inactive	33863.27371	0.78	\$450	\$349.83	\$300
6	340002200	340002200	34-Rat Lake	Inactive	87022.767323	2.00	\$450	\$900.00	\$900
7	50002900	050002900	05-Powers	Active	390874.247842	8.97	\$1,500	\$13,459.86	\$13,500
8	50002900	050002900	05-Powers	Inactive	82234.015869	1.89	\$450	\$849.52	\$800
9	50002900	050002900	05-Powers	Inactive	210650.1509	4.84	\$450	\$2,176.14	\$2,200
10	50002900	050002900	05-Powers	Active	112931.066569	2.59	\$1,500	\$3,888.81	\$3,900
11	50004500	050004500	05-Powers	Active	213907.676844	4.91	\$1,500	\$7,365.97	\$7,400
12	50004500	050004500	05-Powers	Inactive	90169.244217	2.07	\$450	\$931.50	\$900
13	50004400	050004400	05-Powers	Active	90855.948514	2.09	\$1,500	\$3,128.65	\$3,100

Gravel Pit Valuation

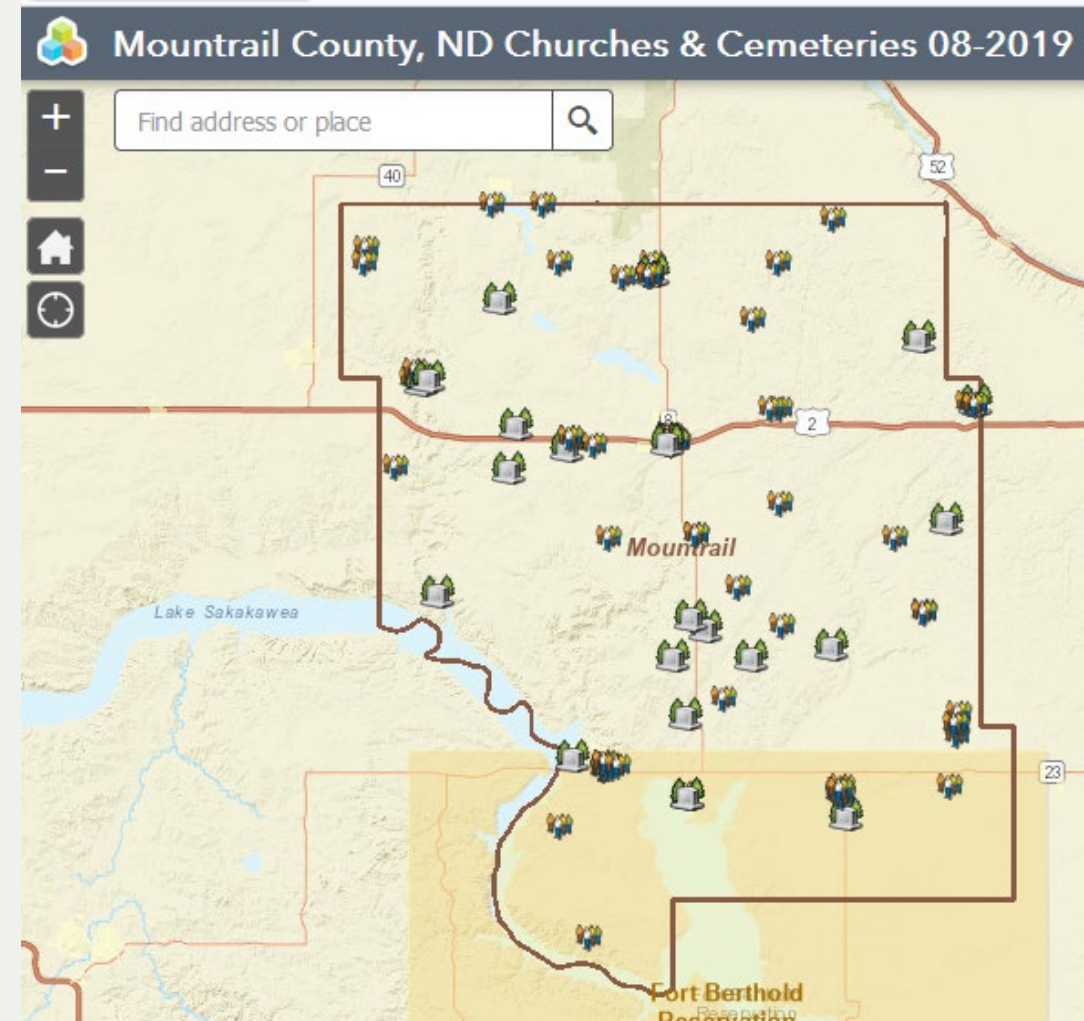
Active			Inactive			Total Sum of Acres_Calc	Total Per Acre Value	Total Value
Sum of Acres_Calc	Per Acre Value	Value	Sum of Acres_Calc	Per Acre Value	Value			
828.11	\$1,500	\$1,242,166.16	397.17	\$450	\$178,727.73	1,225.28	\$984	\$1,420,893.90



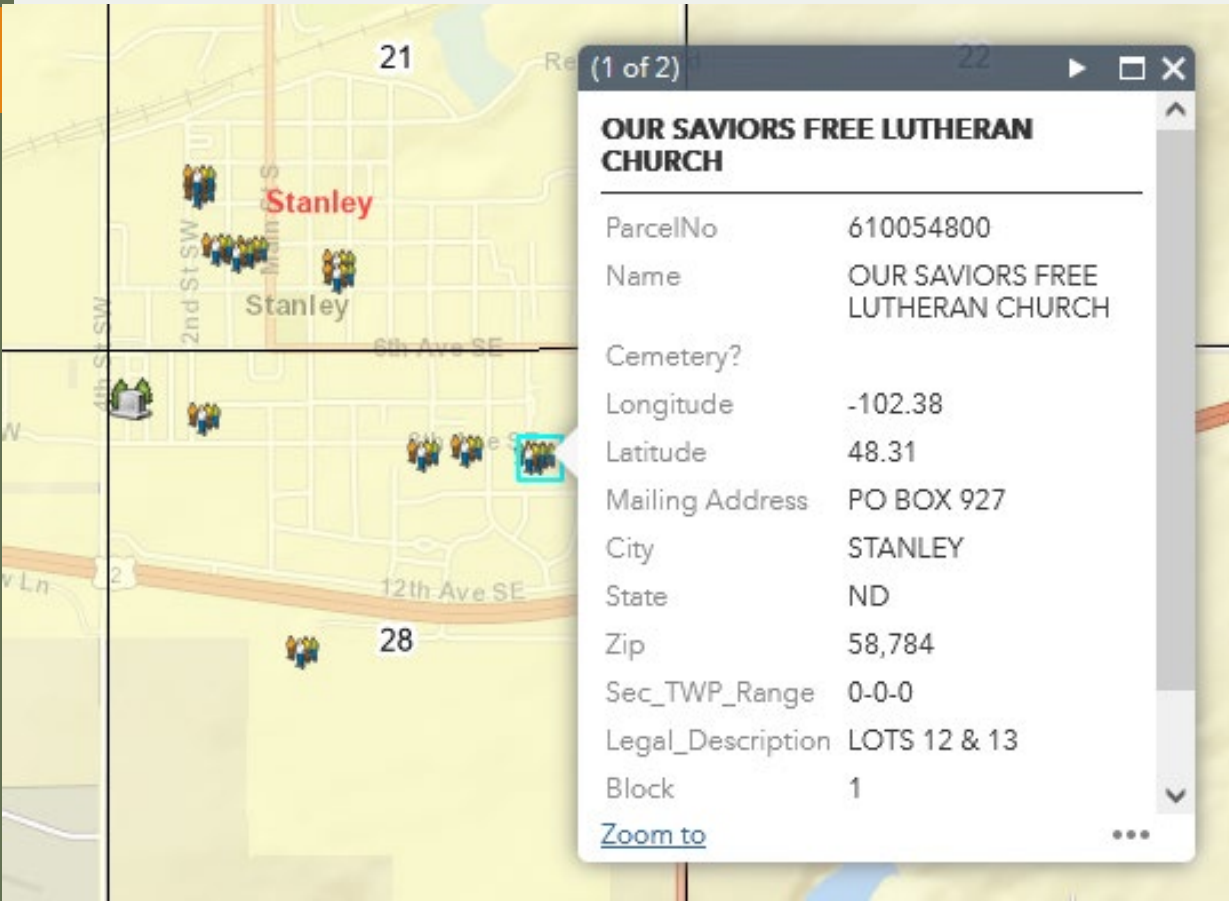
Township / Parcel	Active				Inactive				Total Sum of Acres_Calc	Total Per Acre Value	Total Value	Total Value Rounded
	Sum of Acres_Calc	Per Acre Value	Value	Value Rounded	Sum of Acres_Calc	Per Acre Value	Value	Value Rounded				
05-Powers	31.42	\$1,500	\$47,124.59	\$47,200	13.79	\$450	\$6,203.30	\$6,200	45.20	\$1,023	\$53,327.89	\$53,400
050002900	11.57	\$1,500	\$17,348.67	\$17,400	6.72	\$450	\$3,025.66	\$3,000	18.29	\$975	\$20,374.33	\$20,400
050002901					2.79	\$450	\$1,256.03	\$1,300	2.79	\$450	\$1,256.03	\$1,300
050004301	12.85	\$1,500	\$19,281.31	\$19,300	2.20	\$450	\$990.11	\$1,000	15.05	\$1,150	\$20,271.41	\$20,300
050004400	2.09	\$1,500	\$3,128.65	\$3,100					2.09	\$1,500	\$3,128.65	\$3,100
050004500	4.91	\$1,500	\$7,365.97	\$7,400	2.07	\$450	\$931.50	\$900	6.98	\$975	\$8,297.47	\$8,300
06-Powers Lake	4.45	\$1,500	\$6,678.12	\$6,600	9.61	\$450	\$4,324.38	\$4,300	14.06	\$975	\$11,002.50	\$10,900
060003100	2.50	\$1,500	\$3,748.37	\$3,700	5.54	\$450	\$2,493.02	\$2,500	8.04	\$975	\$6,241.39	\$6,200
060003105	1.95	\$1,500	\$2,929.75	\$2,900	4.07	\$450	\$1,831.36	\$1,800	6.02	\$975	\$4,761.11	\$4,700
07-Bicker	23.33	\$1,500	\$35,001.52	\$35,000	13.24	\$450	\$5,960.18	\$5,900	36.58	\$975	\$40,961.70	\$40,900
070007800	4.48	\$1,500	\$6,721.50	\$6,700					4.48	\$1,500	\$6,721.50	\$6,700
070014800	5.27	\$1,500	\$7,900.77	\$7,900	9.61	\$450	\$4,325.98	\$4,300	14.88	\$800	\$12,226.75	\$12,200
070018900	13.59	\$1,500	\$20,379.26	\$20,400	3.63	\$450	\$1,634.20	\$1,600	17.22	\$975	\$22,013.45	\$22,000
09-Redmond	6.59	\$1,500	\$9,877.55	\$9,900	12.12	\$450	\$5,453.95	\$5,500	18.70	\$870	\$15,331.50	\$15,400
090004100	3.93	\$1,500	\$5,899.03	\$5,900	11.09	\$450	\$4,992.37	\$5,000	15.03	\$975	\$10,891.40	\$10,900
090007300	2.65	\$1,500	\$3,978.52	\$4,000	1.03	\$450	\$461.58	\$500	3.68	\$800	\$4,440.10	\$4,500

How About...?

- **“Do you have a map showing churches and cemeteries in the county?”**
- We didn't, but had the data
- Pulled exempt properties from tax system – then performed “fuzzy logic” to identify parcels
- Used ArcGIS online to map based off longitude, latitude
- Sent link to requestor – satisfied a need



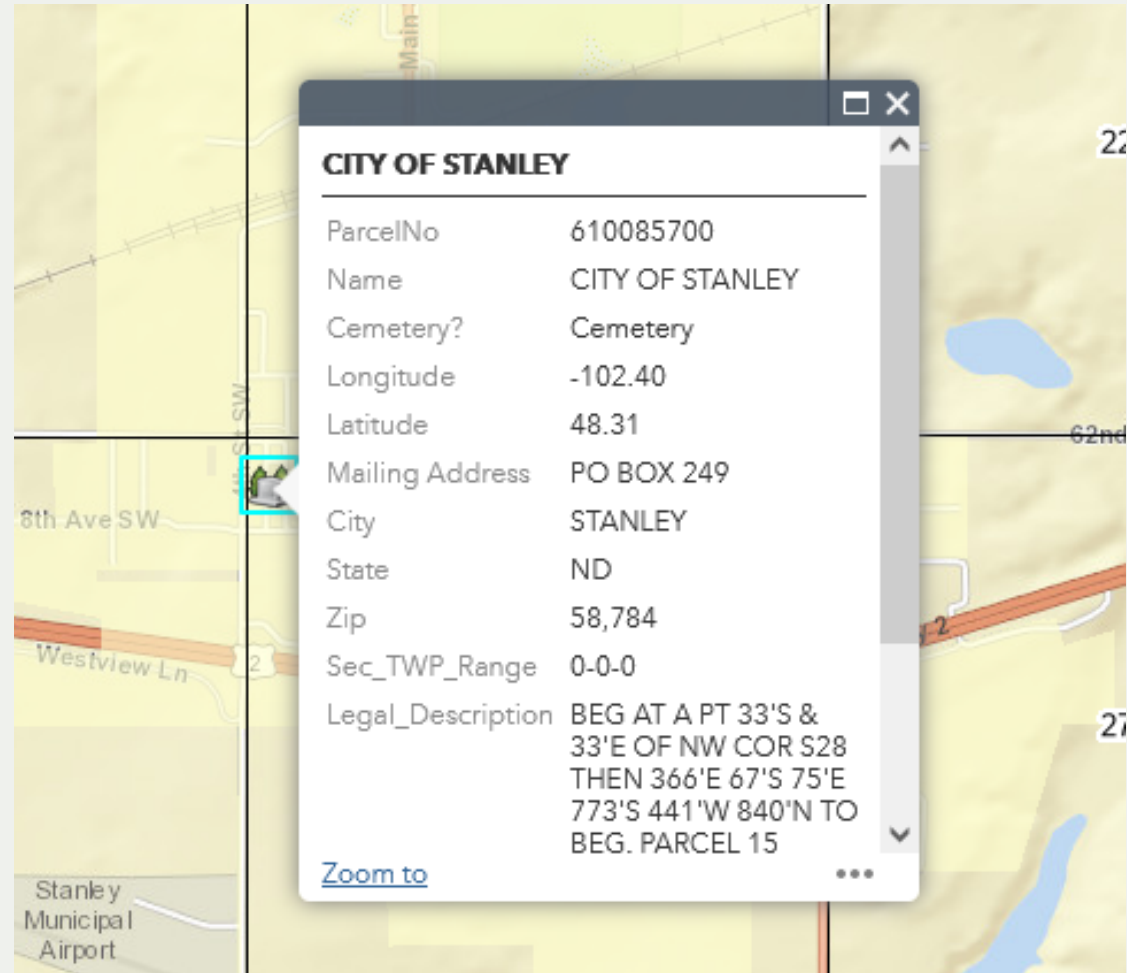
Churches and Cemeteries



A map of Stanley, North Dakota, showing several church locations marked with icons. A popup window is open over one of the churches, displaying the following information:

OUR SAVIORS FREE LUTHERAN CHURCH	
ParcelNo	610054800
Name	OUR SAVIORS FREE LUTHERAN CHURCH
Cemetery?	
Longitude	-102.38
Latitude	48.31
Mailing Address	PO BOX 927
City	STANLEY
State	ND
Zip	58,784
Sec_TWP_Range	0-0-0
Legal_Description	LOTS 12 & 13
Block	1

[Zoom to](#)



A map of Stanley, North Dakota, showing a cemetery location marked with an icon. A popup window is open over the cemetery, displaying the following information:

CITY OF STANLEY	
ParcelNo	610085700
Name	CITY OF STANLEY
Cemetery?	Cemetery
Longitude	-102.40
Latitude	48.31
Mailing Address	PO BOX 249
City	STANLEY
State	ND
Zip	58,784
Sec_TWP_Range	0-0-0
Legal_Description	BEG AT A PT 33'S & 33'E OF NW COR S28 THEN 366'E 67'S 75'E 773'S 441'W 840'N TO BEG. PARCEL 15

[Zoom to](#)

Joining Data within the GIS

- Must have a common field to join data
- Example tax data for calculating per square foot values for land valuation – mostly for Residential and Commercial properties

PclNo	Townsl	TWPCity	TWPN	RNGE	Asmt	Deede	Landv.	BldgVal	SQ_FT	SqFtVal	Lgl1
160020000	16	MCGAHAN TWP	0	0	250	0	2000	0	6000	0.33	LOTS 8 & 9
160020001	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33	
160020100	16	MCGAHAN TWP	0	0	250	0	2000	0	6000	0.33	LOTS 11 & 12
160020101	16	MCGAHAN TWP	0	0	201	0	7300	57100	12000	0.61	LOTS 13 THRU 16
160020300	16	MCGAHAN TWP	0	0	250	0	1000	0	2750	0.36	
160020400	16	MCGAHAN TWP	0	0	250	0	500	0	1375	0.36	N1/2 LOT 2
160020900	16	MCGAHAN TWP	0	0	250	0	2000	0	5500	0.36	LOTS 6 & 7
160021000	16	MCGAHAN TWP	0	0	201	0	3000	39600	2750	1.09	LOTS 8, 9, AND 10
160021300	16	MCGAHAN TWP	0	0	250	0	1000	0	2750	0.36	
160021400	16	MCGAHAN TWP	0	0	250	0	1000	0	2750	0.36	
160021700	16	MCGAHAN TWP	0	0	201	0	5300	7600	6000	0.88	
160021800	16	MCGAHAN TWP	0	0	250	0	2000	0	6000	0.33	
160021900	16	MCGAHAN TWP	0	0	250	0	2000	0	6000	0.33	
160022000	16	MCGAHAN TWP	0	0	250	0	2000	0	6000	0.33	
160022501	16	MCGAHAN TWP	0	0	250	0	2000	0	3000	0.67	
160022600	16	MCGAHAN TWP	0	0	250	0	1000	0	2750	0.36	
160022700	16	MCGAHAN TWP	0	0	201	0	9300	32100	2750	3.38	BLK4 LOTS 2 THROUGH 7 COMBINED
160023300	16	MCGAHAN TWP	0	0	233	0	6000	5100	5500	1.09	LOT 8 & 9
160023400	16	MCGAHAN TWP	0	0	250	0	1000	0	2750	0.36	
160023500	16	MCGAHAN TWP	0	0	250	0	1000	0	2750	0.36	

Joining Data within the GIS

Join Data

Join lets you append additional data to this layer's attribute table so you can, for example, symbolize the layer's features using this data.

What do you want to join to this layer?

Join attributes from a table

1. Choose the field in this layer that the join will be based on:
PIN
2. Choose the table to join to this layer, or load the table from disk:
GISLotVals\$
3. Choose the field in the table to base the join on:
PclNo

Join Options

Keep all records
All records in the target table are shown in the resulting table. Unmatched records will contain null values for all fields being appended into the target table from the join table.

Keep only matching records
If a record in the target table doesn't have a match in the join table, that record is removed from the resulting target table.

Validate Join

[About joining data](#) OK Cancel

	PclNo	Townsl	TWPCity	TWPN	RNGE	Asmt	Deede	Landv	BldgVal
2	160020000	16	MCGAHAN TWP	0	0	250	0	2000	0
3	160020001	16	MCGAHAN TWP	0	0	250	0	1000	0
4	160020100	16	MCGAHAN TWP	0	0	250	0	2000	0
5	160020101	16	MCGAHAN TWP	0	0	201	0	7300	57100
7	160020300	16	MCGAHAN TWP	0	0	250	0	1000	0
8	160020400	16	MCGAHAN TWP	0	0	250	0	500	0
3	160020900	16	MCGAHAN TWP	0	0	250	0	2000	0
4	160021000	16	MCGAHAN TWP	0	0	201	0	3000	39600
5	160021300	16	MCGAHAN TWP	0	0	250	0	1000	0
6	160021400	16	MCGAHAN TWP	0	0	250	0	1000	0
9	160021700	16	MCGAHAN TWP	0	0	201	0	5300	76000
0	160021800	16	MCGAHAN TWP	0	0	250	0	2000	0
1	160021900	16	MCGAHAN TWP	0	0	250	0	2000	0
2	160022000	16	MCGAHAN TWP	0	0	250	0	2000	0
8	160022501	16	MCGAHAN TWP	0	0	250	0	2000	0
9	160022600	16	MCGAHAN TWP	0	0	250	0	1000	0
0	160022700	16	MCGAHAN TWP	0	0	201	0	9300	32100
1	160023300	16	MCGAHAN TWP	0	0	233	0	6000	51000
2	160023400	16	MCGAHAN TWP	0	0	250	0	1000	0
3	160023500	16	MCGAHAN TWP	0	0	250	0	1000	0

Joining Data within the GIS

LotVals-No Labels

FID	Shape *	OID	PIN	Acreage	ALTPin	PUID	SOURCE	REF_DOC	TWP	SECTION_	RANGE	GIS_ACRES	SP_UPDATE	NOTES	OldAcre	GlobalID	ParcelID	Shape_Leng	Shape_Area	PcIno	T
8123	Polygon		160017703	0	160017703							0	<Null>		0	{D340579C-1AB4-4608-BEA9-1BD19F504250}	0	15801.953712	6875485.86209	160017703	
8120	Polygon		160017704	0	160017704							0	<Null>		0	{7E602EA9-D9DF-461A-98DC-5D4B9394BC51}	0	10577.752398	6993009.87963	160017704	
10612	Polygon		160018000	0	160018000							0	<Null>		0	{024BF246-090B-40F7-9644-B9CE53DC3ADF}	0	413.661107	7330.514385	160018000	
10607	Polygon		160018100	0	160018100							0	<Null>		0	{2AB6877E-F0F8-4D28-AA86-8C6F41B56392}	0	388.511853	8996.769772	160018100	
10588	Polygon		160018400	0	160018400							0	<Null>		0	{E17DF8FC-C8A4-4B89-80E7-93BEB842A143}	0	289.999917	2999.992501	160018400	
10583	Polygon		160018500	0	160018500							0	<Null>		0	{78EEE5F1-8DC3-4B5F-9CD0-987566B2674E}	0	290.000057	3000.004706	160018500	
10579	Polygon		160018600	0	160018600							0	<Null>		0	{2E48CAD7-DF93-45F2-866F-117421A8F828}	0	289.999917	3000.000115	160018600	
10572	Polygon		160018700	0	160018700							0	<Null>		0	{BED86267-7860-4A67-90AE-DB6C70CEC84F}	0	290.000036	3000.000644	160018700	
10568	Polygon		160018800	0	160018800							0	<Null>		0	{FED9CAB8-10A8-4696-935C-3A3791970258}	0	290.000056	2999.998058	160018800	
10564	Polygon		160018900	0	160018900							0	<Null>		0	{B76BFBAE-47BA-4DD9-BB9D-7069D15C69EF}	0	290.000077	3000.002119	160018900	
10562	Polygon		160019000	0	160019000							0	<Null>		0	{FE3A6F41-FFE5-4A61-8B5A-F2216A20AD8F}	0	290.000056	3000.004705	160019000	
10555	Polygon		160019100	0	160019100							0	<Null>		0	{490E4D39-5D98-49E4-8BFD-105628591747}	0	289.999756	2999.990498	160019100	
10552	Polygon		160019200	0	160019200							0	<Null>		0	{16BC8ABE-20BC-46C2-96CA-5886A3EDF3D9}	0	290.000056	3000.004706	160019200	
10547	Polygon		160019300	0	160019300							0	<Null>		0	{2F8FF258-A405-4FCF-944F-4FF4E7B9EF30}	0	290.000077	3000.002118	160019300	
10545	Polygon		160019400	0	160019400							0	<Null>		0	{BE821E7C-F6C9-43DE-B9B4-4AF571D4A8E6}	0	290.000056	2999.998058	160019400	
10530	Polygon		160019490	0	160019490							0	<Null>		0	{CE252E14-ECB3-472C-9059-E6D1B48F89AF}	0	339.999921	5999.997207	160019490	
10520	Polygon		160019500	0	160019500							0	<Null>		0	{96257D6D-84D2-491B-91D1-C7442067F1DE}	0	290.000077	3000.002118	160019500	
10516	Polygon		160019600	0	160019600							0	<Null>		0	{CBF9E841-EB68-4569-A53B-500459B104B0}	0	290.000057	3000.004706	160019600	
10510	Polygon		160019700	0	160019700							0	<Null>		0	{14C93D48-103C-41CF-B625-FF5595CD2587}	0	289.999756	2999.990498	160019700	
10495	Polygon		160019900	0	160019900							0	<Null>		0	{E8B65B11-B5DC-4F9C-95EE-B50EE55A78D0}	0	340.000081	6000.006824	160019900	
10490	Polygon		160020000	0	160020000							0	<Null>		0	{A6D09C87-4DA4-41E1-97EF-3E87E3EB7A38}	0	339.999941	5999.996115	160020000	
10472	Polygon		160020001	0	160020001							0	<Null>		0	{2E368C7E-43C1-4949-A589-074982E0209A}	0	290.000056	3000.004705	160020001	

LotVals-No Labels

















ParcelID	Shape_Leng	Shape_Area	PcIno	Township	TWPCity	TWPNO	RNGE	Asmt	Deeded	Landval	BldgVal	SQ_FT	SqFtVal	Lgl1	Lgl2	Lgl3
0	15801.953712	6875485.8620	160017703	16	MCGAHAN TWP	156	89	900	157.48	0	0	0	0	SW		
0	10577.752398	6993009.8796	160017704	16	MCGAHAN TWP	156	89	900	160	0	0	0	0	SE 160.00 ACRES		
0	413.661107	7330.51438	160018000	16	MCGAHAN TWP	0	0	250	0	1500	0	7425	0.2	LOTS 1 & 2 & 3		
0	388.511853	8996.76977	160018100	16	MCGAHAN TWP	0	0	201	0	6300	29600	3000	2.1	BLOCK 1 LOTS 4, 5, & 6		
0	289.999917	2999.99250	160018400	16	MCGAHAN TWP	0	0	201	0	4300	200	3000	1.43			
0	290.000057	3000.00470	160018500	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	289.999917	3000.00011	160018600	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	290.000036	3000.00064	160018700	16	MCGAHAN TWP	0	0	201	0	1000	100	3000	0.33			
0	290.000056	2999.99805	160018800	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	290.000077	3000.00211	160018900	16	MCGAHAN TWP	0	0	250	0	2000	0	3000	0.67			
0	290.000056	3000.00470	160019000	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	289.999756	2999.99049	160019100	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	290.000056	3000.00470	160019200	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	290.000077	3000.00211	160019300	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	290.000056	2999.99805	160019400	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			
0	339.999921	5999.99720	160019490	16	MCGAHAN TWP	0	0	201	0	2000	900	0	0	LOT 2		
0	290.000077	3000.00211	160019500	16	MCGAHAN TWP	0	0	250	0	1000	0	3000	0.33			

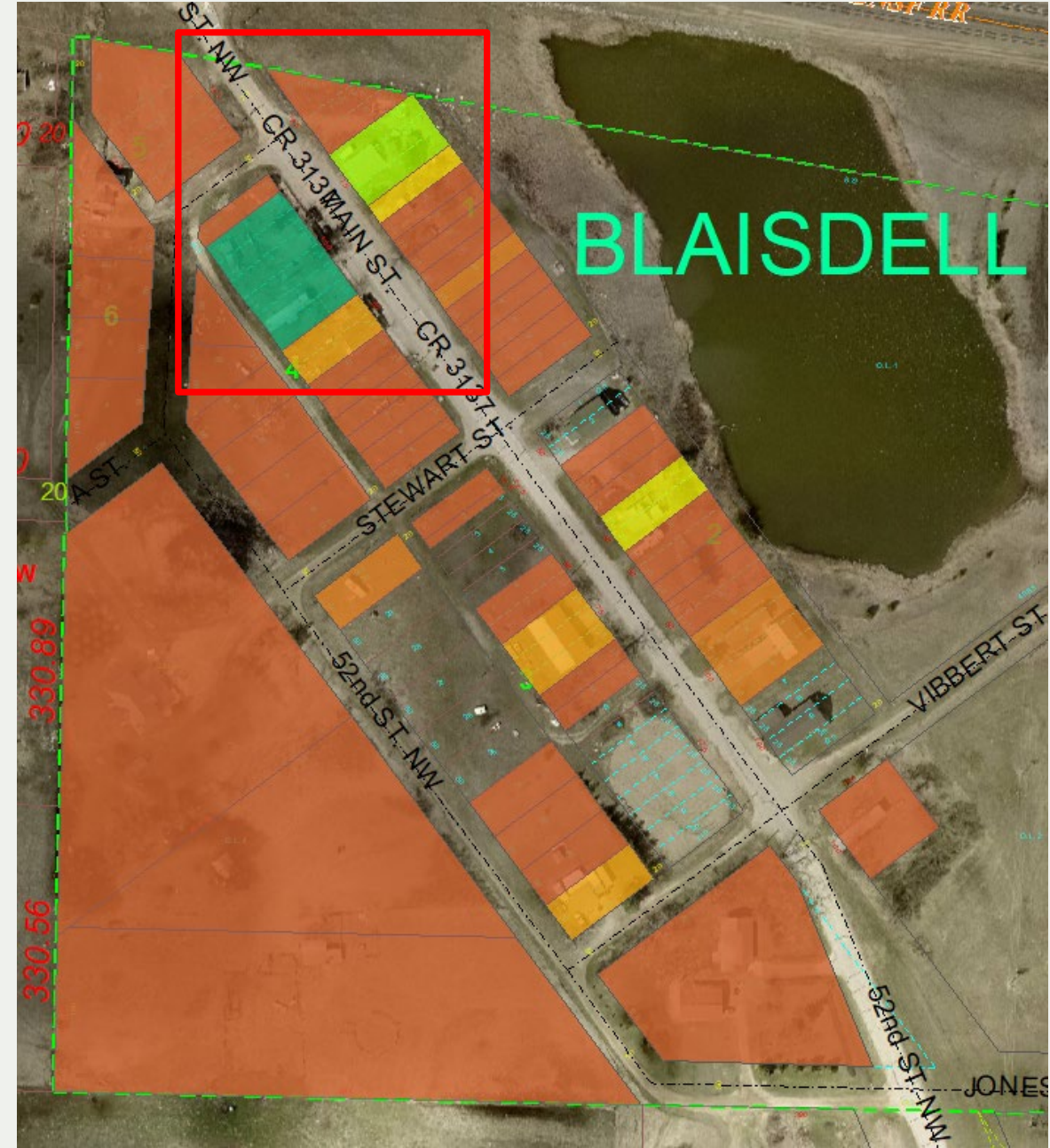
Joining Data within the GIS

- Per SQ FT value
- Adjust Symbology

LotVals-No Labels

SqFtVal

	\$0.00
	\$0.01 - \$0.51
	\$0.52 - \$0.84
	\$0.85 - \$1.15
	\$1.16 - \$1.38
	\$1.39 - \$1.71
	\$1.72 - \$2.04
	\$2.05 - \$2.36
	\$2.37 - \$2.69
	\$2.70 - \$2.93
	\$2.94 - \$3.15
	\$3.16 - \$4.17
	\$4.18 - \$6.67
	\$6.68 - \$15.62
	\$15.63 - \$32.50
	\$32.51 - \$317.36



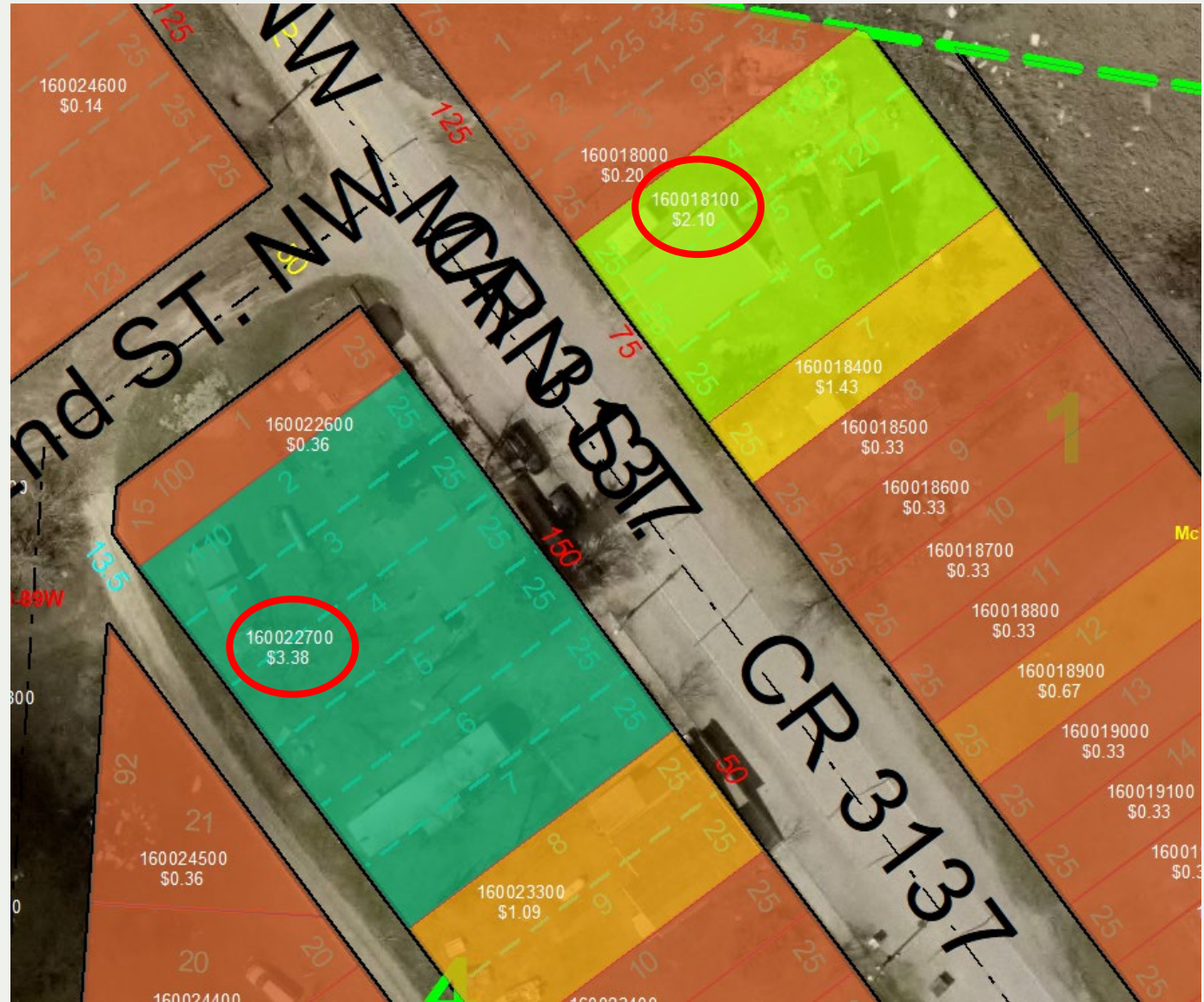
Joining Data within the GIS

- Per SQ FT value
- Adjust Symbology

LotVals-Labels

SqFtVal

□	\$0.00
■	\$0.01 - \$0.51
■	\$0.52 - \$0.84
■	\$0.85 - \$1.15
■	\$1.16 - \$1.38
■	\$1.39 - \$1.71
■	\$1.72 - \$2.04
■	\$2.05 - \$2.36
■	\$2.37 - \$2.69
■	\$2.70 - \$2.93
■	\$2.94 - \$3.15
■	\$3.16 - \$4.17
■	\$4.18 - \$6.67
■	\$6.68 - \$15.62
■	\$15.63 - \$32.50
■	\$32.51 - \$317.36





Other GIS Mapping Uses

In-House GIS work for assessing

Visualizing Property Types

All Assmt Codes-Colors Only

<all other values>

AsmtCode

0

101-Ag Land

201-Residential

233-Commercial

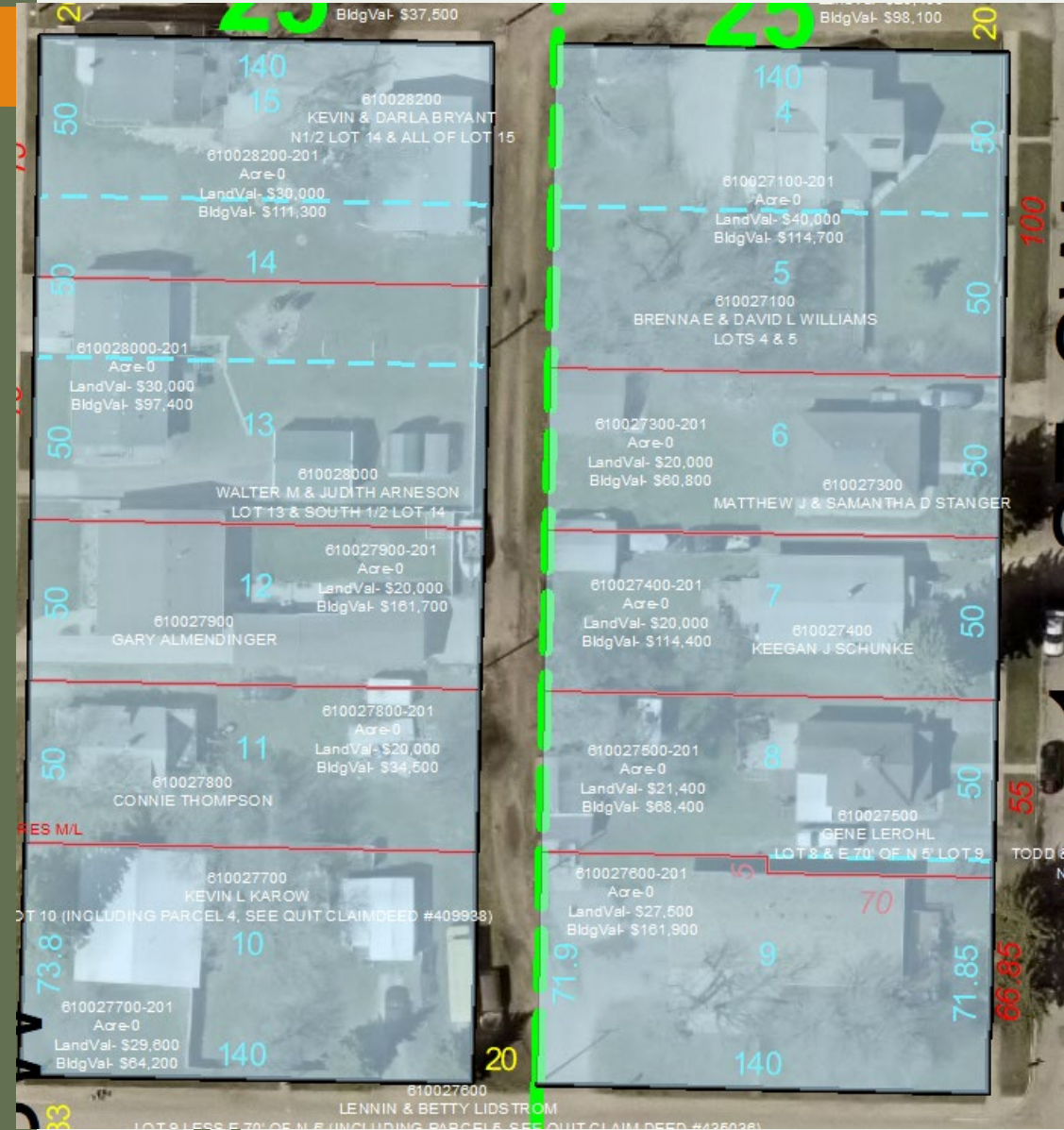
250-Vacant

900-Exempt



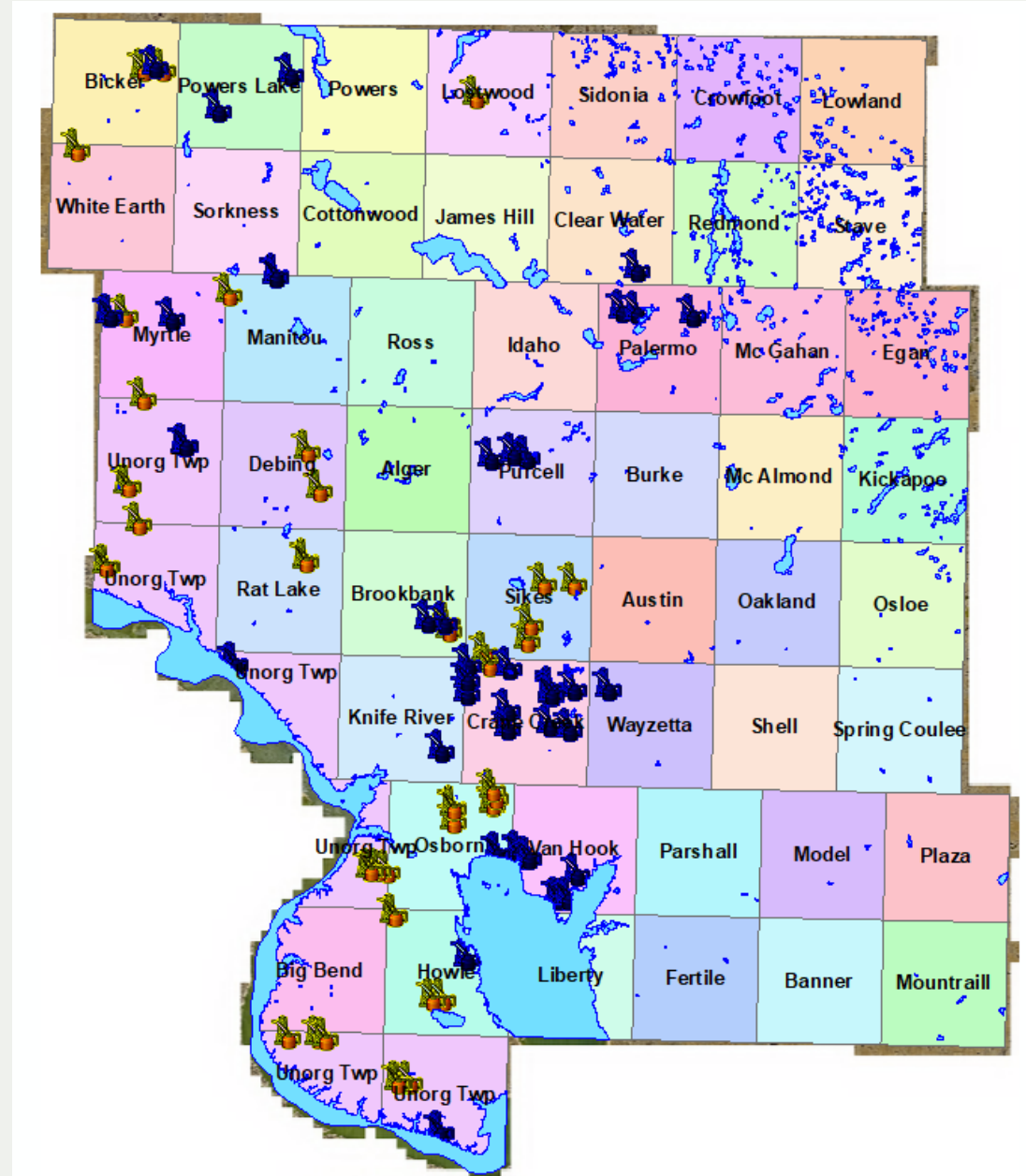
Valuation Information

- All Assmt Codes-Colors Only
- <all other values>
- AsmtCode
- 0
- 101-Ag Land
- 201-Residential
- 233-Commercial
- 250-Vacant
- 900-Exempt



Using Annual Aerial Photography

- Example – Oil Well Sites
- Received 2022 high-res aerals in June 2022 (flown in April – around blizzards)
- Actual Land Use Layer turned on
- Used ND Oil & Gas shapefiles for review
- 2021 & 2022 spud dates
 - **Blue – 2022**
 - **Yellow - 2021**
- Mapped those on in-house GIS
- Result – targeted sites for review
- Zoom in on an area

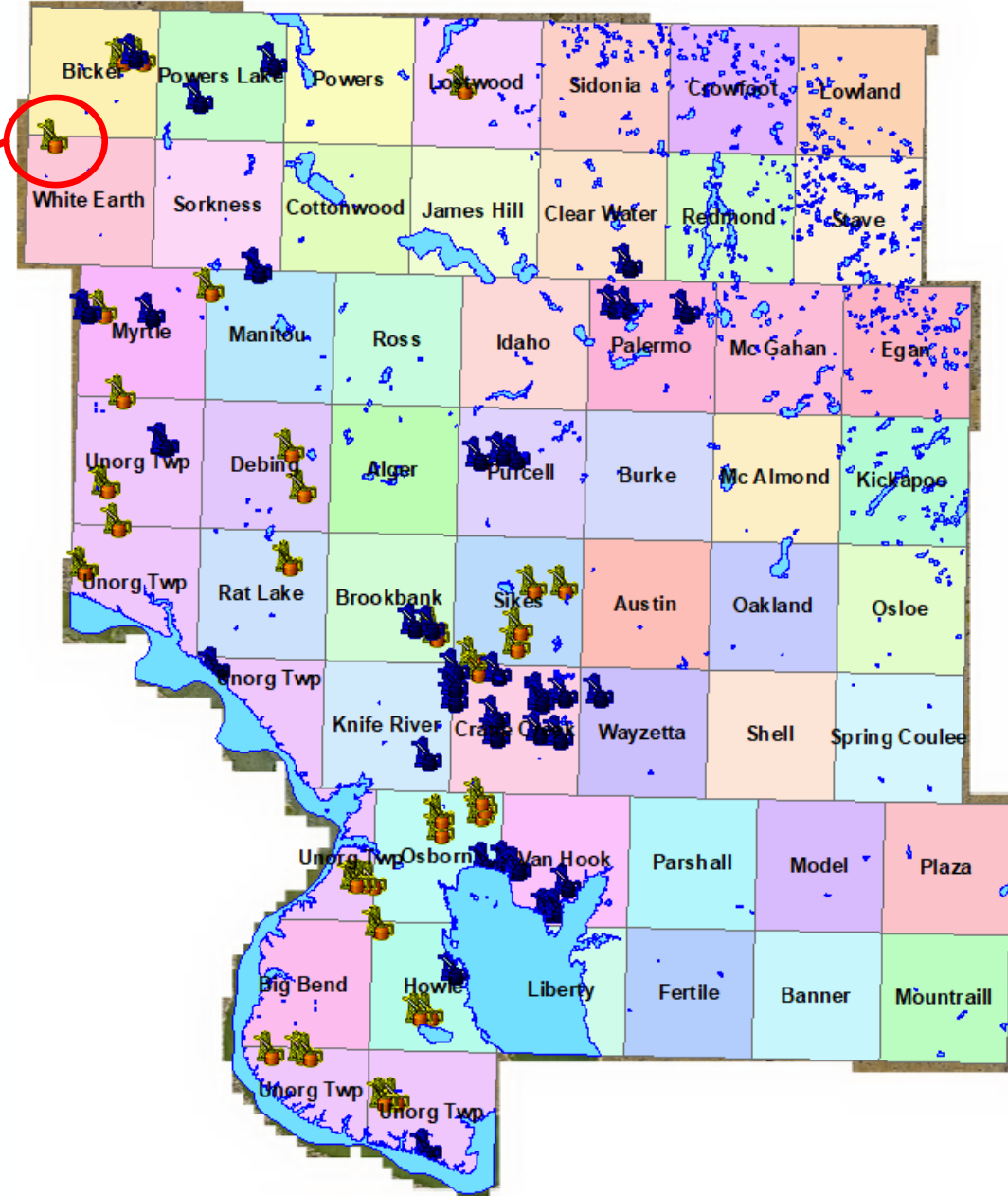
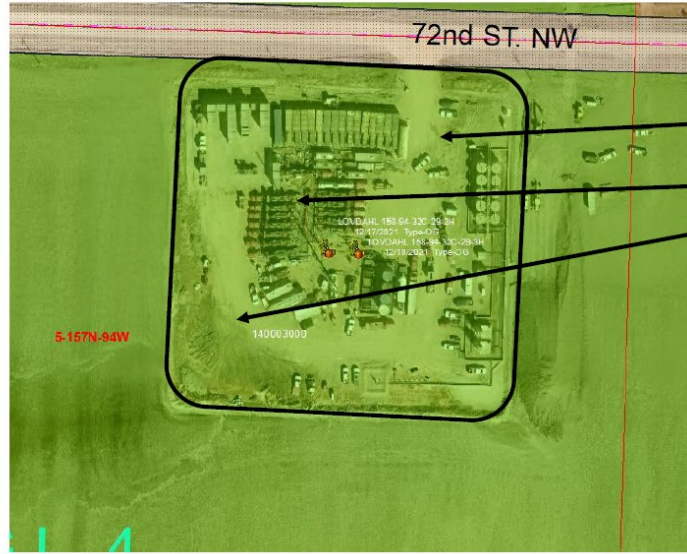


Comparing 2022 high res to Land Use Layer

Sept 2022 - 1 of 3- Land Use Oil Well Sites.docx

****NOTE** - All photography is using 2022 Pictometry Aerials**

Parcel 14-0003000 - put in Oil well site



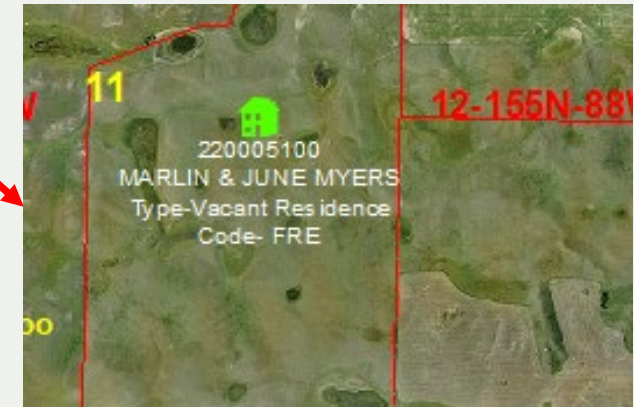
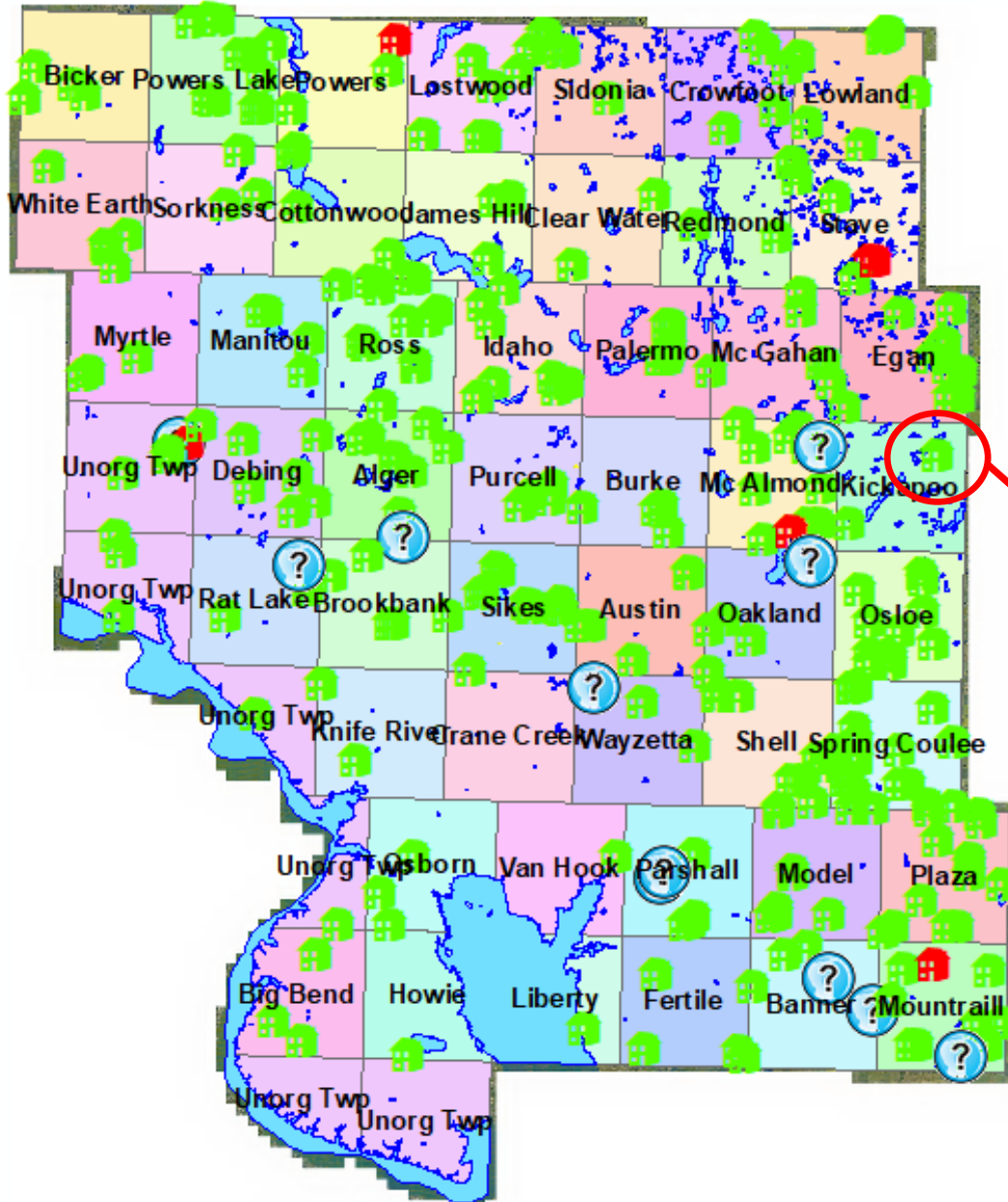


A Few More Quick Examples

Using Joins to Spreadsheet Data

Farm Residence Exemptions

- Farm Residence Exemptions (Group)
- 2022_Farm_Residence_Tracking
- 2021_Farm_Residence_Tracking
- 2020_Farm_Residence_Tracking
- 2019_Farm_Residence_Tracking
- 2018_Farm_Residence_Tracking



Who are the Township Assessors?

Assessor - Townships (zoom out)

<all other values>

Assessor

Bryan G.

Dorothy

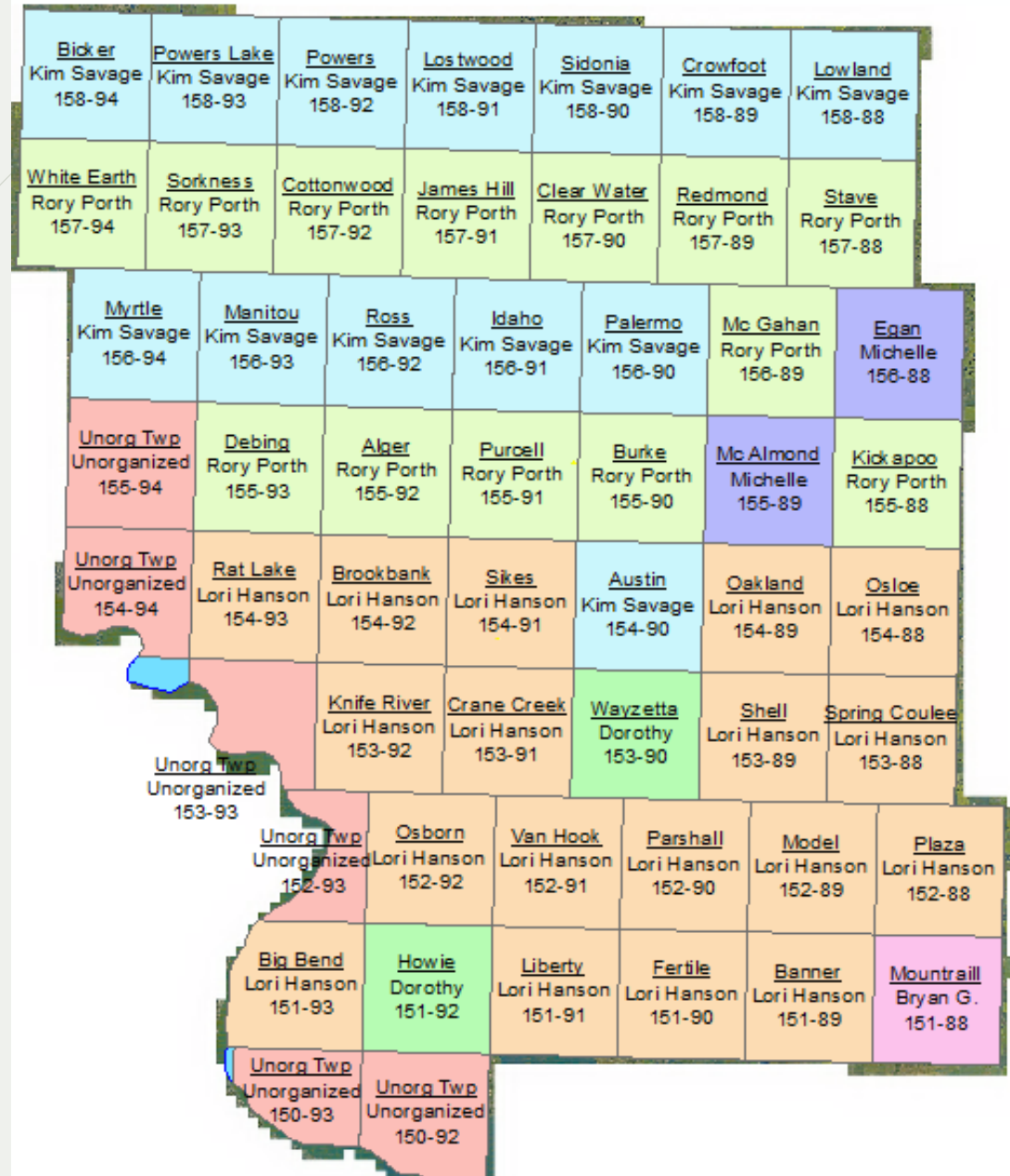
Kim Savage

Lori Hanson

Michelle

Rory Porth

Unorganized



Building Permits

Building Permits 2020-2022

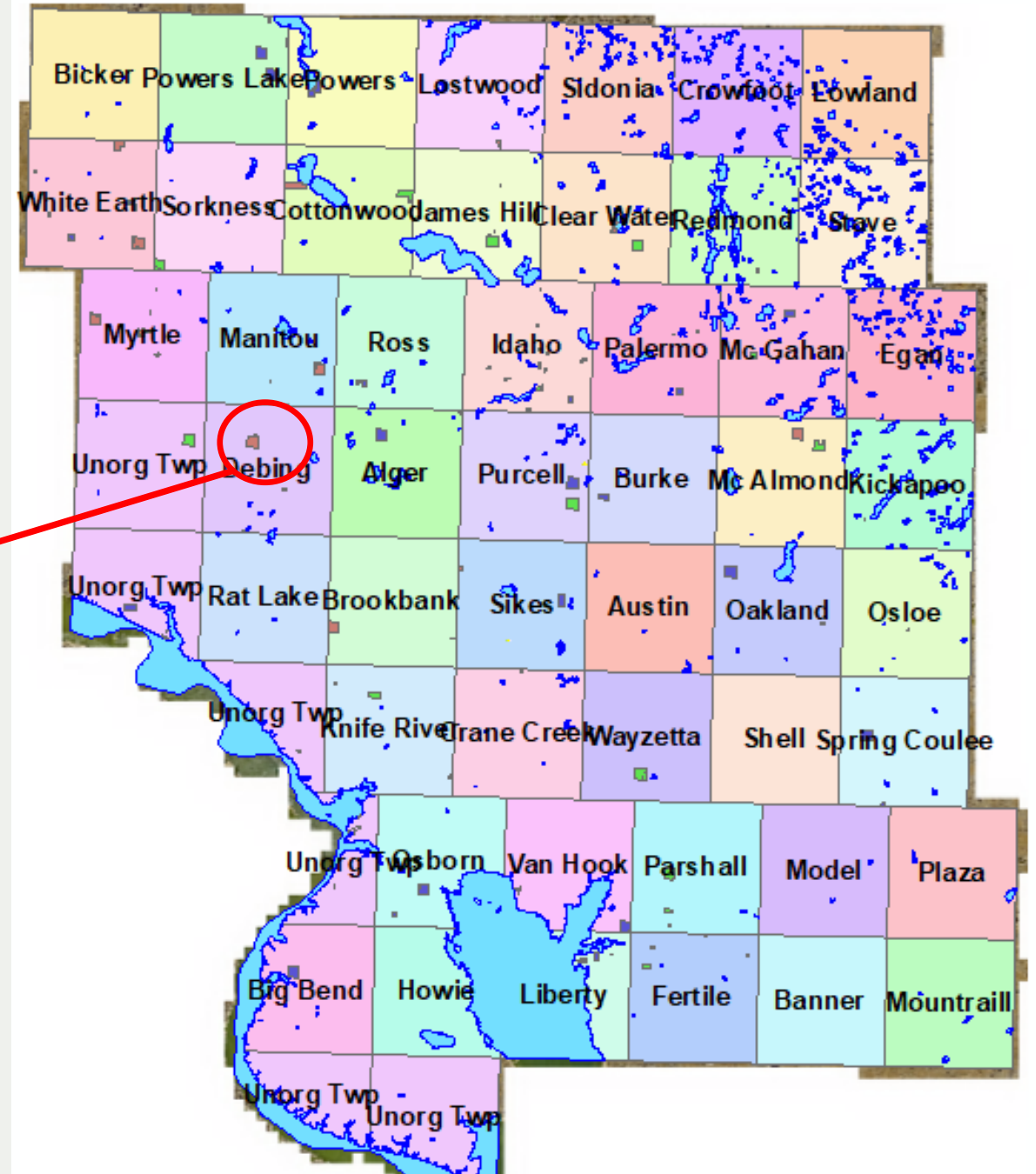
<all other values>

PMTYear

2020

2021

2022



Assessor Valuations – Ag Land

CPT August 2023 Values

Owner Name Legal

AgLand_Avg Acre

101_Ag Land Value



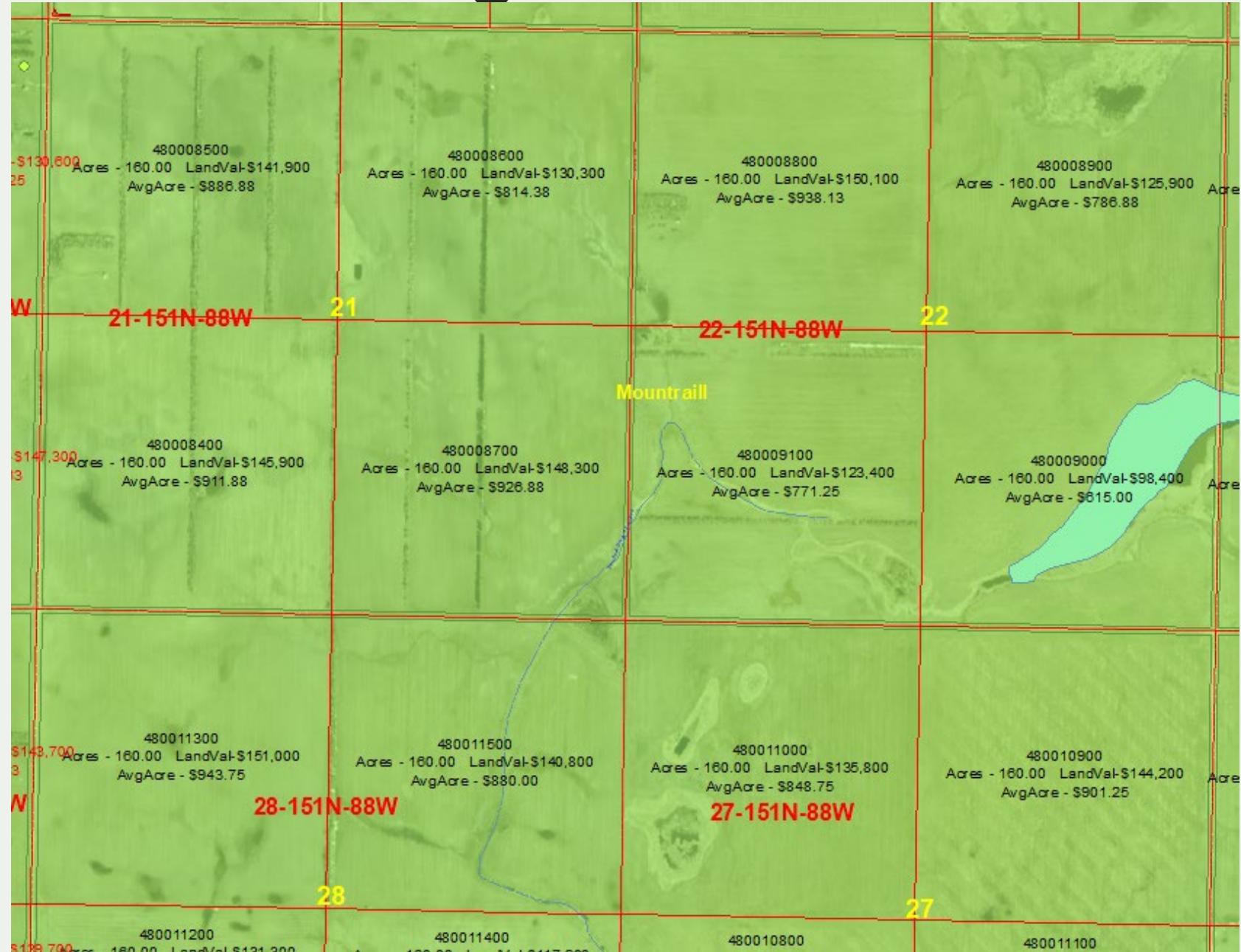
201_Residence - Acre & LandVal

233_Commercial_Value

250_Vacant Value

900_Exempt - Acres

All Assmt Codes-Colors Only



Tax Valuation

CPT August 2023 Values

Owner Name Legal

AgLand_Avg Acre

101_Ag Land Value



201_Residence - Acre & LandVal



233_Commercial_Value



250_Vacant Value

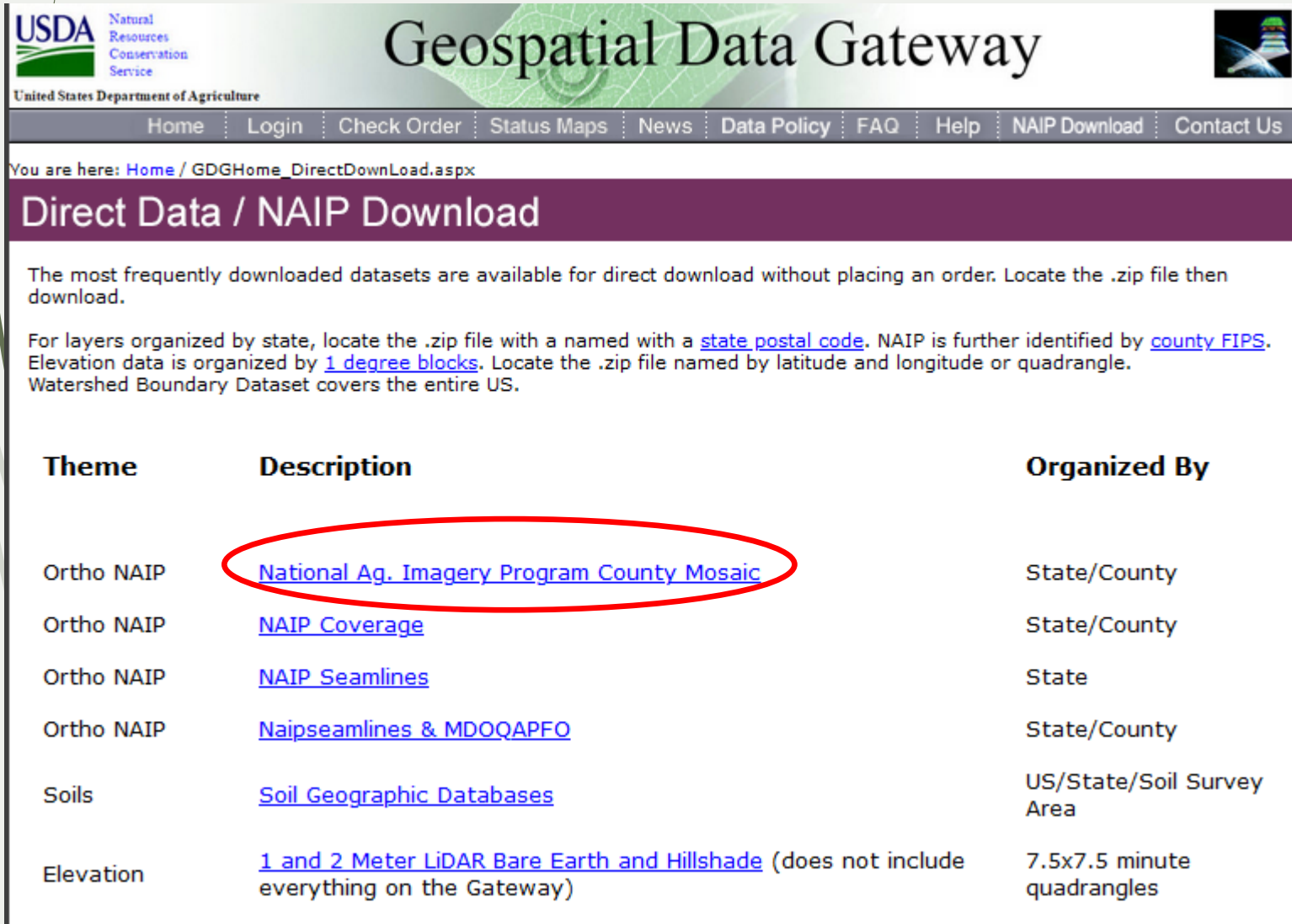


900_Exempt - Acres



Numerous Years of Aerial Photography

NAIP - https://gdg.sc.egov.usda.gov/GDGHome_DirectDownload.aspx



USDA Natural Resources Conservation Service
United States Department of Agriculture

Geospatial Data Gateway

Home | Login | Check Order | Status Maps | News | Data Policy | FAQ | Help | NAIP Download | Contact Us

You are here: [Home](#) / [GDGHome_DirectDownload.aspx](#)

Direct Data / NAIP Download

The most frequently downloaded datasets are available for direct download without placing an order. Locate the .zip file then download.

For layers organized by state, locate the .zip file with a named with a [state postal code](#). NAIP is further identified by [county FIPS](#). Elevation data is organized by [1 degree blocks](#). Locate the .zip file named by latitude and longitude or quadrangle. Watershed Boundary Dataset covers the entire US.

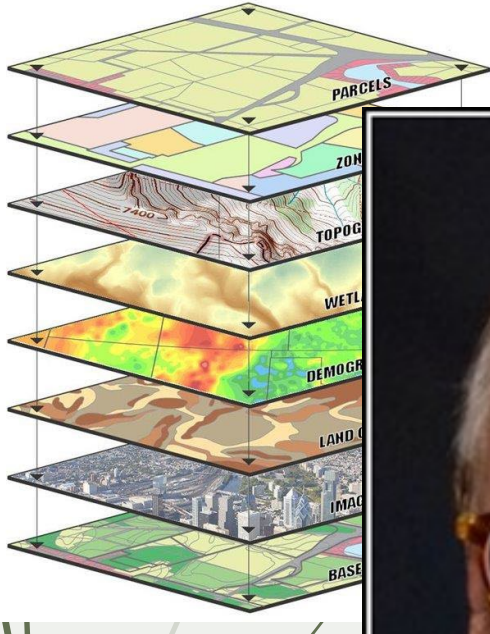
Theme	Description	Organized By
Ortho NAIP	National Ag. Imagery Program County Mosaic	State/County
Ortho NAIP	NAIP Coverage	State/County
Ortho NAIP	NAIP Seamlines	State
Ortho NAIP	Naipseamlines & MDOQAPFO	State/County
Soils	Soil Geographic Databases	US/State/Soil Survey Area
Elevation	1 and 2 Meter LiDAR Bare Earth and Hillshade (does not include everything on the Gateway)	7.5x7.5 minute quadrangles

- Aerial Photography-NAIP and Pictometry
 - 2022 Aerial-NAIP
 - 2022 Pictometry NDMOUN22-ECW-AW-6INCH.ecw
 - 2022 Pictometry High-Res Mr. Sid-Regionals
 - 2021 Aerial-NAIP
 - 2020 Aerial-NAIP
 - 2019 Pictometry NDMOUN19-MOSAICS-ECW-3INCH
 - 2019 Aerial-NAIP
 - 2018 Aerial-NAIP
 - 2017 Aerial-NAIP .6 Meter
 - 2016 Aerial-NAIP
 - 2015 Aerial-NAIP
 - 2014 Aerial-NAIP
 - 2012 Aerial-NAIP
 - 2010 Aerial-NAIP
 - 2009 Aerial-NAIP_2
 - 2006 Aerial-NAIP
 - 2005 Aerial-NAIP
 - 2004 Aerial-NAIP
 - 2003 Aerial-NAIP
 - esri World Imagery
 - FSA-Imagery\AerialImage_ND_19951998
 - FSA-Imagery\AerialImage_ND_19571962
 - esri World Imagery-older but clear 2009/2010?
 - ND DOT 2009-2013 .9 feet

GIS

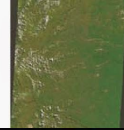
GIS DATA LAYERS

Many different types of data



Integrated GIS Database

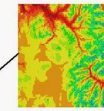
Satellite Imagery



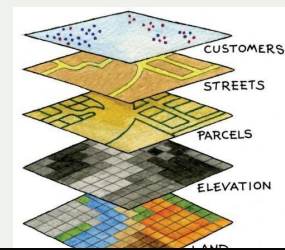
Aerial Photography



Digital Elevation Models



Cadastral Data



GIS

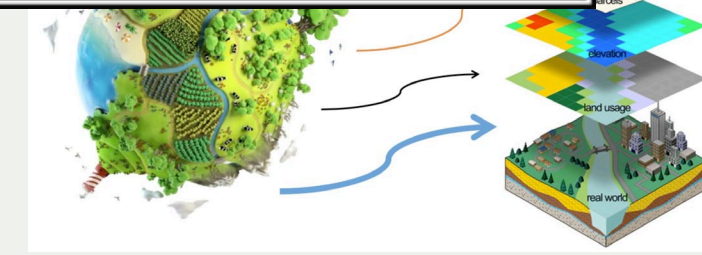
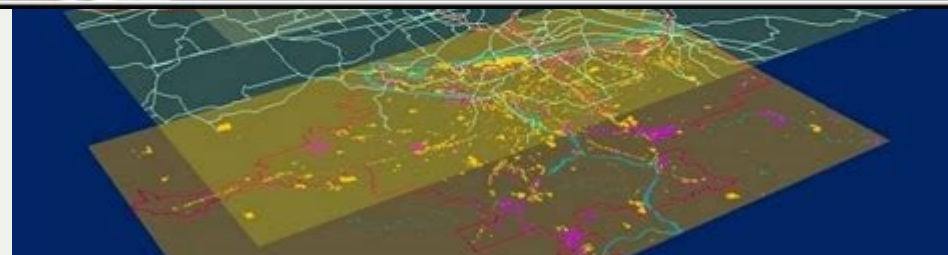
geographic information



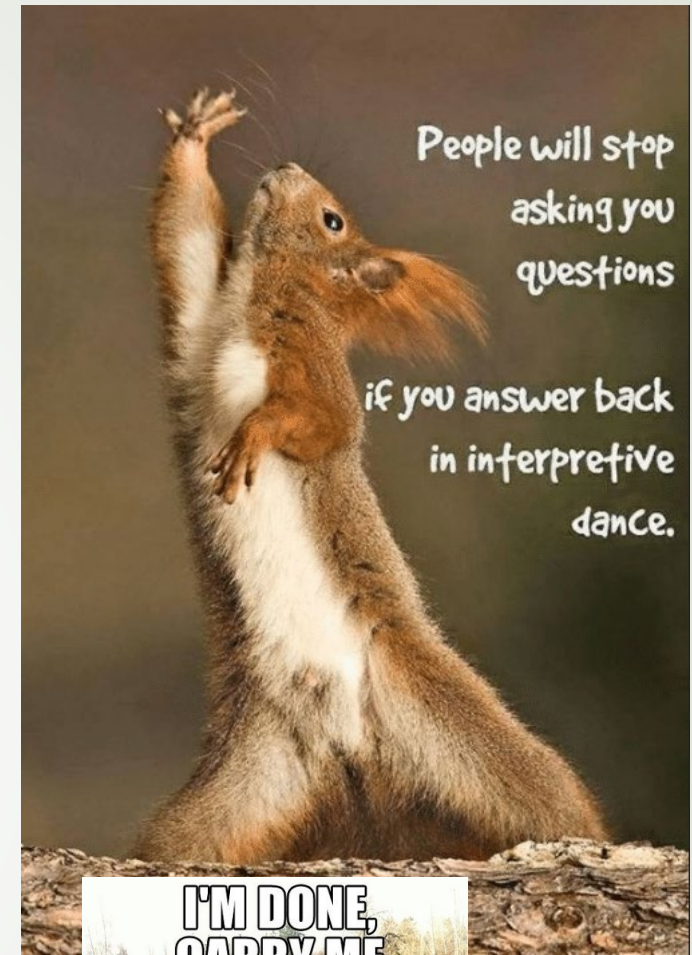
The application of GIS is limited only by the imagination of those who use it

— Jack Dangermond —

AZ QUOTES



Questions?



Rory Porth
Property Assessor / GIS

Mountrail County Tax Equalization



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