

PROJECT BACK TO THE FUTURE

Agricultural Land Valuation in Mountrail County, ND



First things....

- ▶ Check out this formula – what does it 'say' ?

$$B > \frac{1}{n} \sum_{i=1}^n x_i$$

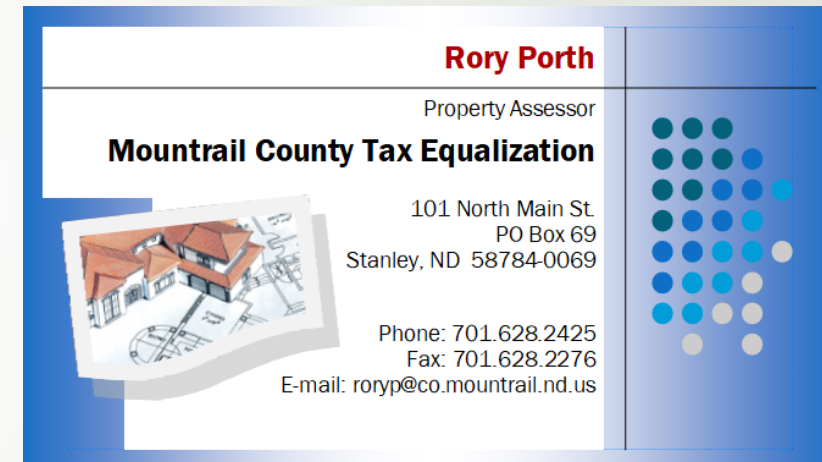
Starting out...

- ▶ 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**

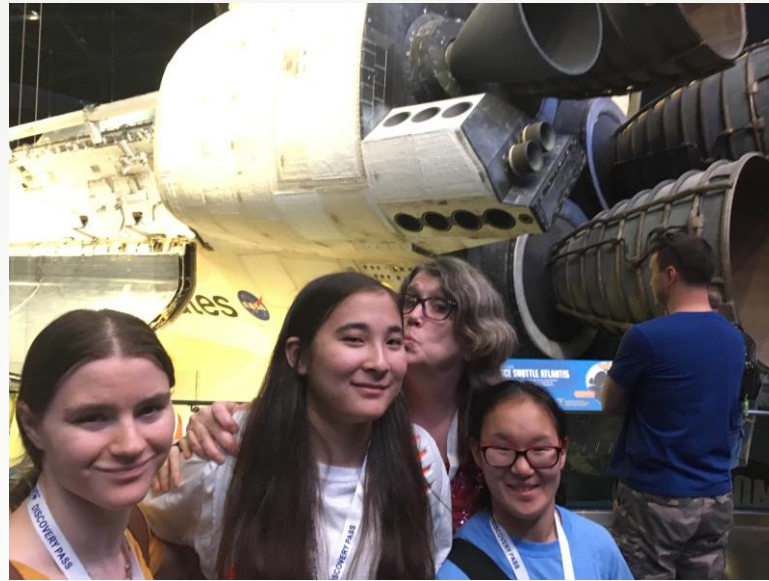


Introduction - Our Journey

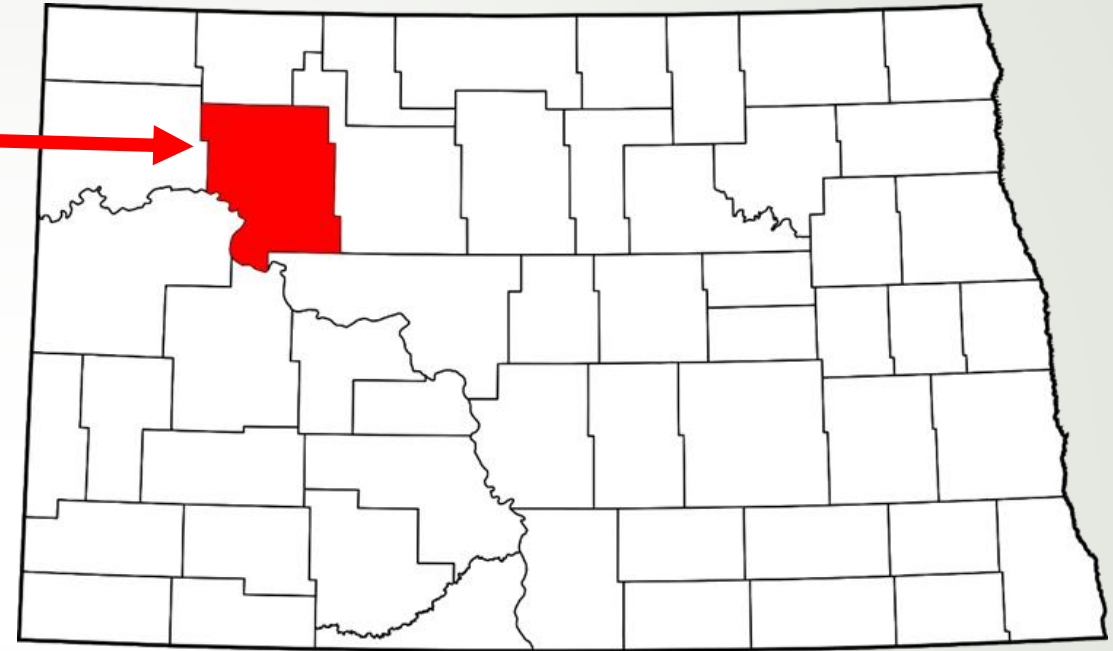
- ▶ Quick Bio
 - ▶ Class 1 Property Assessor in Mountrail County – relatively new to role
 - ▶ Previously – complex systems integrator / consultant
 - ▶ Certified Information Systems Auditor (CISA) – ISACA – Information Systems Audit and Control Association
- ▶ Where / what is Mountrail county?
- ▶ A few pictures
- ▶ “The Bakken” – oil & natural gas production
- ▶ Ag Land Valuation – a little history and lots of work
 - ▶ **Maps, numbers, spreadsheets**
- ▶ What we did and where we are



OK... the 'fam'...



Mountrail County, North Dakota



- ▶ 9th largest County by sq mi -1,824
- ▶ Population – 10,265 (2017 Census est)
- ▶ Density – approx. 5.6 persons per sq mi

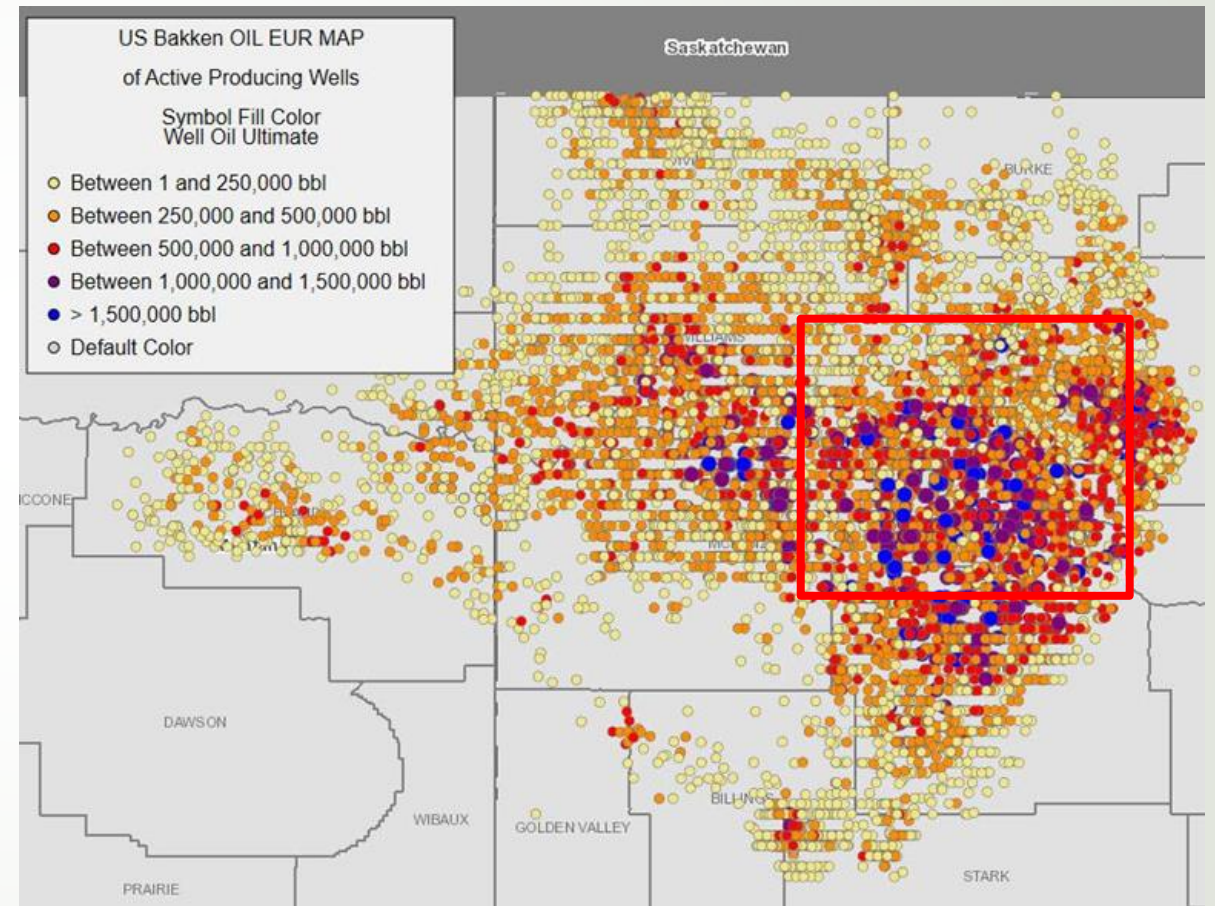
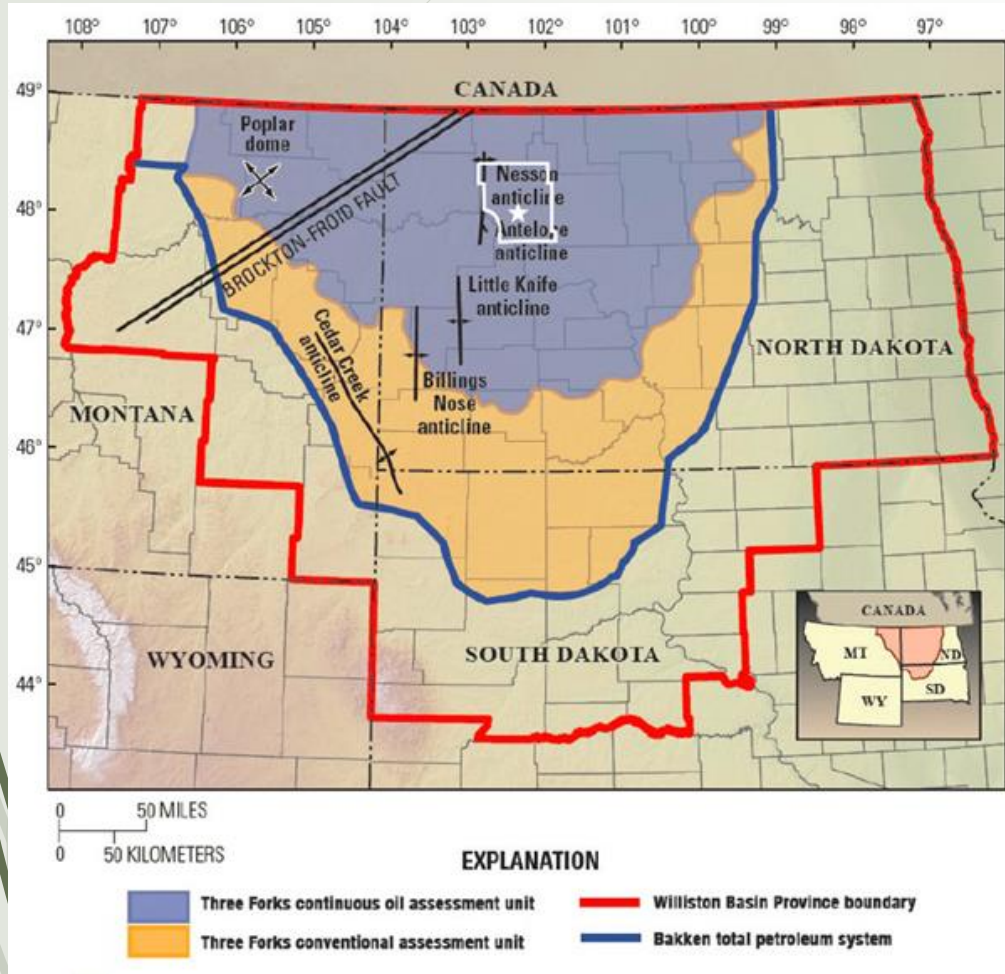
What does Mountrail look like?



What does Mountrail look like?



The Bakken - North Dakota is #2 Oil Producer in US



The Bakken



Winter Temps... Uffda..



December 24, 2017 8:30 PM

STANLEY NORTH DAKOTA

WIND CHILL WARNING

-4°F
RealFeel®: -36°
Partly cloudy
3°/-16°

CURRENT CONDITIONS
HUMIDITY: 63%
DEW POINT: -13°F

No precip for 120 min

December 25, 2017 8:02 AM

STANLEY NORTH DAKOTA

WIND CHILL WARNING

-19°F
RealFeel®: -47°
Partly cloudy
-8°/-20°

CURRENT CONDITIONS
HUMIDITY: 72%
DEW POINT: -26°F

No precip for 120 min

December 26, 2017 10:47 AM

STANLEY NORTH DAKOTA

WIND CHILL WARNING

-18°F
RealFeel®: -36°
Sunny
-8°/-22°

CURRENT CONDITIONS
HUMIDITY: 76%
DEW POINT: -24°F

No precip for 120 min

December 29, 2017 3:51 PM

STANLEY NORTH DAKOTA

WIND CHILL WARNING

-11°F
RealFeel®: -37°
Sunny
-6°/-31°

CURRENT CONDITIONS
HUMIDITY: 70%
DEW POINT: -18°F

No precip for 120 min

7:44 AM 20%

STANLEY NORTH DAKOTA

WIND CHILL WARNING

RealFeel®: -56°

-26°F

Clear

Check MinuteCast®

TODAY: -12°/-21°

AccuWeather

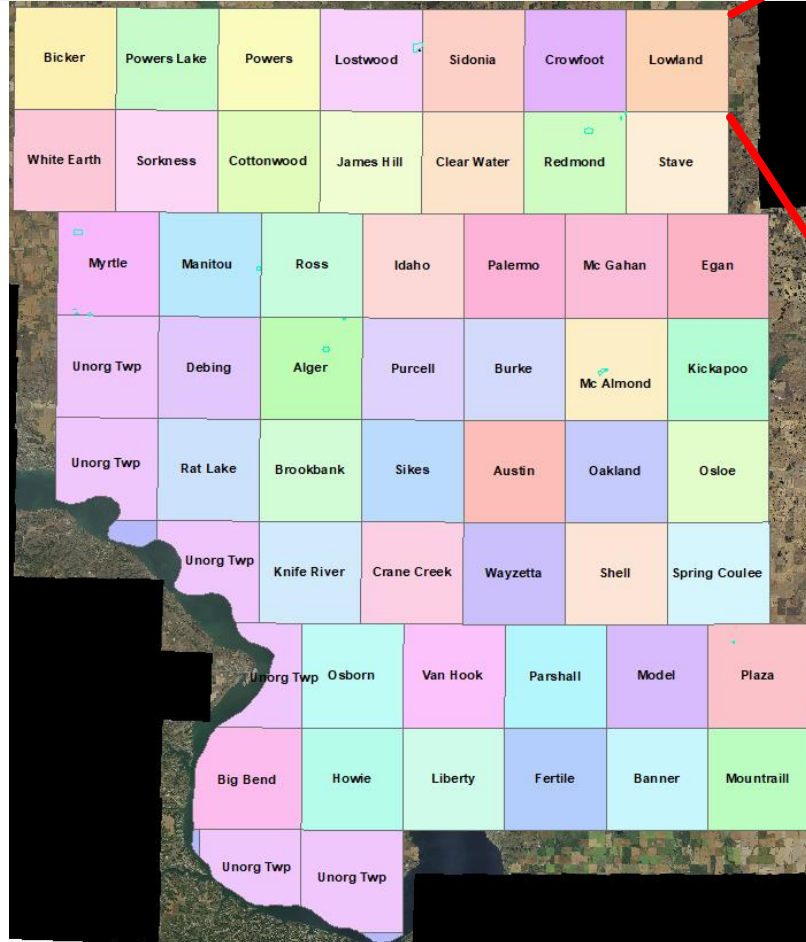
Valuation in Mountrail - 2018 Values

Assessment Code*	Description	Parcels	Parcel %	True & Full Value	Value %
101	Agricultural	8,946	59.3%	\$462,571,200	29.3%
201	Residential	3,331	22.1%	\$385,144,700	24.4%
233	Commercial	880	5.8%	\$694,445,700	44.0%
250	Vacant Land	1,931	12.8%	\$37,875,100	2.4%
Total		<u>15,088</u>		<u>\$1,580,036,700</u>	

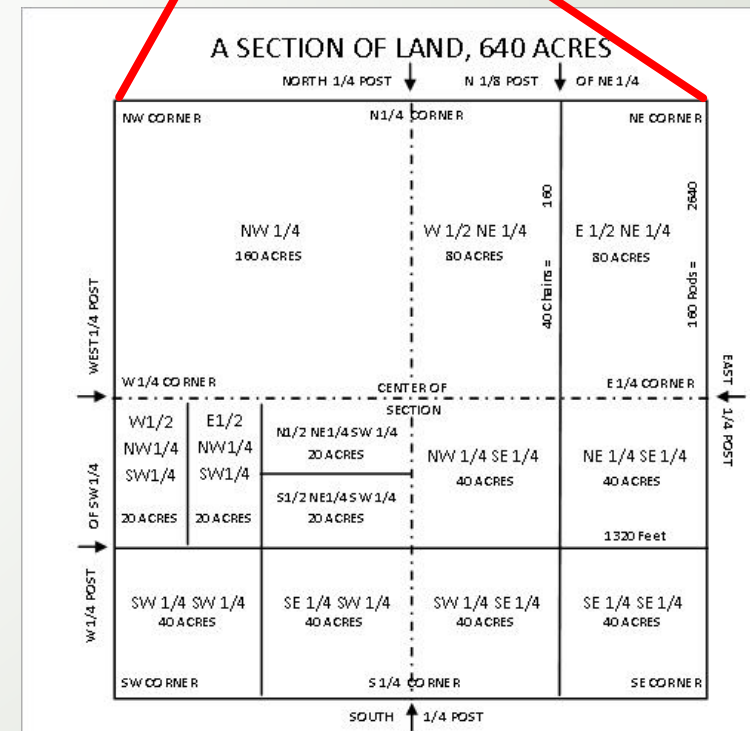
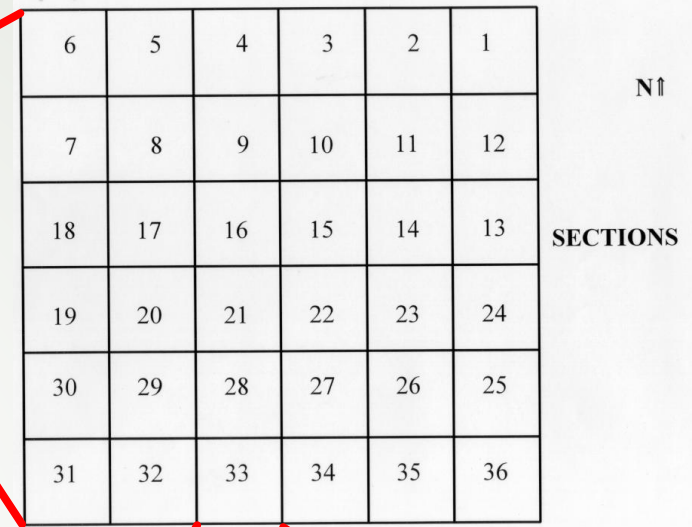
**NOTE: Centrally assessed properties are not included in the list*

Some Land Definitions

- **County**-largest administrative division of a state.
- **Township**-An approximately thirty-six-square mile division of land used in the Federal Rectangular Survey System.
- **Section**-A unit of land approximately one mile square and normally containing 640 acres, as laid out by the government survey.
- **Parcel**-A contiguous area of land described in a single legal description or as one of a number of lots on a plat



55 Townships in Mountrail County



Ag Land Valuation - Basically Two Methods

- ▶ **Must be based on soil type – detailed or general**

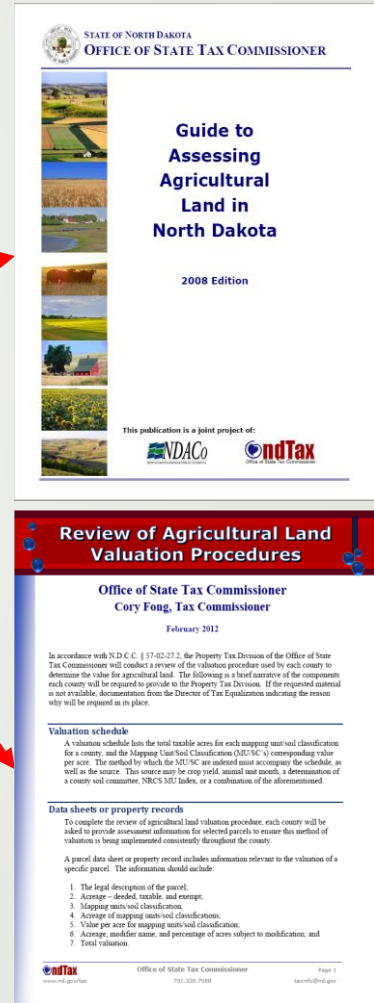
- ▶ Soils information from NRCS – National Resources Conservation Service – US Dept. of Agriculture
- ▶ Implement NDSU average values by NRCS soil type for Agricultural land valuation
- ▶ State Tax Dept. Ag Land valuation guide & Certification guide

- ▶ **1. “Breakpoint” – generalized use** “Productivity Index”

- ▶ Better quality soils considered “cropland”
- ▶ Lower quality soils considered “non cropland”
- ▶ Much Simpler to implement

- ▶ **2. “Actual Ag Land Use”** – use GIS to map land use acres + Productivity Index-Soils

- ▶ More complex and time consuming to implement – most precise



North Dakota Ag Land Valuation Overview

ND Tax Dept

2019 Average Ag Land Values

STATE OF NORTH DAKOTA
OFFICE OF STATE TAX COMMISSIONER
RYAN RAUSCHENBERGER, COMMISSIONER

AGRICULTURAL VALUE PER ACRE
FOR THE 2017 ASSESSMENT

To County Boards of Tax Equalization

As required by North Dakota Century Code § 10-01-02.1, 10-01-02.2, & 10-01-02.3, the Commission and the Board of Equalization hereby provide to you the following average value per acre of agricultural lands in this state, and to the extent available, the average value per acre of agricultural lands in each county of the state for the year 2017. The Agricultural Value per Acre and Agricultural Land Use Data are as of the North Dakota State Valuation Date.

The average value of agricultural lands in the state for the year 2017 is \$454.62.

The average value of agricultural lands in each county for the year 2017 is as follows:

County	Value per Acre
Adams	102.00
Barnes	102.00
Benson	102.00
Bismarck	102.00
Boisdore	102.00
Burke	102.00
Cass	102.00
Cavalier	102.00
Chapman	102.00
Chilton	102.00
Clegg	102.00
Collins	102.00
Conkling	102.00
Cook	102.00
Coulter	102.00
Dakota	102.00
Dawson	102.00
Deerfield	102.00
Dickey	102.00
Dix	102.00
Dodge	102.00
Dolan	102.00
Dunlap	102.00
Eaton	102.00
Emmons	102.00
Faust	102.00
Fergus	102.00
Fisher	102.00
Flora	102.00
Golden Valley	102.00
Grand Forks	102.00
Grandin	102.00
Grant	102.00
Griggs	102.00
Hazen	102.00
Hector	102.00
Hemlock	102.00
Hess	102.00
Hill	102.00
Holmes	102.00
Hooker	102.00
Jackson	102.00
Jackson Park	102.00
Jordan	102.00
Kandiyohi	102.00
Kearney	102.00
Kelly	102.00
Kidder	102.00
Kingsbury	102.00
Knox	102.00
Lambert	102.00
Larson	102.00
Laurel	102.00
LeFlore	102.00
Lincoln	102.00
Linton	102.00
Logan	102.00
Lynden	102.00
Mahoning	102.00
Mandan	102.00
Mandanville	102.00
Mars	102.00
McLean	102.00
McIntosh	102.00
McKenzie	102.00
McPherson	102.00
Merriam	102.00
Mohr	102.00
Mountrail	102.00
Murphy	102.00
Nelson	102.00
Ness	102.00
Ness City	102.00
North Dakota	454.62
Northwood	102.00
Oliver	102.00
Osborne	102.00
Ottawa	102.00
Paradee	102.00
Parker	102.00
Pembina	102.00
Pierce	102.00
Pinkney	102.00
Polk	102.00
Rockwell	102.00
Ross	102.00
Sargent	102.00
Shannon	102.00
Shaw	102.00
Sheephead	102.00
Sioux	102.00
Sioux Falls	102.00
South Dakota	102.00
Southwest	102.00
Stanley	102.00
Steele	102.00
Stutsman	102.00
Sully	102.00
Tadmor	102.00
Towner	102.00
Trimbur	102.00
Valley	102.00
Vallentyne	102.00
Walsh	102.00
Ward	102.00
Ward County	102.00
Washburn	102.00
Wells	102.00
Wheatland	102.00
Wilton	102.00
Williston	102.00
Woodworth	102.00
Yankton	102.00
Yankton County	102.00

NDSU Ag Land
Production Value 2018
Average Ag - \$454.62
Cropland - \$692.46
NonCrop - \$156.54

Problem: How to make Allocation Equitable?

Need to know how many crop and noncrop acres, other types of land

How much to Where?



Mountrail Ag Acres
1,048,451.07
X \$454.62
=
Ag Acre Total Value
\$476,646,825
at 100% Threshold

NDSU Ag Values

“Capitalized average annual gross return”

“Breakpoint Method” - 2017 Valuation

Better Soils

Productivity Index (PI) or AUM (noncrop)	Land Valuation – “Cropland”	Land Valuation – “NonCrop”
95	\$917	-- N/A --
90	\$880	-- N/A --
80	\$770	-- N/A --
70	\$688	-- N/A --
60	\$578	-- N/A --
50	\$486	-- N/A --
49	-- N/A --	\$217
40	-- N/A --	\$178
30	-- N/A --	\$132
20	-- N/A --	\$89
10	-- N/A --	\$40
0	-- N/A --	\$15

Poorer Soils

2017 Ag Values

Average Ag - \$458.53

Crop - \$678.66

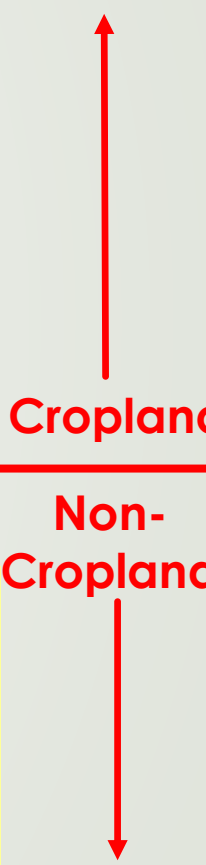
NonCrop - \$147.91

Breakpoint

Cropland

Non-Cropland

Note the Difference between Soil Types - \$269



2017 Breakpoint Method Implemented – Processed New Ag Land Values

- ▶ Different method for the county – changed historical Ag Land values
- ▶ Updated 8,900+ parcels
- ▶ ND “Notice of Increase” – approx. 3,000 letters sent out
 - ▶ \$3,000+ increase in valuation AND 10% or more of previous value
- ▶ Minimal communication with public – one small article in paper
 - ▶ (our “bad”)
- ▶ Result?
- ▶ Confusion, some angst, some happy – some *VERY* unhappy vocally...

Contention!

May 10, 2017 Paper

ATTENTION MOUNTRAIL COUNTY LANDOWNERS! Do Your 2017 Farmland Valuations Make Sense?

Sign our petition today at

<https://www.ipetitions.com/petition/reverse-mountrail-countys-taxation-method>

The petition reads: "We, the undersigned, call on Mountrail County Commissioners to continue to use 2016 farmland valuations until: 1. A new valuation method is developed based on actual land use as cropland or non cropland. 2. A Soils Committee is formed to recommend tax assessment methods to the county commission."

The site is easy to use, just follow the instructions.

Let your voice be heard concerning proposed changes in taxable valuations in Mountrail County.

Voice your concerns, not only by signing the petition, but also call your County Commissioners and attend the Commissioners Meeting on Tuesday, May 16 at noon at the Courthouse in Stanley

ship met with the Board to discuss the soil implementation. Also present from the Tax Directors Office was Rory Porth, Assessor and Teresa Captain, Deputy Tax Director. Fred Evans stated the County is not utilizing the implementation of soils correctly and feels usage should be utilized.

Charlie Sorenson suggested a soil board be created that would make suggestions to the Tax Director's Office. Charlie Sorenson stated the land should be split into pasture vs crop land.

Assessor Porth explained that the surrounding counties are following the same procedures.

States Attorney Enget stated that modifiers are not dead but it does have to be approved by the state before implementation and the assessing rules come from the legislation.

May 24, 2017 Paper

Landowners Question 2017 Taxable Valuations



Since receiving their new taxable valuations on agricultural land, some landowners in Mountrail County have been expressing their concerns to County Commissioners.

land use. He says that it appears that in the past years non-cropland and grasslands have been valued too low, while good value cropland has been valued too high.

Landowner Charlie Sorenson addressed the commission saying they will keep coming back to the meetings as they believe it is important to all citizens to do the valuations cor-

There clearly are some flawed issues with the Revised/Proposed Taxation of Land in Mountrail County.

We see the main Problem is land use, assessing crop-land and non-cropland the same.

The ND Century Code is very clear on landuse and how it is to be dealt with.

Concerned citizens can do two things:

1. Sign the petition on-line (ipetitionmountrailcounty) it will pop up. It asks to continue 2016 tax rate for 2017 and start a five member soil committee.

No need to donate!

2. Come to the Mountrail County Commissioners meeting on June 6th, 9:00 a.m. and Tax Equalization meeting at 10 a.m. Be ready to hear people share their concerns, along with being ready to share your concerns.

Paid for by Charlie Sorenson and Fred Evans

May 31, 2017 Paper

IT'S THE LAW

The assessor shall apply
"Actual use of the property for cropland or noncropland purposes by the owner of the parcel"
(subsection 8 of NDCC 57-02-27.2)

2017 valuations of agricultural property in Mountrail County do not consider use and have been made in direct violation of this law.

Persuade Mountrail County Commissioners to change direction

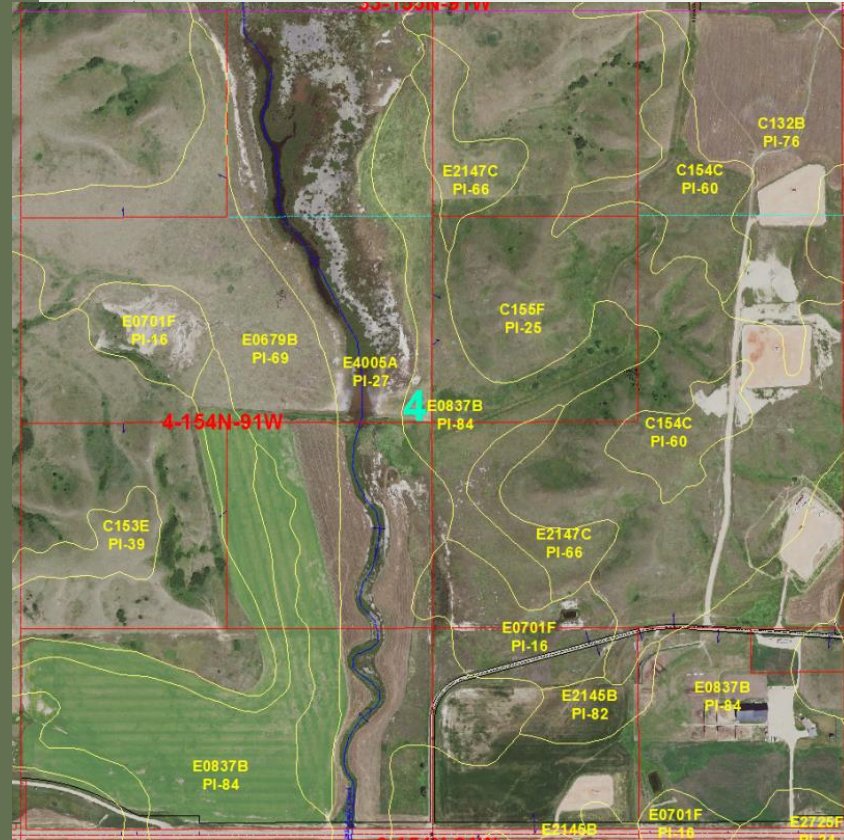
Attend the Mountrail County Equalization Meeting on Tuesday, June 6th at 10:00 a.m. at the courthouse.

Search online "ipetitions Mountrail County" and sign our petition

Paid for by Fred Evans and Charlie Sorenson

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
- ▶ **2017 Mountrail used ND State approved ‘breakpoint method’ in setting values – did not use actual use**
- ▶ **June 2017 - County Board of equalization voted to utilize actual land use for valuation**

**WENT BACK TO 2016 LAND
VALUES FOR THE FUTURE
OF ACTUAL LAND USE**

Two Years Ago....

“How do we do this....?”

RORY'S "BEAUTIFUL MIND"

SOILS LAYER
- CODE - not color
- ARCMAT
- FARM CROP
- Ex → non-crop
- 2 AC Pies
- OIL SITES / POND
- CRP
- GRAVEL
- COMMERCIAL
- SANDY
- PRIVATE DRIVE

BEAUTIFUL MIND
- SPACE
- MUST ID ACRES * BY LAYERS
- TEST - A LAYER POWERS RAT LAKE

VANGUARD ROCKS!
"BRAIN BUBBLES"

RON JOY SURF SHOP
"ONE OF A KIND"

WHAT IS UNIQUE ABOUT THIS PICTURE?
- ARE SALES
- MAX \$2800
- \$1600
- \$1380
- \$1261
- \$11970
- \$12600

12-1200 \$100 2016 AL VALUE
- 0.53 \$ 53 &
- 16-6515 - D-2016

NEW PLAN
- VMS PROJECT - \$5865
- VMS VISIO - \$5899 + \$33799
- SIDWELL DISCUSSIONS
- FARMS - \$1599 / \$999 MAINT.

ARC MAP - \$1250 / \$400-500 ANNUAL
- TRAINING - 1-1.5 DAYS
- SW TOOLS INVESTIGATION
- OFFROAD - \$2K-2.5K/ATR
- SIDWELL GIS - FARMSC
- NAIP AIRPHOTO

CROP/NON CROP TOOLS
- CROPSCAPE
- ASBIDATA
- TAX DEFT REPORTING TOOLS &
- FARMS SERVER?

SIDWELL GIS
- UPDATE AERIAL PHOTOGRAPHY - \$900/120YR
- 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 PARCEL SOIL CODES?

VALUATION
- 770/300
- SCHOOL DIST
- VOTING DIST
- AMBLY AVE
- FID
- 2 VALUES

VALUATION SCHEDULES
- CROPLAND CRP SA, 515
- NON CROPLAND
- RANGELAND
- PASTURE LAND
- NON PRODUCTIVE
- ALL MODIFIERS
- INUNDATED TAPPOADS
- COMMERCIAL
- OIL SITES
- SALT WATER
- RESIDENTIAL
- ASMT CODES

TRG
- IAAO-811-INTRO GIS - 18HRS \$1000
- IAAO-812-ADV GIS - 18HRS \$1200
- IAAO-102-INC. APPROACH-30 \$400
- RORY?

SOILS GOOD
- 2-132017
- 8942 \$421.83
- 6,991.70
- 1,066,991.70
- \$450,085,337.04
- VALUE \$1,569,500
- \$412.85
- * DO NOT ERASE
- DIFF 8,515,837.04
- \$422.13
- 421.93
- 450,114,400

GO BACK - OTTF
- W PARCELS 25K20 = 530

STATE AID
- 5510K
- SECTIONS ≈ 1800
- UGOS - 1

DO NOT ERASE

AMMSTROVE
- ED
- MICHAEL COLLINS

ESTER'S UNDISTURBED DECK THE NIGHT OF HIS PASSING

Actual Land Use – Bounding the Problem

Much to keep track of:

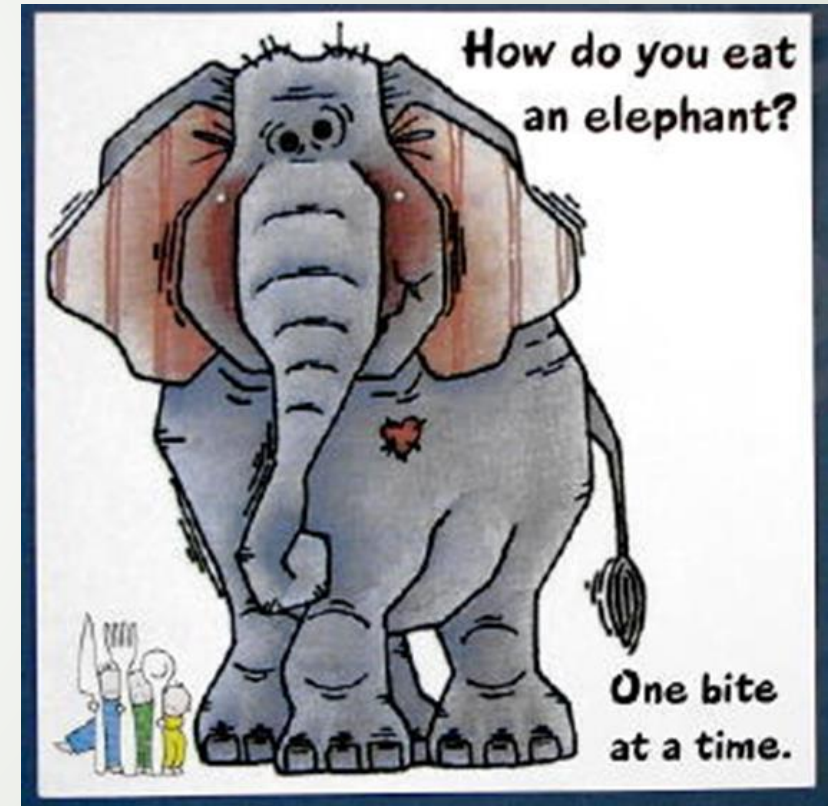
- ▶ Mountrail County Comprised of
 - ▶ 55 Townships – 7 cities
 - ▶ 1,803 Sections
 - ▶ 1,048,451.07 Ag related acres
 - ▶ 8,946 Ag related parcels
 - ▶ 2,200 Ag related parcel owners
 - ▶ 147 Soils Codes - \$ values applied
 - ▶ Where are those soils?
- ▶ How is each parcel being used?
 - ▶ Cropland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



Answer? – utilize a GIS system

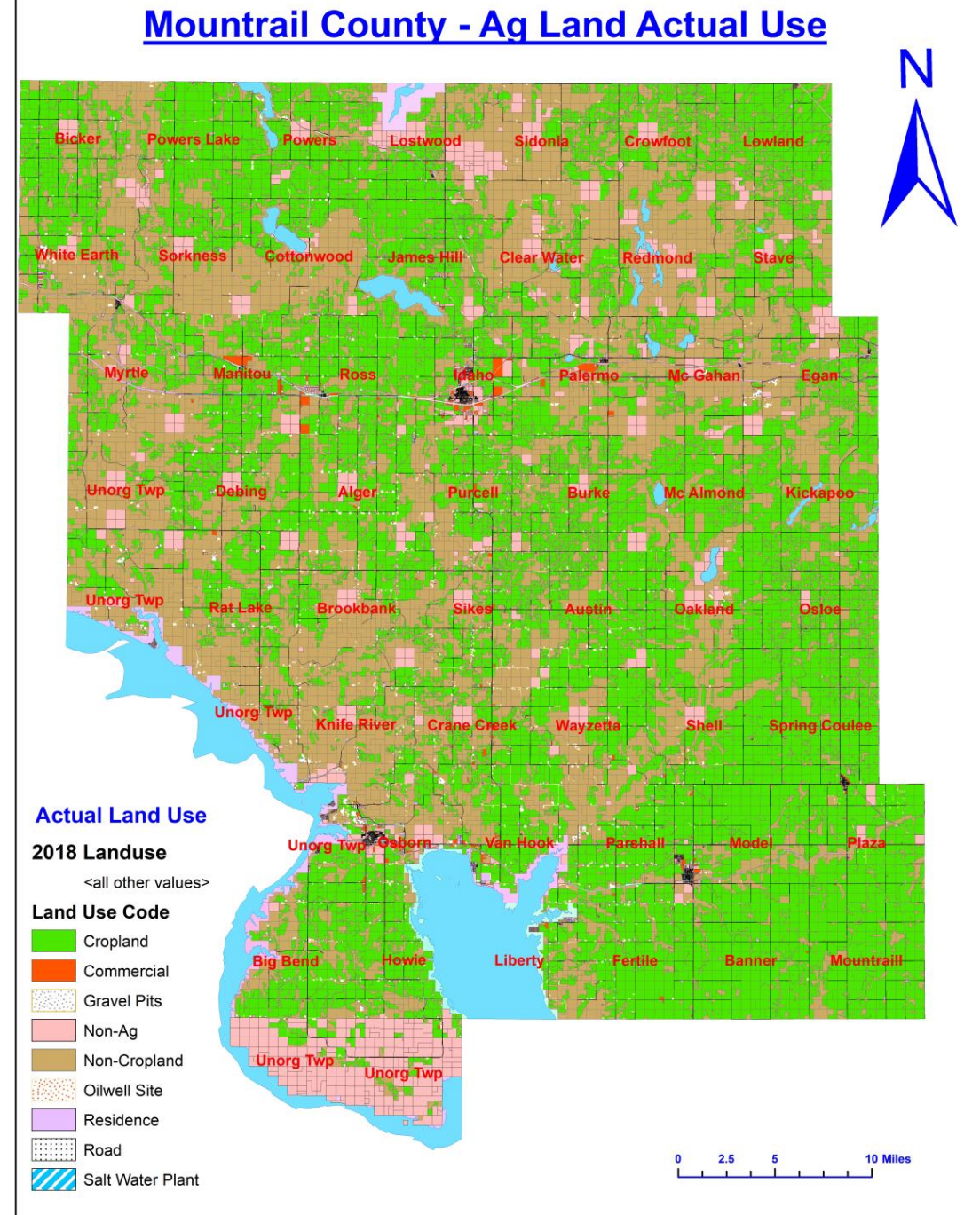
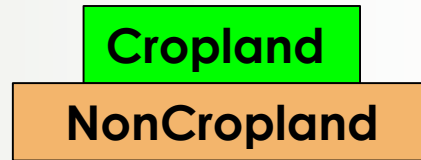
Problem – we were VERY new to GIS

Education needed – our office AND our constituents



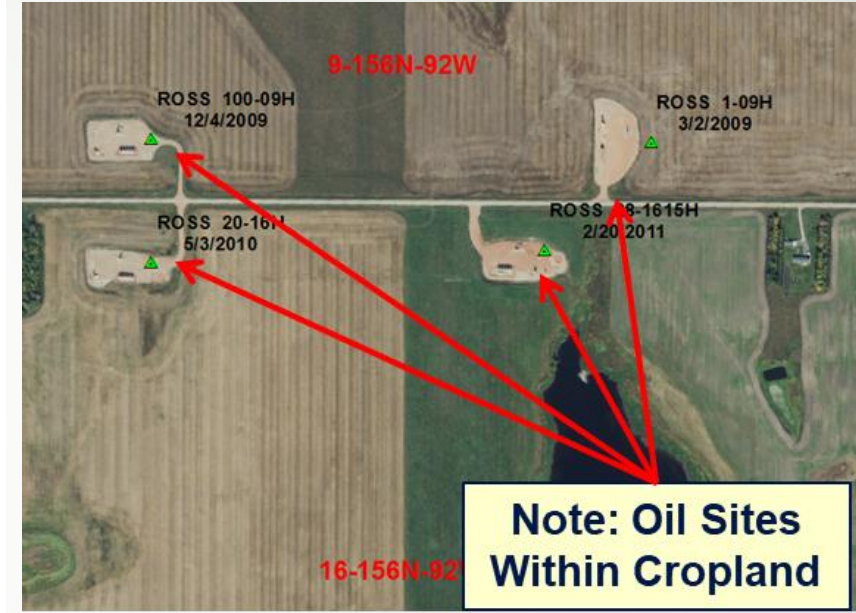
Project Plan

- ▶ GIS Software in House – ArcMAP
 - ▶ ArcMap Publisher, Sidwell FARMS
- ▶ Soils Committee Formed
- ▶ Drawing Ruleset Defined and Approved
- ▶ Valuation Ruleset Drafted and Approved
- ▶ All phases start – July 2017
 - ▶ 3 Sections – “Pre-Pilot”
 - ▶ Pilot Section
 - ▶ Drawing by Tier
- ▶ Tier Deliveries Started Fall 2017
- ▶ Total Tier county delivery – Feb 2018
- ▶ 2017 Aerial Photography Reviews-Update
- ▶ Used for 2019 Equalization Process



Drawing Ruleset Example - Oilwell Sites

- ▶ ND Century Code – “Ag property used for oil, natural gas, or subsurface minerals must continue to be assessed as Ag property for the remainder....”
- ▶ **Challenge: Was it cropland or noncropland before?**
 - ▶ Some parcels found oil sites partially on crop land, partially on non-cropland
 - ▶ Very difficult to manage acres
- ▶ **Simplified Approved Decision** – all oil site acreage will be valued as non-cropland based off soil types underneath oil site (includes road leading to oil site)



Land Used for Extraction of Oil, Natural Gas, or Subsurface Minerals

Land that was assessed as agricultural property at the time the land was put to use for extraction of oil, natural gas, or subsurface minerals as defined in N.D.C.C. § 38-12-01 must continue to be assessed as agricultural property if the remainder of the surface owner's parcel of property on which the subsurface mineral activity is occurring continues to qualify for assessment as agricultural property under subsection 1 of N.D.C.C. § 57-02-01.

Farmsteads and Modifiers

- ▶ Farmsteads are considered 'non-crop' and are valued at non-cropland value based off soils under farmstead
- ▶ With **Actual Land use** – modifiers are **not** necessary and are not used in Mountrail County
 - ▶ With breakpoint method, modifiers could be considered and are used for cropland areas only



Rocky*	Very Rocky*	Salinity*
Non-Productive	Obstacles	Multiple Factors
Irregular Field	Trees	Inaccessibility
Electrical Transmission Lines	Public Road	Brush & Ponding
Abandoned Railroad	Oil Well Site	Non-Tilled
Pasture	Non-Cropland	Drain Ditch
Marsh	Land Use (?)	Easements

Examples of Modifiers from ND State List

*Items handled By NRCS Soil Survey

Land Valuation Ruleset

GIS Item	Valuation Method
Cropland	Cropland values - Productivity Index (PI)
Non Cropland	Noncrop values – based off AUM (Animal Unit Month) calculation (lbs air dry forage x 0.25 / 913 lbs/month = AUM/ac) Ex. 2000lbs forage x 0.25=500lbs / 913 = 0.55 AUM/ac
Farmsteads	Noncrop values
Oilwell Sites	Noncrop values
Salt Water Wells	1) Commercial wells @ Commercial Values (Tax Dept) 2) Private Wells @ Noncrop values
<u>Taxable</u> Rural Residence	2 Acres at \$2,000 / acre
Roads	\$0 for Right-of-Way acreage of TWP Certified Roads, County Roads, State Highways
Commercial Land / Structures	Commercial Values (Tax Dept)
Gravel Pits	Commercial Values (Tax Dept)
Non-Ag (vacant land)	Vacant Land Values (Tax Dept)

Envisioning Data An Idea!

NRCS Soils Info

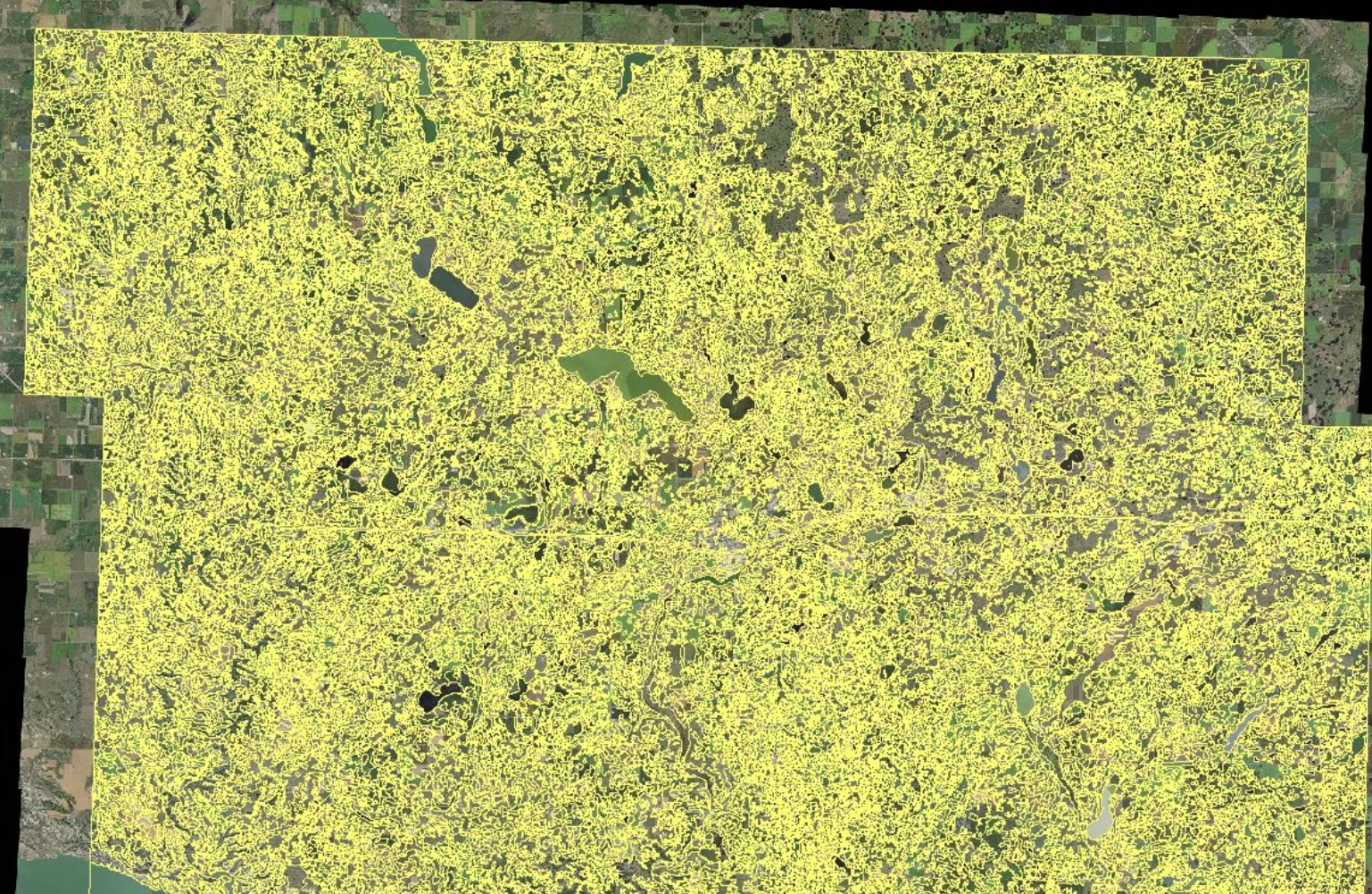


Map unit symbol	Map unit name	PI	Acres in AOI
C2A	Tonka silt loam, 0 to 1 percent slopes	42	5,040.90
C3A	Parnell silty clay loam, 0 to 1 percent slopes	20	20,932.00
C5A	Southam silty clay loam, 0 to 1 percent slopes	5	12,561.50
C6A	Tonka-Parnell complex, 0 to 1 percent slopes	80	22.2
C64C	Wamduska, west-Mauvai 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



Soil Code 'Productivity Index'

- ▶ North Mountrail County with NRCS Soils Layer



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

Soil Code by NRCS Productivity Index

► Symbology - PI Breakdown

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

Layer Properties

General Source Selection Display Symbology Fields Definition Query Labels Joins & Relates Time

Show:

- Features
- Categories
- Quantities
 - Graduated colors
 - Graduated symbols
 - Proportional symbols
 - Dot density
- Charts
- Multiple Attributes

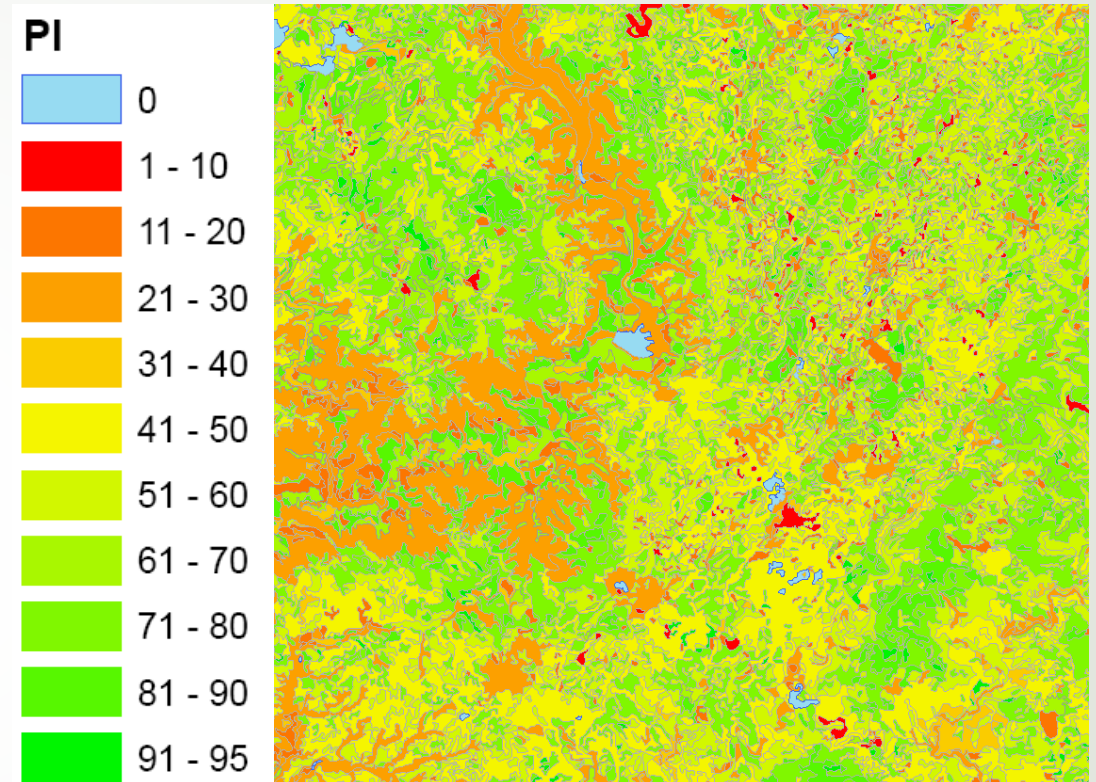
Draw quantities using color to show values. Import...

Fields: Value: PI Normalization: none Classification: Manual Classes: 11 Classify...

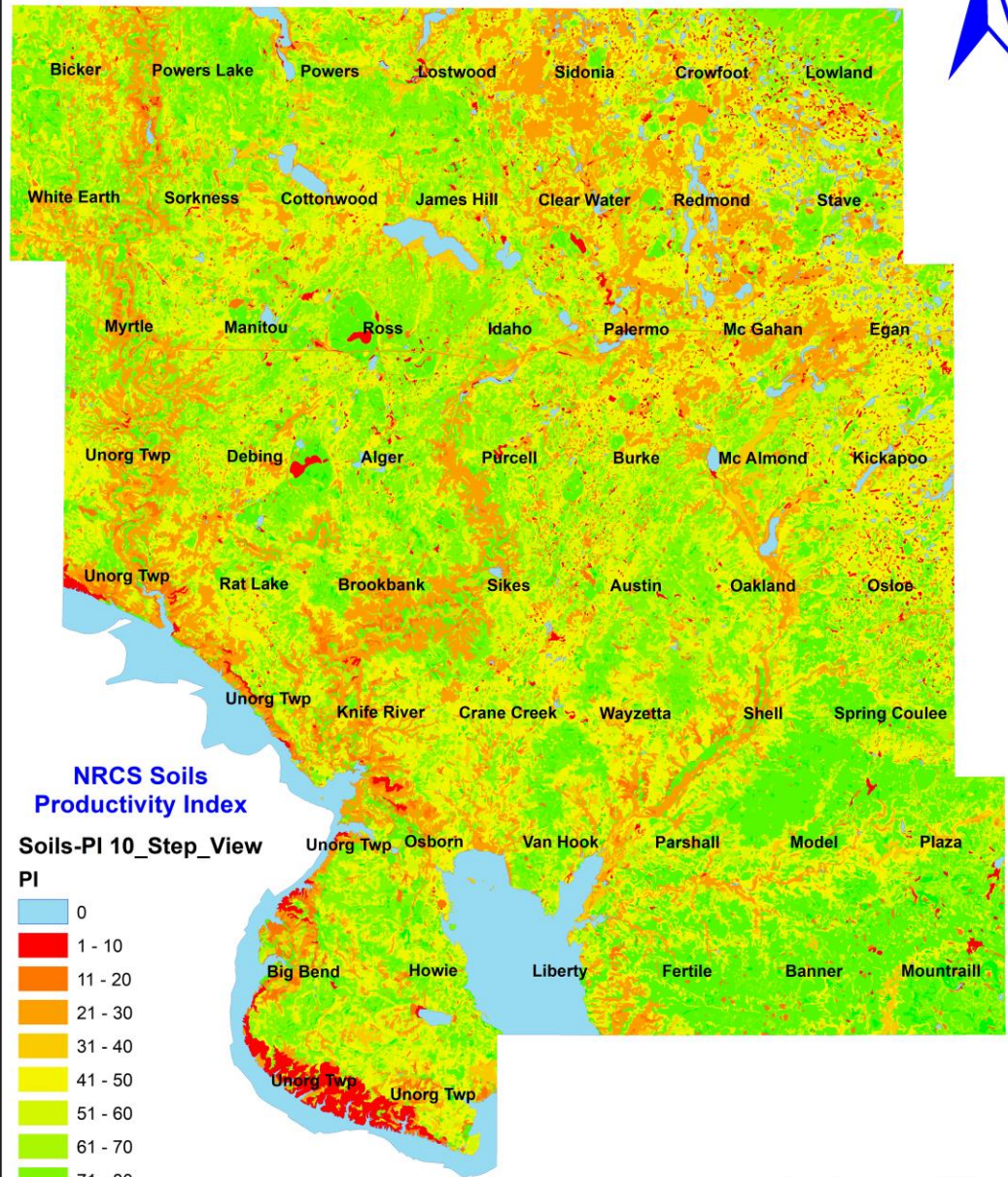
Color Ramp:

Symbol	Range	Label
	0.00000000	0.000000
	0.000001000 - 10.0000000	0.000001 - 10.000000
	10.00000010 - 20.0000000	10.000001 - 20.000000
	20.00000010 - 30.0000000	20.000001 - 30.000000
	30.00000010 - 40.0000000	30.000001 - 40.000000
	40.00000010 - 50.0000000	40.000001 - 50.000000
	50.00000010 - 60.0000000	50.000001 - 60.000000
	60.00000010 - 70.0000000	60.000001 - 70.000000
	70.00000010 - 80.0000000	70.000001 - 80.000000
	80.00000010 - 90.0000000	80.000001 - 90.000000
	90.00000010 - 95.0000000	90.000001 - 95.000000

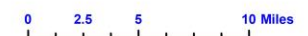
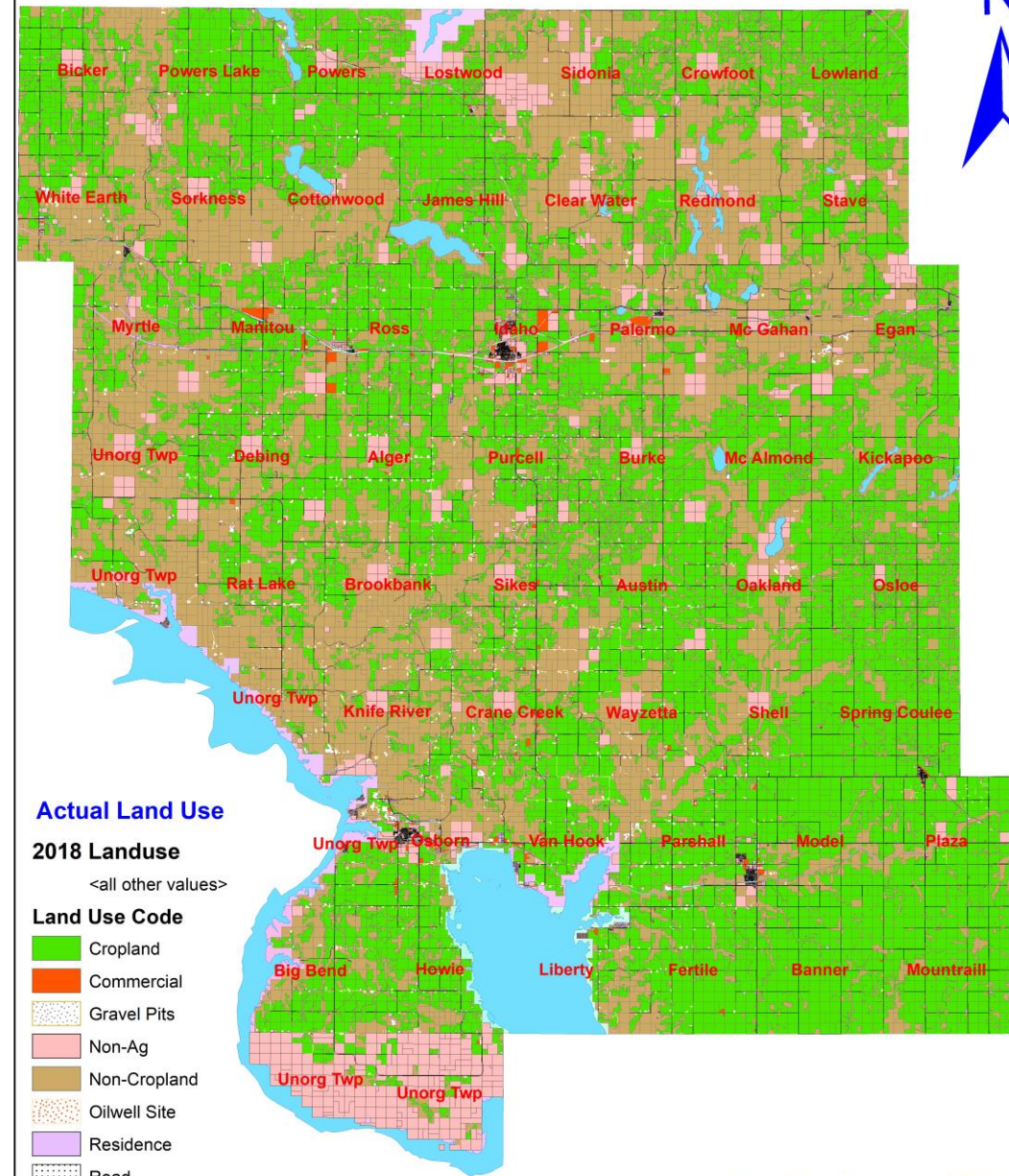
Show class ranges using feature values Advanced



Mountrail County - NRCS Soils



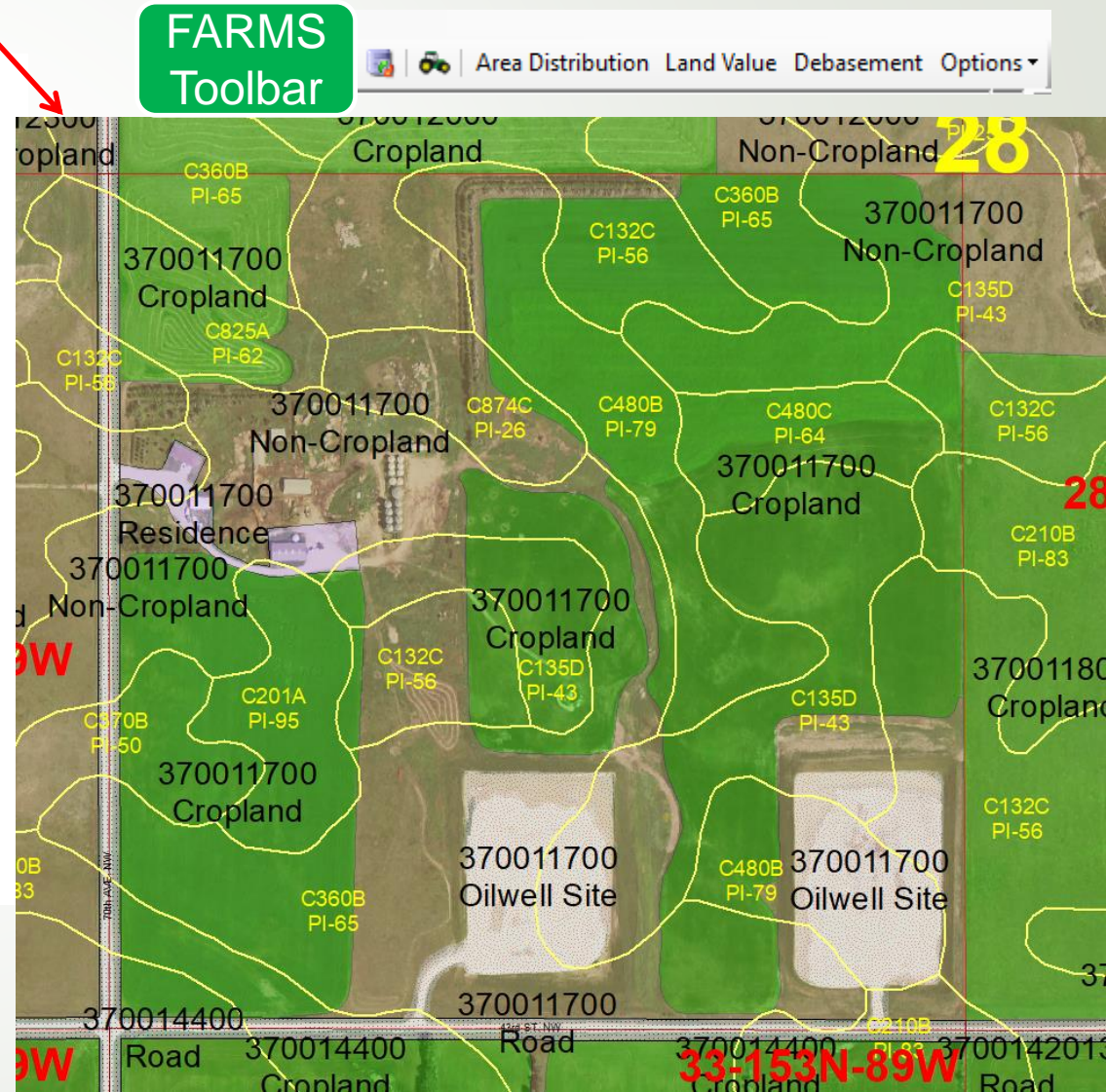
Mountrail County - Ag Land Actual Use



FARMS Processing – FARMS Program

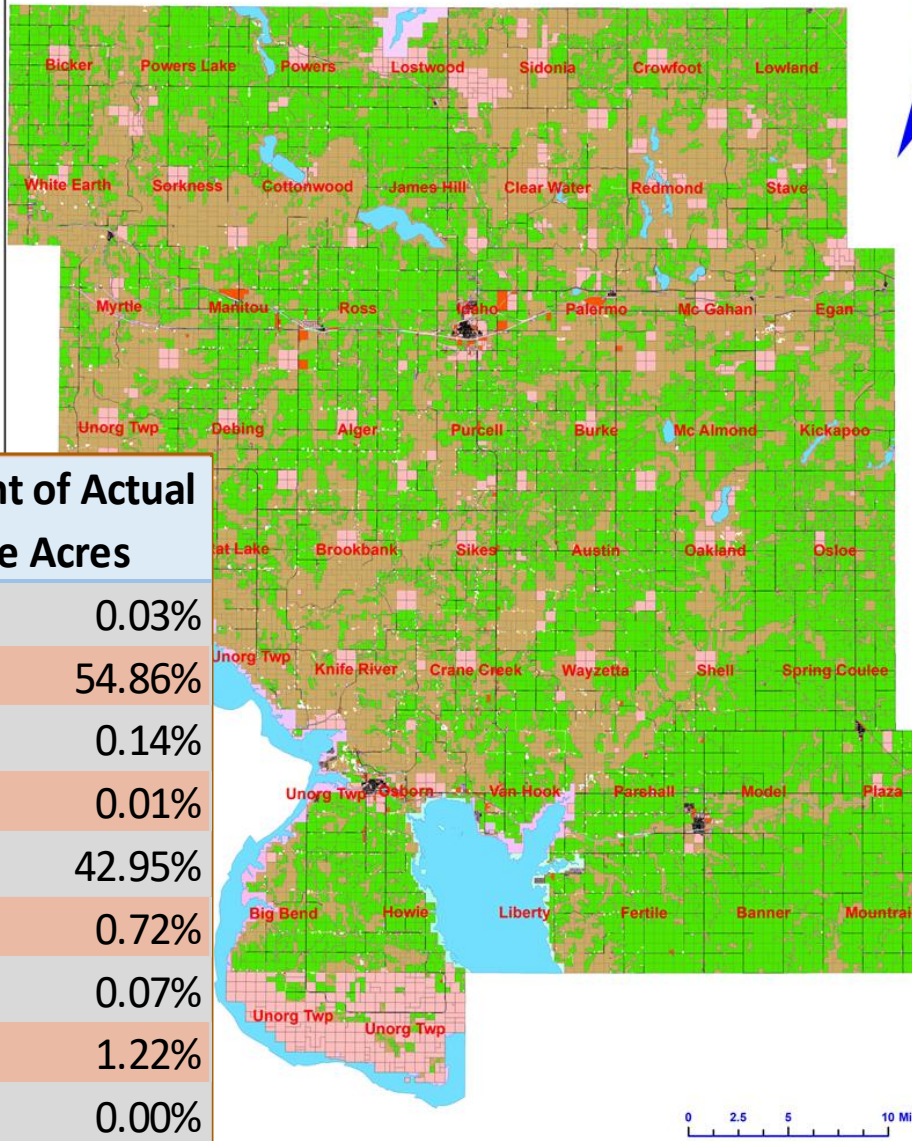
Sample Parcel
– SW ¼ Section

- ▶ 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 - 107,671 rows



Detailed Acreage Reporting

Mountrail County - Ag Land Actual Use



Land Use	Actual Use Acres	Percent of Actual Use Acres
Commercial	334.80	0.03%
Cropland	583,785.01	54.86%
Gravel Pit	1,496.77	0.14%
Non-Ag	123.23	0.01%
NonCrop	457,047.22	42.95%
Oilwell Site	7,618.84	0.72%
Residence	790.80	0.07%
Road	12,964.26	1.22%
(blank)		0.00%
Grand Total	1,064,160.93	100.00%

Land Use	Actual Use Acres	Percent of Actual Use Acres
01-Lowland 158-88		
Cropland	16,906.39	15.67%
NonCrop	4,837.26	4.48%
Residence	3.97	0.00%
Road	343.95	0.32%
02-Crowfoot 158-89		
Cropland	10,858.88	10.06%
NonCrop	10,366.88	9.61%
Oilwell Site	17.07	0.02%
Residence	7.32	0.01%
Road	250.69	0.23%
03-Sidonia 158-90		
Cropland	4,662.05	4.32%
NonCrop	15,002.39	13.90%
Oilwell Site	98.18	0.09%
Residence	5.95	0.01%
Road	200.89	0.19%
34-Rat Lake 154-93		
Commercial	6.04	0.01%
Cropland	8,380.50	7.77%
Gravel Pit	60.42	0.06%
NonCrop	12,473.27	11.56%
Oilwell Site	295.64	0.27%
Residence	11.24	0.01%
Road	206.27	0.19%
48-Mountrail 151-88		
Cropland	19,619.87	18.18%
NonCrop	2,959.16	2.74%
Road	334.56	0.31%

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

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

Two Years Ago....

"How do we do this....?"

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

JUST DO IT → 485K / 534K

RORY'S "BEAUTIFUL MIND"

VANGUARD ROCKS!

RON JOY SURF SHOP
ONE OF A KIND

WHAT IS UNIQUE ABOUT THIS PICTURE?

MAX \$23800
\$1600
\$1687
\$1380
\$1261
\$1970
\$1290
\$12600

- SOILS LAYER
- ARCMAP
- FARM CROP
- FARM RES
- 2 AC RES
- OILSITES/ROADS
- CRP
- GRAVEL
- SALTY WATER
- PRIVATE DRIVE

12-1200 \$100 2016 AB VALUE

• 53 \$ / 53 \$

NEED DEN

Sidwell GIS

UPDATE AERIAL PHOTOGRAPHY - \$900/120YR
- YEARLY ALSO
LAND USE LAYER(S)? \$86K
- CROP
- NON-CROP
- OTHERS
EXAMPLE COUNTY W/LAND USE
- WHAT IS PROVIDED

MUST ID ACRES BY LAYERS
TEST-A-LAYER
POWER
RAT LANE

D-U
D-U
D-P

MISS ANASTASIOU
ED
MICHAEL COLLINS

DO NOT ERASE

Soils' GAO
8942
1,066,991.70
\$450,085,337.04

NEW PLAN
VMS PROJECT - \$5265
VMS VISID - \$68999 + \$33799
SIDWELL DISCUSSIONS
FARMS - \$1599 / \$999 MAINT.

ARC MAP - \$1250 / \$400-500 ANNUAL
- TRAINING - 1-1.5 DAYS
SW TOOLS INVESTIGATION
- DEERAD - \$24-25K/ATR
- SIDWELL GIS - FARMS
- NAIP AIRPHOTO
CROP/NON CROP TOOLS
- CROPSCAPE
- ASBIDATA
BTAX DEFT REPORTING TOOLS &
FARMS SERVER.

- FARMS QUARTERLY PULL - \$1500

- PORTICO ? WHEN

- WHEN TO ROUND SOIL CODES? PARCEL

LAYERS HISTORICAL PHOTOGRAPHY

CROPLAND CRP

NONCROPLAND 3A, 5S

- RANGELAND

- PASTURE LAND

NON PRODUCTIVE

ALL MODIFIERS

INNOVATED TAMP ROADS, CITY ROADS

COMMERCIAL

OIL SITES

SALT WATER RESIDENTIAL
- ASMT CODES

TRG

IAAO-811-INTRO GIS - 18HRS \$100
IAAO-812-ADV GIS - 18HRS \$100
IAAO-102-INC. APPROACH-30 ROAD \$400

Elmore's undisturbed desk the night of his passing

VALUE SCHEDULES
Pi
AUM
NON PRODUCTIVE

Go BACK - BTTF
w/ PARCELS 26K30
= 520

STATE AID 3510K
SECTIONS ≈ 1800
UGOS - 1

VALUE \$142.85
* DO NOT ERASE
Diff 8,515,837.04

\$422.13
422.93
450,114,400

770/300

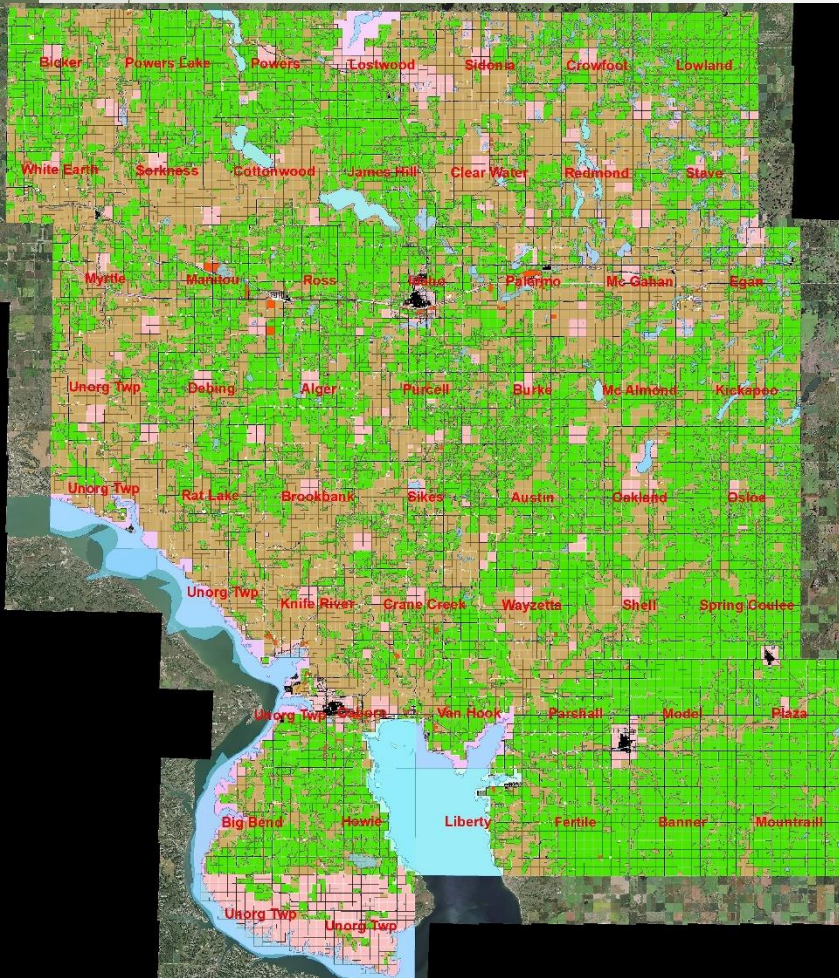
SCHOOL DIST
VOTING DIST
AMBULANCE
FIRE

2 VALUES

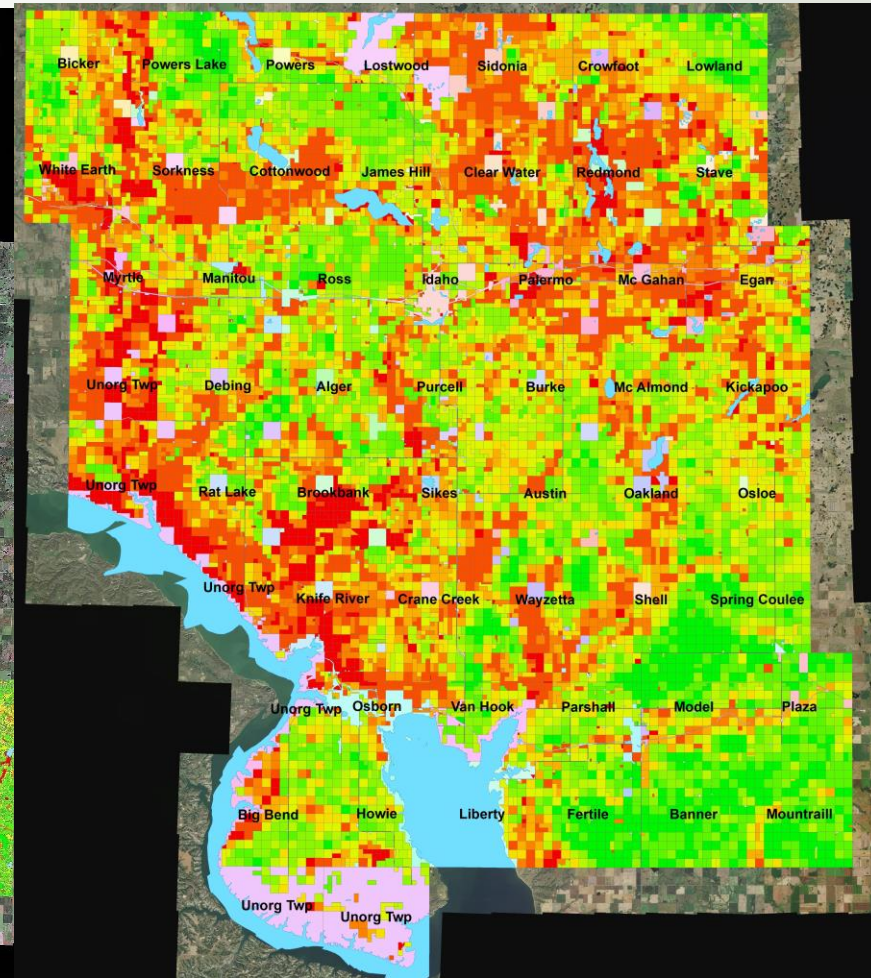
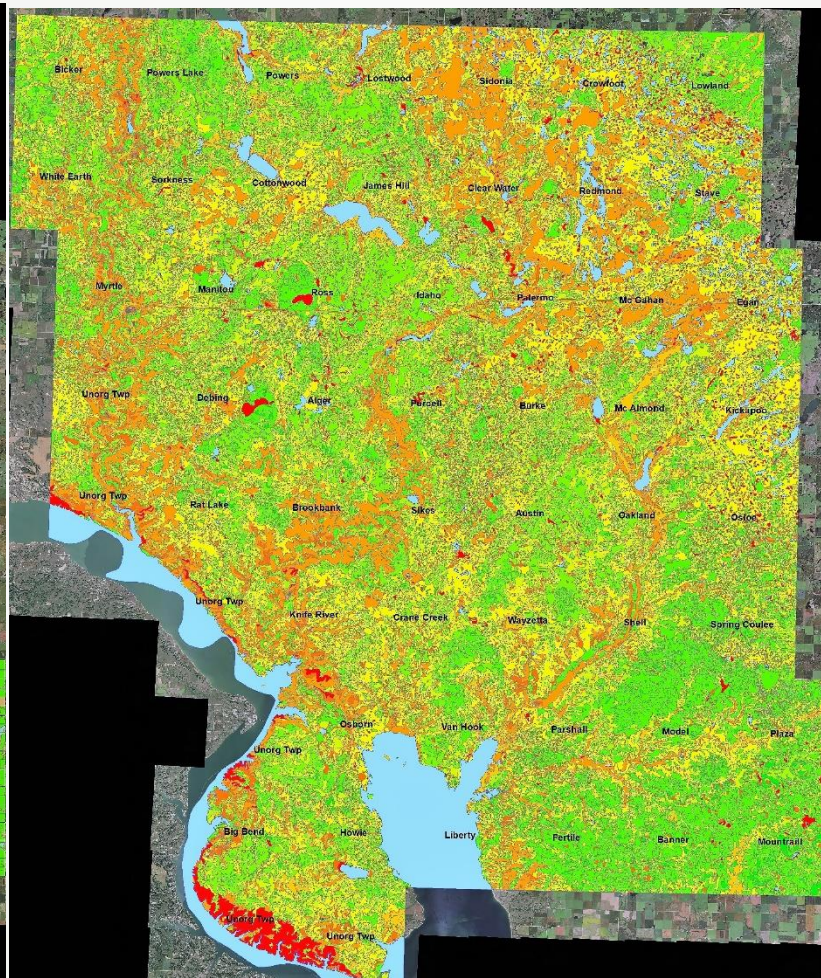
GIS is the Answer!

2019 Average Ag Land Parcel Value per Acre

Actual Use Layer



NRCS Soils Quality Layer



Robust Communication Campaign

- ▶ Ongoing throughout life of project
- ▶ Several Soils Committee meetings
 - ▶ Collaborative effort for rulesets
 - ▶ Additional input and suggestions
 - ▶ Attendance at Township Review Meetings
 - ▶ **Result? - “Ownership” of Ag Land Solution**
- ▶ Articles in the official County paper
- ▶ Presentations at County Commissioner meetings
- ▶ Presentations at Township Officer’s meetings
- ▶ Presentation to Lion’s Club
- ▶ Township Review Meetings – 55 Townships!
 - ▶ Ag Land Valuation overview
 - ▶ Reviewed and updated individual’s land for Actual Land Use



The Mountrail County Township Officers Association held their

Page 3

Township Officers Meet

(Continued from Page 1)

legislative hearings that they speak up and be heard. The proposed dramatic changes mean to help rural areas to meet market, but township are “ground zero” and they need to be heard because even a small change can make a big impact.

Richard also encouraged townships to take advantage of the county assistance and assistance programs as well as the uniform permit system.

Don Wheeler of the State Township Officers Association reminded officers about the state meeting in Bismarck on December 4 and 5 and the speakers they had to go. He stressed also that township officers communicate with the state representative about what they need. They are an advisory board to help township and be encouraged townships to use their website to help communication.

He also expressed his concern about how townships are getting left out, using townships need to speak up, get out there and be heard. Townships in western North Dakota need money to keep the roads in good shape. Meanwhile there is

the perception that the area has more money than they need. Roads are finally getting better, but if funding gets cut, he fears they will be back where they were. He also worries about the next legislative session and the impact it will have on the oil producing counties.

The final presentation came from the County Treasurer’s office. Lori Henson, Rony Porth and Theresa Caputo were on hand. Henson discussed the annual township tax equalization meetings, asking the township consider holding those meetings in centralized locations so that her office can hold several in the area they are committed to. Some townships did that last year and it made the process easier.

Tip also, they discussed the changes to land valuation after the county’s equalization meeting this year. They had originally proposed to use the benchmark method, but after that meeting, it was decided to use an actual land use and detailed note as a valuation method. To that goal, a committee was established and they are developing the land use drawings. Using Submitt, they started with three indicators of land use the first test and did a pilot township out with Fox Lake Township. This is a complex process and they were offering information to help township officers understand where they are in the process and how it will move forward.

Rony Porth started by describing the process of going through the 1.65 million acres of agricultural land in Mountrail County. The state requirements and rules are a complex process. They will be using the Submitt GIS, NRCS Web Soil Survey and the county tax system as they move forward.

The GIS system leaves. Right now, they have the soil types but also is adding the land use so they can include many more acres as they go.



Rony Porth started by describing the process of going through the 1.65 million acres of agricultural land in Mountrail County.

A screenshot of a software interface titled "LAND VALUATION RULESET". It shows a list of rules with columns for "Description", "Priority", and "Status". The rules are organized into sections like "Agriculture", "Residential", "Commercial", "Industrial", "Public Use", "Forest", "Water", "Waste", "Other", and "Miscellaneous".

Rule ID	Description	Priority	Status
1	Agriculture - Agricultural Use (A)	1	Active
2	Agriculture - Pasture (P)	2	Active
3	Agriculture - Hay (H)	3	Active
4	Agriculture - Other (O)	4	Active
5	Residential - Single-Family (R1)	5	Active
6	Residential - Two-Family (R2)	6	Active
7	Residential - Multi-Family (R3)	7	Active
8	Residential - Mobile Home (R4)	8	Active
9	Residential - Vacant (R5)	9	Active
10	Commercial - Retail (C1)	10	Active
11	Commercial - Office (C2)	11	Active
12	Commercial - Industrial (C3)	12	Active
13	Commercial - Warehouse (C4)	13	Active
14	Commercial - Other (C5)	14	Active
15	Industrial - Manufacturing (I1)	15	Active
16	Industrial - Other (I2)	16	Active
17	Public Use - School (PU1)	17	Active
18	Public Use - Government (PU2)	18	Active
19	Public Use - Other (PU3)	19	Active
20	Forest - Forest (F1)	20	Active
21	Forest - Other (F2)	21	Active
22	Water - Water (W1)	22	Active
23	Water - Other (W2)	23	Active
24	Waste - Waste (W3)	24	Active
25	Other - Other (O1)	25	Active
26	Miscellaneous - Miscellaneous (M1)	26	Active



2019 Agricultural Land Valuation Information

From Lori Henson, Director of Tax Equalization, Mountrail County. Mountrail County is in the process of implementing the use of detailed soil types with actual land use to determine the value of all agricultural land within the county. This soil valuation method is required by North Dakota Century Code 57-02-27.2.

The North Dakota Office of State Tax Commissioner provides counties with estimates of agricultural value per acre on a state-wide and on a county-wide basis as compared for the year by the Agriculture Department of NDSD. As part of the Web Soil Survey from the USDA, (reclassifying, re-weighing), soil types and productivity indices are identified for all lands within the county.

There is much to keep track of when utilizing Actual Land Use within Mountrail County – for instance, Mountrail County is comprised of:

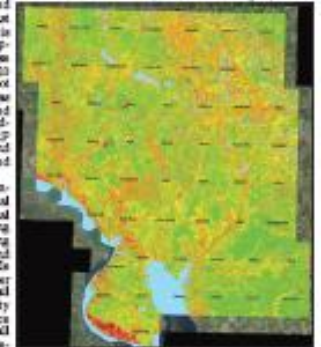
- 55 Townships – 7 cities
- 1,802 Sections
- Pasture – 1,971,355 Acres
- 1,241,380 Total Acres
- 1,665,908.94 Ag related acres
- 8,942 Ag related parcels
- 2,216 Ag related parcel owners
- 147 Soil Codes

Along with what Mountrail County is comprised of listed above, for equalized valuation, the Assessor's office needs to know how each parcel is being actually used:

- Cropland
- Non-Cropland
- Pastureland
- Commercial
- Residential
- Other (PA)
- Roads
- Other (S)
- Saltwater Disposal Wells

With this much information to keep track of – it is necessary to utilize advanced computing resources to summarize the information and review all sections within the Township for any updates to the Actual Land Use layer drawn in on the maps. All updates are then sent to Submitt for updating the actual tax information.

For 2019 actual tax valuation, a pricing schedule for each NRCS soil type is based off the productivity index (PI) rating for cropland, Actual Unit Month (AUM) calculation for noncropland, and the average (Continued on Page 4)



Pinpoint at the top of the NRCS map and below the actual land use layer described in this article.



Township Review Meetings

- ▶ Section by Section Reviews



GIS – Public Facing

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

The screenshot displays a web-based GIS application interface. At the top, the browser address bar shows the URL: <https://portico.mygisonline.com/html5/?viewer=mountraind>. The main map area shows a parcel with a blue border and a search bar containing the parcel number "320015000". The map displays various layers including soil types (e.g., C132B, C135D, C424A, C816B, C1350) and land use (e.g., Cropland, Non-Cropland, Oilwell Site). A sidebar on the left provides a "Filter Layers..." panel with the following options:

- Soils 2017 (NRCS)
- Land Use
- Zoning
- Cadastral
- Imagery
 - 2017 Aerial (NAIP)
 - 2016 Aerial (NAIP)
 - 2012 Aerial (NAIP)
 - 2010 Aerial (NAIP)
 - 2003 Aerial (NAIP)
- BaseMap
 - World Imagery
 - World Street Map

On the right side, a "Parcel Information" panel displays the following details for parcel 320015000:

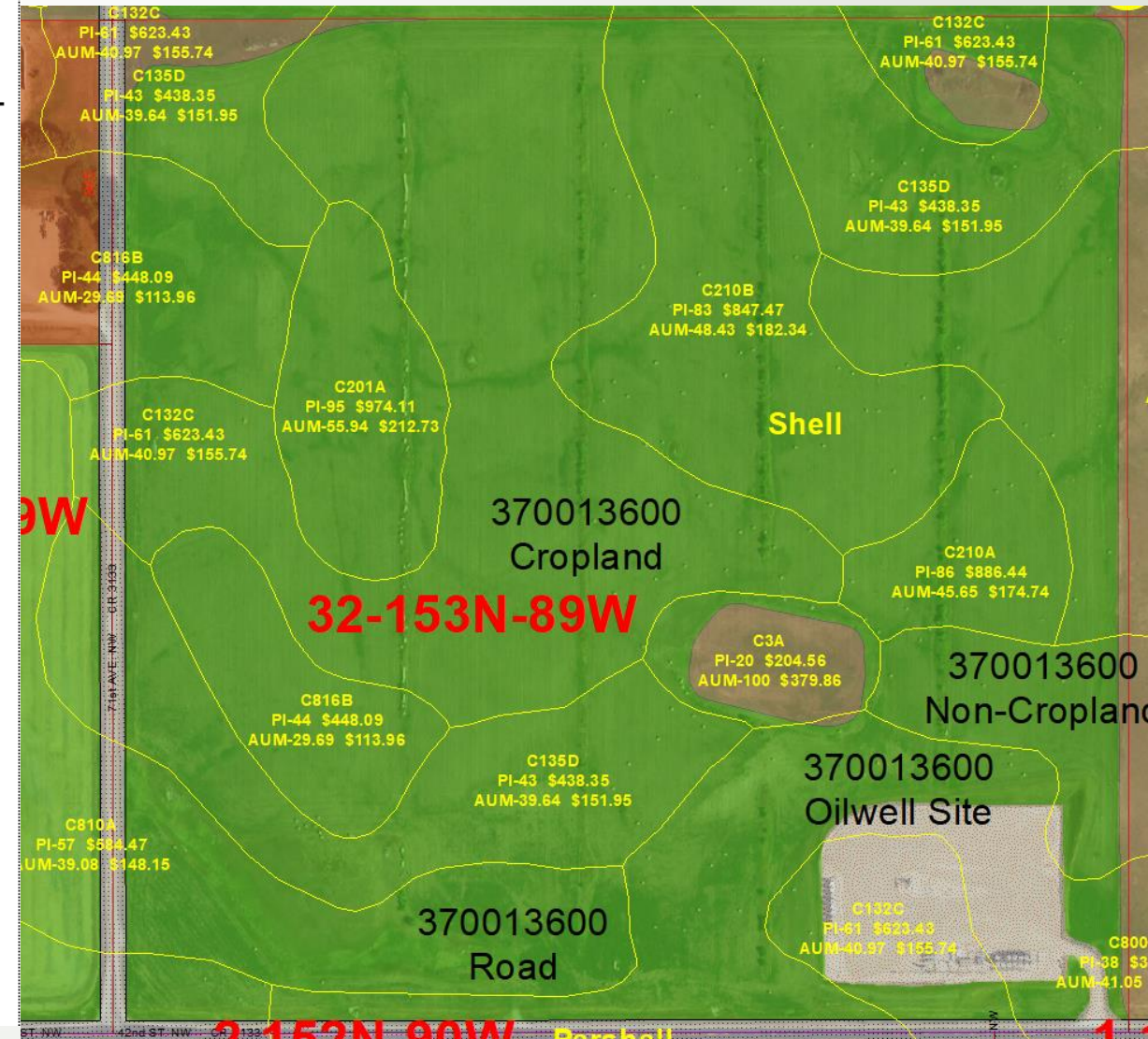
- Parcel Number: 320015000
- Acres: 160
- Owner: JORGENSEN/ELROY S & EMOJEAN S
- Owner Address: 4955 HIGHWAY 8 NEW TOWN ND 58763
- Legal Description: NW
- Sec Twp Rng: 27 154 091
- Township: SIKES TWP
- Plat: N/A
- Block: 000
- Lot: N/A
- Soil Information:
 - Soil: C132B - Acres: 14.91
 - Soil: C132C - Acres: 95.65
 - Soil: C135D - Acres: 38.85
 - Soil: C424A - Acres: 1.67
 - Soil: C816A - Acres: 3.52
 - Soil: C816B - Acres: 5.40

Land Valuation Reporting



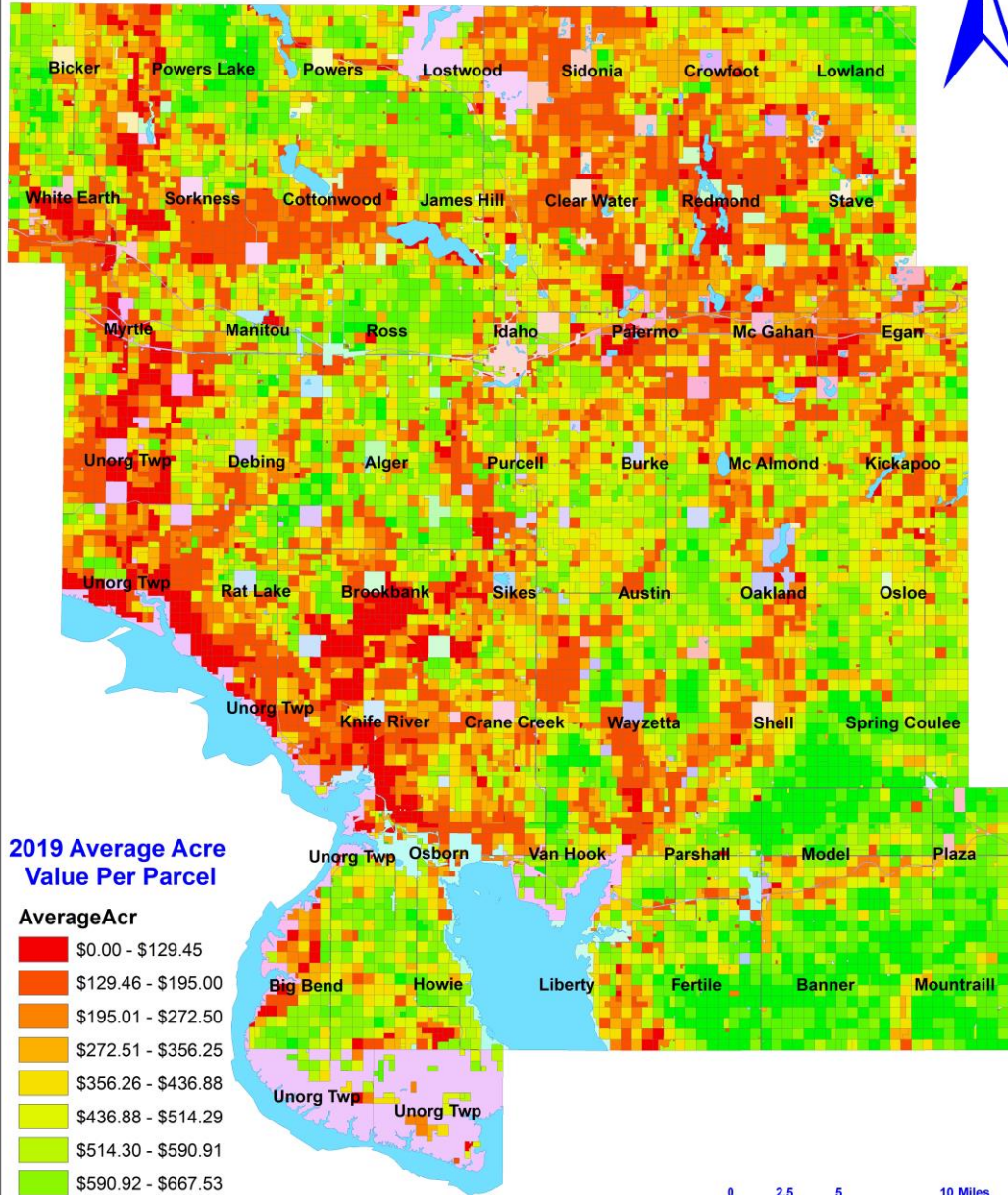
Mountrail Final Calculation Report

PARCELS	CRP NUMBER	LAND USE	SOIL CODE	SOIL NAME	NET ACRES	RATE	VALUE
37-0013600							157.49
		AG					
			C132C	Williams-Zahl-Zahill	47.75	623	29,768.78
			C135D	Zahl-Williams loams,	29.18	438	12,791.05
			C201A	Bowbells loam, 0 to 3	7.31	974	7,120.74
			C210A	Williams-Bowbells	4.95	886	4,387.88
			C210B	Williams-Bowbells	16.78	847	14,220.55
			C3A	Parnell silty clay loam,	1.42	205	290.48
			C800B	Appam sandy loam, 2	12.29	390	4,788.80
			C810A	Bowdle loam, 0 to 2	9.79	584	5,721.96
			C816B	Lehr loam, 2 to 6	11.12	448	4,982.76
					<u>140.59</u>		<u>84,073.00</u>
		NCR					
			C132C	Williams-Zahl-Zahill	1.74	156	270.99
			C135D	Zahl-Williams loams,	1.76	152	267.43
			C3A	Parnell silty clay loam,	2.50	380	949.65
			C800B	Appam sandy loam, 2	0.25	156	38.94
					<u>6.25</u>		<u>1,527.01</u>
		OS					
			C132C	Williams-Zahl-Zahill	3.34	156	520.17
			C135D	Zahl-Williams loams,	0.13	152	19.75
			C800B	Appam sandy loam, 2	3.27	156	509.27
					<u>6.74</u>		<u>1,049.19</u>
		RD					
			C132C	Williams-Zahl-Zahill	0.96	0	0.00
			C135D	Zahl-Williams loams,	0.66	0	0.00
			C800B	Appam sandy loam, 2	1.45	0	0.00
			C810A	Bowdle loam, 0 to 2	0.40	0	0.00
			C816B	Lehr loam, 2 to 6	0.44	0	0.00
					<u>3.91</u>		<u>0.00</u>
					<u>157.49</u>		<u>86,649.20</u>
					<u>157.49</u>		<u>86,649.20</u>



Finally

Mountrail County - Average Acre Value



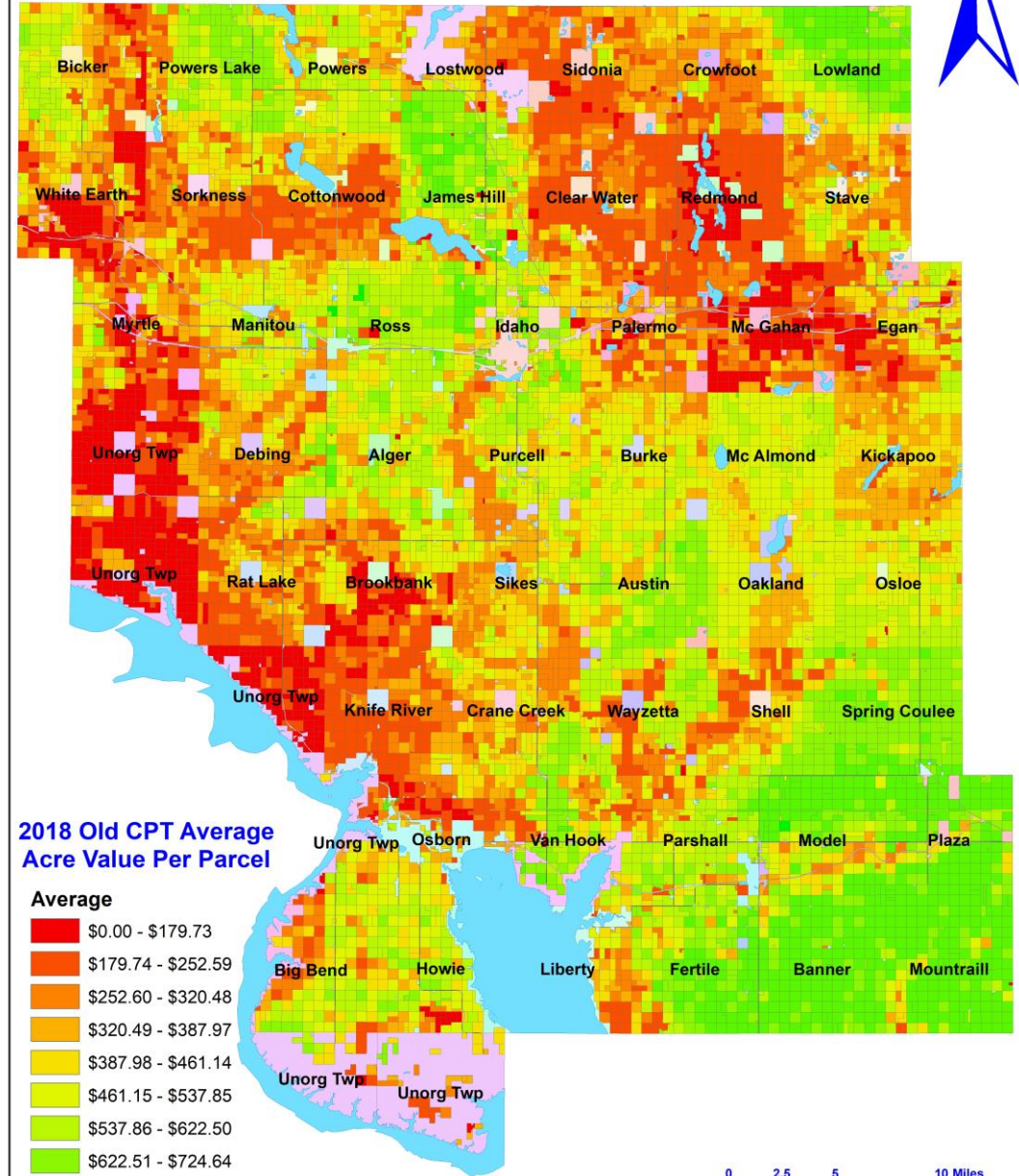
2019 Average Acre Value Per Parcel

AverageAcr

Red	\$0.00 - \$129.45
Orange-Red	\$129.46 - \$195.00
Orange	\$195.01 - \$272.50
Yellow-Orange	\$272.51 - \$356.25
Yellow	\$356.26 - \$436.88
Light Green	\$436.88 - \$514.29
Green	\$514.30 - \$590.91
Light Green	\$590.92 - \$667.53
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
Orange-Red	\$179.74 - \$252.59
Orange	\$252.60 - \$320.48
Yellow-Orange	\$320.49 - \$387.97
Yellow	\$387.98 - \$461.14
Light Green	\$461.15 - \$537.85
Green	\$537.86 - \$622.50
Light Green	\$622.51 - \$724.64
Green	\$724.65 - \$1,231.88
Dark Green	\$1,231.89 - \$2,440.00



Finishing up...

- Remember this formula? what does it 'say'?

Sigma means to add them up

$$B > \frac{1}{n} \sum_{i=1}^n x_i$$

'i'=1 means start adding with the first number

Sum	55
-----	----

	x_i
1	x_1
2	x_2
3	x_3
4	x_4
5	x_5
6	x_6
7	x_7
8	x_8
9	x_9
10	x_{10}

10 Count - "n"

'n' is total number of items

'x' is the actual items
'x_i' is simply the index number of the item

$$\frac{1}{10} \times 55 = \frac{55}{10} = 5.5 - \text{Average}$$

Hint

- **Be**
- **Greater than**
- **Average.....**

Questions?



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