

32nd Annual
**NATIONAL
NO-TILLAGE
CONFERENCE**

January 9-12, 2024 • Indianapolis, Ind.

Harness Precision Technologies for Higher Profits

Tim Norris



It's an honor to be back here speaking at one of the Premier Events for Agriculture in the Country

- I want to thank Lessiter Media for all that they do for the promotion of Soil Stewardship and Precision Agriculture.
- Also for their faith in me by continuing to ask me to speak at their events.
- Thank you to all the sponsors who's support makes this event possible.
- Thank you all for supporting the conference through your attendance.



My Agenda for this Session

- Introduce you to myself and my farm.
- Discuss the data that I collect and how I use it.
- Discuss the ROI that I see on some of today's technologies.



Who am I?



I owe everything to God and my family

- I grew up on a small grain and livestock farm in Gambier, Ohio.
- I had exceptional parents and siblings and they taught me how to work and how to live a good Christian life by their examples.
- Ever since I was a child all I wanted to do was to farm.
- But I thought that I knew better than my father and brother and decided to grain farm on my own instead of joining them on their grain and livestock. farm. I wanted bigger and better and no livestock.



1984 I started to farm on my own and all went well for a few years.

- I grew my farm in size to about 800 acres of corn, popcorn, soybeans and wheat.
- I was the youngest person ever to get elected to the board of directors at the Mount Vernon Farmers Exchange Company.
- I received the Good Year Conservationist of the Year award for Knox County in 1986
- Got married to the most perfectly matched mate a guy could ask for in December of 1989.
- We wasted no time as our oldest son Eli was born in December of 1990
- Even won a cruise in our county's No-Till Yield competition in 1990
- I have to admit, I got a big head!



God had other plans for me!!!

- We had a bad drought in 1988.
- Followed by an extremely wet year in 1989.
- Had another extremely wet year in 1990.
- Another bad drought in 1991.
- I had 4 bad years in a row.
- I had to decide whether to risk another year and possibly go bankrupt and lose the farm, or have an auction, sell all my equipment pay off all my bills and keep the farm.
- I had the auction and was asked to resign my board position at the Co-op.



This was exactly what God knew I needed.

- I needed to be humbled!
- I got a job dumping grain at the Farmers Exchange
- Soon moved into custom application
- Went to the “Countrymark Crops Development School”
- I started to realize I knew the mechanics of farming but had missed out on the Agronomics of farming.
- During that Crops Development School training I was exposed to Grid Soil Sampling in Champaign County Illinois.
- I knew if it could work there, where there are 2 soil types in a 80 acre field, Eastern Ohio was made for Precision Ag with 8 soil types in a 20 acre field.



From then on Precision Ag was my Mission!!!

- I worked in the co-op system with Precision Ag for 10 years, until I started Ag Info Tech, LLC in 2004.
- But in 2016, I felt God calling me to get ready to leave Ag Info Tech because he had something else in store for me.
- During my time owning Ag Info Tech, it was my privilege to grow my team of 1 to a team of 14 when I sold my last shares in 2019.
- It was my honor to serve over 800 different farms in the eastern 2/3rds of Ohio and North West corner of PA, by assisting them with the implementation of various Precision Ag Technologies.
- I wish everyone had the opportunity to meet so many amazing farm families like I did. I am grateful that several of them have become very good friends, far deeper than a normal business relationship usually entails.



God soon showed me what he had in store for me.

- 2 Days after I agreed to sell my remaining shares to 2 of my team members, Matt and Derik, I was approached by a startup company called “Smart Ag” to help bring their Autonomous Grain Cart solution to market.
- The first Autonomous Grain Cart Solution In Ohio was at Ed Piar’s in Knox County and the second was on Charlie Troxell’s farm, close to London, Ohio.
- We also had tractors in Michigan, Indiana, Illinois, Iowa, Mississippi, New York, Pennsylvania, North Dakota, Kansas and California.
- Our company was purchased by Raven Industries in November of 2019 and then Raven was purchased by Case in the fall of 2020.



Sonny Purdue visited our Michigan Sugar Beet Harvest using our Autonomous Tractor



But my heart was in farming and I felt called to leave and focus on the farm.

- Which fulfilled my life long dream of being a fulltime farmer.

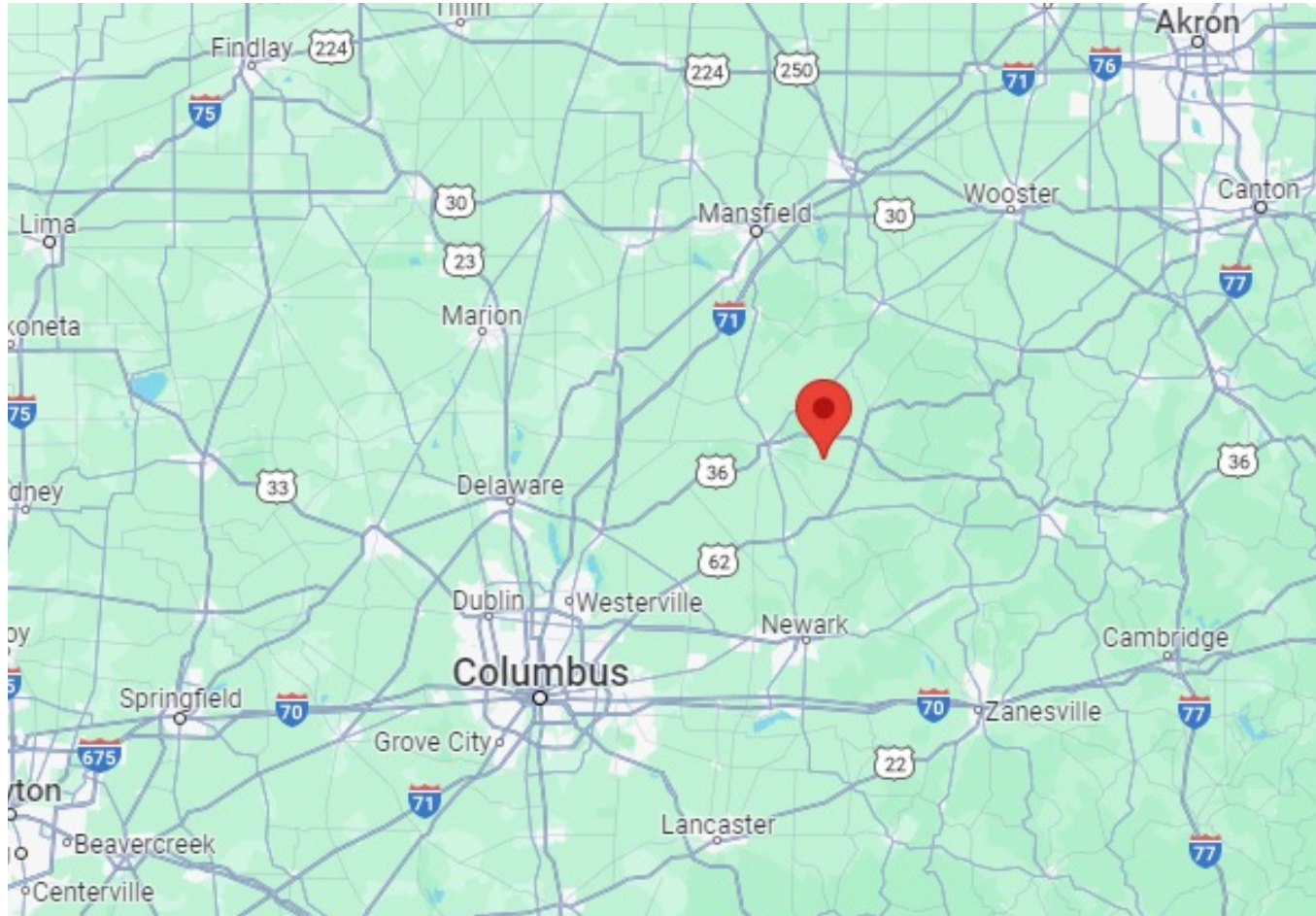


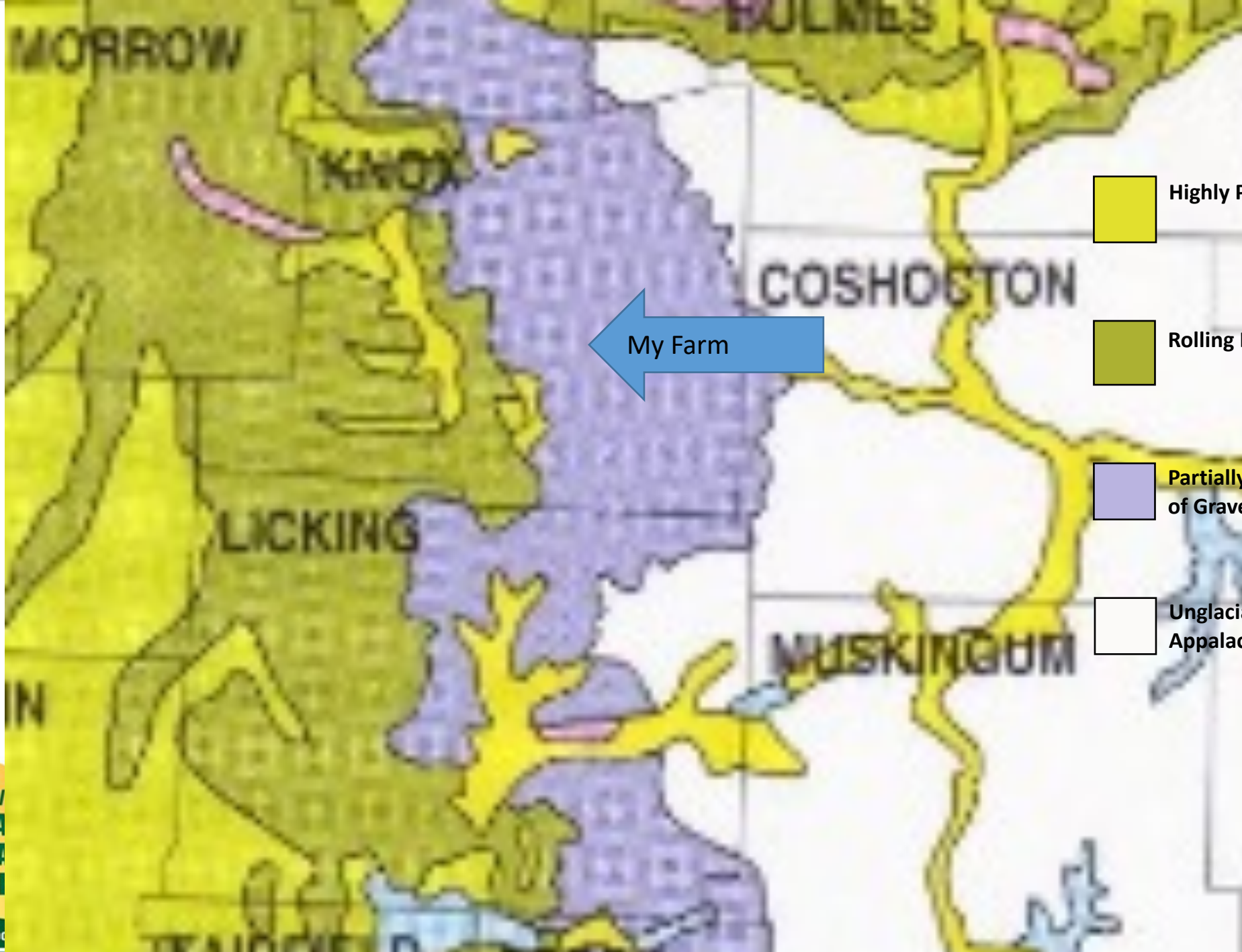
The middle of Knox County is where the glacier stopped.

- To the West it is flatter and part of the Corn Belt
- To the East are foot hills to the foothills to the Appalachian Mountains



Our Farm – Gambier, Ohio





 Highly Productive Flat Plains

 Rolling Hills Glacial Deposits

 Partially Carved by Glaciers Lots of Gravel Deposits

 Unglaciated foothills to the Appalachian Mountains



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Ground
by Bayer



Sound 

This makes farming a little more difficult.

- Most of Ohio worries about getting rid of water.
- Lots of our fields are underlaid with gravel making one of my concerns to conserve and retain water.
- We harvested a total of 122 fields in 2022 with an average field size of 13.6 acres.
- The amount of time we spend moving equipment around is ridiculous.
- I've often wondered why my ancestors didn't settle 60 miles further to the west.



Norris Grain Farms Vision Statement

I believe a Vision Statement should be two-fold

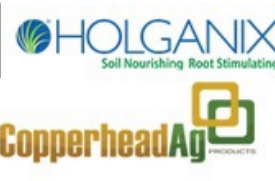
- Mission:



Norris Grain Farms Vision Statement

I believe a Vision Statement should be two-fold

- Mission: *Why we exist:*



Norris Grain Farms Vision Statement

I believe a Vision Statement should be two-fold

- Mission: *Why we exist:* To serve God by being the best caretakers of His land that we can possibly be. Making sure to leave His land in better condition than we received it.



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- Vision:



Norris Grain Farms Vision Statement

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- Vision: *What we want to become:*



Norris Grain Farms Vision Statement

I believe a Vision Statement should be two-fold

- Mission: *Why we exist:* To serve God by being the best caretakers of His land that we can possibly be. Making sure to leave His land in better condition than we received it.
- Vision: *What we want to become:* To grow our farm to 1,200 acres in the next 3 years by farming in a way that people ask us to farm their land. We will accomplish that by opening our farm to guests, and sharing the good news of today's agriculture while sharing our faith in God.



Our farm has 3 unique features to it.
1st, our house was built in 1830



Our home when we purchased it
in 1990.



Our home today.



2nd, our bank barn was built in 1901



Our barn when we purchased the farm in 1990.



Our barn as it is today.

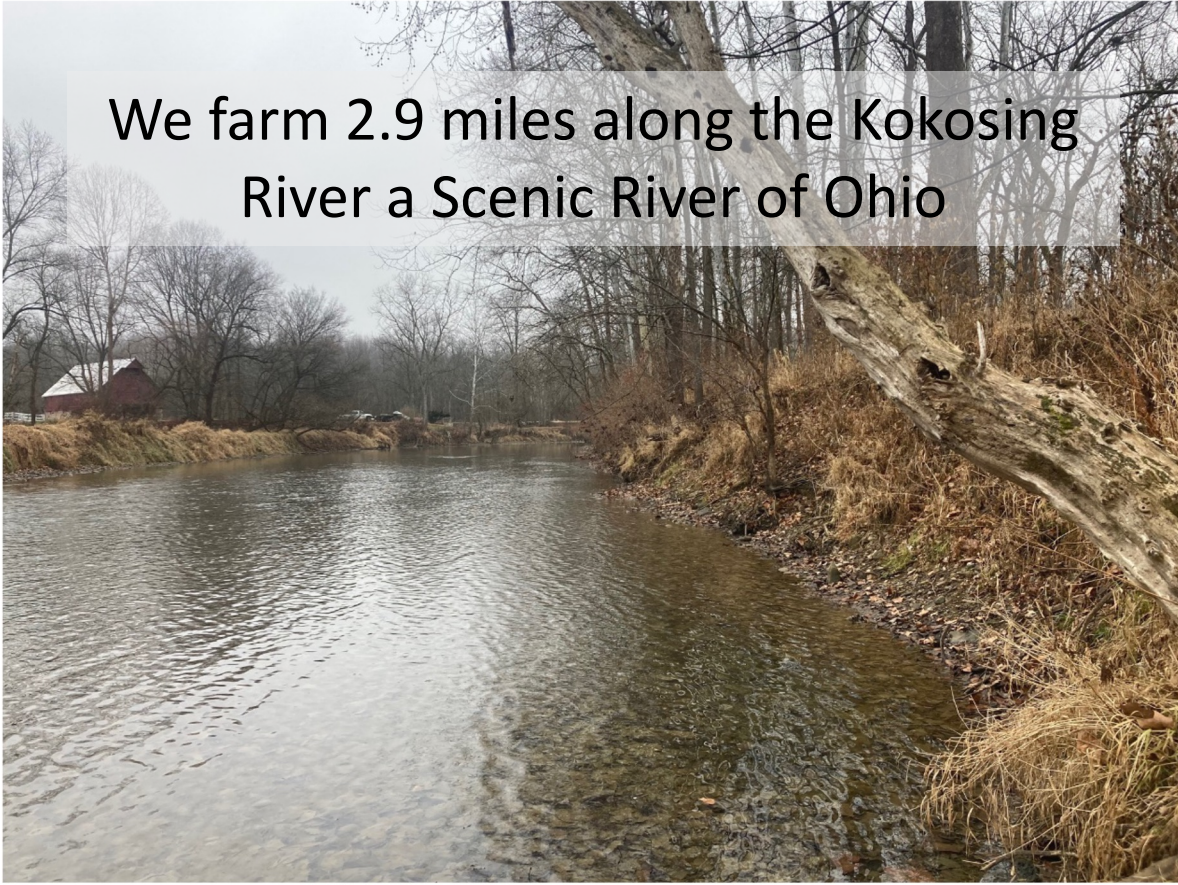


We have hosted a variety of family and community events in the barn.

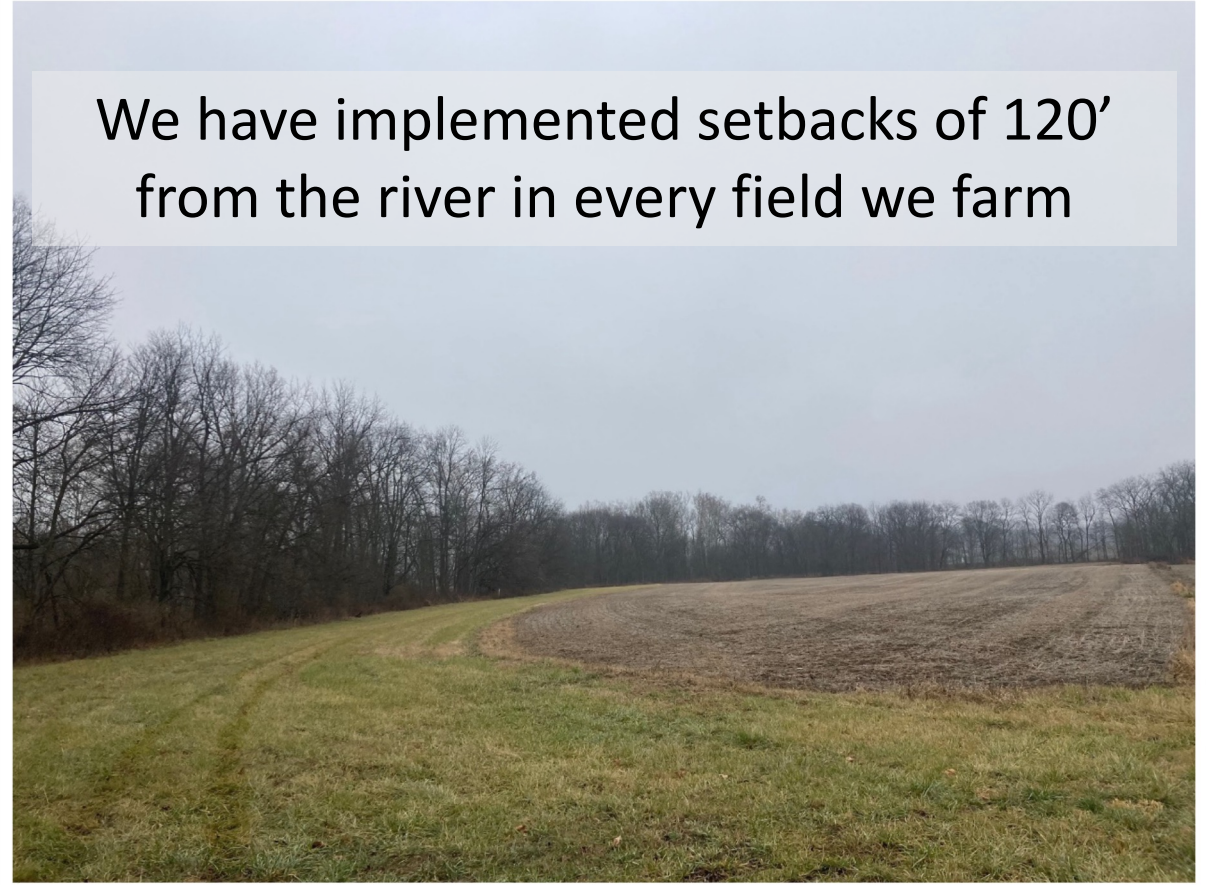


3rd, we have over 2/3's of a mile of river frontage.

We farm 2.9 miles along the Kokosing River a Scenic River of Ohio



We have implemented setbacks of 120' from the river in every field we farm



Heidi and I wanted to preserve our farm for future generations to experience and utilize.

We were one of the first farms in the state to be enrolled in the ODA's Farmland Preservation Program

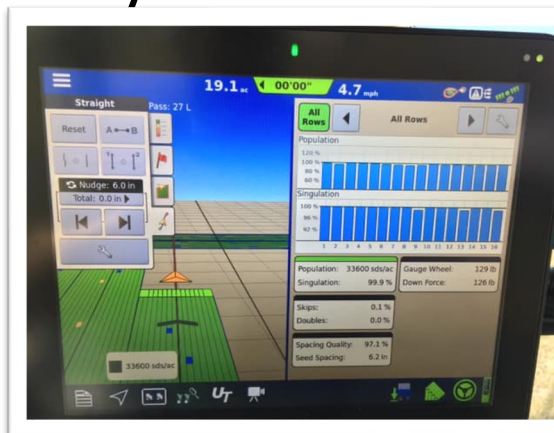


Governor Taft visited our farm to honor us for our participation in the program.



We No-Till everything we can.

- Last year we no-tilled 1,400 acres of the 1,700 we planted.
- We often partially till the river bottoms because they flood. Had 100 acres we incorporated chicken manure.
- I picked up a new farm that had been conventionally tilled so we used a vertical tillage tool to help “Dry it Out”.



Sunflowers

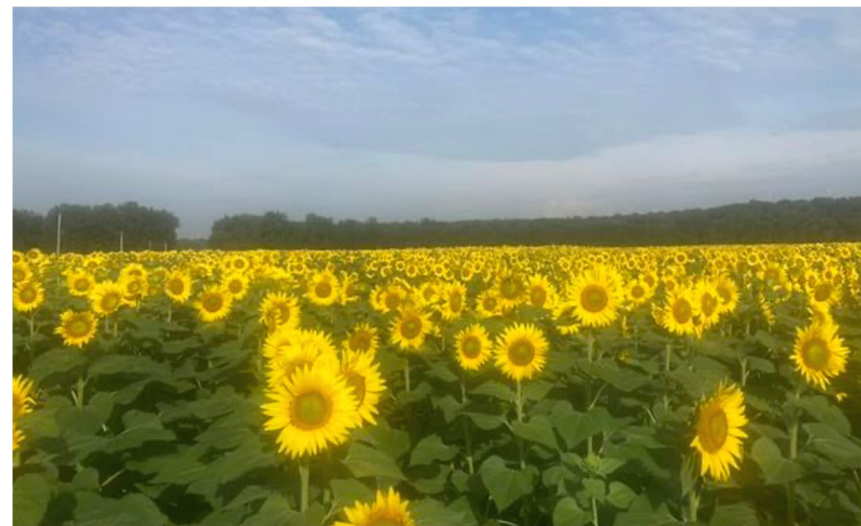
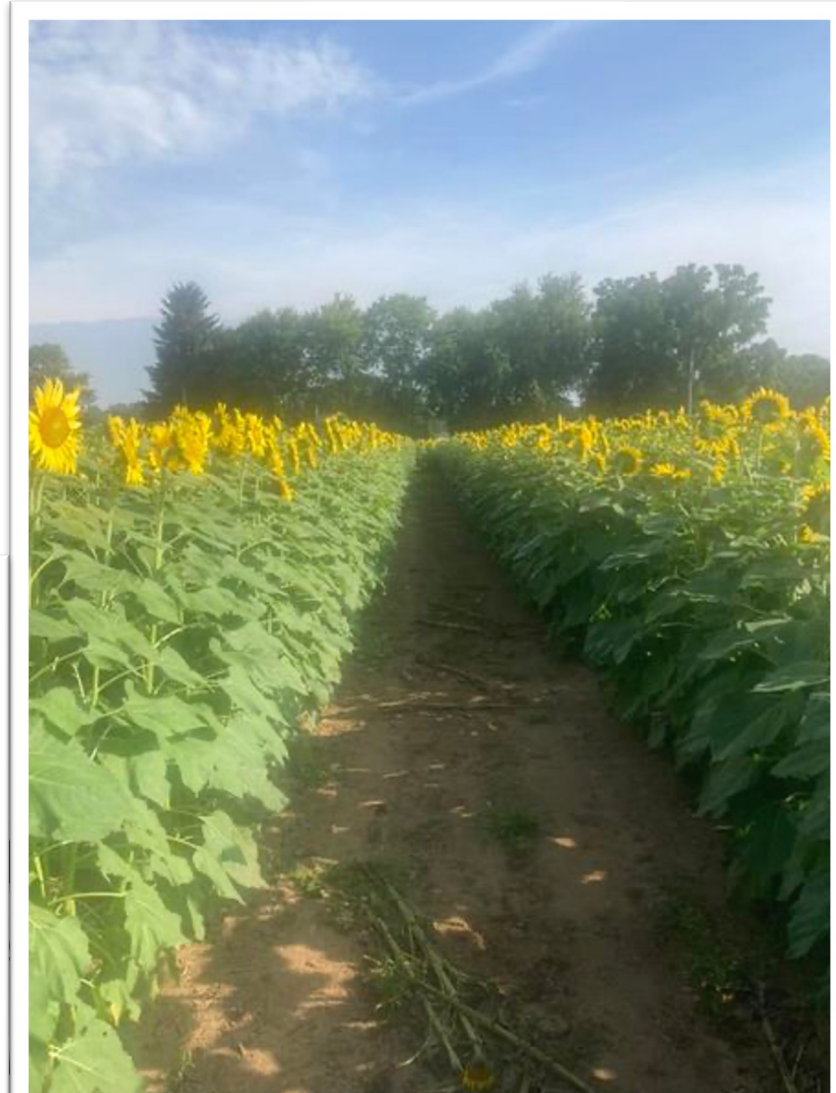
- Started with 2 ½ acres in 2021 as a trial run to see how they would grow.
- I thought they would look good and it would draw some attention to our farm.
- We couldn't believe the amount of people that stopped and took pictures.
- I planted them on the east side of the driveway, big mistake!



Sunflowers



We planted 5 acres of Sunflowers in 2022 That year we openly invited the public to come and see.



2022 Cover Crop after Wheat

- Used a 8 variety Mix
 - Oats
 - Cereal Rye
 - Kale
 - Crimson Clover
 - Winter Peas
 - Buckwheat
 - Flax
 - Sunflower



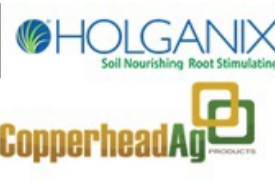
2023 Sunflowers

- Planted them on one of our landlords farm on a state route.
- Again we had well over 1,000 visitors to walk the fields.
- I feel this is a great way to give back to the community.
- Free to walk and \$2.00 per flower if they take any.
- Bag and sell the seed for bird seed.



Precision Practices that I Utilize

- Grid Soil Sampling
- Variable Rate Fertilizer, Lime and Manure
- Ag Leader Auto Steer on all the Tractors
- Planting
 - Variable Rate Seeding
 - Ag Leader Hydraulic Down Force
 - Sure Stop Clutches



Precision Practices that I Utilize

- Sprayer
 - Currently Trimble Auto Pilot but switching to Ag Leader
 - Currently Ag Leader Direct Command but switching to Ag Leader Right Spot
- Combine
 - Ag Leader Yield Monitoring
 - Case Auto Steer
- Ag Leader SMS and AgFiniti



I am sure that you have heard that you can't manage what you can't measure?

- Your Precision Ag displays can record almost every operation in your fields.
- You only get one chance to capture that data.
- Remember you can't measure what you don't record.
- And you can't manage what you can't measure.



I feel Precision Ag is Key to Our Farms Success!

- We don't have as productive soils as to the west of us.
- We don't have the efficiency of scale like larger farms do so we need to be as efficient as possible with our inputs.
- Record keeping is one of the most important parts for my farm.
- I have precision Ag Data on my farm since 1998
- I will show you an example of some of the data set I have on one field at my house.
- Due to time I'm not showing you soil test data or as applied maps.



Home 1

Project Workspace

- Ferinbaugh
- Gary Davis
- Hallinan
- Holt
- Home
 - H1 - 36.3A
 - H2 - 3.9A
 - H3 - 6A
- Houck
 - Hou1-17A
 - NO Year
 - Soil Survey
 - NO Product
 - NO Instance
 - 12/17/2022 11:36:50 AM
 - 2023
 - 2022
 - 2021
 - 2020
 - 2019
 - 2018
 - 2017
 - 2016-2021
- Huffelnager
- Kenyon
- Leach
- McPhail
- Perkins
- Robinson
- Ryan
- Stream
- White
- Potential Rental Ground
- Steve Andrews

Map 1 Layers

H1 - 36.3A | Norris, Tim

Field - Name

Transparency - 100 %

Field - Name

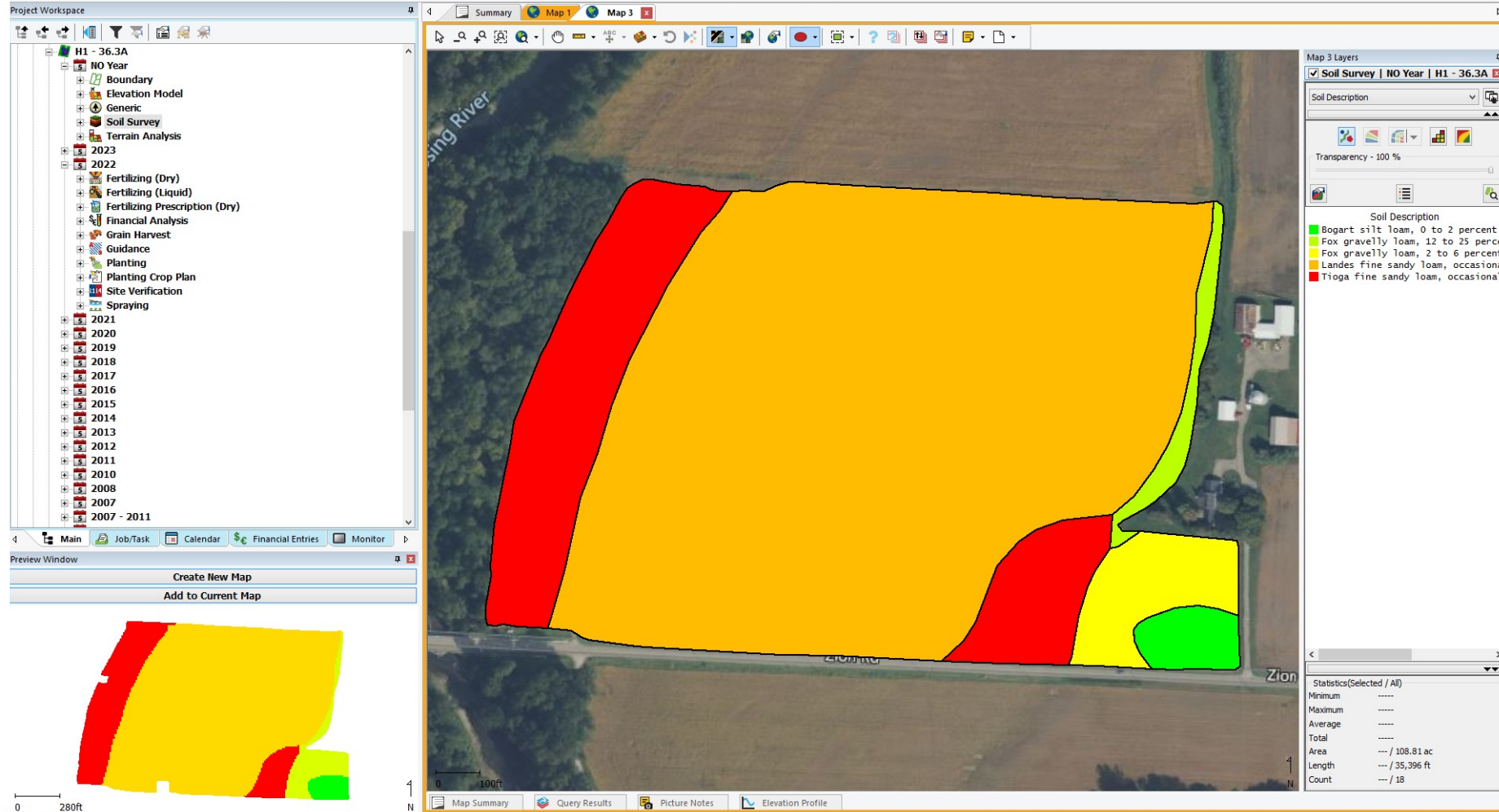
H1 - 36.3A (36.24 ac)

Statistics(Selected / All)

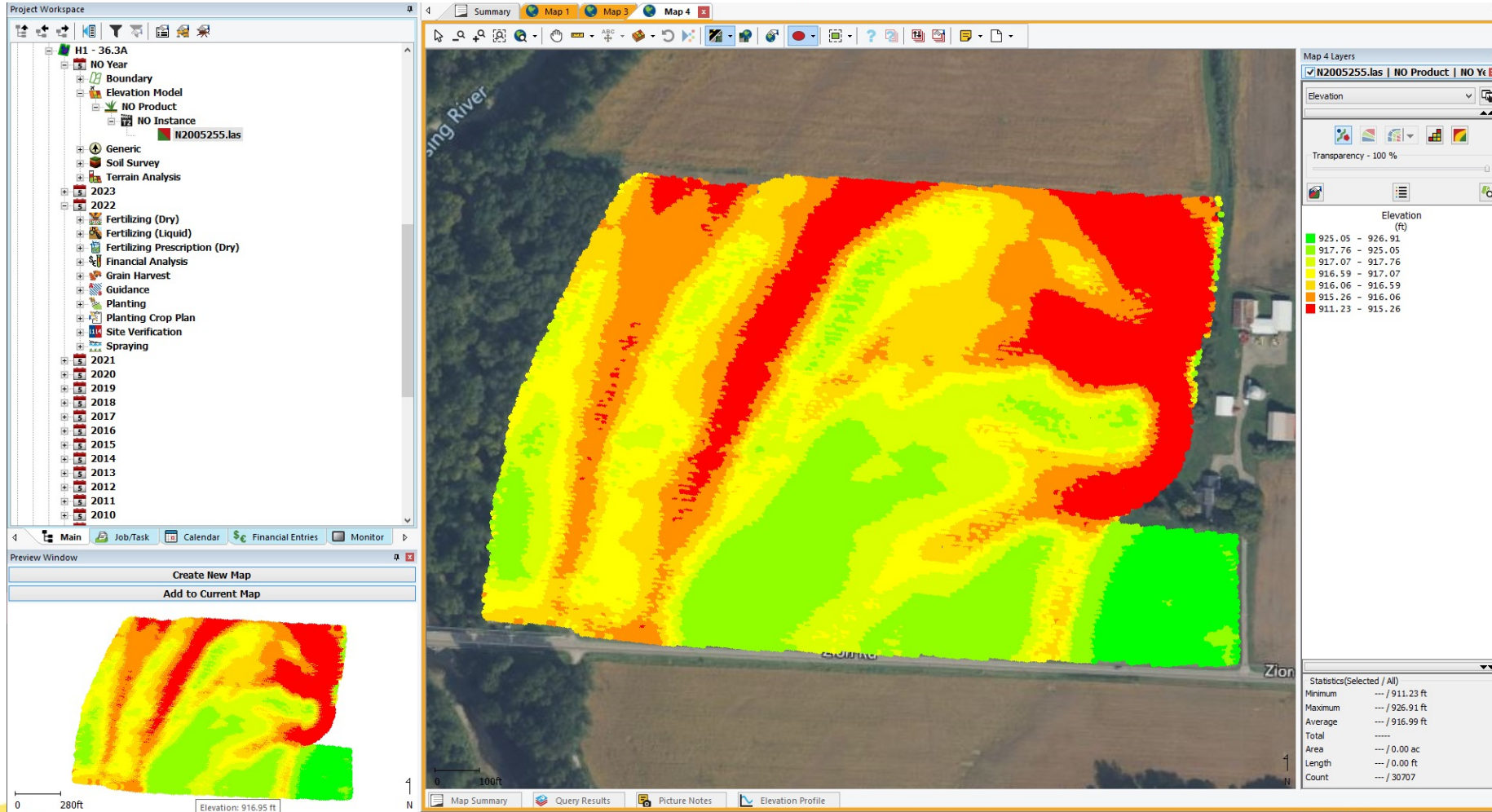
Minimum	----
Maximum	----
Average	----
Total	----
Area	--- / 36.24 ac
Length	--- / 5,722.7 ft
Count	--- / 1



Soil Type



Elevation Model - Lidar

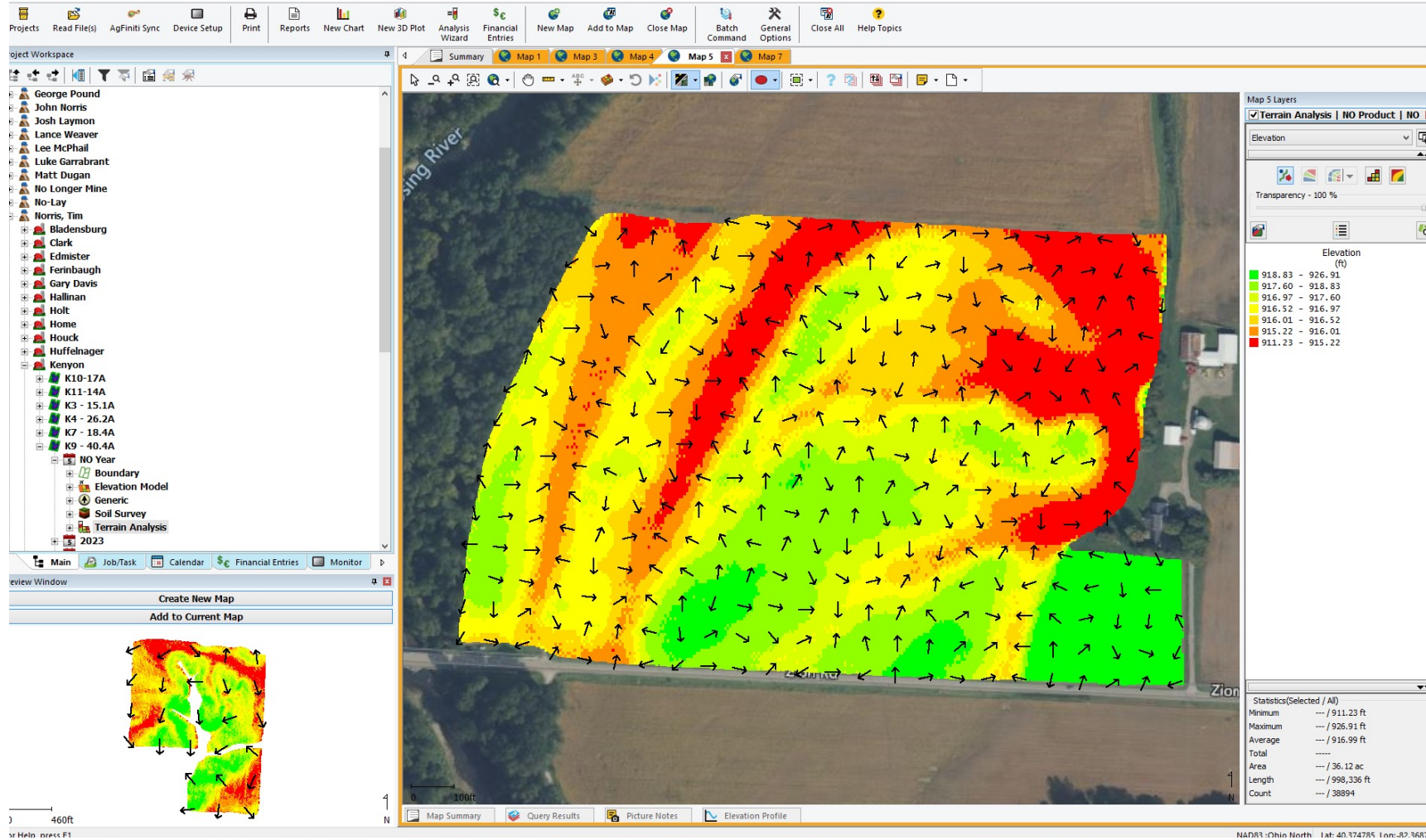


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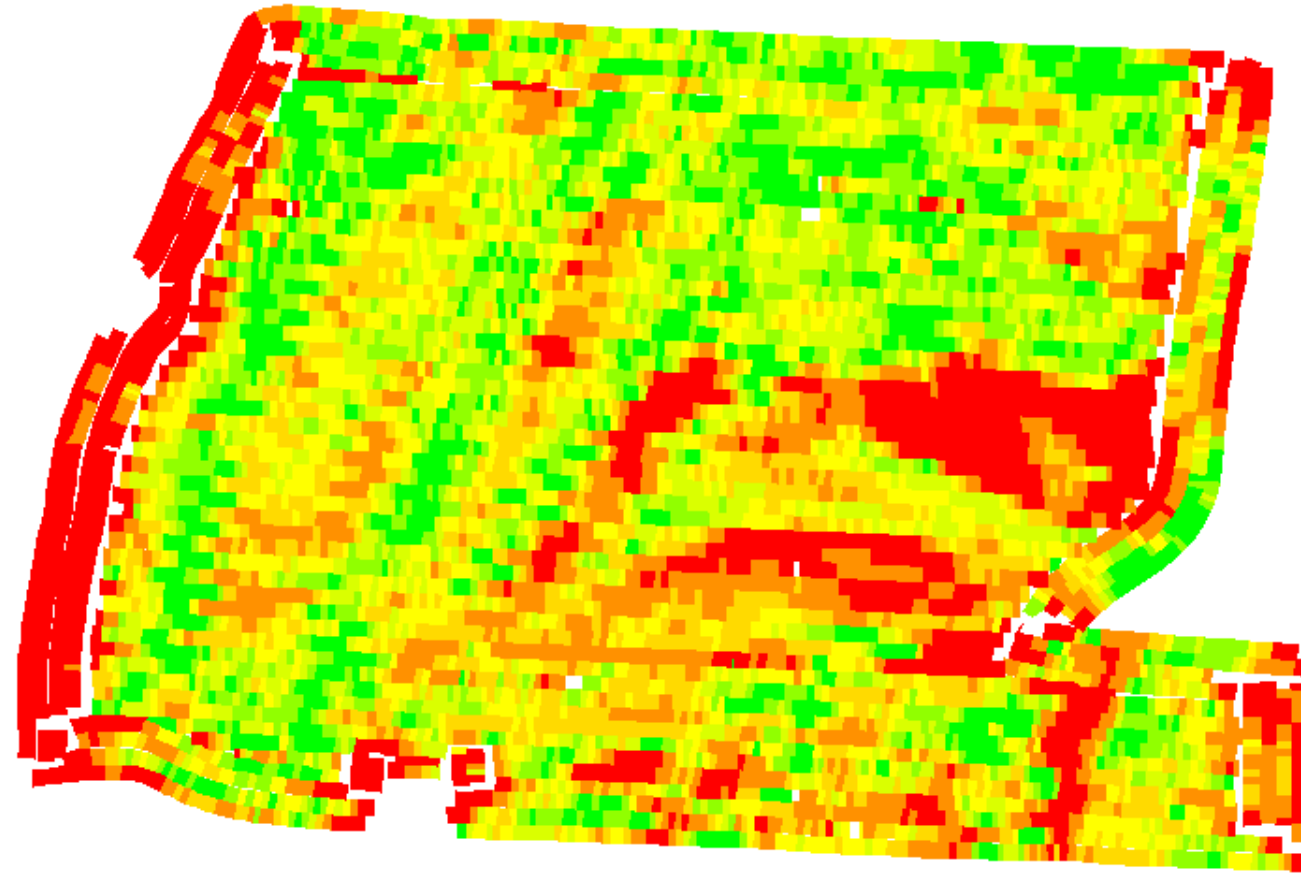
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From the LIDAR I make a Terrain Analysis



2019 Yield



Map 6 Layers

Grain Harvest | 2019 | H: x

Yield (Dry) [dropdown]

Transparency - 100 %

Yield (Dry)
(bu/ac)

254.47 - 447.31	(4.523 ac)
237.83 - 254.47	(4.836 ac)
223.81 - 237.83	(4.969 ac)
208.86 - 223.81	(5.071 ac)
190.59 - 208.86	(5.122 ac)
150.62 - 190.59	(5.228 ac)
6.40 - 150.62	(5.459 ac)

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MonTag

The Andersons
GS3 QUALITY SEED

HOLGANIX
Soil Nourishing Root Stimulating

APACHE ET
SPRAYERS

ForGround
by Bayer

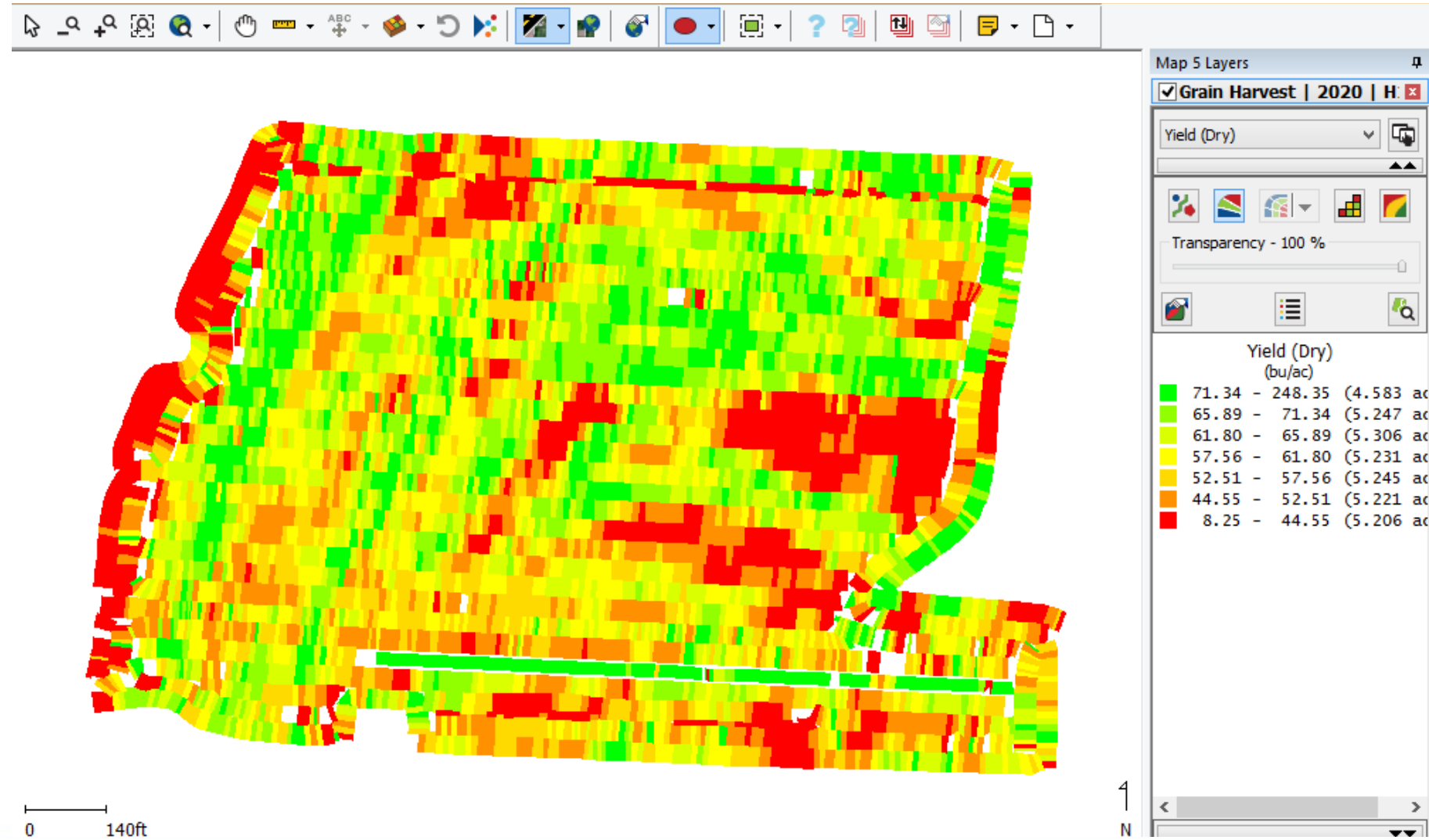
LAFORGE

Martin Till

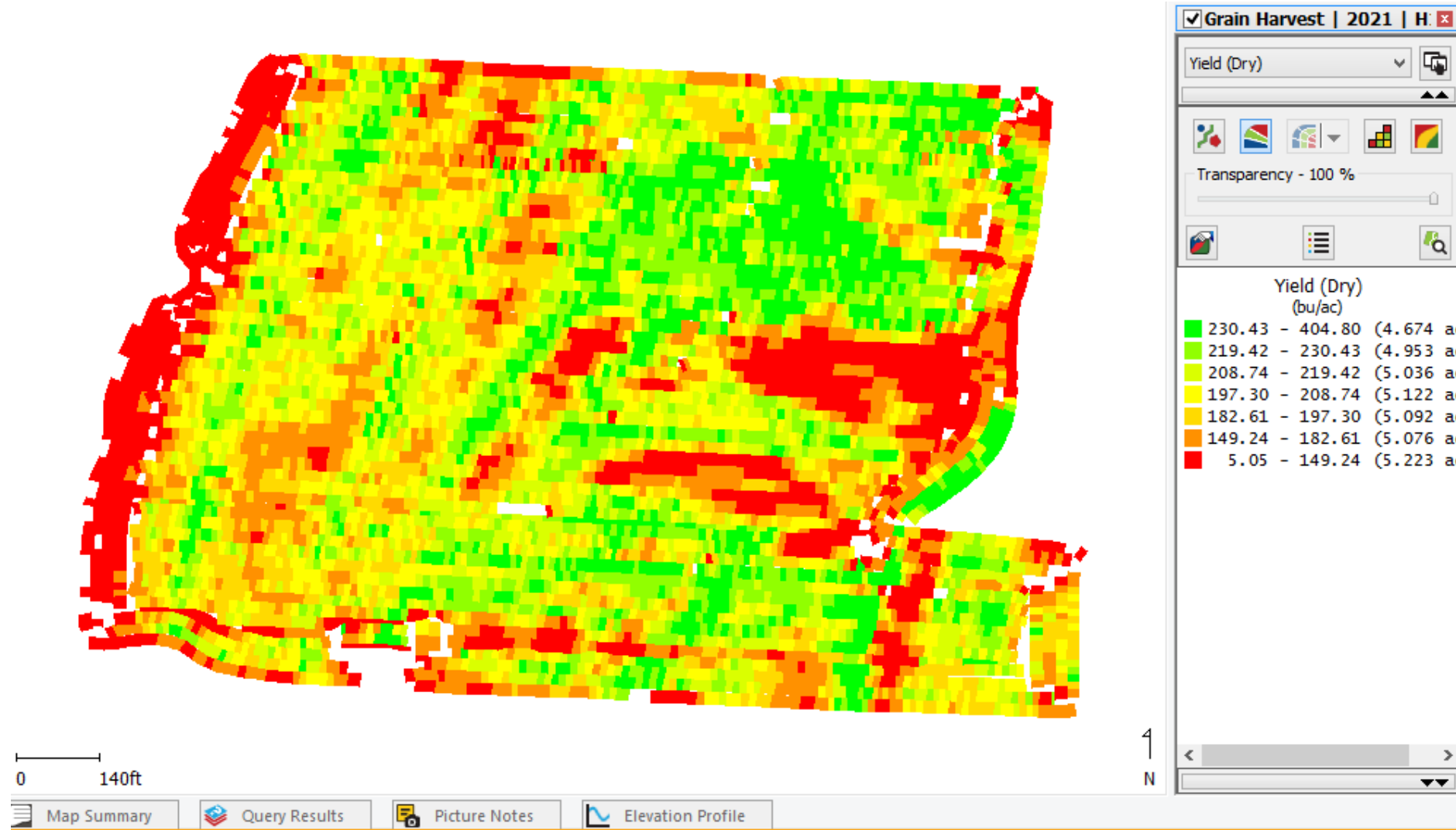
Great Plains
"Harvest Starts Here."

Sound

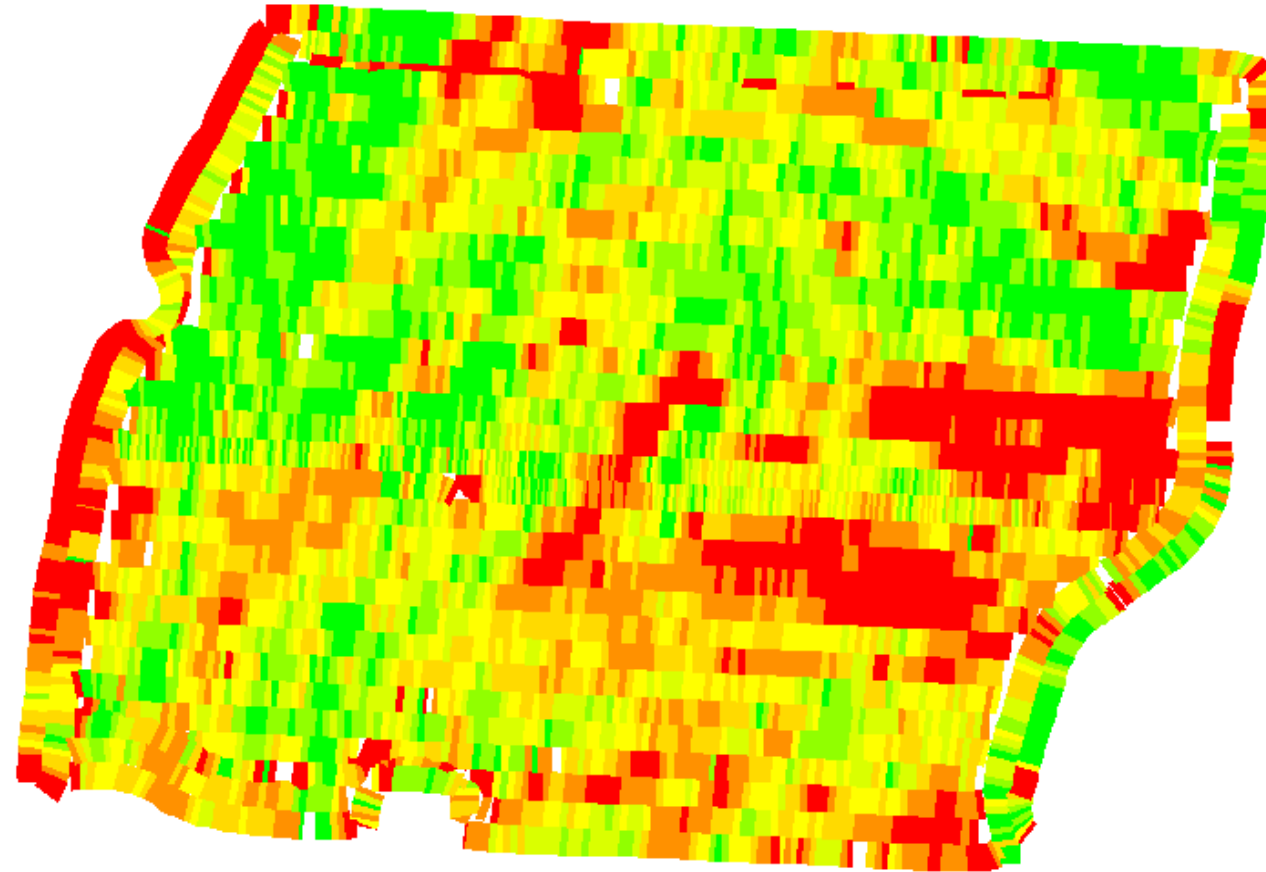
2020 Yield



2021 Yield



2022 Yield



0 140ft

Grain Harvest | 2022 | H

Yield (Dry)

Transparency - 100 %

Yield (Dry)
(bu/ac)

68.78 - 309.54	(4.759 ac)
63.78 - 68.78	(4.981 ac)
59.60 - 63.78	(4.925 ac)
55.48 - 59.60	(4.823 ac)
50.48 - 55.48	(4.963 ac)
41.35 - 50.48	(4.845 ac)
5.03 - 41.35	(4.522 ac)

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Andersons
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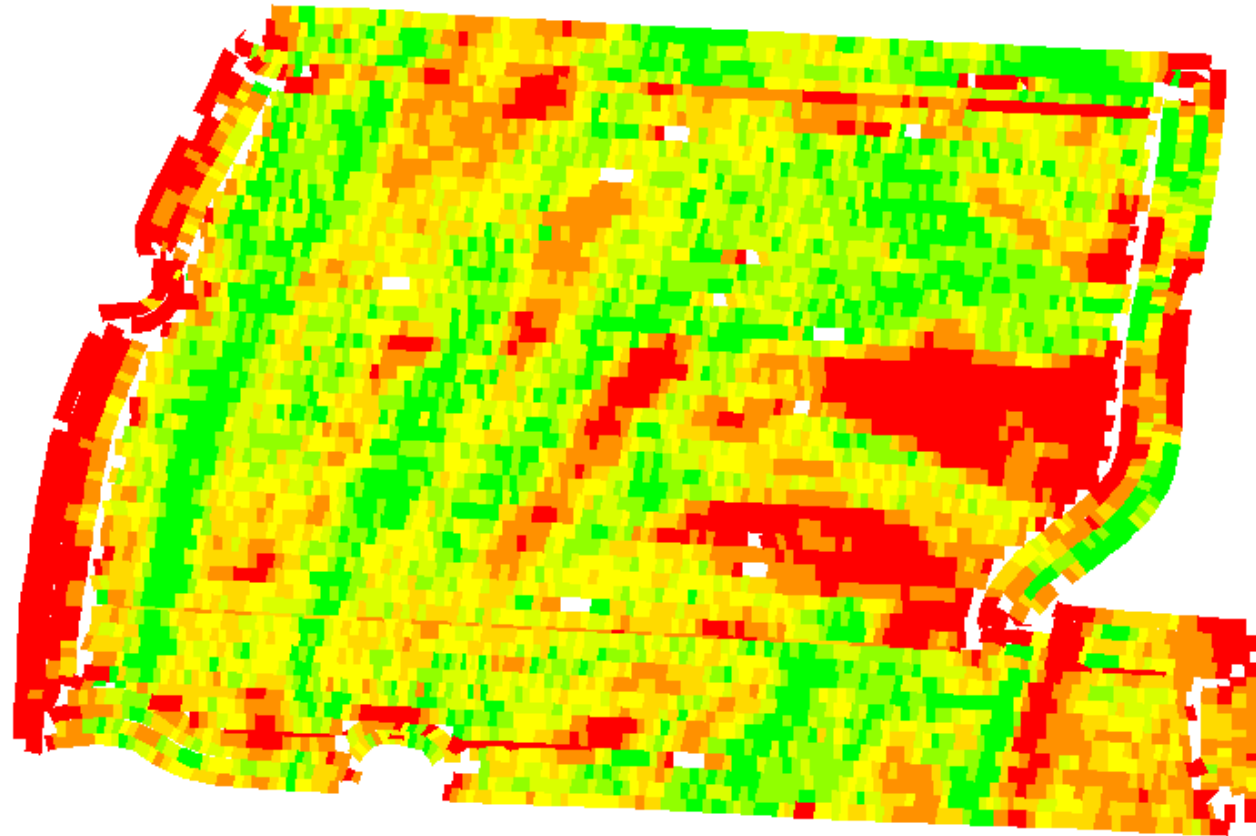
ForGround
by Bayer

L
LAFORGE

Great Plains
"Harvest Starts Here."

Sound

2023 Yield



Map 2 Layers

Grain Harvest | 2023 | H

Yield (Dry) [dropdown]

Transparency - 100 %

Yield (Dry)
(bu/ac)

268.14 - 495.19	(4.850 ac)
254.34 - 268.14	(4.983 ac)
242.26 - 254.34	(4.991 ac)
228.66 - 242.26	(5.012 ac)
210.24 - 228.66	(4.971 ac)
171.13 - 210.24	(4.909 ac)
6.02 - 171.13	(4.985 ac)

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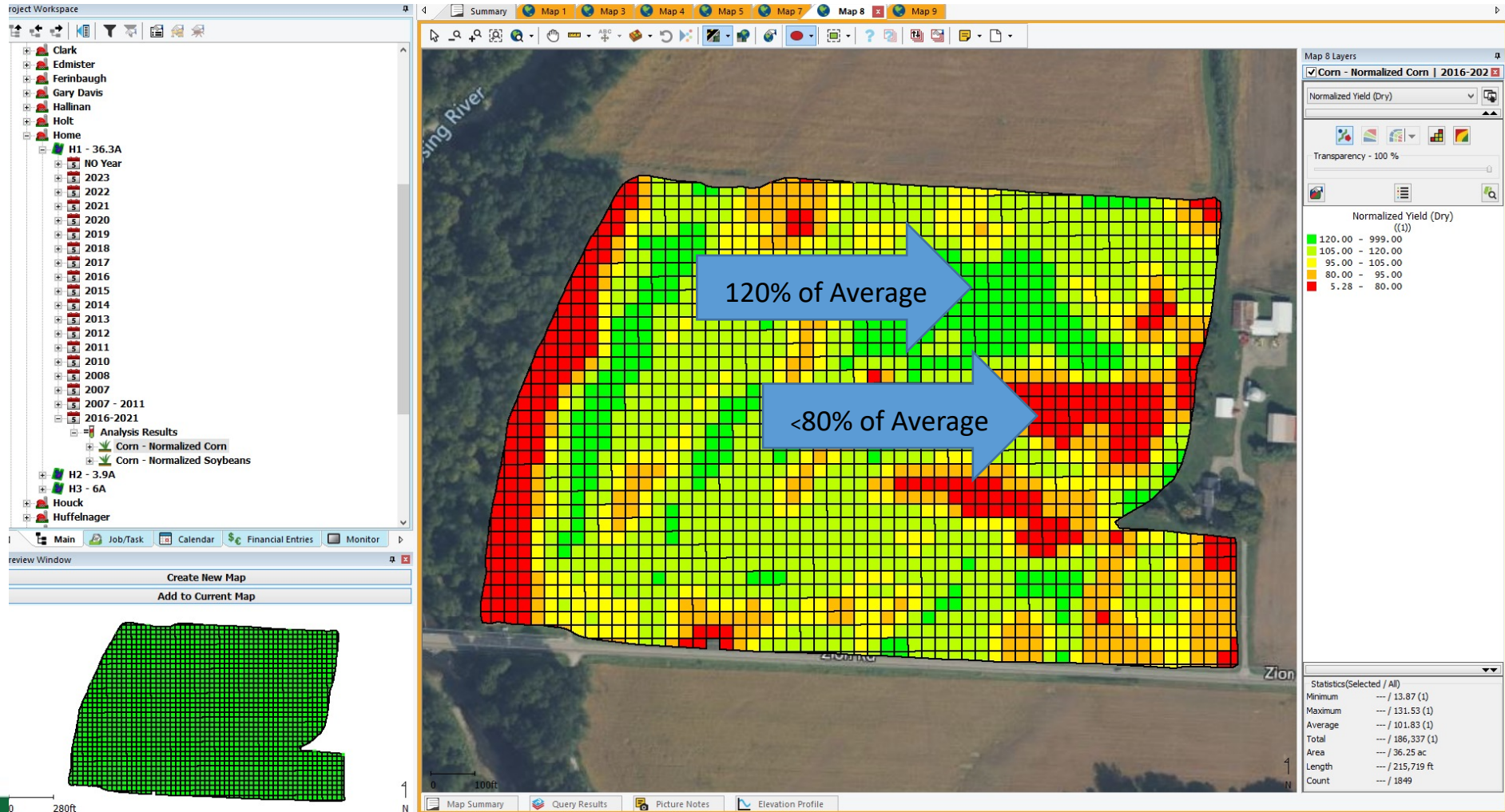
CopperheadAg
PRODUCTS

Martin Till

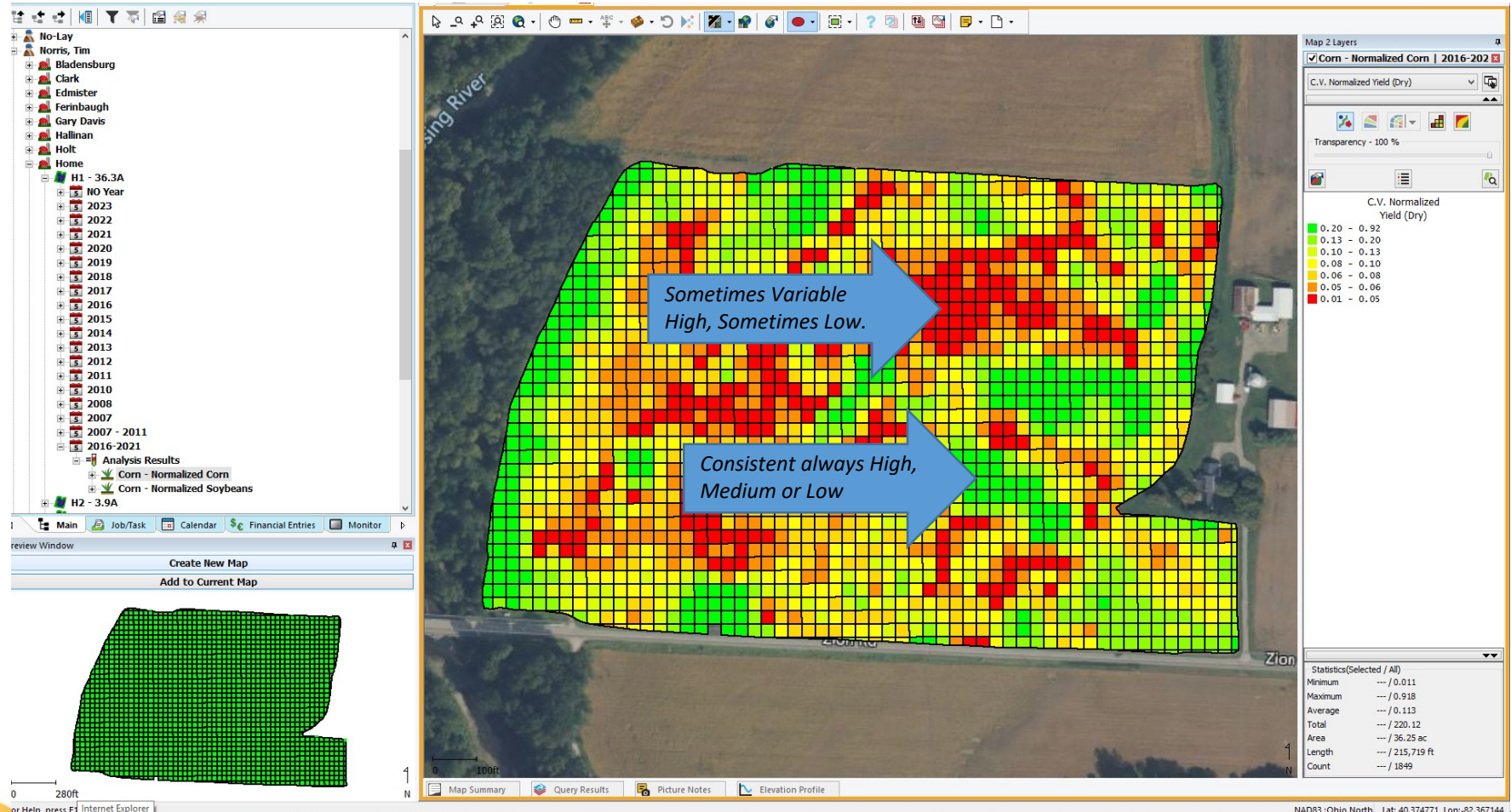
Great Plains
"Harvest Starts Here."

Sound

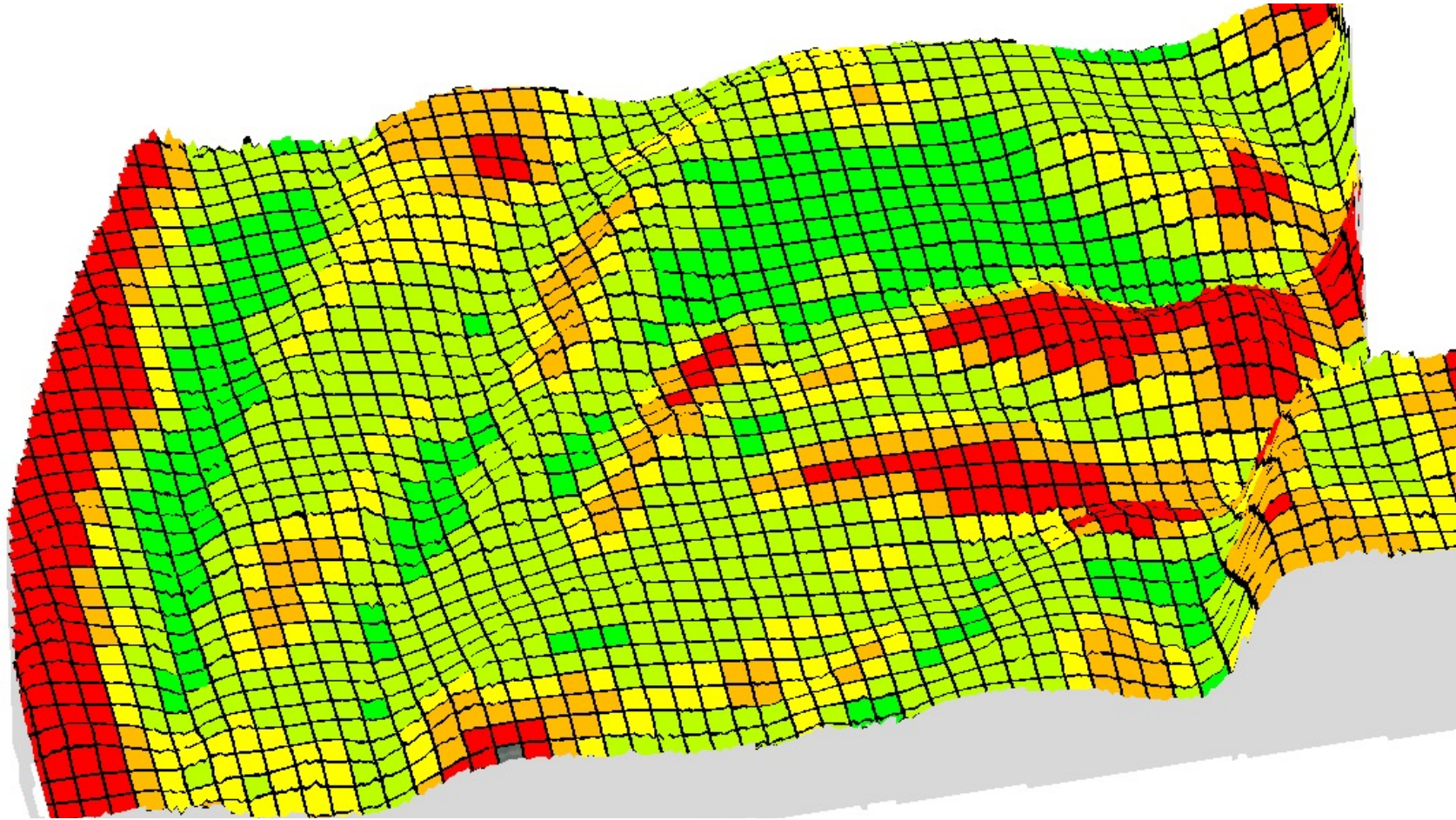
10 Year Normalized Corn Yield



Create a CV, Coefficient of Variation, of the Yield this shows is the Yield Stable or Variable.



If you have a Terrain Analysis you can look at your any map in a 3D view. This is a 10 year average corn yield.



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SPRAYERS

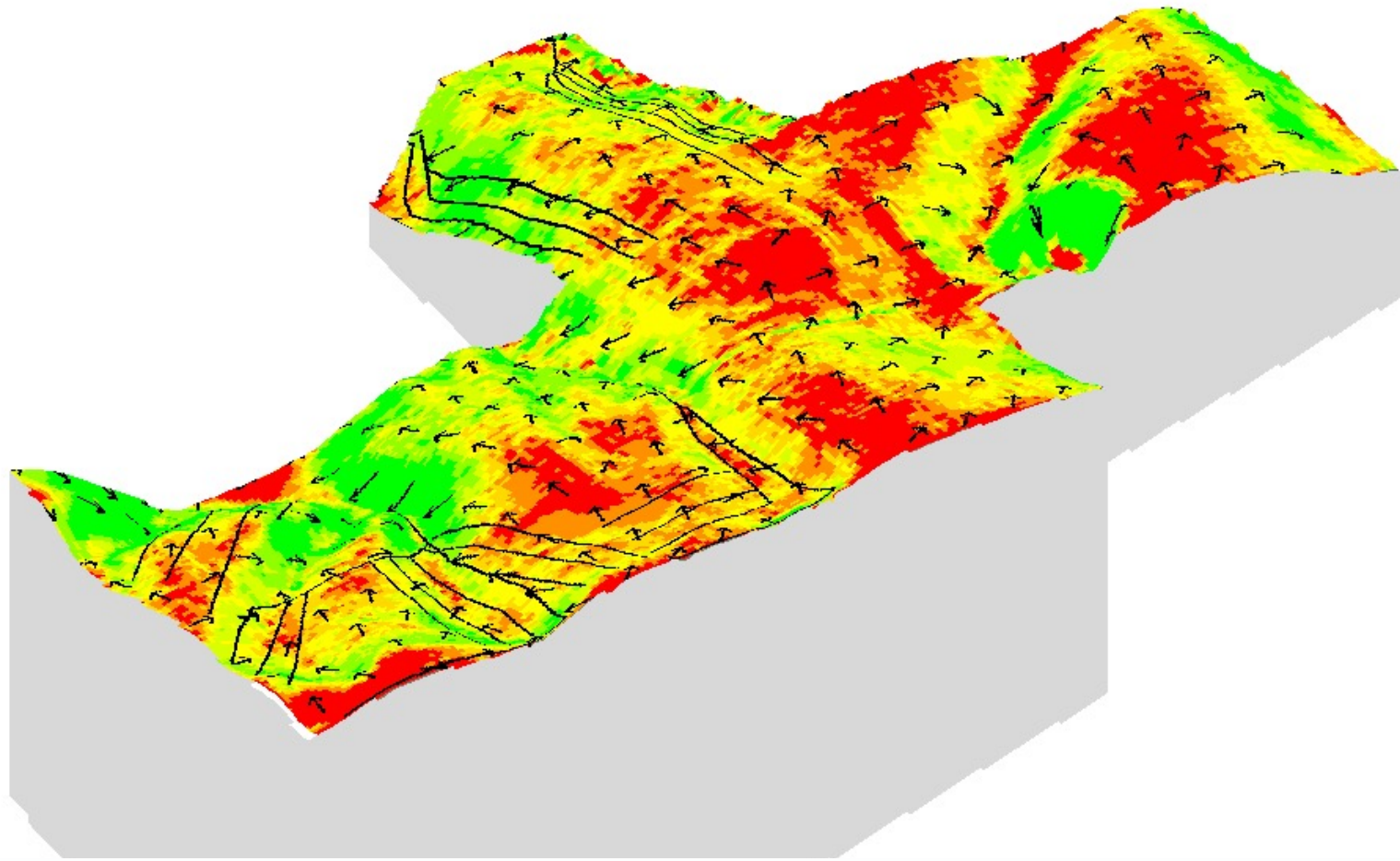
Martin Till

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We use this for drainage tile designs and waterways.



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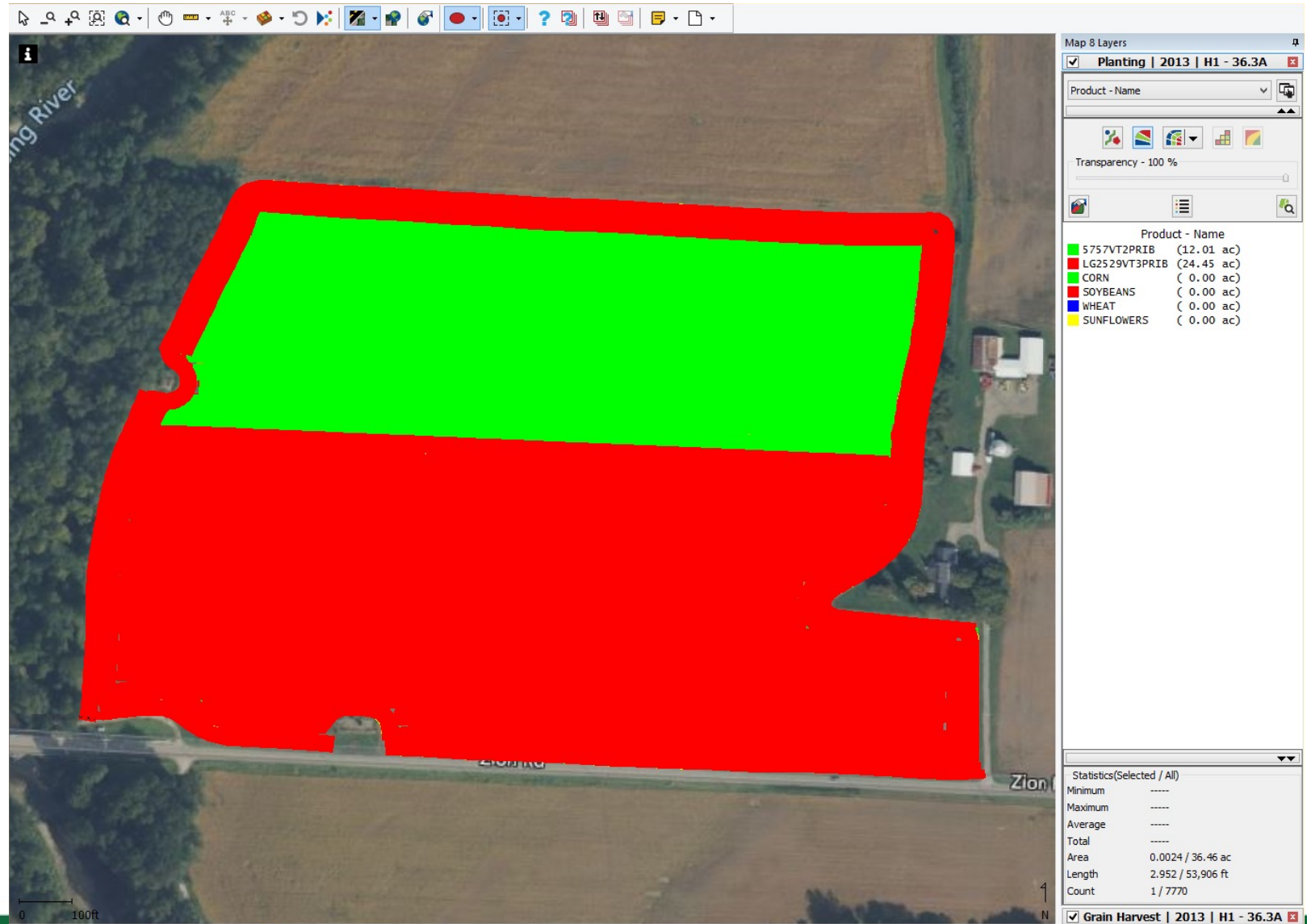
Sound

The Yield Monitor is a great way to evaluate the ROI of most new products.

- However if you don't track every operation you may be missing some pieces to the puzzle and you may draw some wrong conclusions.
- I tried a new cropland variety in 2013 that was supposed to be way better than the LG variety I was planting.
- Lets look at the results.



Red is LG
Green is Croplan

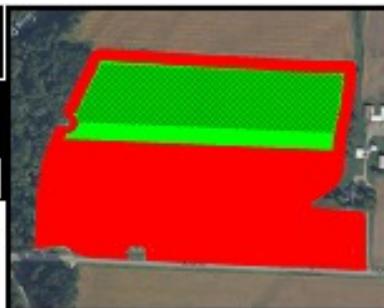


Query 1

Layer 1 - Planting | 2013 | H1 - 36.3A

Main Layer

Total area 8.799 ac
Length 12,789 ft
Count 1819



Description	Average	Total	Minimum	Maximum
Rate (Count)	32.62 ksds/ac	287.00 ksds	24.55 ksds/ac	66.83 ksds/ac
Elevation	929.36 ft		925.83 ft	931.74 ft

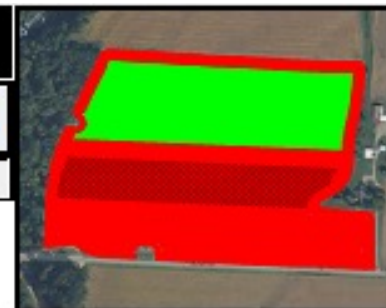
Description	Value	Area	Length	Count
Product - Name	5757VT2PRIB	8.799 ac	12,789 ft	1819

Query 2

Layer 1 - Planting | 2013 | H1 - 36.3A

Main Layer

Total area 6.367 ac
Length 9,278.2 ft
Count 1270



Description	Average	Total	Minimum	Maximum
Rate (Count)	31.69 ksds/ac	201.74 ksds	3.045 ksds/ac	65.78 ksds/ac
Elevation	930.42 ft		927.48 ft	932.34 ft

Description	Value	Area	Length	Count
Product - Name	LG2529VT3PRIB	6.367 ac	9,278.2 ft	1270

Layer 2 - Grain Harvest | 2013 | H1 - 36.3A

Main Layer

Total area 5.958 ac
Length 17,323 ft
Count 1485

Description	Average	Total	Minimum	Maximum
Yield (Dry)	216.71 bu/ac	1,291.1 bu	20.91 bu/ac	371.05 bu/ac
Moisture	27.54 %		23.99 %	31.17 %
Elevation	927.64 ft		923.53 ft	931.67 ft

Layer 2 - Grain Harvest | 2013 | H1 - 36.3A

Main Layer

Total area 4.381 ac
Length 12,786 ft
Count 1148

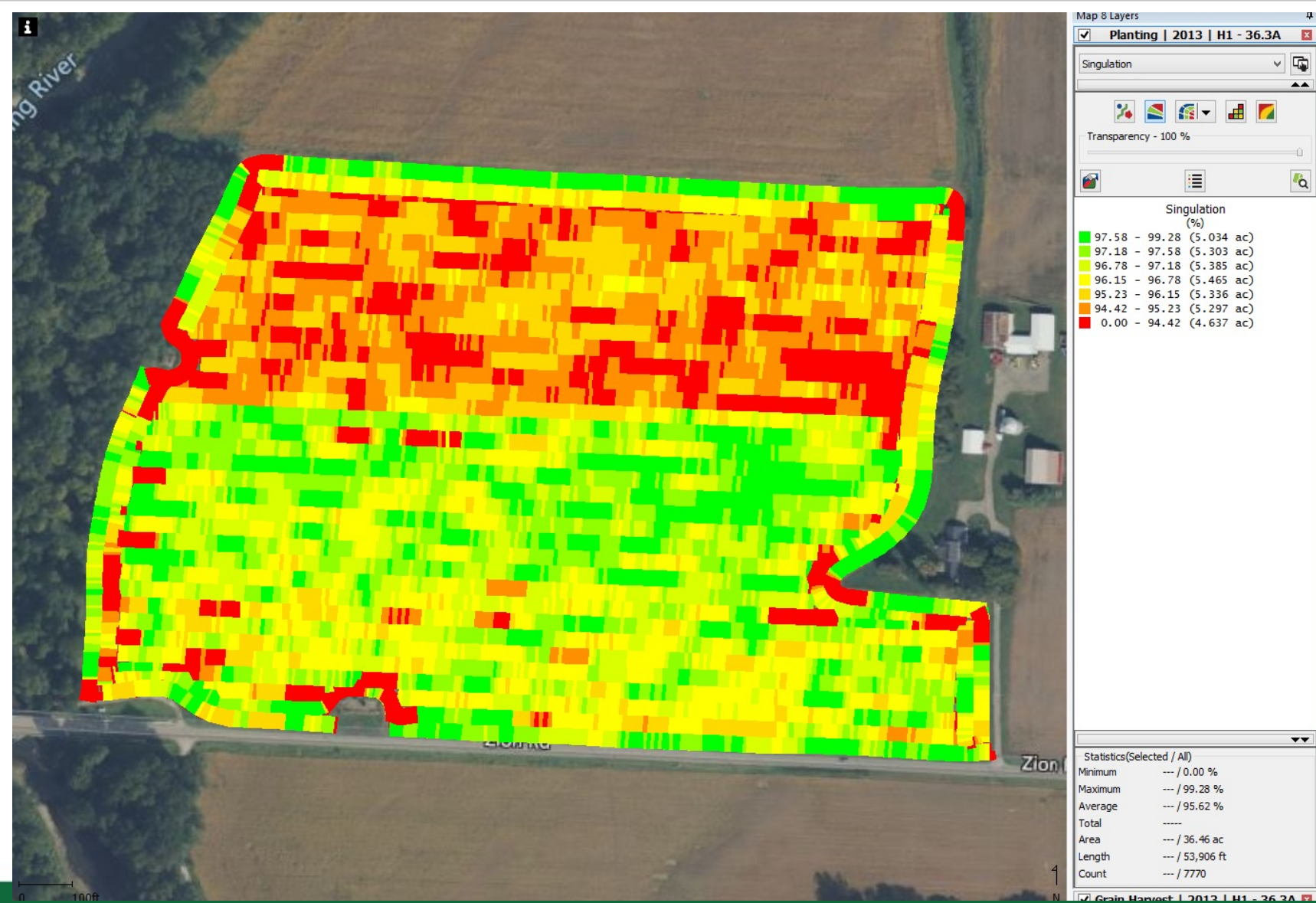
Description	Average	Total	Minimum	Maximum
Yield (Dry)	221.84 bu/ac	971.81 bu	9.285 bu/ac	302.20 bu/ac
Moisture	27.55 %		23.82 %	31.30 %
Elevation	929.47 ft		923.20 ft	934.49 ft



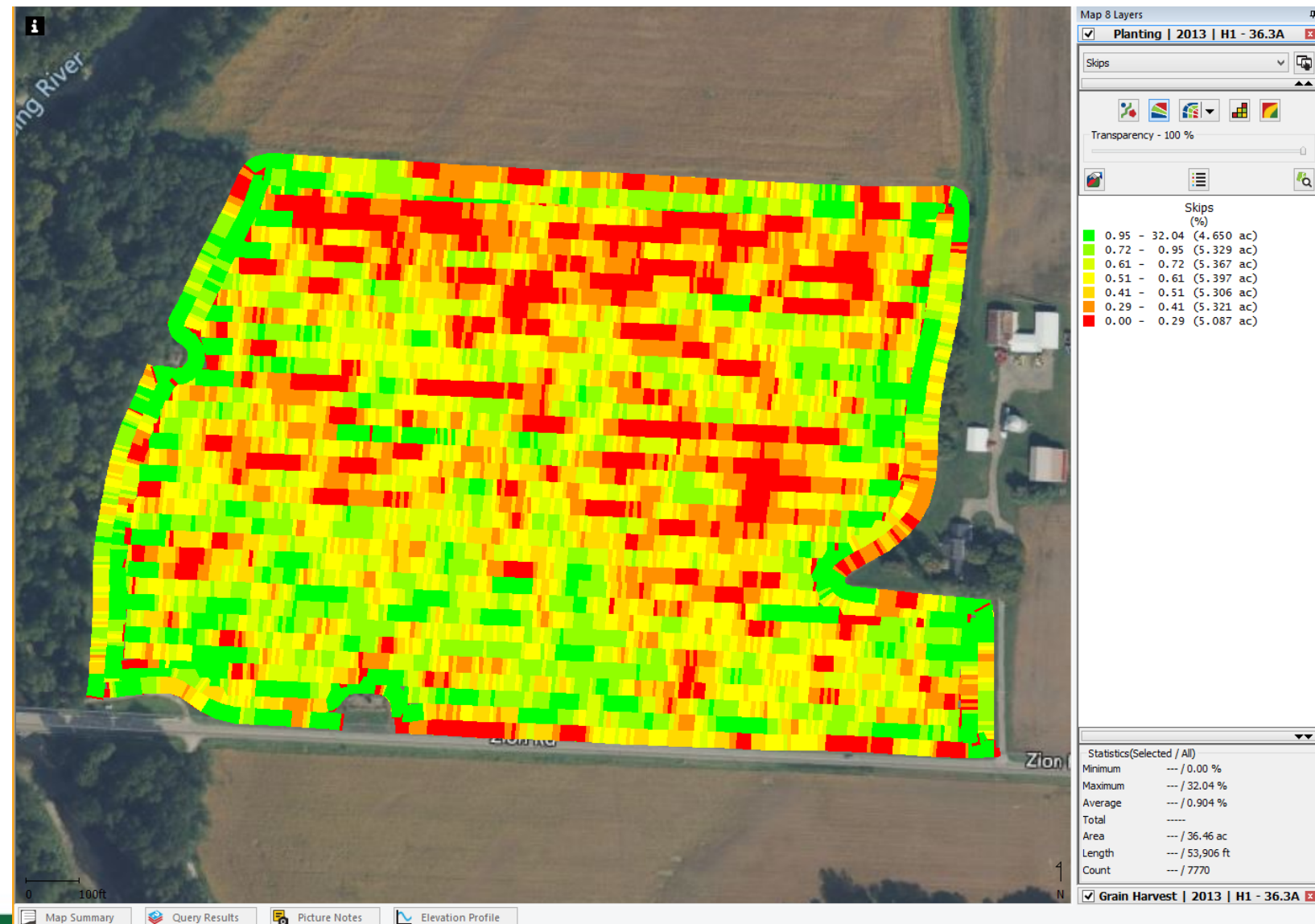
Population is much higher in this cropland



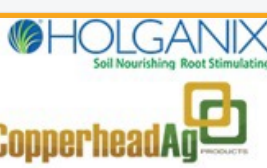
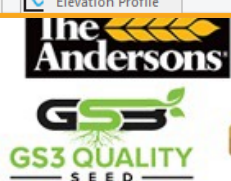
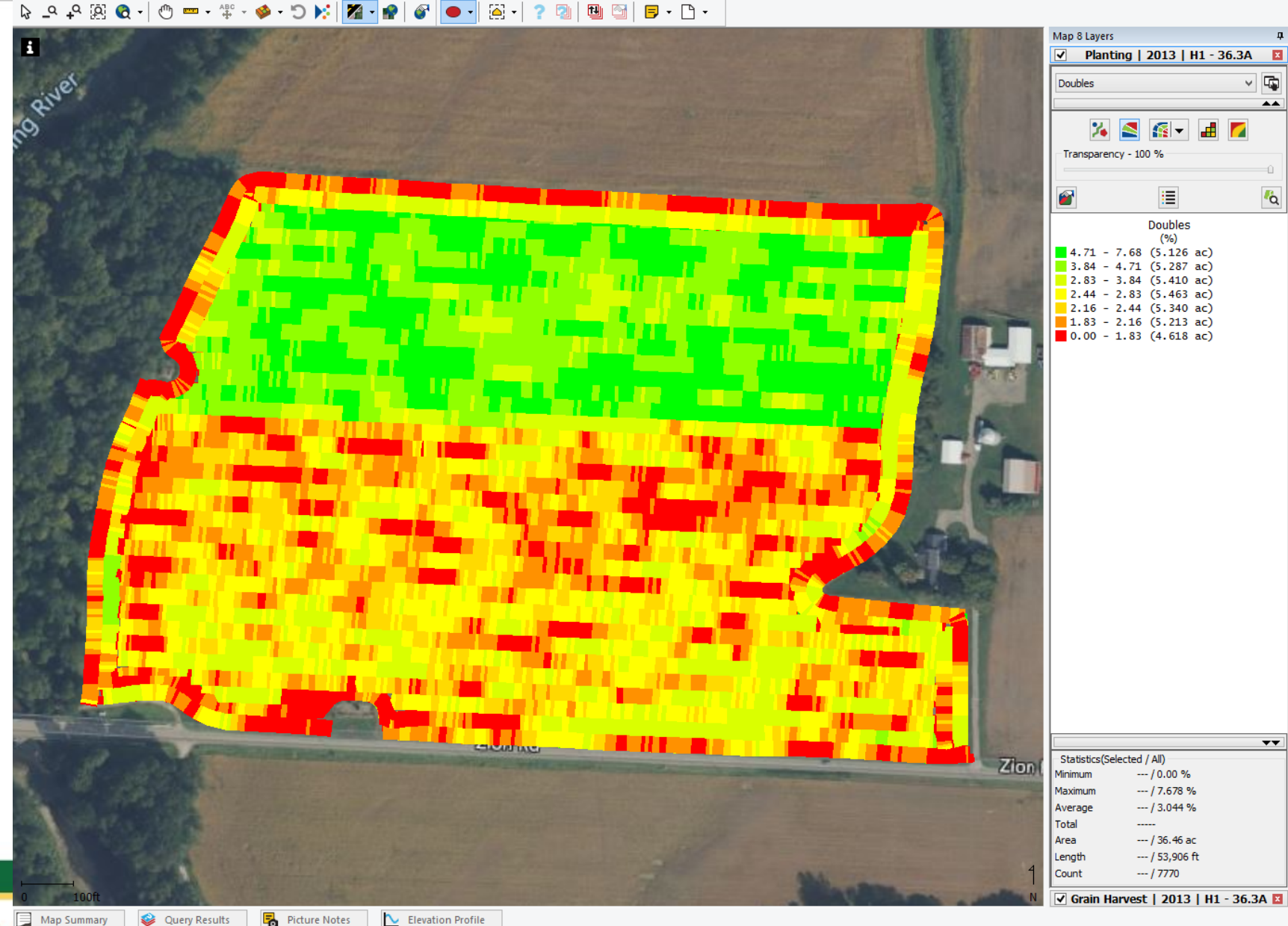
2013 before I had Precision Planting vSet meters



Skips we similar



Doubles were extremely high in the croplan

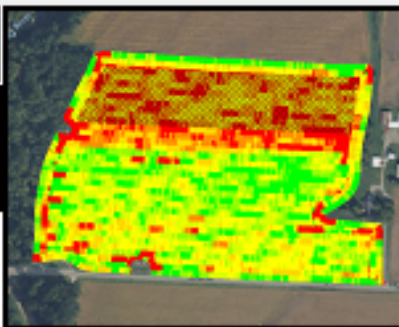


Query 3

Layer 1 - Planting | 2013 | H1 - 36.3A

Main Layer

Total area 7.883 ac
Length 11,459 ft
Count 1627



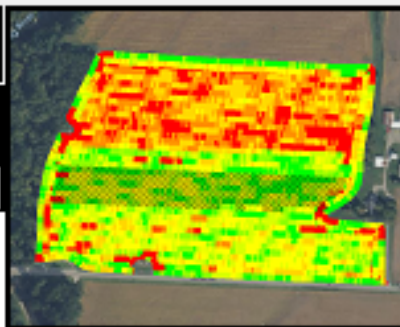
Description	Average	Total	Minimum	Maximum
Rate (Count)	32.63 ksds/ac	257.21 ksds	26.98 ksds/ac	66.83 ksds/ac
Elevation	929.42 ft		926.02 ft	931.74 ft
Singulation	94.93 %		92.01 %	96.90 %

Query 4

Layer 1 - Planting | 2013 | H1 - 36.3A

Main Layer

Total area 5.313 ac
Length 7,751.9 ft
Count 1061



Description	Average	Total	Minimum	Maximum
Rate (Count)	31.73 ksds/ac	168.61 ksds	27.04 ksds/ac	65.78 ksds/ac
Elevation	930.35 ft		927.42 ft	932.34 ft
Singulation	97.08 %		0.00 %	98.66 %

Layer 2 - Grain Harvest | 2013 | H1 - 36.3A

Main Layer

Total area 5.299 ac
Length 15,402 ft
Count 1319

Description	Average	Total	Minimum	Maximum
Yield (Dry)	217.68 bu/ac	1,153.4 bu	20.91 bu/ac	371.05 bu/ac
Moisture	27.49 %		23.99 %	31.17 %
Elevation	927.59 ft		923.70 ft	931.67 ft

Layer 2 - Grain Harvest | 2013 | H1 - 36.3A

Main Layer

Total area 3.991 ac
Length 11,653 ft
Count 1042

Description	Average	Total	Minimum	Maximum
Yield (Dry)	221.69 bu/ac	884.88 bu	9.285 bu/ac	302.20 bu/ac
Moisture	27.51 %		23.82 %	31.00 %
Elevation	929.03 ft		923.20 ft	934.38 ft



32nd Annual
**NATIONAL
NO-TILLAGE
CONFERENCE**

January 9-12, 2024 • Indianapolis, Ind.



Was this an even comparison?

- The LG Variety out yielded Croplan by 5.1 bu. acre.
- However my finger pickup planter didn't like the small flat seed size of the cropland variety.
- OSU says that for every 1% improvement in singulation you gain 3 bu. acre.
- So if the LG averaged 2.1% better singulation that would mean the Croplan yield should be 6 bu. more than it was if it were planted correctly.



I urge you to track everything

- When looking at variety or other comparisons I like to make sure I am comparing apples to apples.
- I try to add the singulation to the report.
- I also like to try to ensure that there were no fertility, drainage or other yield limiting issues.
- I also like to only look at data from the headlands.



I also use SMS to create a mega layer that includes the following info.

- Field level Info: Field Management Level. Tillage practice, cover crop and headland or not.
- Soil Info: soil type, soil P, K, pH, Bph, CEC and OM
- Planting Info: Planting Date, Variety, Population, Singulation, Row starter, Row starter rate.
- Application Information: Total N,P & K



I also use SMS to create a mega layer that includes the following info.

- Harvest Information: Harvest Date, Dry Yield, Moisture
- Weather Information: GDD from Planting Date till harvest Date and Rainfall fall for April to October.



FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS QuickBooks

Clipboard: Paste, Cut, Copy, Format Painter

Font: Calibri, 11, Bold, Italic, Underline, Text Color, Background Color

Alignment: Wrap Text, Merge & Center

Number: General, Currency, Percentage, Decimals

Styles: Normal, Bad, Good, Neutral

Cells: Insert, Delete, Format

Editing: AutoSum, Fill, Clear, Sort & Find & Filter

O1 Singulation(%)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Longitude	Latitude	Crop	Crop Year	Farm	Feature ID	Field	Grower	Headland	Normalized	Planting Date	Planting V	Populatio	Productivity Level	Singulatio	Soil P Lbs.	Soil K Lbs.	Soil BpH((Soil pH((1	Soil Type	Yield
2	-82.2573	40.24213	WHEAT	2023	Bladensburg	1	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	20	150	6.9	5.9	Gilpin	
3	-82.2573	40.24218	WHEAT	2023	Bladensburg	2	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	20	150	6.9	5.9	Gilpin	
4	-82.2573	40.24224	WHEAT	2023	Bladensburg	3	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	20	150	6.9	5.9	Gilpin	
5	-82.2573	40.24229	WHEAT	2023	Bladensburg	4	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	20	150	6.9	5.9	Gilpin	
6	-82.2573	40.24235	WHEAT	2023	Bladensburg	5	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	20	150	6.9	5.9	Gilpin	
7	-82.2573	40.2424	WHEAT	2023	Bladensburg	6	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	20	150	6.9	5.9	Gilpin	
8	-82.2573	40.24246	WHEAT	2023	Bladensburg	7	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
9	-82.2573	40.24251	WHEAT	2023	Bladensburg	8	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
10	-82.2573	40.24257	WHEAT	2023	Bladensburg	9	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
11	-82.2573	40.24262	WHEAT	2023	Bladensburg	10	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
12	-82.2573	40.24268	WHEAT	2023	Bladensburg	11	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
13	-82.2573	40.24273	WHEAT	2023	Bladensburg	12	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
14	-82.2573	40.24279	WHEAT	2023	Bladensburg	13	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
15	-82.2573	40.24284	WHEAT	2023	Bladensburg	14	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
16	-82.2573	40.24289	WHEAT	2023	Bladensburg	15	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.9	Gilpin	
17	-82.2573	40.24295	WHEAT	2023	Bladensburg	16	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.8	Gilpin	
18	-82.2573	40.243	WHEAT	2023	Bladensburg	17	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	150	6.9	5.8	Gilpin	
19	-82.2573	40.24306	WHEAT	2023	Bladensburg	18	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	200	6.9	5.8	Gilpin	
20	-82.2573	40.24311	WHEAT	2023	Bladensburg	19	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	200	6.8	5.8	Gilpin	
21	-82.2573	40.24317	WHEAT	2023	Bladensburg	20	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	200	6.8	5.8	Gilpin	
22	-82.2573	40.24322	WHEAT	2023	Bladensburg	21	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	200	6.8	5.8	Coshactor	
23	-82.2573	40.24328	WHEAT	2023	Bladensburg	22	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	200	6.8	5.8	Coshactor	
24	-82.2573	40.24333	WHEAT	2023	Bladensburg	23	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	200	6.8	5.8	Coshactor	
25	-82.2573	40.24339	WHEAT	2023	Bladensburg	24	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	25	200	6.8	5.8	Coshactor	
26	-82.2573	40.24344	WHEAT	2023	Bladensburg	25	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	30	200	6.8	5.7	Coshactor	
27	-82.2573	40.2435	WHEAT	2023	Bladensburg	26	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	30	200	6.8	5.7	Coshactor	
28	-82.2573	40.24355	WHEAT	2023	Bladensburg	27	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	30	200	6.8	5.7	Coshactor	
29	-82.2573	40.24361	WHEAT	2023	Bladensburg	28	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	30	200	6.8	5.6	Coshactor	
30	-82.2573	40.24366	WHEAT	2023	Bladensburg	29	Donahae	Norris Tim	Yes	0	10/24/2022	WHEAT	0	Average Productivity	0	30	200	6.8	5.6	Coshactor	

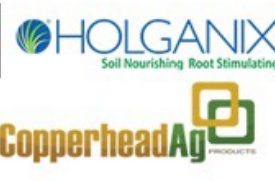
Norris, Tim_Bladensburg_Donahae

Grower	(All)	▼		
Farm	(All)	▼		
Field	(All)	▼		
Productivity Level	Average Productivity	▼		
Headland	No	▼		
Crop Year	2023	▼		
Crop	CORN	▼		
Row Labels	Average of Yield (Dry)(bu/ac)	Average of Population(ksds/ac)	Average of Singulation(%)	
Gilpin	192.8674699	30.51204819	99.25216867	
Glenford	186.26	30	99.608	
Loudonville	184.7699801	32.00126743	94.78238638	
Rigley	178.6	29.07575758	97.20909091	
Tioga	197.525791	32.29325373	83.57091463	
Titusville	225.775	32	99.395	
Westmoreland	191.7583333	33	99.46333333	
Grand Total	192.2621269	32.13681592	89.62190189	



Variable Rate Planting Prescriptions

- We assign our soil types a 10 year percent of average and give 1/3 of the credit to soil type.
- We use our 10 year Normalized Yield map and give 1/3 of the credit.
- Using the CV Map if yield is consistent we leave it the same if not we make it the average and give it a 1/3 of the Credit.
- I then create a map that has 4 yield zones.

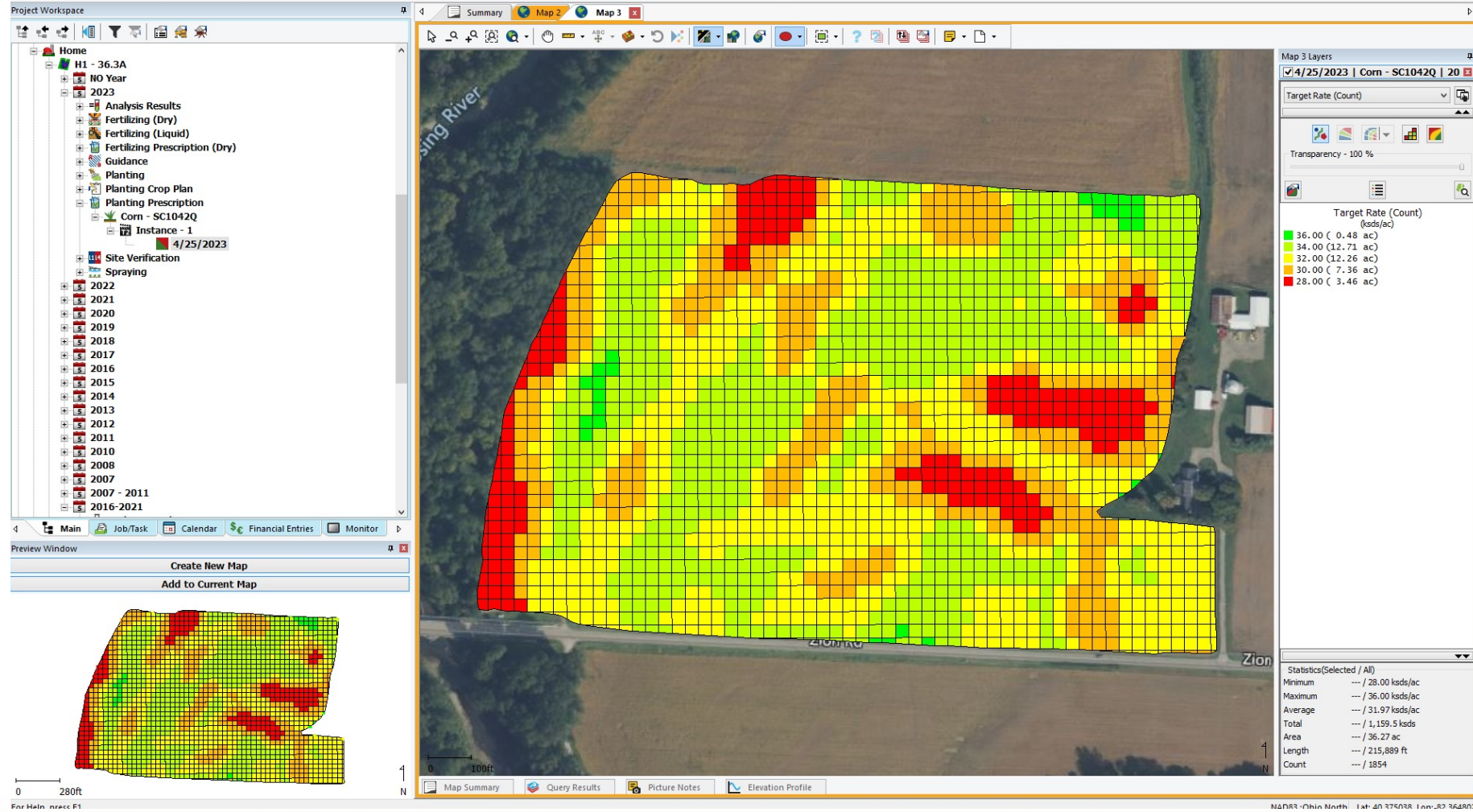


Variable Rate Planting Prescriptions

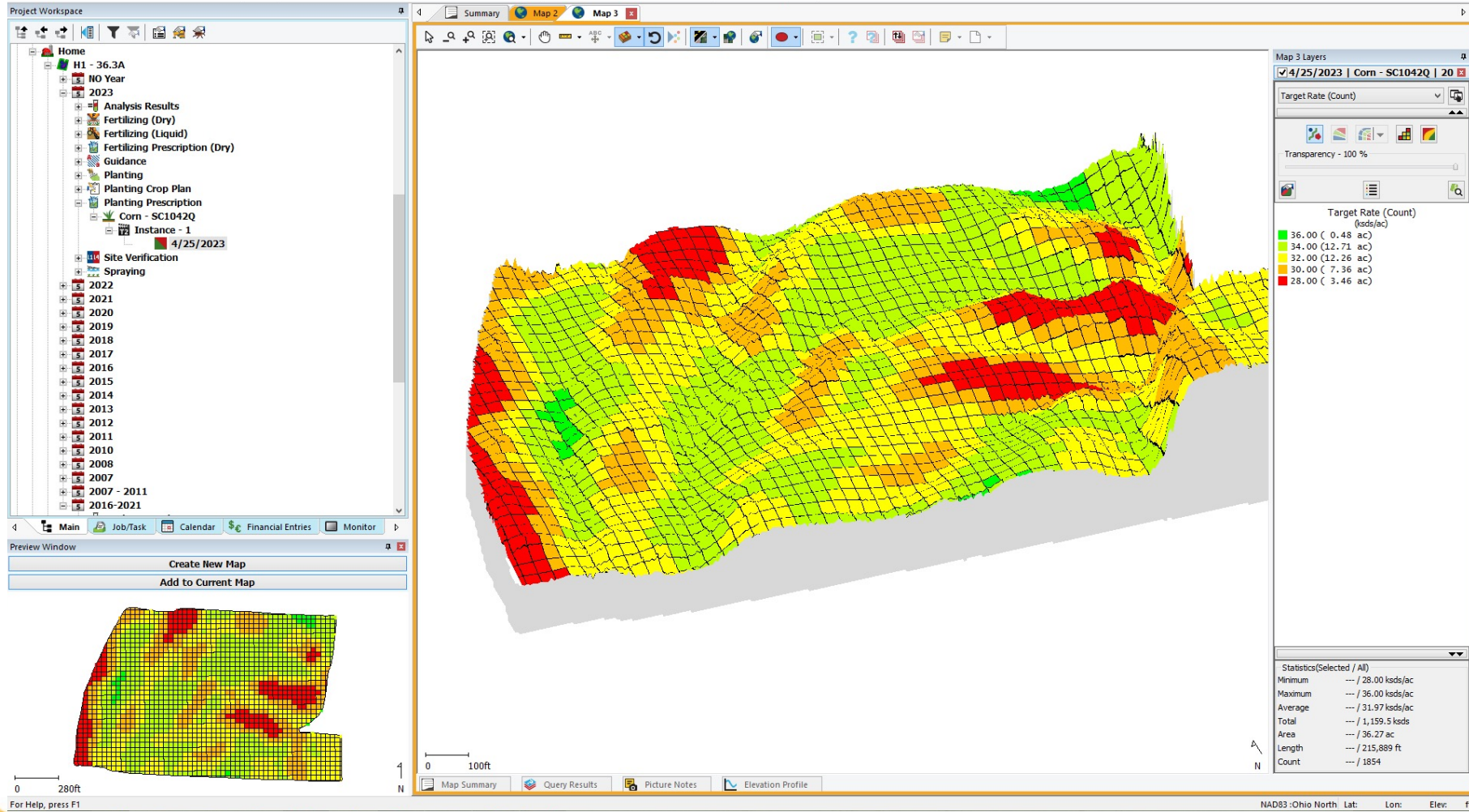
- Then I sit down with my Seedsman and we chose the best hybrid for the soils in that field.
- Then we choose the appropriate rate for each zone in the field based on the capability of the field and hybrid.
- This seems labor intense but I feel it gives me the best results.



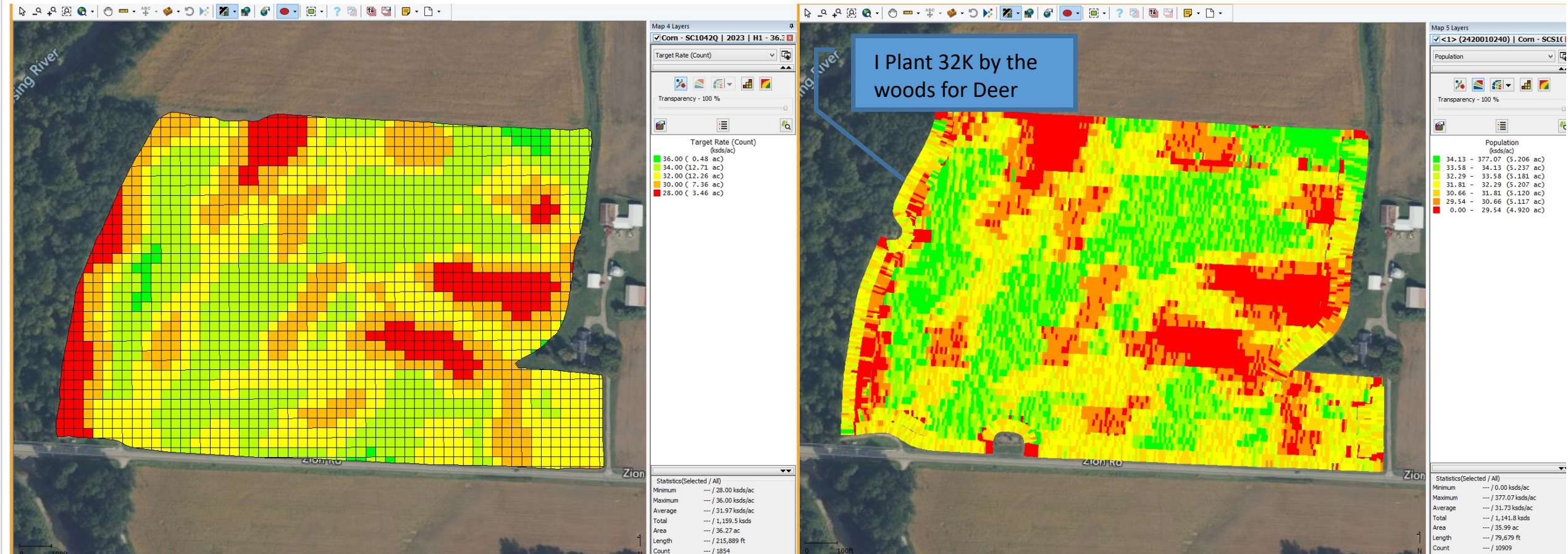
2023 Planting Prescription



Planting Prescription in 3D



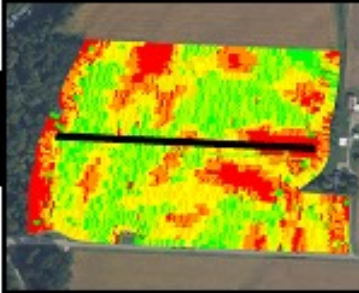
Prescription compared to Actual Planting

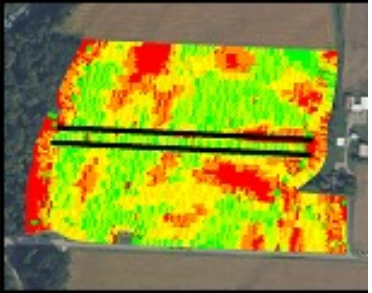


Results of VRA Planting in 2021 Dry Year

Straight Rate

Variable Rate

Query 1				
Layer 1 - Planting 2021 H1 - 36.3A				
Main Layer				
Total area	1.235 ac			
Length	2,688.9 ft			
Count	382			
				
Description	Average	Total	Minimum	Maximum
Rate (Count)	33.80 ksds/ac	41.72 ksds	25.95 ksds/ac	37.24 ksds/ac
Elevation	926.50 ft		924.20 ft	927.65 ft
Layer 2 - Grain Harvest 2021 H1 - 36.3A				
Main Layer				
Total area	1.225 ac			
Length	2,667.7 ft			
Count	210			
Description	Average	Total	Minimum	Maximum
Yield (Dry)	164.43 bu/ac	201.39 bu	13.37 bu/ac	250.54 bu/ac
Moisture	17.10 %		12.33 %	20.38 %
Elevation	912.77 ft		910.27 ft	914.19 ft

Query 2				
Layer 1 - Planting 2021 H1 - 36.3A				
Main Layer				
Total area	1.232 ac			
Length	2,686.5 ft			
Count	378			
				
Description	Average	Total	Minimum	Maximum
Rate (Count)	31.62 ksds/ac	38.96 ksds	10.53 ksds/ac	48.84 ksds/ac
Elevation	926.56 ft		924.30 ft	928.12 ft
Layer 2 - Grain Harvest 2021 H1 - 36.3A				
Main Layer				
Total area	1.235 ac			
Length	2,689.6 ft			
Count	217			
Description	Average	Total	Minimum	Maximum
Yield (Dry)	177.64 bu/ac	219.36 bu	21.47 bu/ac	262.73 bu/ac
Moisture	18.04 %		16.14 %	20.31 %
Elevation	912.87 ft		910.82 ft	914.53 ft



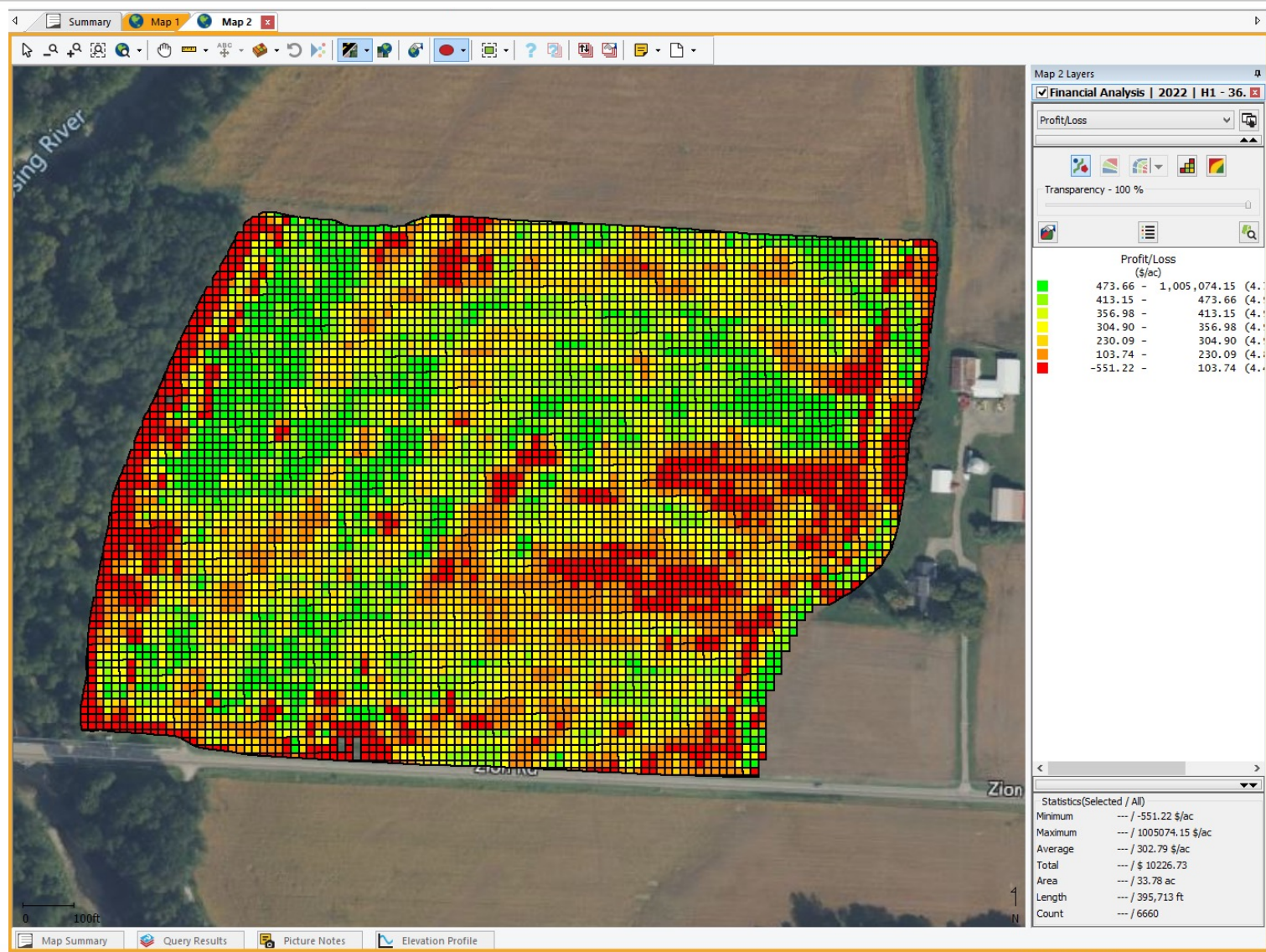
Just the Gravel Area

Query 1					Query 2				
Layer 1 - Planting 2021 H1 - 36.3A					Layer 1 - Planting 2021 H1 - 36.3A				
Main Layer					Main Layer				
Total area	0.278 ac				Total area	0.417 ac			
Length	606.04 ft				Length	907.36 ft			
Count	84				Count	126			
Description	Average	Total	Minimum	Maximum	Description	Average	Total	Minimum	Maximum
Rate (Count)	33.90 ksds/ac	9.434 ksds	32.85 ksds/ac	34.87 ksds/ac	Rate (Count)	27.91 ksds/ac	11.63 ksds	21.74 ksds/ac	30.28 ksds/ac
Elevation	927.14 ft		924.91 ft	927.65 ft	Elevation	927.32 ft		926.30 ft	927.81 ft
Layer 2 - Grain Harvest 2021 H1 - 36.3A					Layer 2 - Grain Harvest 2021 H1 - 36.3A				
Main Layer					Main Layer				
Total area	0.277 ac				Total area	0.286 ac			
Length	602.47 ft				Length	622.78 ft			
Count	43				Count	47			
Description	Average	Total	Minimum	Maximum	Description	Average	Total	Minimum	Maximum
Yield (Dry)	96.06 bu/ac	26.57 bu	23.42 bu/ac	186.84 bu/ac	Yield (Dry)	111.95 bu/ac	32.01 bu	44.92 bu/ac	178.43 bu/ac
Moisture	15.07 %		12.33 %	17.28 %	Moisture	17.15 %		16.33 %	18.15 %
Elevation	913.45 ft		912.62 ft	914.19 ft	Elevation	913.56 ft		912.35 ft	914.17 ft



2022 Profit Map

- Soybeans – Good but not great Prices.
- High Input costs.
- Every cost from parts, equipment payments, interest everything is included.
- It is a farm I own so it just has taxes and insurance figured in.
- Still it was a good year.
- Green areas are over \$400 per acre profit.
- Red is \$53 dollar loss to \$101 profit.
- Average was \$302 per acre.



How I use the Profit Map Data

- If a new farm comes available I can look at my average profit by soil type over time and based on the soil types of the potential new farm, I can have a good idea of the potential of the farm.
- If I have a landlord that feels their rent is too low I can use this history and a baseline of how their farm compares to others to make sure that the rent is fair for the both of us.
- It also helps me identify areas that I shouldn't be farming.



Machine use Data is good to look at as well.

- I pay the fuel bill and the labor bills so productivity is something that I think about a lot.
- When I am not operating the combine it is easy for my operator to go a half a mile to a mile per hour slower than I go.
- That drives me nuts and I used machine data to show him why.
- Lets look at 2 years of corn harvest data.



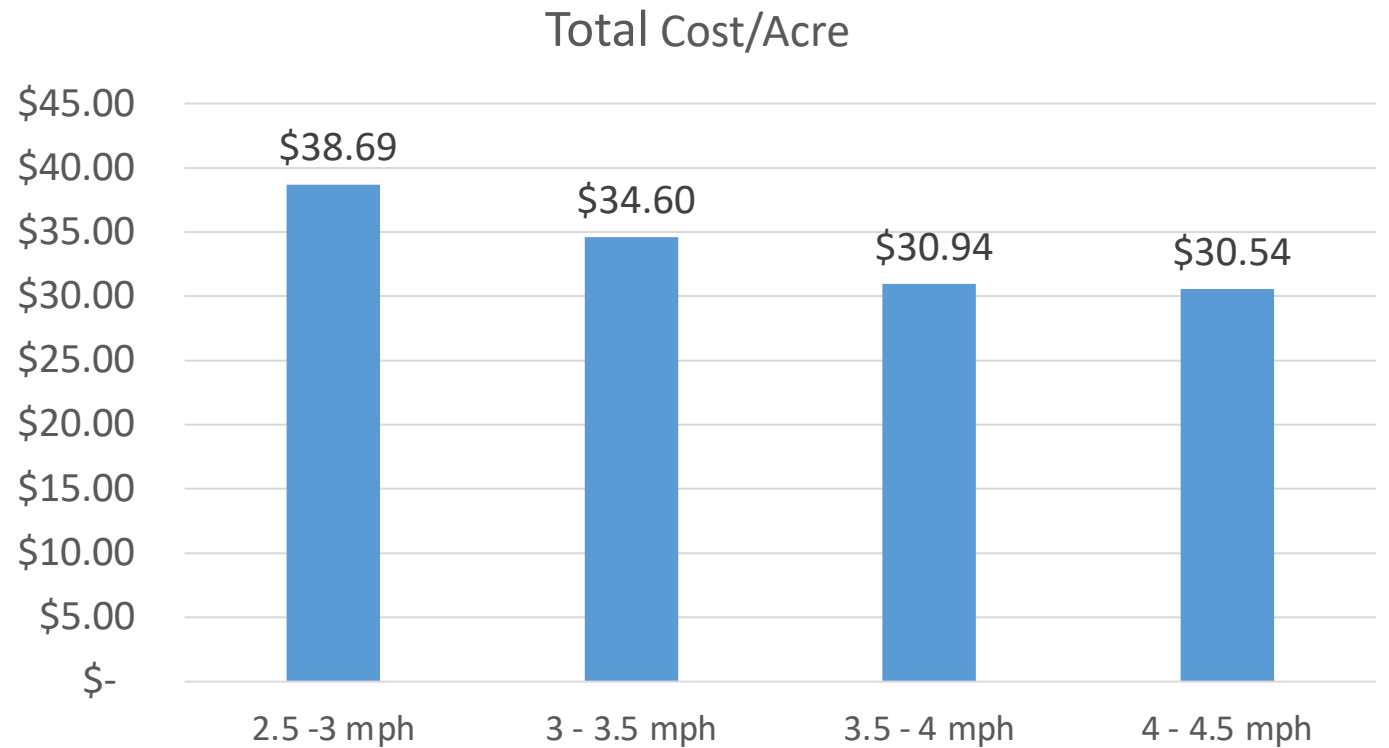
Fuel Usage and Productivity by Speed

Speed	Avg. Fuel Consumption Rate (Area) gal(US)/ac	Avg. Fuel Consumption Rate (Time) gal(US)/h	Avg. Productivity ac/h	Area ac
2.500 - 3.000 mph	1.506	10.00	8.528	163.42
3.000 - 3.500 mph	1.297	10.34	9.482	604.27
3.500 - 4.000 mph	1.151	10.45	10.59	431.69
4.000 - 4.500 mph	1.144	11.24	10.74	252.62



What do the slower speeds cost per acre using actual machine data?

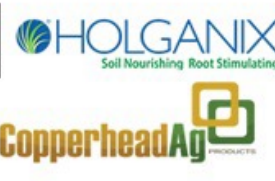
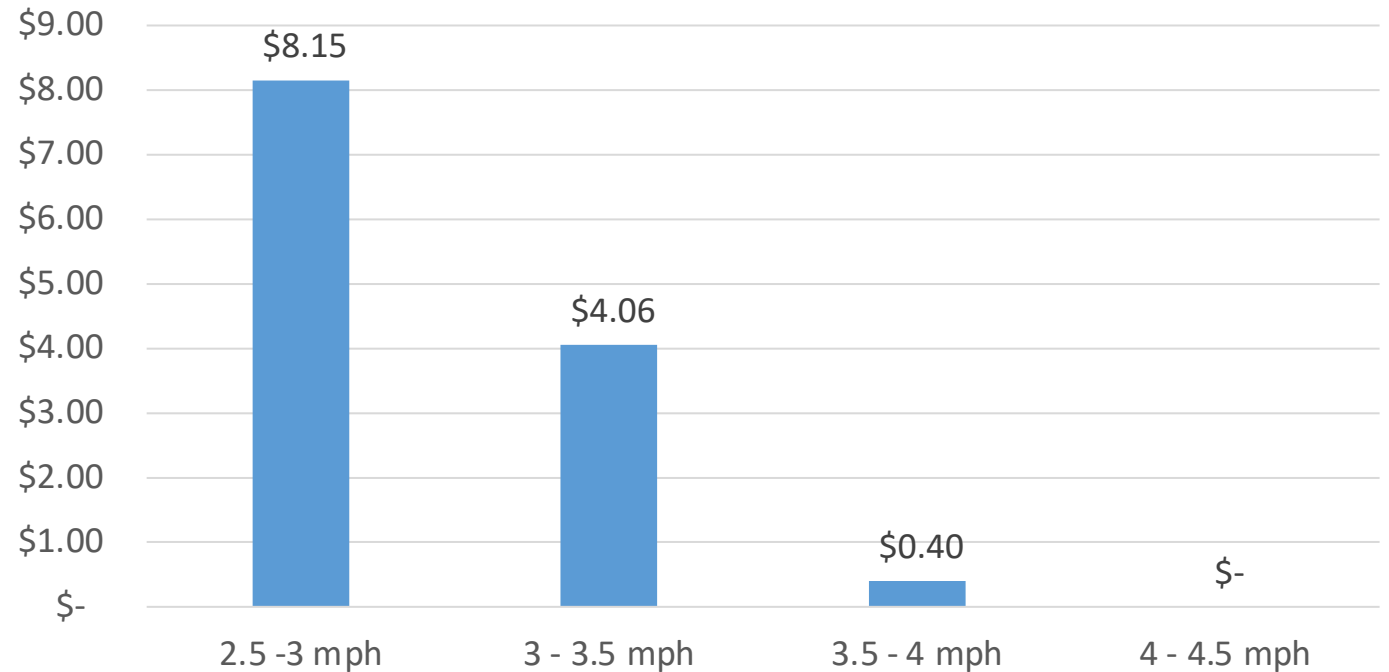
- I used the following assumptions:
 - Fuel at \$3.50 per hour
 - Combine Operator Labor at \$35 per hour
 - Combine at \$150 per hour
 - Grain Cart Operator \$25 per hour
 - Cart and tractor \$75 hour.



What do the slower speeds cost per acre using actual machine data?

- I used the following assumptions:
 - Fuel at \$3.50 per hour
 - Combine Operator Labor at \$35 per hour
 - Combine at \$150 per hour
 - Grain Cart Operator \$25 per hour
 - Cart and tractor \$75 hour.

Cost of Going Slow



What does the slower speeds cost per acre using actual machine data?

- That doesn't include the cost of not getting that last load of grain to town and having to quit early.
- Or not getting that field done and couldn't move to the next farm.
- Missed opportunities? Cover Crop Seeding?
- Remember you can't manage what you can't measure.



When I started Ag Info Tech our moto was “Precision with a Purpose”

- We wanted everything that we sold and every service that we offer to fulfil a Purpose in our customers farming operation.
- I tried to look at all of the purposes our products and services could fulfil.
- My dad always said figures don't lie but sometimes liars will figure.
- Because of that statement I wanted to use reliable data to prove the ROI of our products and services and pass that information onto our customers so they could make informed decisions.



Lets look at some different technologies and their potential Paybacks

I don't have access to todays pricing structures so the costs I use cost are estimates.



Precision Soil Sampling & VRA of Lime and Fertilizer

- **This solution provides the following:**
 - **Place The Right Product, In The Right Place, At The Right Rate, At The Right Time.**
 - **Control Variability:**
 - Soil can vary greatly across a field, due to soil types, combining smaller fields into larger ones, old barn sites in or near fields, variable yield and crop nutrient removal, application of manure at inconsistent rates, and blanket rates of fertilizer and lime.



Precision Soil Sampling & VRA of Lime and Fertilizer

- **Protect The Environment:**

- Precision Soil Sampling & VRA Lime and Fertilizer ensures correct rates are applied to all areas of a field. This reduces rates where excess product is not needed.

- **Relieve The Stress:**




- By using Precision Soil Sampling & VRA Lime and Fertilizer you will always know what every area of your field needs and you will never have to question your fertilizer and lime programs.



Precision Soil Sampling & VRA of Lime and Fertilizer

- **More Savings:**

- Ag Info Tech's 77,000 acre study showed a savings per acre of \$21.90 for VRA Lime, \$12.90 for VRA Phosphate, and \$5.94 for VRA Potash.

<p>Total VRA Savings for Lime, Phosphate, and Potash.</p> 	<p>Cost of Precision Soil Sampling</p> 	<p>= ROI</p> 	<p>This does not account for any yield gain by putting more fertilizer in low fertility areas.</p>
<p>\$40.74/acre</p>	<p>\$12.00/acre</p>	<p>\$28.74/acre</p>	<p>240% ROI</p>



Assisted Steering

- These are systems that attach to and turn your steering wheel.
 - Ag Leader Steady Steer
 - John Deere Universal AutoTrac
 - Raven DirecSteer
 - Trimble EZ-Steer & EZ-Pilot



Assisted Steering

- **Fulfills The Following Purposes**

- **Increased Efficiency:**

- By reducing overlap, running later at night and turning quicker on the ends.

- **Reduce Operator Fatigue:**

- By eliminating the need to focus on driving without overlapping or leaving skips, the stress on the operator is greatly reduced as compared to a non-assisted steering operation.

- **Satisfaction:**

- Seeing straight rows each time you drive by the field to check your crops is proof of a job well done.



Assisted Steering

- **Fulfills The Following Purposes**

- **Focus On The Job:**

- Assisted steering allows you to focus on the equipment and the job that you are performing vs. focusing on where to drive.

- **Reduce Overlap:**

- Assisted steering, coupled with the free WAAS signal, can steer you through the field within 6 to 8 inches of where you need to be 95% of the time. This greatly reduces overlap and inputs in your farming operation.

- **Protecting The Environment:**

- By greatly reducing overlap of inputs.



Assisted Steering

- **Fulfills The Following Purposes**





- **More Profit:**

- GPS.Gov says that by adding guidance you can increase your productivity by 10% per day.
- Iowa State University did a study showing that the average overlap in a tillage operation is 7%. A 2' overlap on a 30' tillage tool is 6.6%.
- GPS.Gov states that GPS guidance saves 7% to 10% of fertilizer and pesticides by not overlapping.



Assisted Steering

- Payback on a \$9,000 System

7% fewer acres of Vertical Tillage at \$16.00 per acre =	7% reduction of fertilizer at \$75/acre	7% reduction of Herbicide at \$25/acre	= Savings per acre	Acres before an ROI on an \$9,000 Assisted Steering System
				
\$1.12/acre	\$5.25/acre	\$1.75/acre	\$8.12/acre	1,108 acres



Auto Steer

- These are steering systems that are integrated into the equipment being steered.
- Can be configured from WAAS to RTK.
- Can have a simple display or the most advanced display offered by each company.
- Adaptable to integrated steering systems from the factory or aftermarket add on depending on the vehicle.



RTK Auto Steer

- **RTK Auto Steer Solutions Can Fulfill The Following Purposes:**
 - **All the Benefits of Assisted Steering, Increased Productivity, Reduced Operator Fatigue, Satisfaction & Focusing On The Job.**
 - **Reduce Overlap:**
 - RTK Auto Steer coupled with the free ODOT VRS signal will steer you through the field within 1" of where you need to be 95% of the time. This virtually eliminates overlap in your farming operations.
 - **Residue Management:**
 - Plant your corn with RTK and the next year plant your soybeans 7 inches to the side of the old corn row.



One of the first challenges we had with No-Till Soybeans was dealing with the corn stubble.

- We tried several things from rotary mowing to vertical tillage.
 - I felt that both options left the stalks too mobile and susceptible to loss from wind or water.
- RTK Guidance was our answer.
 - When we planted corn with a 12 row and the soybeans with the same planter only as a 12/23 row it worked well.
 - When we went to a 16 row corn planter and 12/23 bean planter the drift on the hillsides was too different.
- Now our best option is to keep the planter in great condition and plant on a slight angle.







RTK Auto Steer

- **RTK Auto Steer Solutions Can Fulfill The Following Purposes:**
 - **Strip Till:**
 - RTK Auto Steer will allow you to strip till with a 8 row strip till rig and plant with a 16 row. It also allows you to plant right on top of the fertilizer band that you placed with the strip till rig.
 - **Protecting The Environment:**
 - RTK auto steer not only helps you eliminate wasteful overlap, it can also help you keep more residue on the soil surface by not disturbing old residue and by banding fertilizer you can reduce your rates 20% to 30% or more.
 - **More Profit:**
 - GPS.Gov says that by adding guidance you can increase your productivity by 10% per day.
 - Customers tell us that a 2% to 4% reduction on a planting operation is a typical savings from RTK.
 - GPS.Gov states that GPS guidance saves 7% to 10% of fertilizer and pesticides by not overlapping.



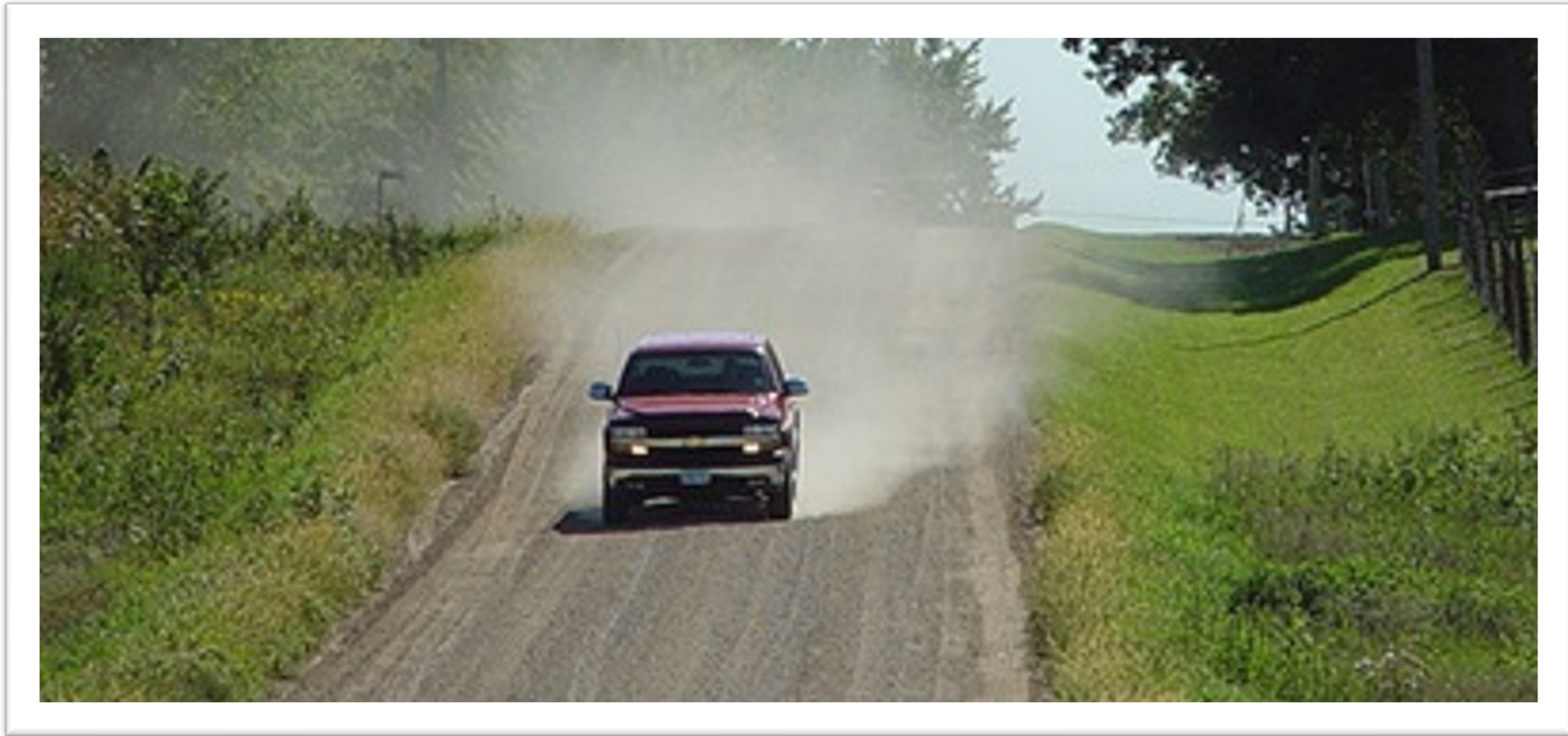
RTK Auto Steer

- ROI on a \$18,000 Low End System
- ROI on a \$25,000 High End System

3% less seed per acre at a cost of \$112 per acre = 	3% less starter fertilizer at \$44 acre 	3% less acres to plant at \$24/acre planting cost 	= Savings per acre 	Low End System 3,333 acres High End System 4,629 acres
\$3.36/acre	\$1.32/acre	\$.72/acre	\$5.40/acre	



Auto Steer and other technologies have other Paybacks



That was the day I realized that my products and services were about more than ROI.

It was also about helping to meet the farms goals and improving lives.

“Precision with a Purpose”



Should you purchase a Low end System or a High End System?

- That depends on your goals for your farming operation.
- Both are good at steering, most likely could be the exact same.
- But I would challenge you to look at how other technologies could help make your operation more profitable.
- Most of those would require the higher end systems from your brand of choice.



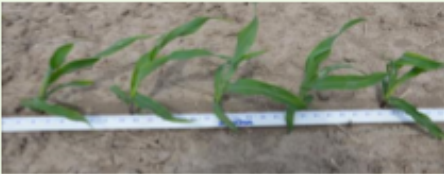


Planter Performance Monitoring

- **Fulfill The Following Purposes In Your Farming Operation.**
 - **Peace of Mind:**
 - Planter Performance Monitoring solutions give you a virtual look at how your planter is performing.
 - **Maximize Performance:**
 - Allows you to see problems with your seed meters while planting so you can make the necessary corrections.



Planter Performance Monitoring

- Lets look at the payback of fixing one row that had a skip because of a plugged hole on a seed disk would be 32,000 population divided by 16 rows divided by 40 cells = 50 fewer ears on a 16 row planter.

<p>1 seed cell plugged on a 40 cell seed meter.</p> 	<p>16 Row Planter with one row with one cell plugged = 50 less ears = Yield Increase</p> <p>1 Bu./acre</p>	<p>X Price of Corn</p>  <p>\$4.20/bu.</p>	<p>= Profit per acre</p>  <p>\$4.20 acre</p>	<p>Wiring for Advanced Seed Monitoring</p> <p>\$2,000</p> <p>476 acres</p>
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Variable Rate Seeding

- **Planter Variable Rate Population Control Solutions Can Fulfill the Following Purposes in Your Farming Operation:**
 - Maximize Your Yield:
 - Variable Rate Control allows you to plant corn at higher populations in the good areas of the field that need higher populations to maximize your yield.
 - Reduce Your Rates:
 - Variable Rate Control allows you to plant corn at lower populations in the poor areas of the field that can not benefit from higher populations.



Variable Rate Seeding

- **Relieves the Stress:**

- By creating variable rate seeding prescriptions you can load them in the display, sit back, and let it do the work for you.

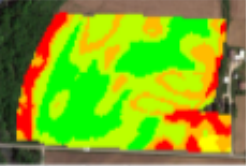



- **More Profit:**

- A 2 year study with one of Ag Info Tech's customers showed an average yield advantage in corn of 4 bu. /acre and an average advantage in soybeans of 1.5 bu./acre.



Variable Rate Seeding

- Several of you have this this technology but don't use it.
- But if you don't have it and have to add it, the cost would be around \$12,000 for a 16 row planter.

By planting 36K in the green areas and	= Yield Increase	X Price of Corn	= Profit per acre	Acres planted before an ROI on a 16 Row Planter
				
28K in the red we can increase yield!	4 Bu./acre	\$4.20/bu.	16.80 acre	714 acres



Individual Row Shutoffs

- **Individual Row Clutches Can Fulfill the Following Purposes in Your Farming Operation:**
 - **Save On Seed:**
 - These clutches will shut off the seed flow one row at a time when the row unit gets into an area that has already been planted.
 - **Increased Yield:**
 - By not double planting in the headlands and point rows, yields will be increased since they are not overpopulated.
 - **Increase Productivity:**
 - By utilizing these clutches to automatically shutoff individual rows when in point rows or in the headlands, you can continue to plant through the headlands and lower the planter immediately after your turn without worrying about wasting seed.



Individual Row Shutoffs

- **Minimize Stress:**

- Let the display tell you when to lift the planter and quit planting. It knows exactly when to shut the rows off. When you see all rows off, just lift the planter and turn.



- **More Profit:**

- Average seed savings from individual row clutch control is 4% to 5%. We have had customers say they had savings between 2% and 8% depending on field size and shape.
- Typical yield loss in areas that are double planted is 20%.
- We have had customers report that they believe they have experienced losses as high as 50% due to double planting.



Individual Row Shutoffs

- Adding row shutoffs to a 16 row planter at an estimated cost of \$14,000

<p>4% Seed Savings @ \$280 a bag and 34,000 population</p>	<p>20% Yield Increase on the 4% double planted</p>	<p>X \$4.20 Corn</p>	<p>Acres planted before an ROI on a 16 Row Planter</p>		
		<p>\$4.76 acre</p>	<p>1.4 Bu./acre</p>	<p>\$5.88 acre</p>	<p>1315 acres</p>

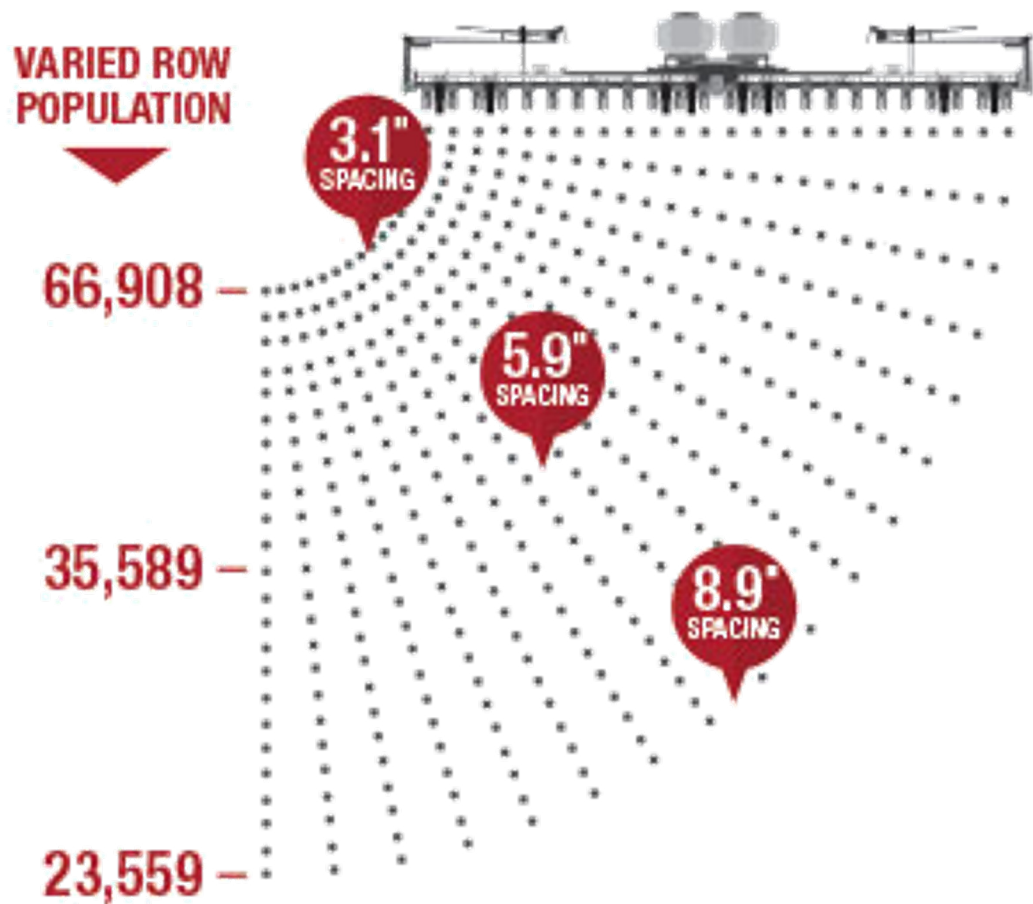


Electric Drives

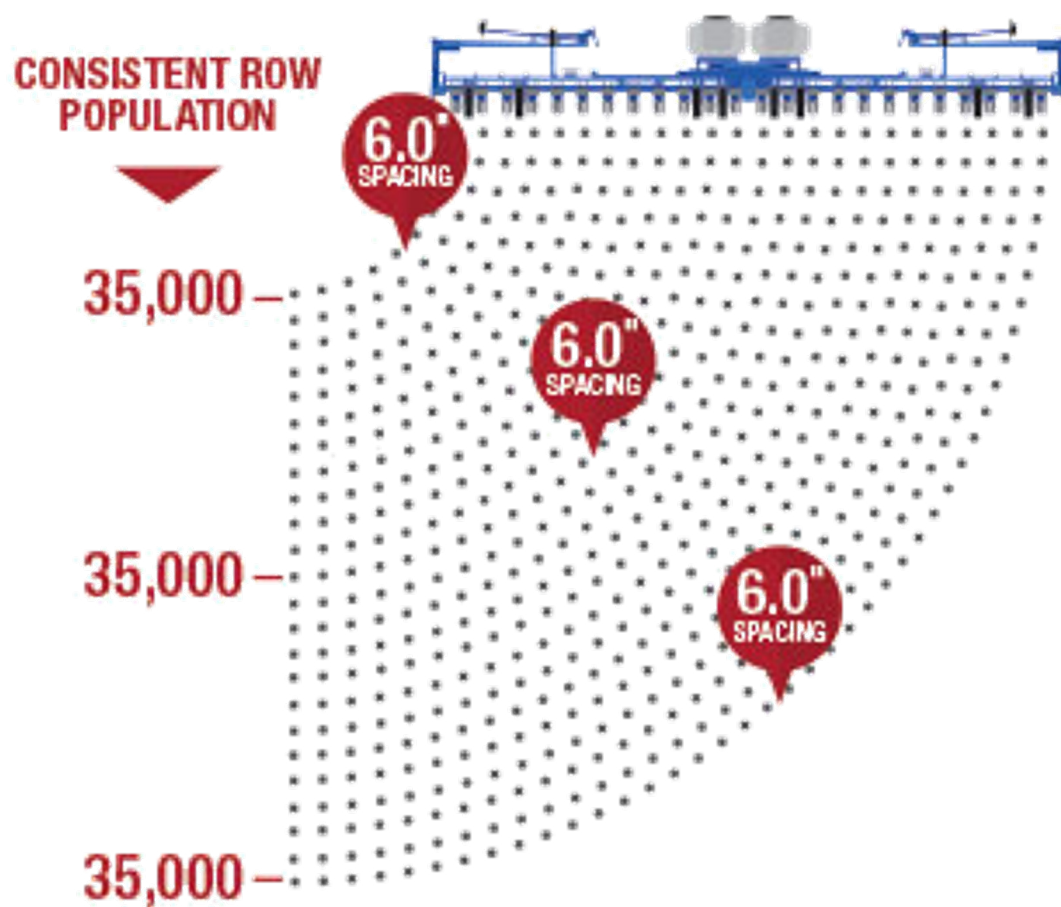
- **Electric Drives Have all the same benefits as Row Shut Offs plus VRA and the following benefits:**
 - Takes all of the noise out of the driveline.
 - Bearings and chains can get hard spots making the driveline jump or chatter
 - Drive tires can slip or if you lose air pressure it can change your rate.
 - Turns VRA Seeding into High Definition
 - The biggest advantage in my opinion is turn compensation.



WITHOUT CURVE COMPENSATION**



WITH CURVE COMPENSATION**



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Bio-Tech, Inc.
MonTag

The
Andersons
GS3
QUALITY
SEED

HOLGANIX
Soil Nourishing Root Stimulating

APACHE ET
SPRAYERS

ForGround
by Bayer
Great Plains
"Harvest Starts Here."



Sound

Electric Drives

- About the same as adding Row Shut Offs and VRA drives. I am estimating \$26,000 for a 16 Row Planter.

Payback for VRA Seeding per acre	Total payback for Row Shut Offs per acre	Increased Yield on curves	Acres planted before an ROI on a 16 Row Planter
\$16.80 acre	\$10.64/acre	??*/acre	947 acres



Hydraulic Downforce

- **Hydraulic Downforce Solutions Can Fulfill the Following Purposes in Your Farming Operation:**
 - **Maintain Proper Depth:**
 - Hydraulic Downforce Control measures the gauge wheel load and automatically adjusts the downforce to keep the gauge wheel in contact with the ground without compacting the soil.
 - **Better Seed Spacing:**
 - Your seed meters can drop the seed in a perfect pattern but if the row unit is bouncing up and down it can change the timing of the seed coming out of the seed tube. Hydraulic downforce control makes your planter unit ride much smoother resulting in more even stands.



Hydraulic Downforce

- **Less Sidewall Compaction:**

- With spring downforce or manual control, we tend to use too much downforce to make sure we do not lose ground contact and end up planting shallow.

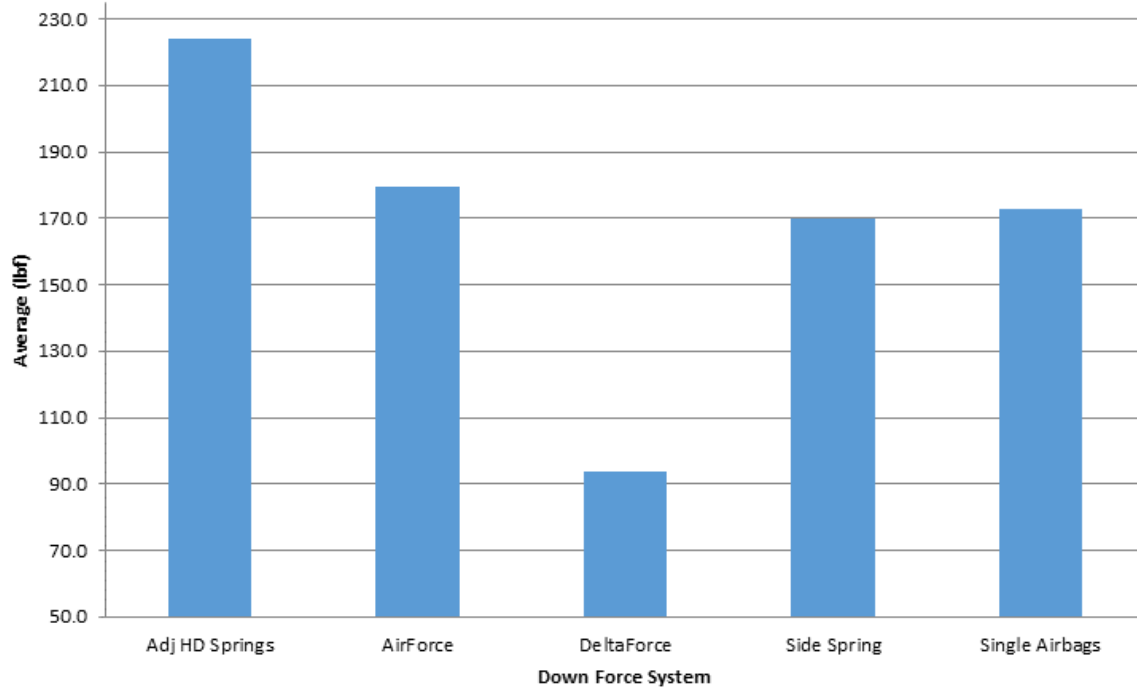
- **More Profit:**

- Beck's Hybrids test plot results show an average yield increase of 11 bu./acre when using hydraulic downforce vs. down pressure springs.
- Iowa State says that if 25% of the field is delayed in emergence it can result in a 6%-10% yield loss.
- An on-farm research study showed an average of 1500 extra ears/acre using hydraulic downforce.

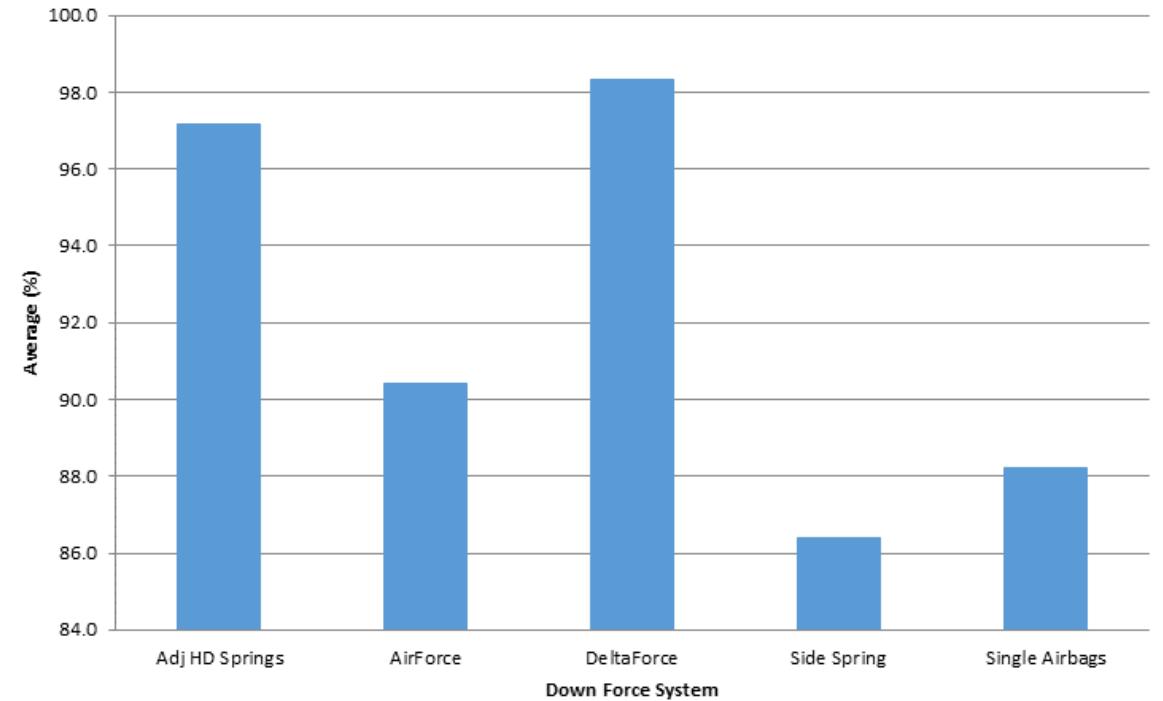


AIT 15,000 acre Downforce Study

Average Gauge Wheel Down Force (lbf)






Average (%) Ground Contact of Down Force Systems



Hydraulic Downforce

- Estimated cost to retrofit a 16 Row Planter is \$36,000

= Yield Increase	X Price of Corn	= Profit per acre	Acres planted before an ROI on a 16 Row Planter
			
11 Bu./acre	\$4.20 bu.	\$46.20/acre	779 acres



The best Stand Evaluation Tool I have seen

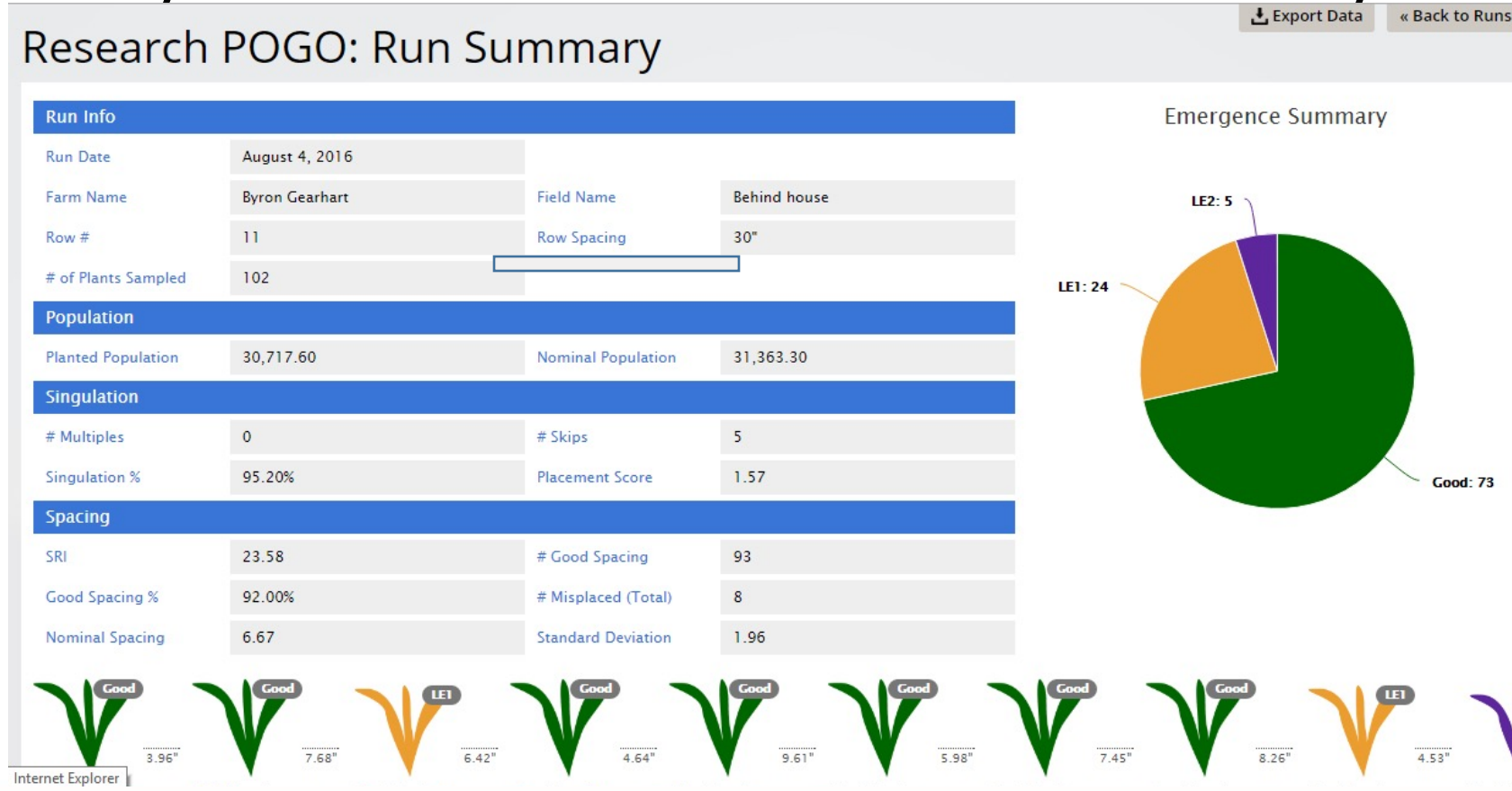
POGO Stick

- Calibrated Tape Measure that syncs to our iPad.
- Provides a report card for how well your planter did.
- Great tool to help growers discover problems with their planter.



Precision with a Purpose!

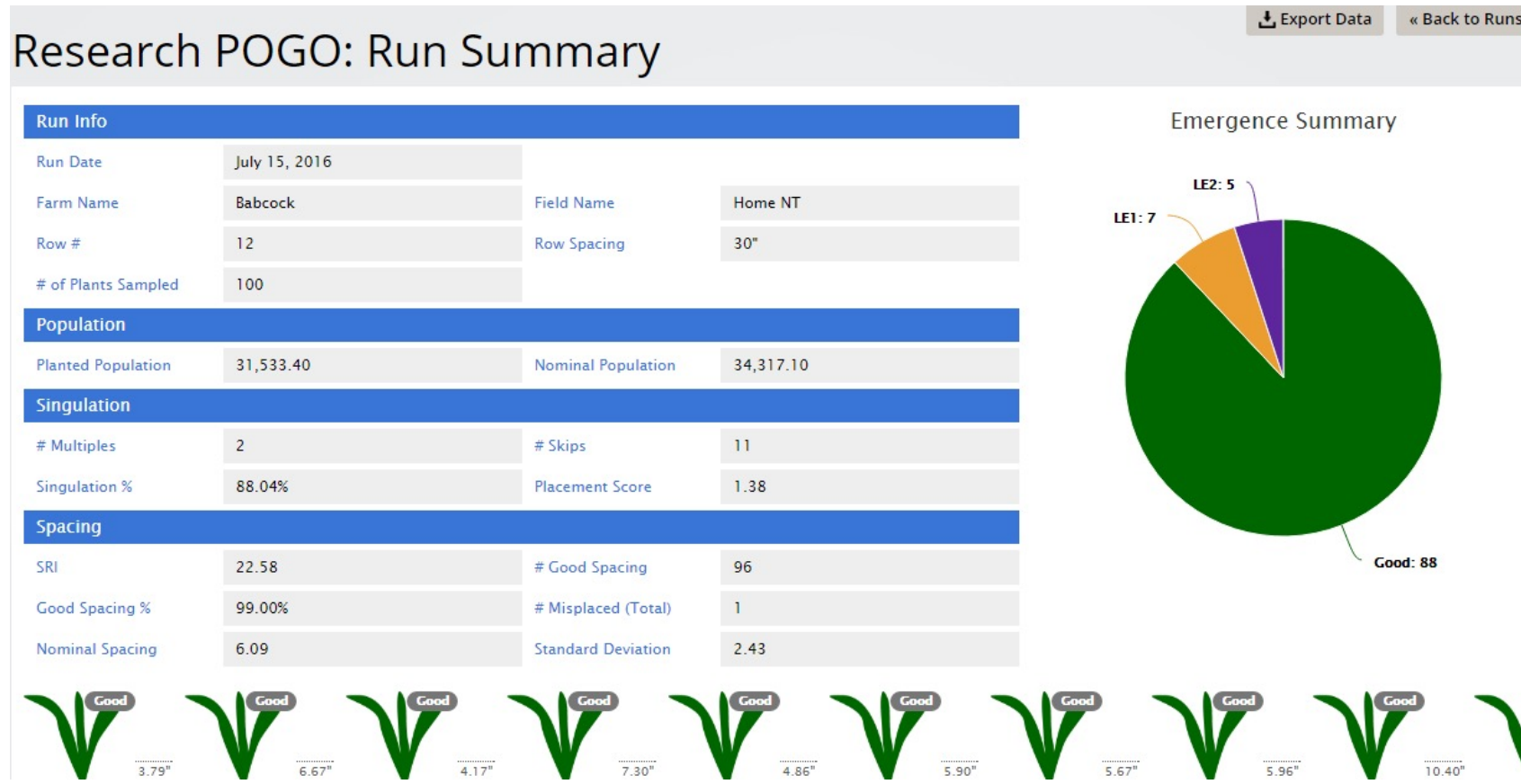
Summary of a Standard Downforce System



Precision with a Purpose!



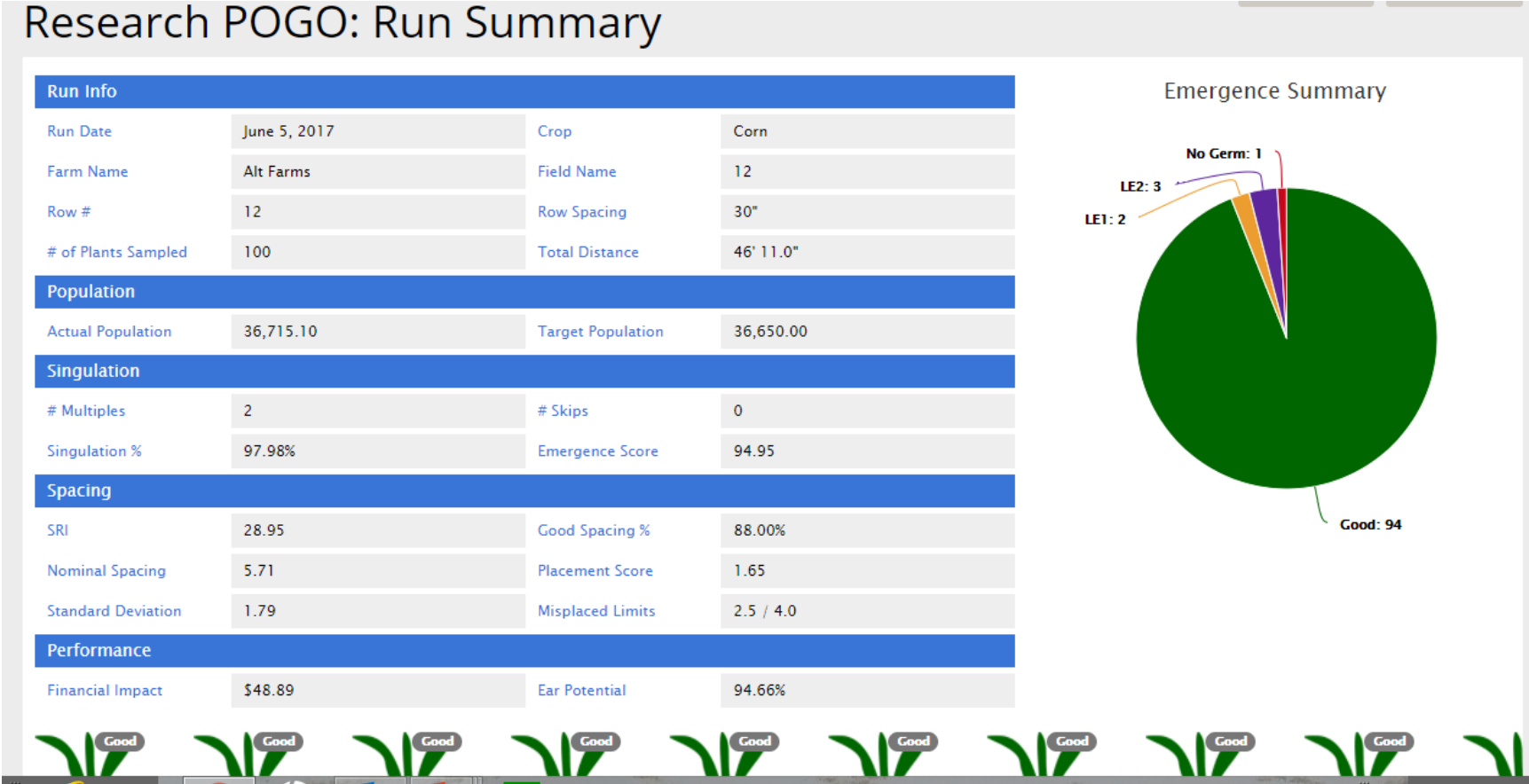
Summary of a vDrive and Delta Force System



Precision with a Purpose!



Summary of a Speed Planter system 8 mph.



Precision with a Purpose!



So we have less late emergers what does that mean?

Hydraulic
Downforce &
vSet Meters
Showing a
\$40.92
advantage



Hydraulic
Downforce,
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and Speed
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"Harvest Starts Here."

Sound

Precision with a Purpose!

The real benefit is using these technologies together as these systems can be built upon.

- **Summary of All of These Solutions Being Implemented on Your Planting Operation:**
- **Save On Seed:**
 - Variable Rate , RTK Auto Steer and Individual Row Clutches are all solutions that will help you save on seed.
- **Increased Yield:**
 - Hydraulic Down Force Control, Variable Rate Population, Individual Row Clutches and vSet meters will help you to increase your yield substantially.



The real benefit is using these technologies together as these systems can be built upon.

- **Increase Productivity:**

- Auto Steer, Individual Clutch Control and Hydraulic Downforce Control will help you plant more acres per day.

- **Minimize Stress:**

- Auto Steer, Planter Performance Monitoring, Individual Row Clutch Control, Variable Rate Population Control and Hydraulic Downforce Control will help to relieve stress and assure that every planter pass was the absolute best that it could be.



The real benefit is using these technologies together as these systems can be built upon.

- **More Profit:**




- RTK Auto Steer \$ 5.40 acre
- Planter Performance Monitoring \$ 4.20 acre
- Electric Drives \$27.44 acre
 - Row Shut Offs and VRA
- Hydraulic Downforce Control \$46.20 acre

- **Total Revenue Increase \$83.24 acre**



The real benefit is using these technologies together as these systems can be built upon.

- **Complete system, RTK Auto Steer Hydraulic Downforce & Electric Drives**
Estimated cost of \$65,000.

Kinze 16 row planter and a New Holland Tractor	Cost for all of the above solutions	= Profit per acre	Acres planted before an ROI on a 16 Row Planter
	 \$65,000	 \$83.24 acre	780 acres

- **The system would pay for itself in 2 years on 400 acres of corn!!!**



There are so many other technologies out there that I don't have numbers for but need looked at.

- Automated down force on closing wheels.
- High speed planting.
- Automatic depth control.



I am excited to have added Nozzle by Nozzle control to my sprayer the 2024 season

- System utilizes a PWM (Pulse Width Modulation) valve at every nozzle.
- Install slightly larger nozzles that needed for your application.
- Set the pressure to get the proper coverage and droplet size that the herbicide manufacture recommends.
- Every other nozzle is on a different frequency so that there is always even coverage.
- System controls the rate by pulsing each nozzle to maintain a constant pressure.



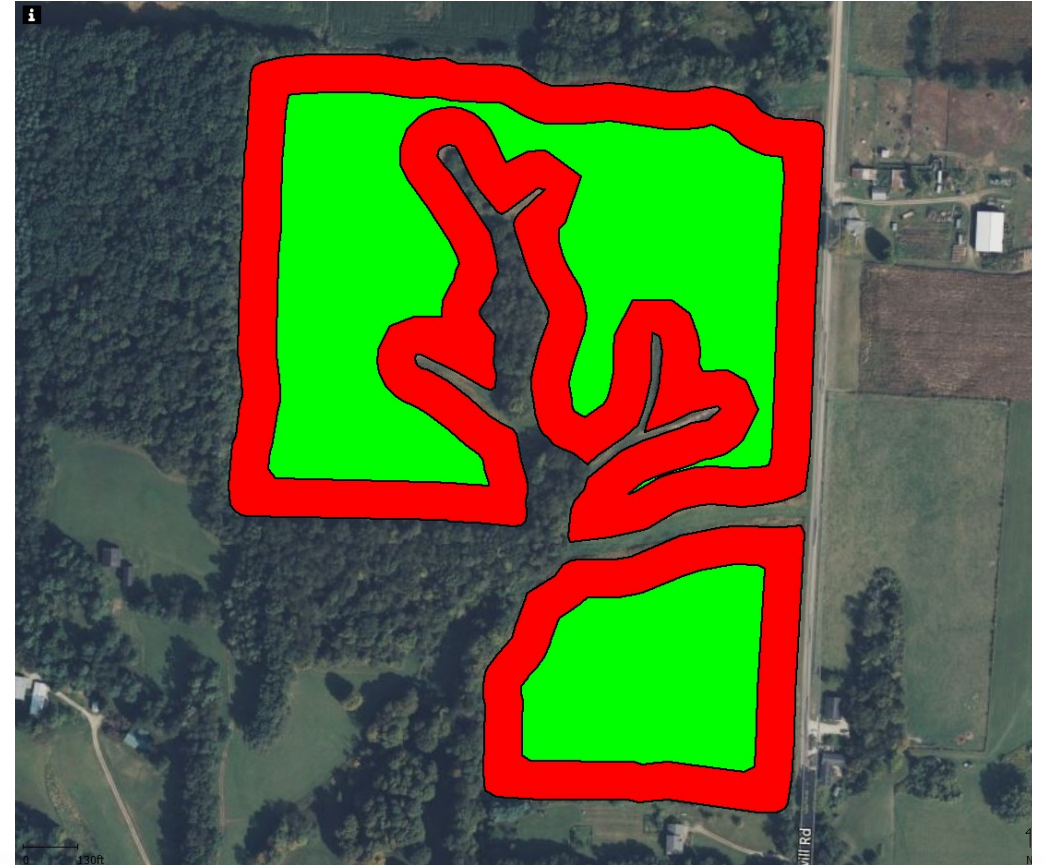
I am excited to have added Nozzle by Nozzle control to my sprayer the 2024 season

- Crisp clean shutoff that is right ahead of the nozzle.
- No need to outline waterways if they are marked with an RTK Boundary.
- Nozzle by Nozzle turn compensation
- Greatly increase efficiency by reducing total acres covered.
- Increase yield by shutting off every 20" instead of a 20' boom section.
- Increased yield and weed control by reducing overlap and under applied sections.



One of my larger 40.5 acre fields

- 20.9 acres or 51.6% is headland.
- I have to drive over 5.19 acres twice to outline the waterways.
- That equals 12.8% extra acres driven.
- Look at how curves are in that field that will be under and over applied.



I don't know the economics on this but I have to think the return is great.

- When evaluating new technologies don't forget the CSP program will help fund some of these purchases especially if they reduce herbicide or fertilizer inputs.



Hopefully I got you thinking today that Precision Ag can pay for itself.

- I hope that you see the value of recording and utilizing your data.
- That you don't have to be large to utilize Precision Ag products and services.
- I hope I encouraged you to get with your Precision Ag supplier and look at some of the systems available and see if they make sense for your farm.

Thank You!!!

