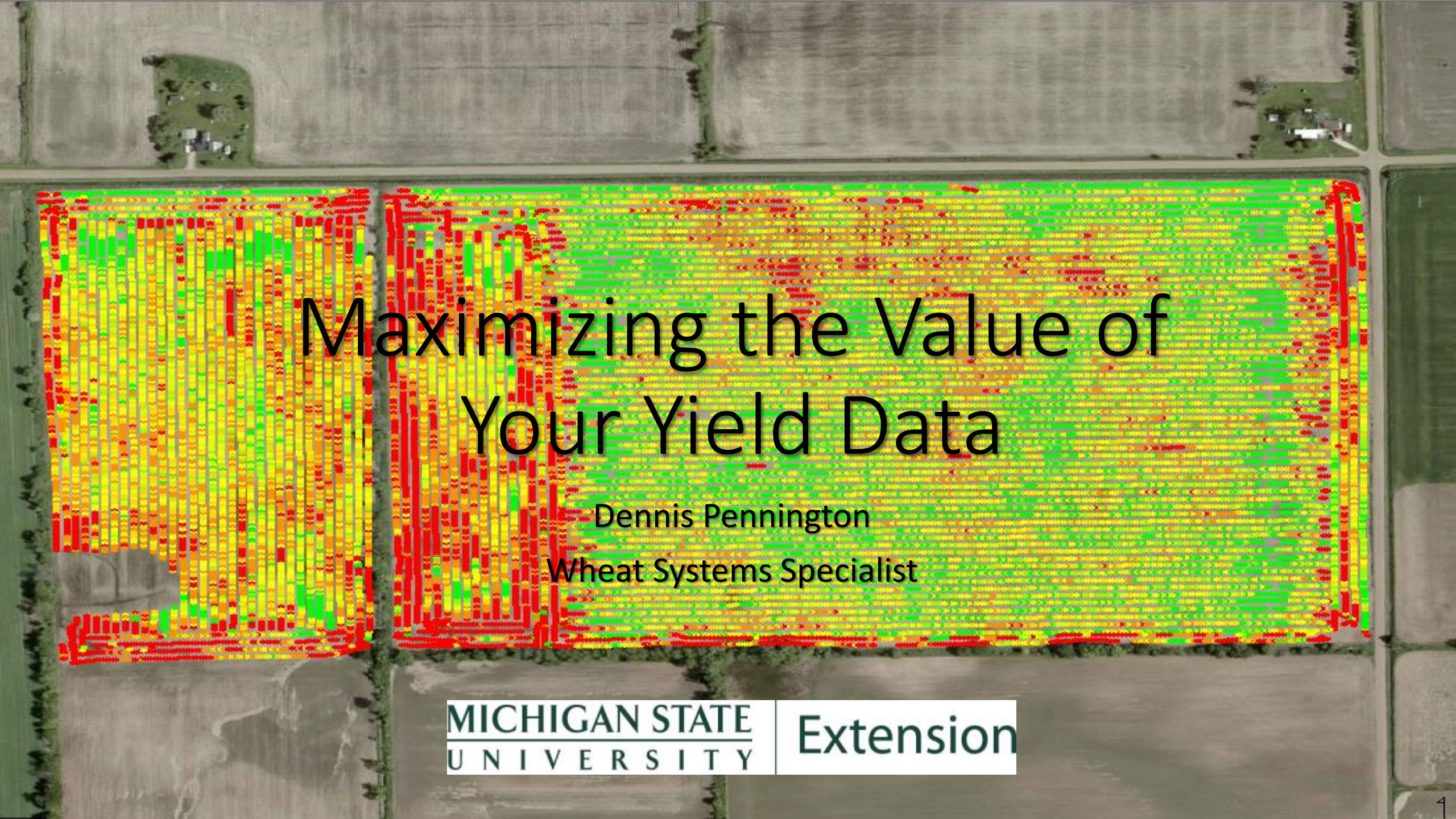

Maximizing the Value of Your Yield Data

Dennis Pennington

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Do you…

- Have a yield monitor?
- Use it?
- Download and store data from it?
- Print maps?
- Grid soil sample?
- Write prescriptions?
- Use it to make management decisions?
- How?

Initial steps…

- Learn how a yield monitor works
- Calibrate the monitor
- Set up grower, farm, field names (and use them)
- Import data to software program
  - Apex
  - Farmworks
  - SMS
  - Map Shots
  - Summit
  - Others

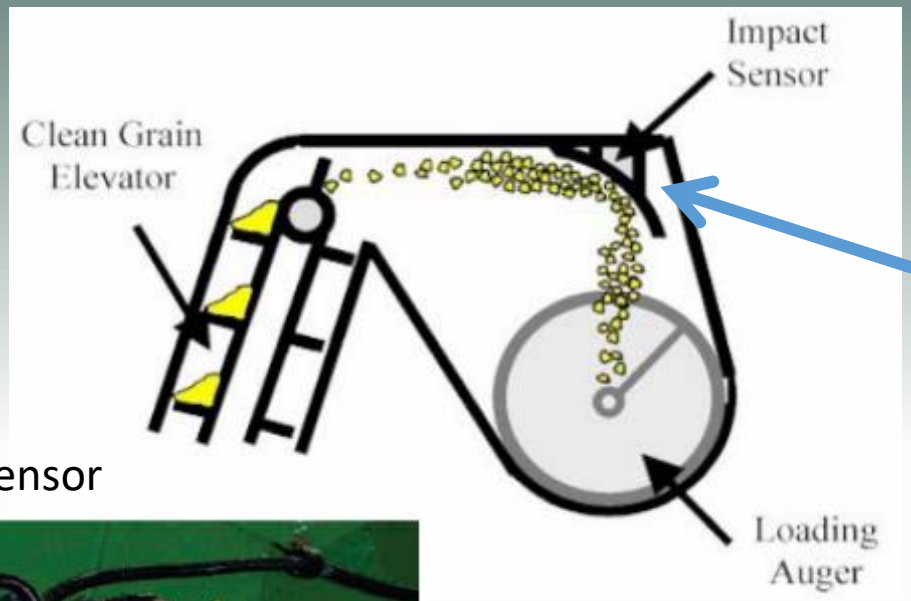
Key Points:

1. Calibrate!
2. Manipulate!
3. Operate!

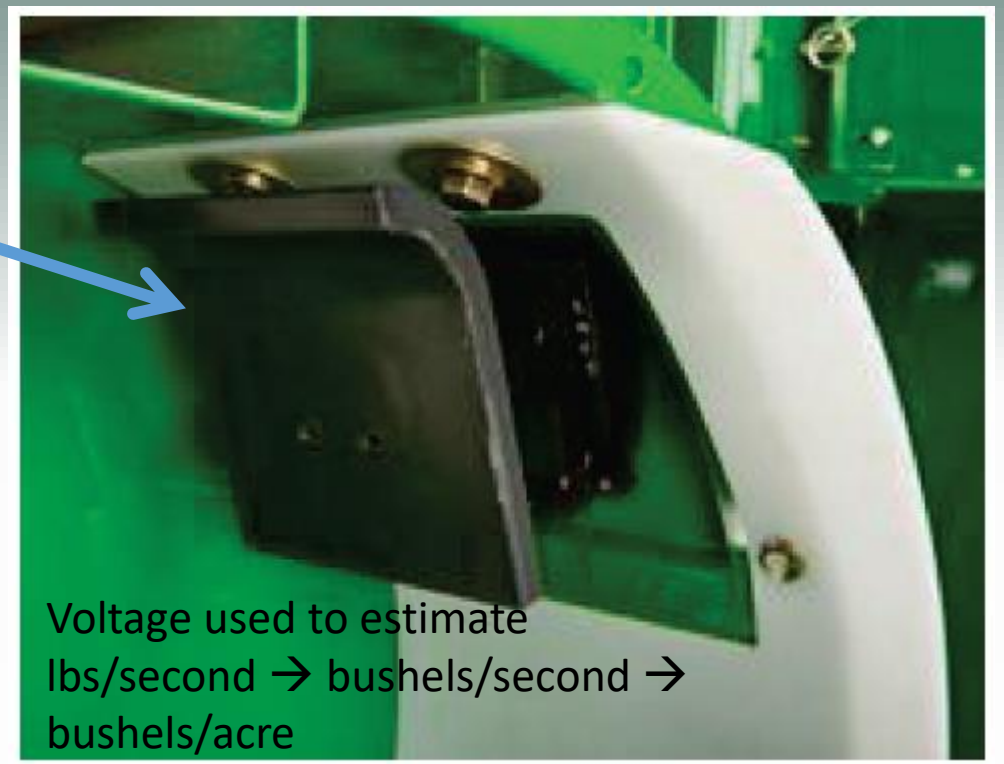
Why Calibrate?

- To ensure accurate data collection
- On farm research
- Create management zones
- Yield data used to create prescriptions
- VRT
  - Fertilizer & lime
  - Seeding rate
  - Varieties

How a Yield Monitor Works



Mass flow sensor

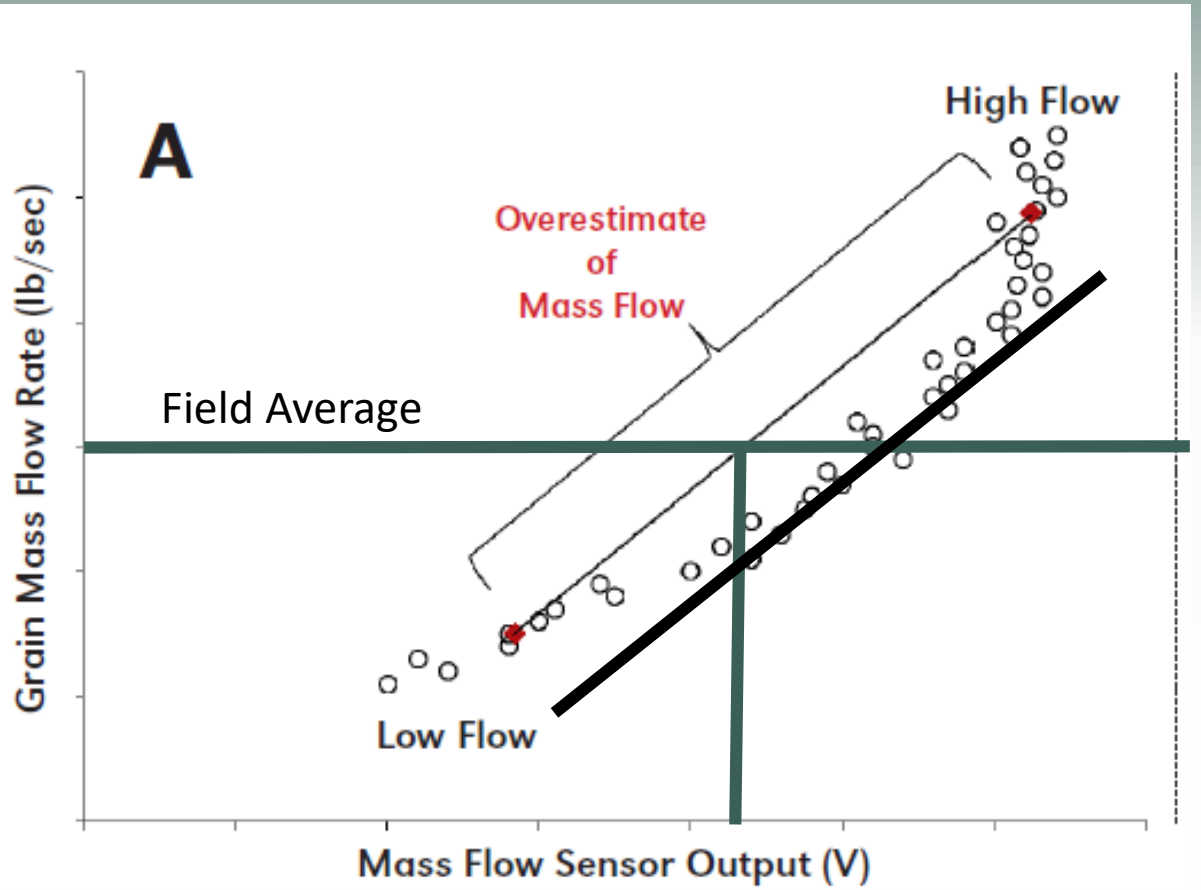


Voltage used to estimate lbs/second → bushels/second → bushels/acre

Moisture sensor

Best Management Practices for Collecting Accurate Yield Data and Avoiding Errors During Harvest, Luck, J. and Fulton, J. UNL Bulletin EC2004.

Mass Flow Sensor Response

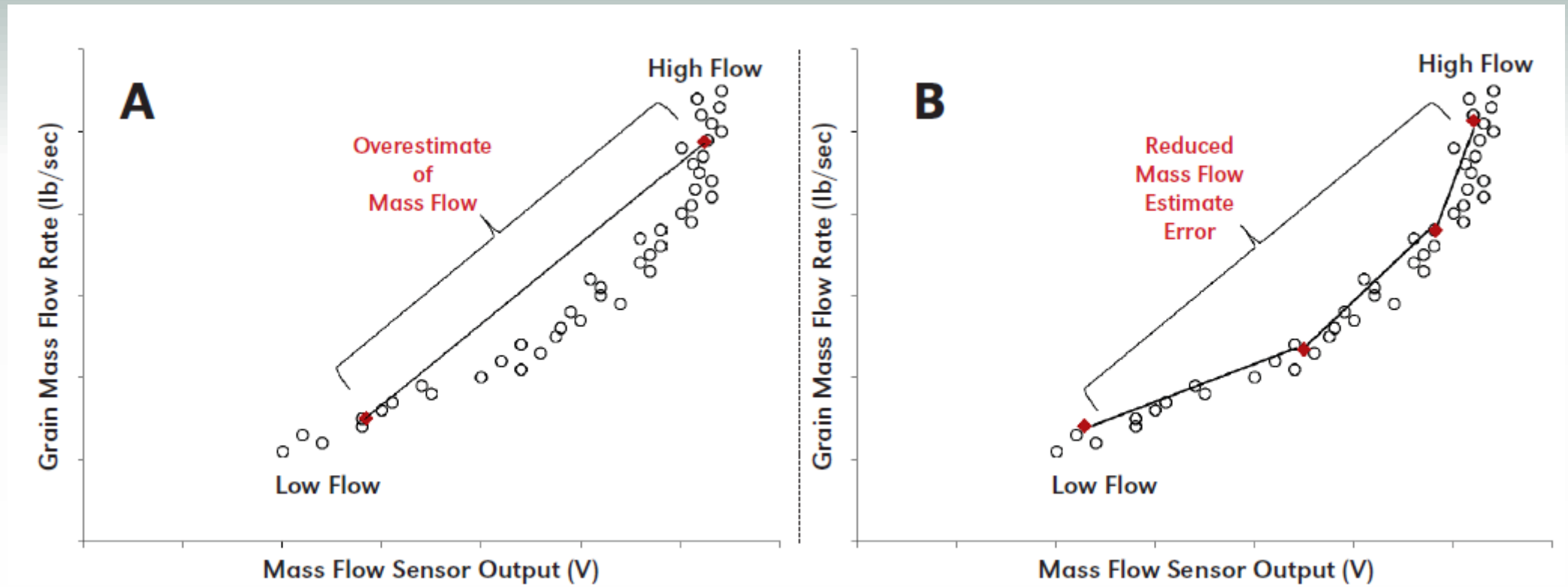


- Non-linear
- Different between combines
- Varies between crops
- Influenced by:
  - Grain moisture
  - Test weight
  - Clean grain elevator
  - Operator behavior
  - Maintenance
  - Other

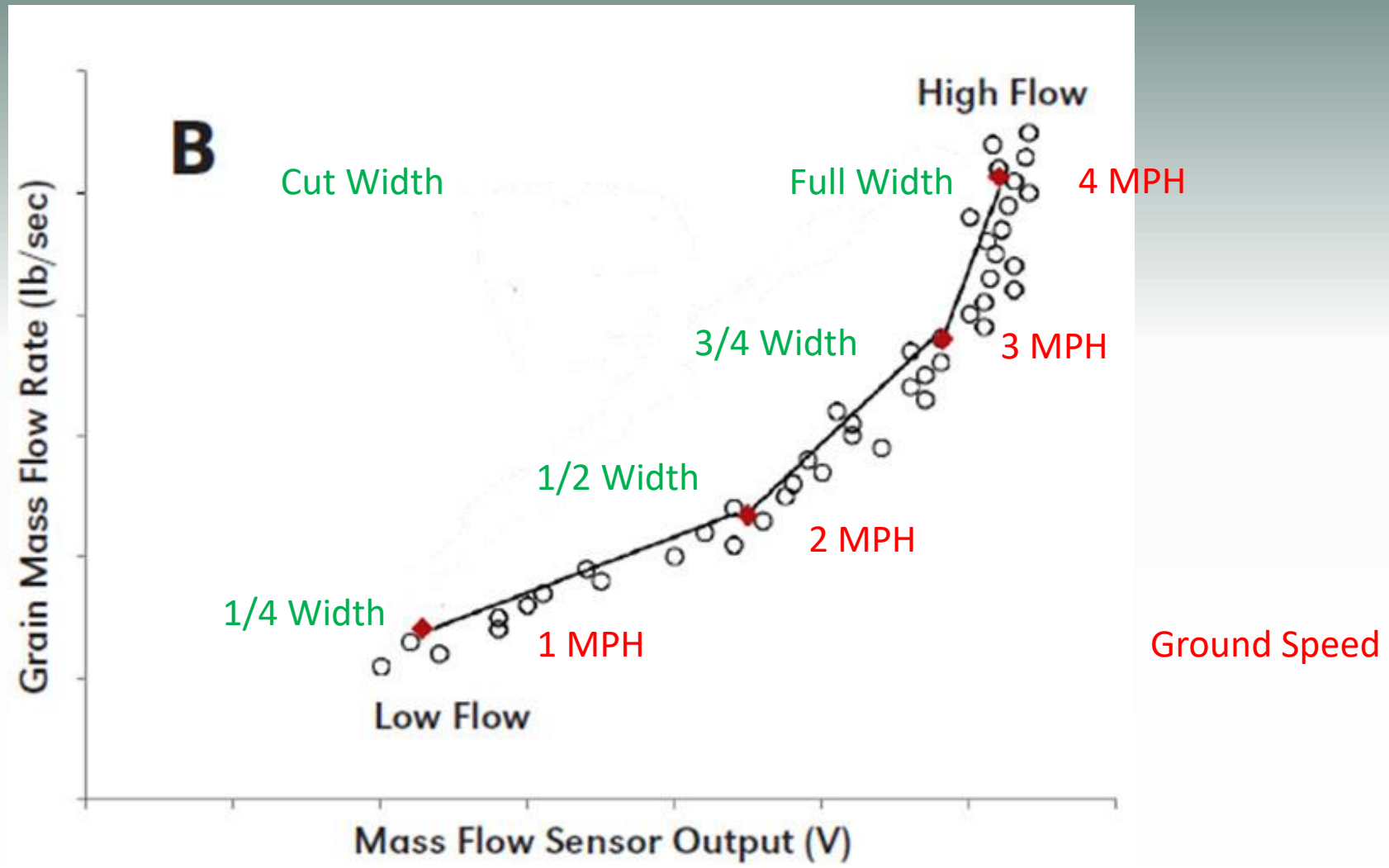
Calibrating the mass flow sensor

Two point calibration

Multi-point calibration



How to get desired flow rate?



Don’t take the shortcut!

Yield Monitor Calibration – Corn ‘16

MPH	Flow rate	Monitor (lbs)
1	Low	3293
2	Medium	4158
3	Medium	5422
4	High	4120

CaseIH combine, Berrien County, MI.

Yield Monitor Calibration – Corn ‘16

MPH	Flow rate	Monitor (lbs)	Weigh Wagon (lbs)
1	Low	3293	3976
2	Medium	4158	4161
3	Medium	5422	4736
4	High	4120	3762

CaseIH combine, Berrien County, MI.

Yield Monitor Calibration – Corn ‘16

MPH	Flow rate	Monitor (lbs)	Weigh Wagon (lbs)	Difference (lbs)
1	Low	3293	3976	-683
2	Medium	4158	4161	-3
3	Medium	5422	4736	686
4	High	4120	3762	358

CaseIH combine, Berrien County, MI.

Yield Monitor Calibration – Corn ‘16

MPH	Flow rate	Monitor (lbs)	Weigh Wagon (lbs)	Difference (lbs)	Difference (%)
1	Low	3293	3976	-683	**-17.2%**
2	Medium	4158	4161	-3	**-0.1%**
3	Medium	5422	4736	686	**14.5%**
4	High	4120	3762	358	**9.5%**

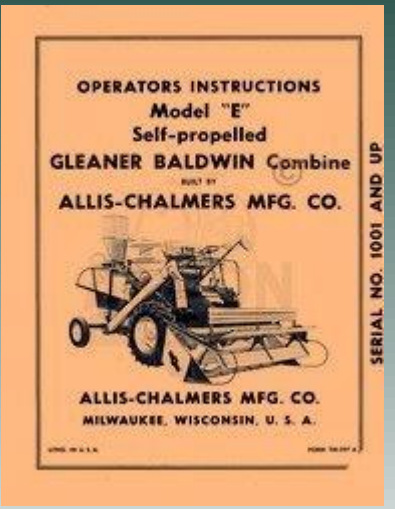
CaseIH combine, Berrien County, MI.

Yield Monitor Calibration – Corn ‘16

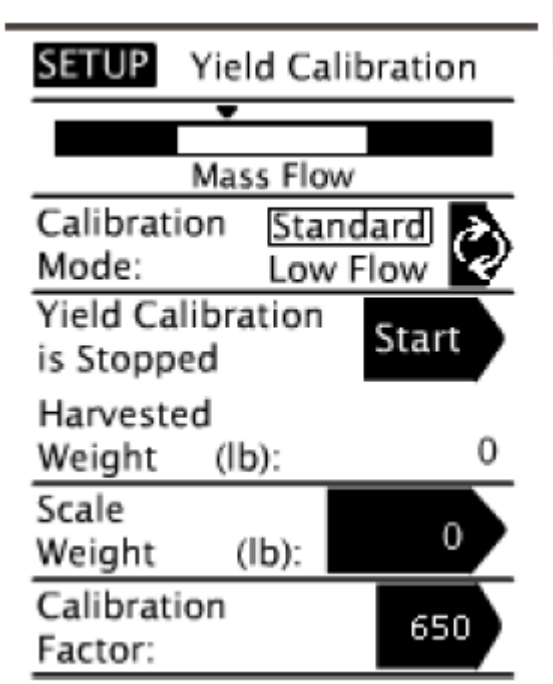
MPH	Flow rate	Monitor (lbs)	Weigh Wagon (lbs)	Difference (lbs)	Difference (%)
1	Low	3293	3976	-683	**-17.2%**
2	Medium	4158	4161	-3	**-0.1%**
3	Medium	5422	4736	686	**14.5%**
4	High	4120	3762	358	**9.5%**
		16,993	16,635	358	**2.1%**

CaseIH combine, Berrien County, MI.

Calibration methods



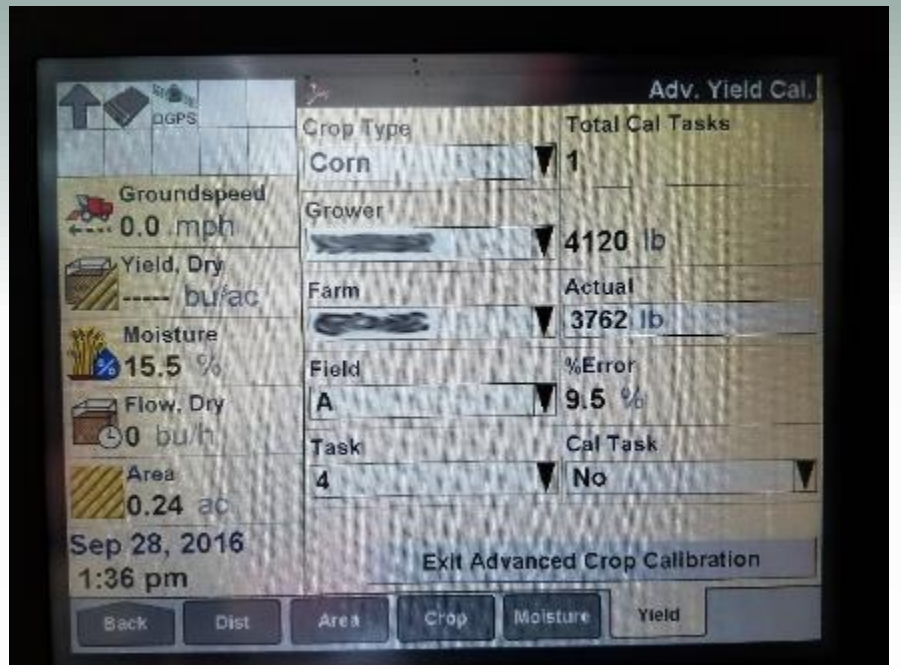
- Each combine is different – read owners manual
- Most new combines have “Advanced” calibration method
  - Allows for multi-point calibration
  - Wizard will give you only quick and dirty calibration
- Some older combines have built in calibration curve where only one calibration is performed
  - John Deere 70 series combines



Calibrations

1. Distance (some models use GPS, others use radar/wheel sensors)
2. Moisture sensor temperature
3. Mass flow vibration
4. Moisture sensor
5. Weight calibration (at least 3000 lbs)
6. Other settings:
   - Lag time
   - Header position
   - Cut width
   - GPS offsets

Recommended: if collecting on farm research data – ask grower to download monitor files prior to starting your trial.

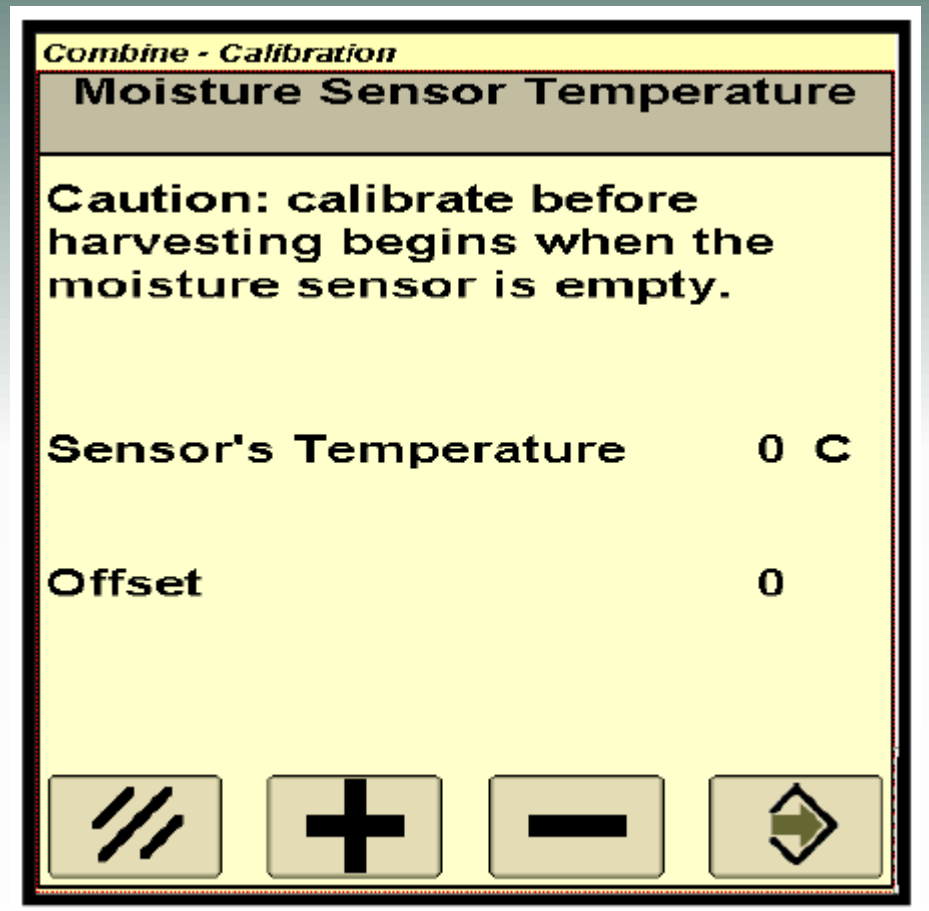


Once per season

Calibrations

1. Distance (some models use GPS, others use radar/wheel sensors)
2. Moisture sensor temperature
3. Mass flow vibration
4. Moisture sensor
5. Weight calibration (at least 3000 lbs)
6. Other settings:
   - Lag time
   - Header position
   - Cut width
   - GPS offsets

Recommended: if collecting on farm research data – ask grower to download monitor files prior to starting your trial.

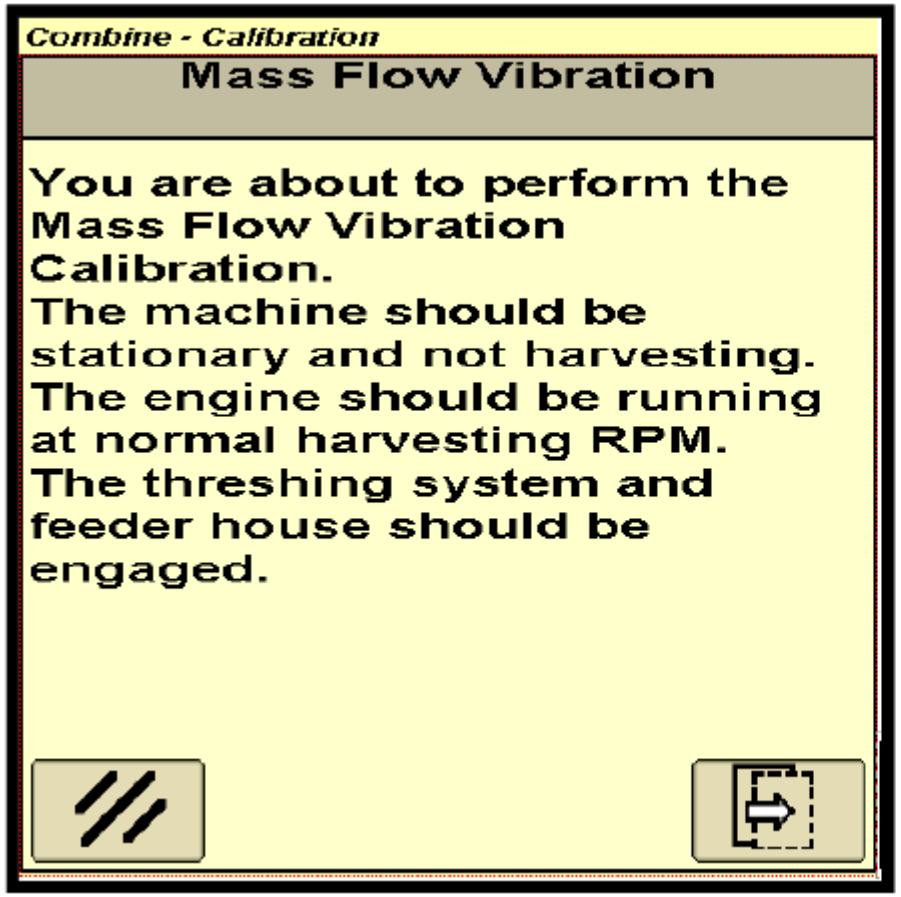


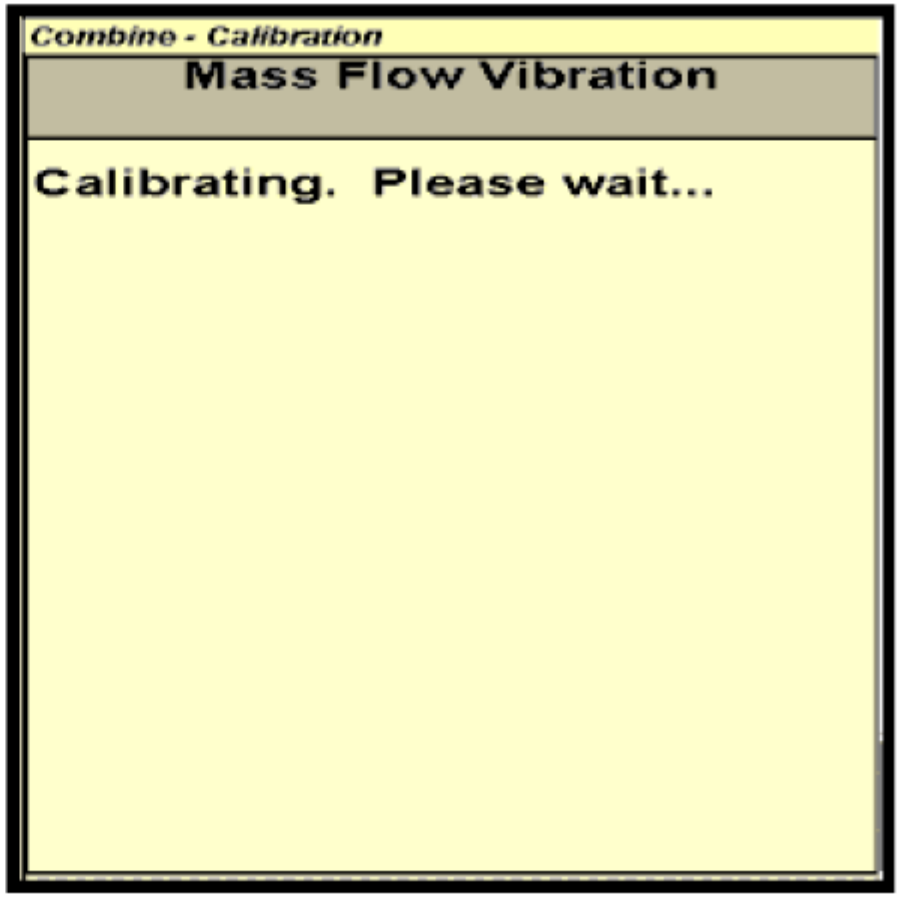
Once per season (not after sunlight)

Calibrations

1. Distance (some r
   use radar/wheel
2. Moisture sensor
3. Mass flow vibrat
4. Moisture sensor
5. Weight calibratic
6. Other settings:
   - Lag time
   - Header position
   - Cut width
   - GPS offsets

Recommended: if col
research data – ask g
monitor files prior to





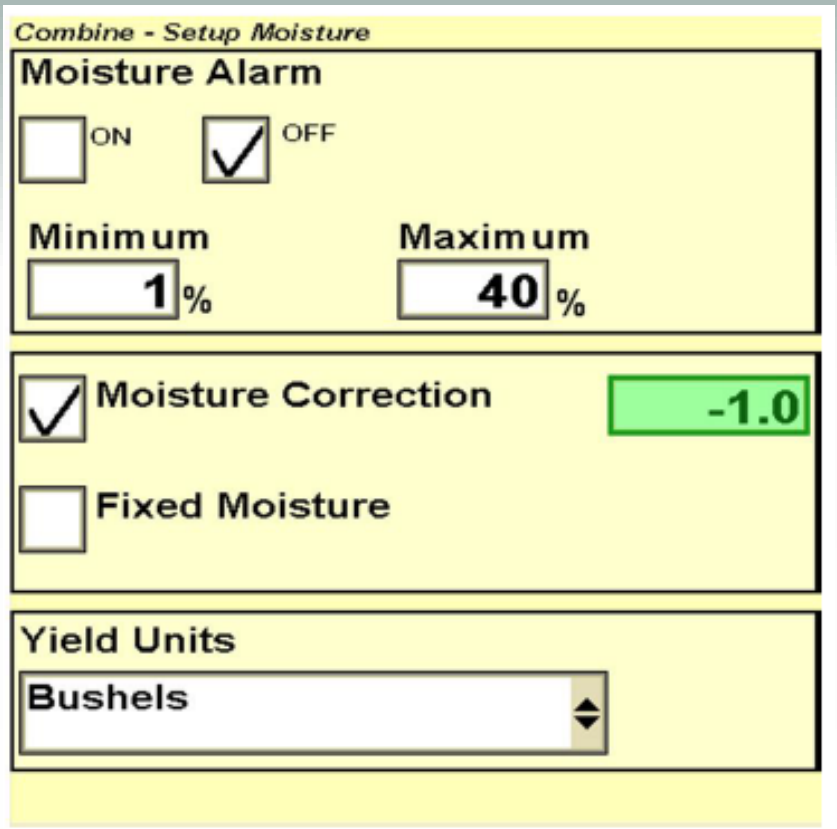
Once per season for each crop (with proper head at operating height)

Calibrations

1. Distance (some models use GPS, others use radar/wheel sensors)
2. Moisture sensor temperature
3. Mass flow vibration
4. Moisture sensor – use trusted tester!
5. Weight calibration (at least 3000 lbs)
6. Other settings:
   - Lag time
   - Header position
   - Cut width
   - GPS offsets

Recommended: if collecting on farm research data – ask grower to download monitor files prior to starting your trial.

Moisture Meter Capacitance Plate

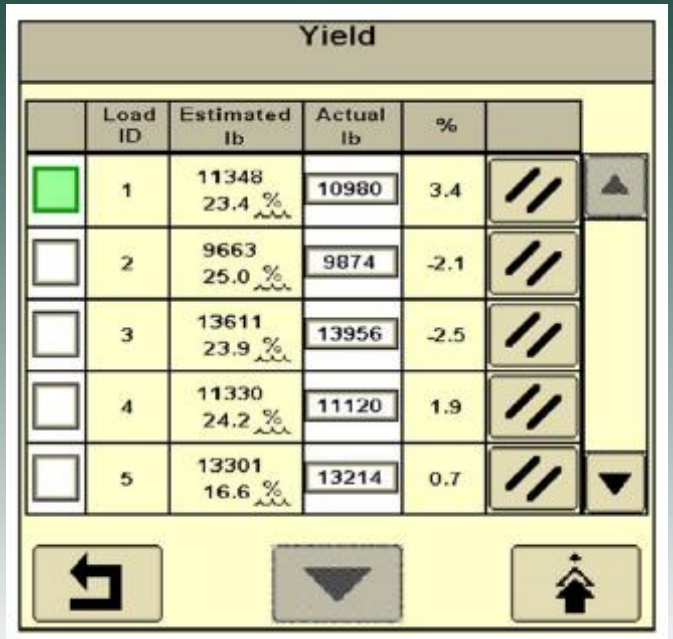


Once per season for each crop

Calibrations

1. Distance (some models use GPS, others use radar/wheel sensors)
2. Moisture sensor temperature
3. Mass flow vibration
4. Moisture sensor
5. Weight calibration (at least 3000 lbs)
6. Other settings:
   - Lag time
   - Header position
   - Cut width
   - GPS offsets

Recommended: if collecting on farm research data – ask grower to download monitor files prior to starting your trial.

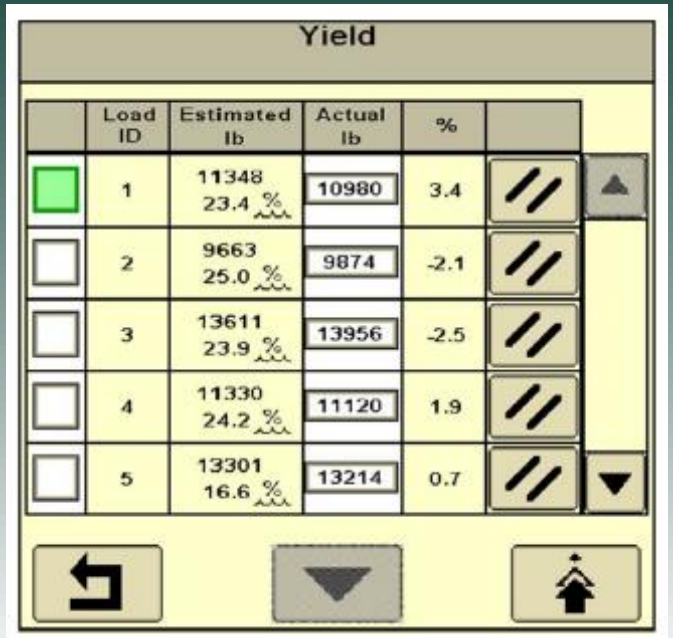


Once per season per crop (wet & dry)

Calibrations

1. Distance (some models use GPS, others use radar/wheel sensors)
2. Moisture sensor temperature
3. Mass flow vibration
4. Moisture sensor
5. Weight calibration (at least 3000 lbs)
6. Other settings:
   - Lag time
   - Header position
   - Cut width
   - GPS offsets

Recommended: if collecting on farm research data – ask grower to download monitor files prior to starting your trial.



Once per season per crop (wet & dry)

Manipulate - Data clean up

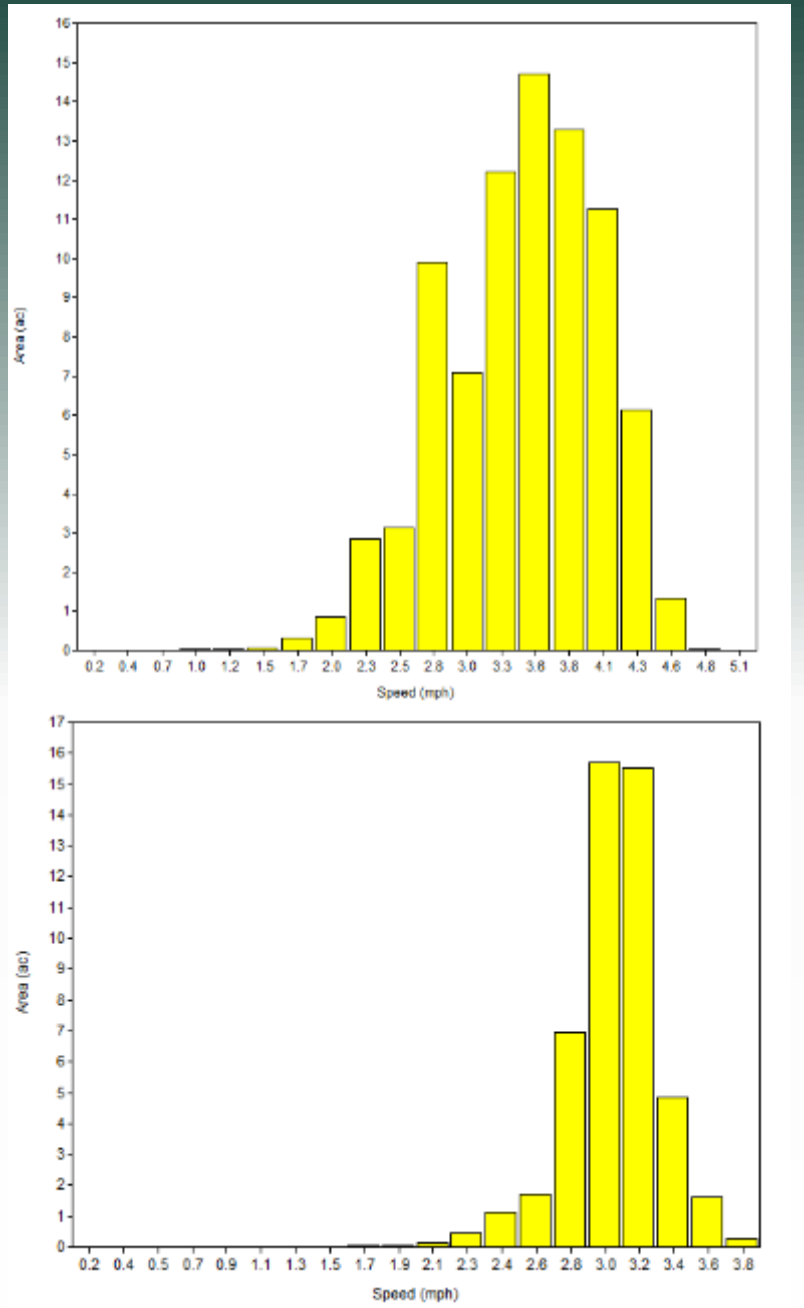
- Grower/farm/field errors
- “wild” points (outside of field)
- Turnaround on ends
- Partial swath width (last pass)
- Abnormalities – 2106 bu/a soybean yield?
- Speed up/slow down

Variation in Operators???

Soybean Harvest – Ground Speed

2 Type of Operators

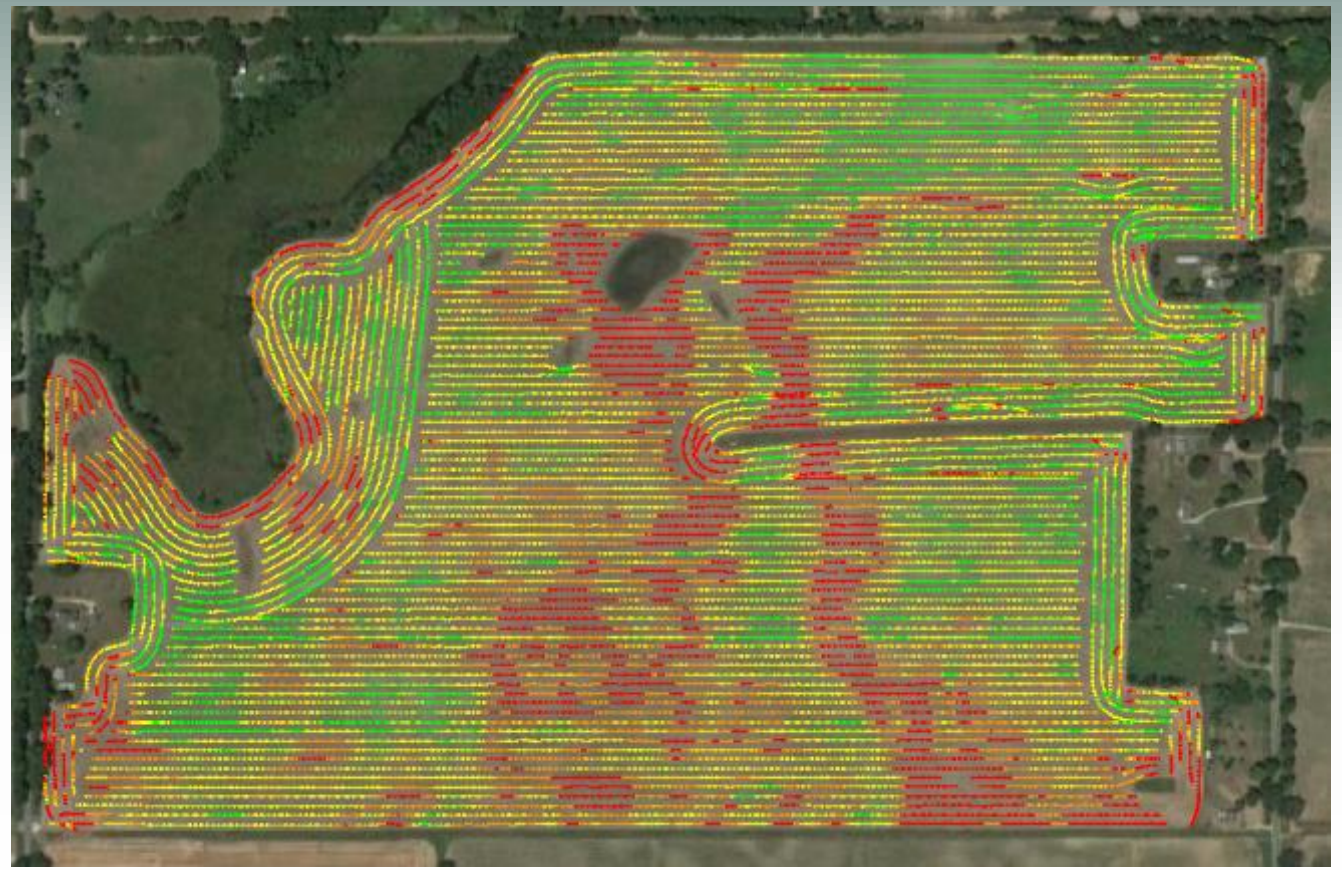
1. Those that tend to adjust hydrostat frequently.
2. Those that tend to maintain a preferred ground speed with minor speed adjustments based on operating conditions.



Your intention for using data?

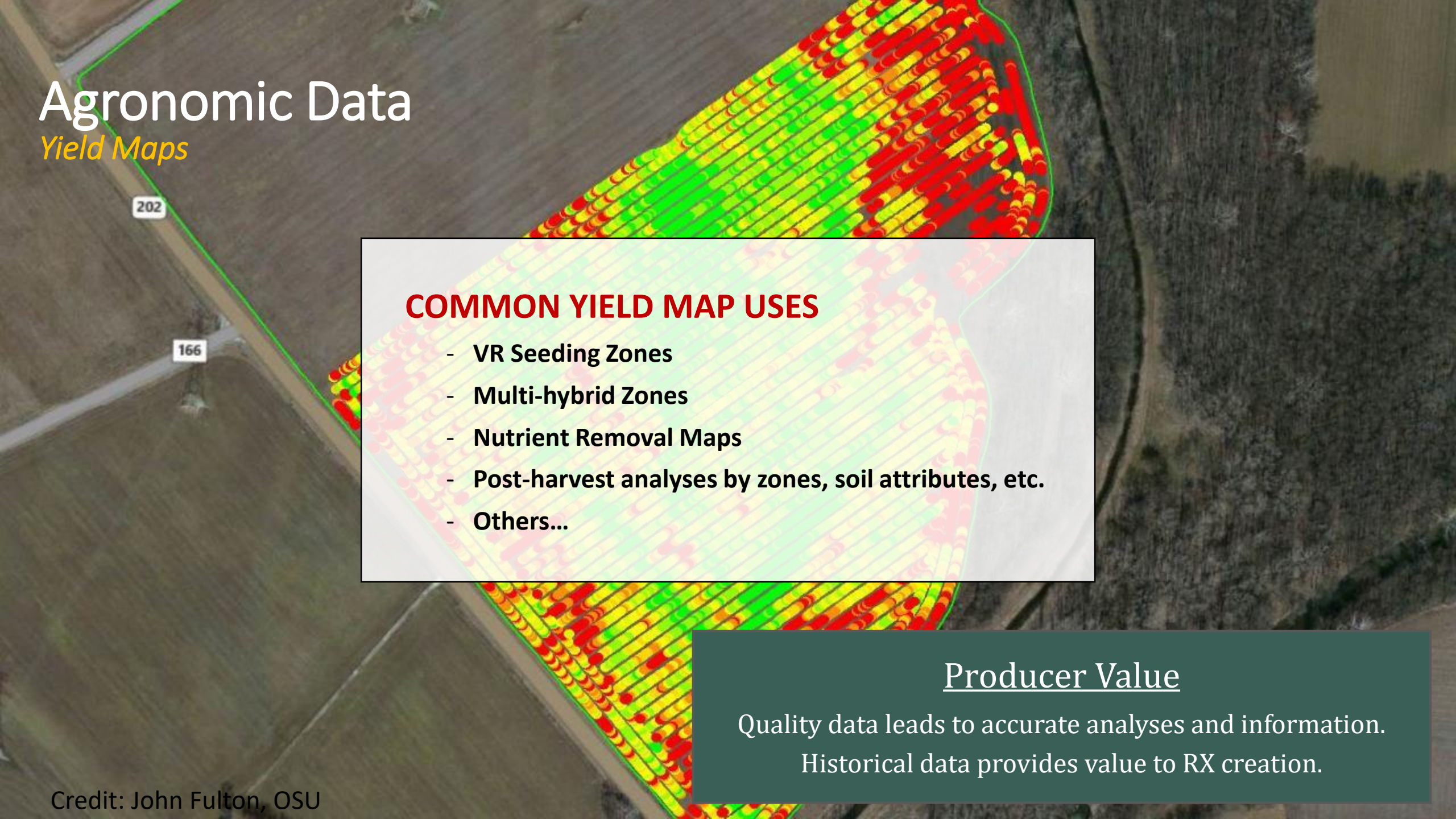
- Prescriptions
- Post harvest analysis

- Need:
  1. Relative precision (spatial) and
  2. Cleaning prior to analysis



Agronomic Data

Yield Maps



COMMON YIELD MAP USES

- **VR Seeding Zones**
- **Multi-hybrid Zones**
- **Nutrient Removal Maps**
- **Post-harvest analyses by zones, soil attributes, etc.**
- **Others…**

Producer Value

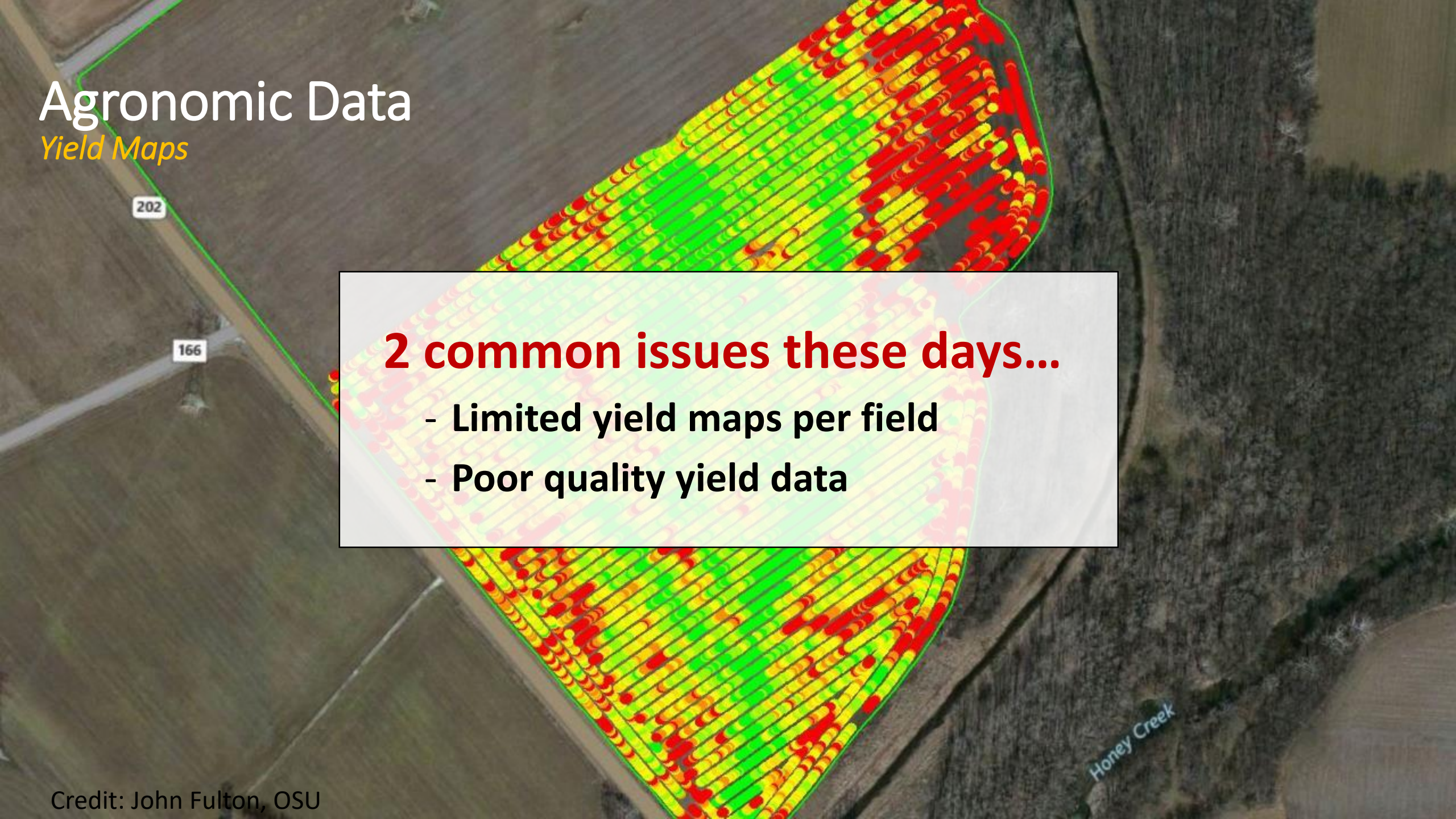
Quality data leads to accurate analyses and information.

Historical data provides value to RX creation.

Credit: John Fulton, OSU

Agronomic Data

Yield Maps



2 common issues these days…

- **Limited yield maps per field**
- **Poor quality yield data**

Credit: John Fulton, OSU

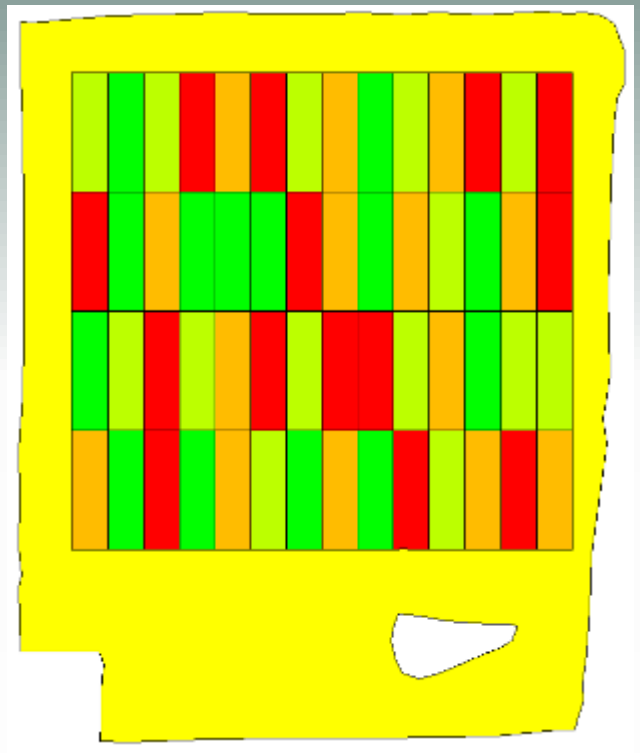
Operate – Use technology for your own research

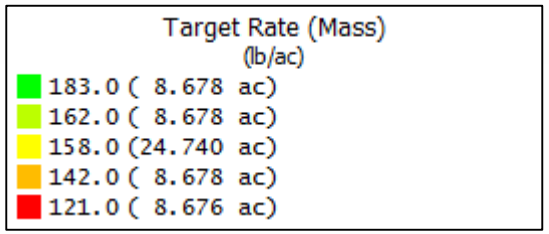
- Most farms have yield monitors
- Many have VRT capabilities (owned or hired)
- RTK accuracy is greatly improved
- Less time
- Easier for farmer

Plot Layout Considerations

- Field size
- Application width
- Combine header width
- Traffic patterns
- Replications
- Plot orientation

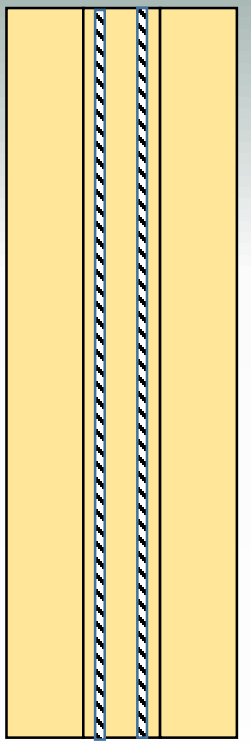
Operate: on farm research - seeding rate



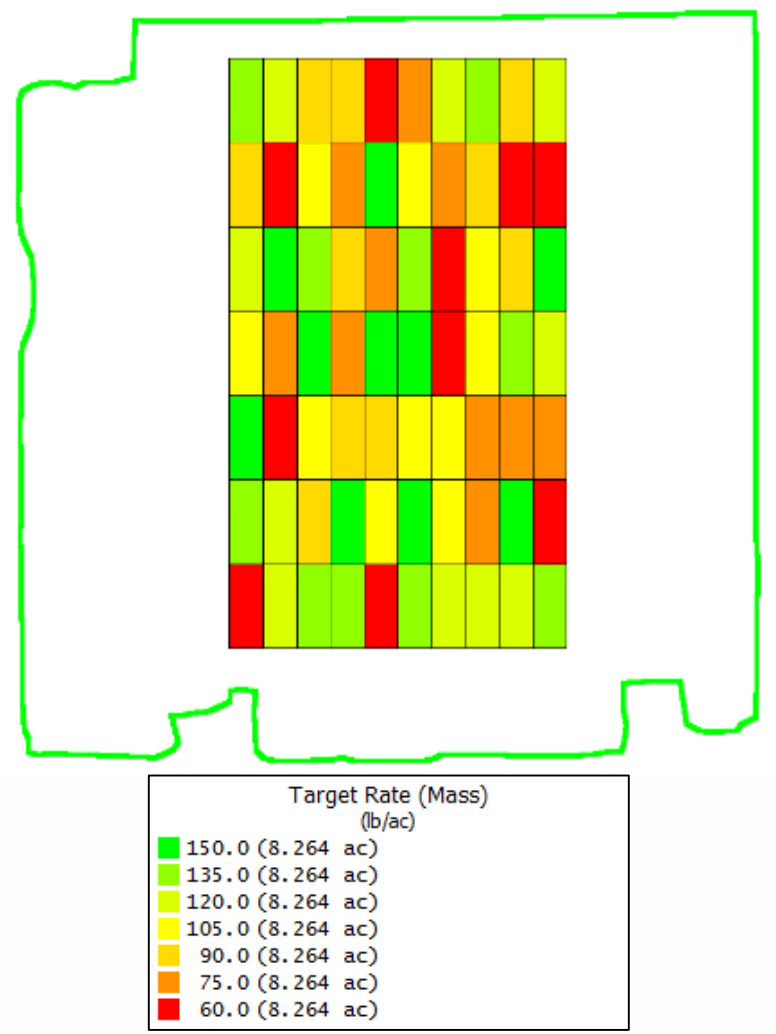


90 foot x 300 ft
4 rates x 14 reps
30 foot combine header
90 foot sprayer

Plot Traffic

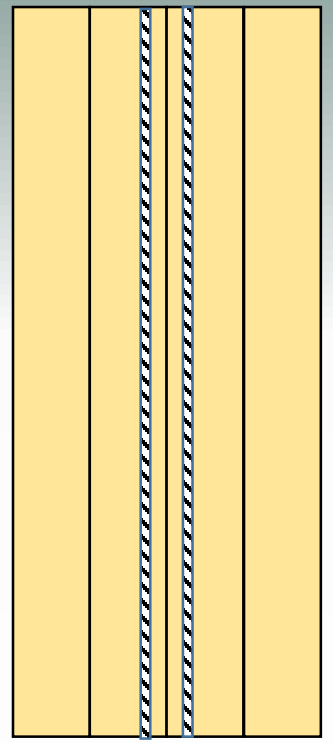


Operate: on farm research – nitrogen rate

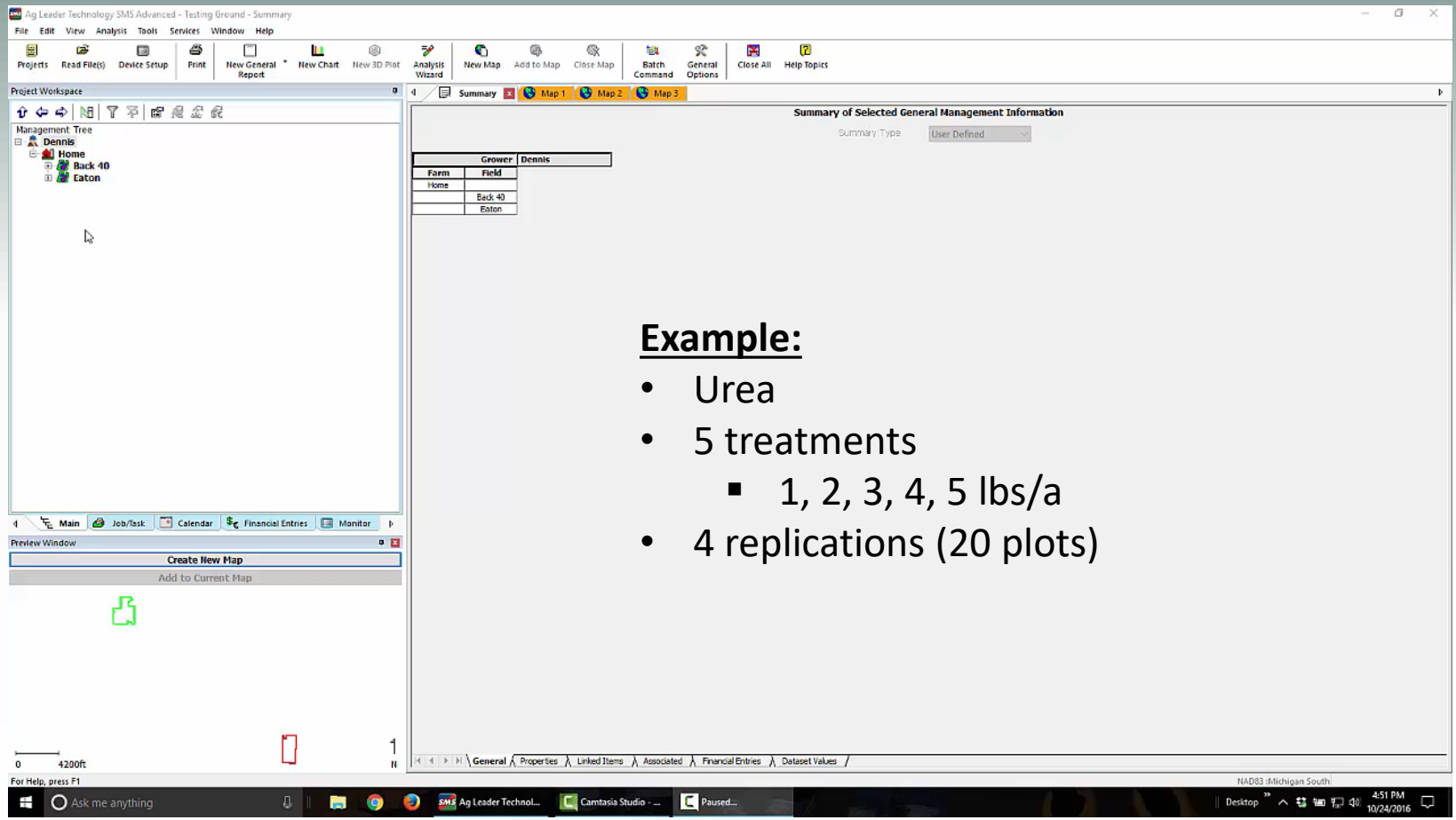


120 foot x 300 ft
7 rates x 10 reps
30 foot combine header
120 foot sprayer

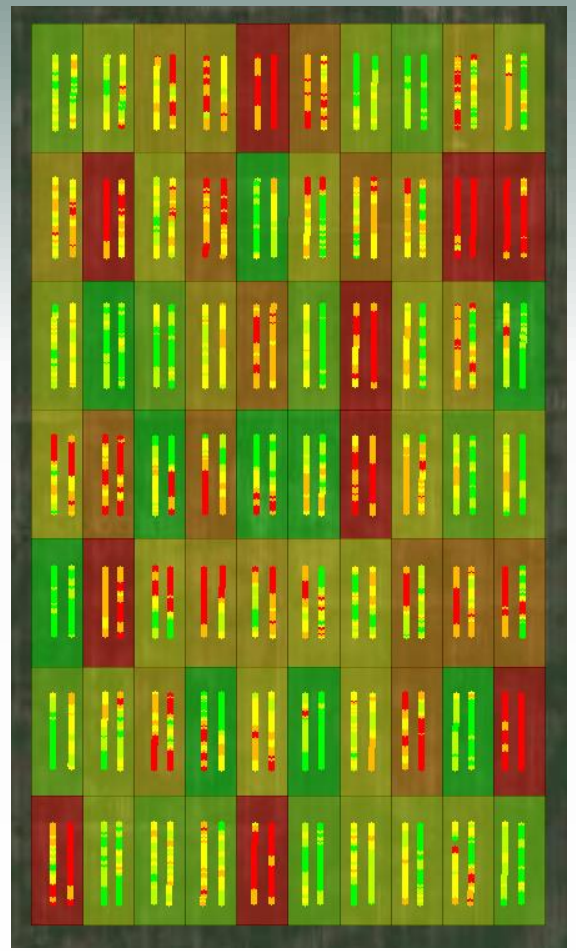
Plot Traffic

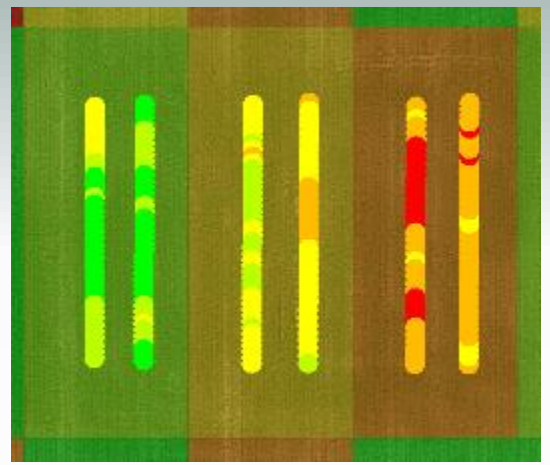


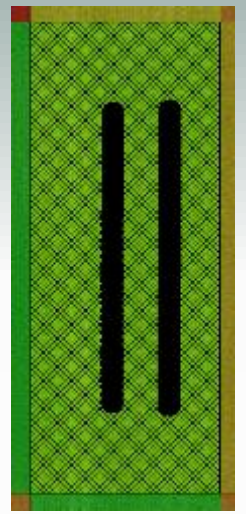
Create plots in SMS Advanced



Manipulate: edit yield layer to obtain data







Yield (Dry)
(bu/ac)

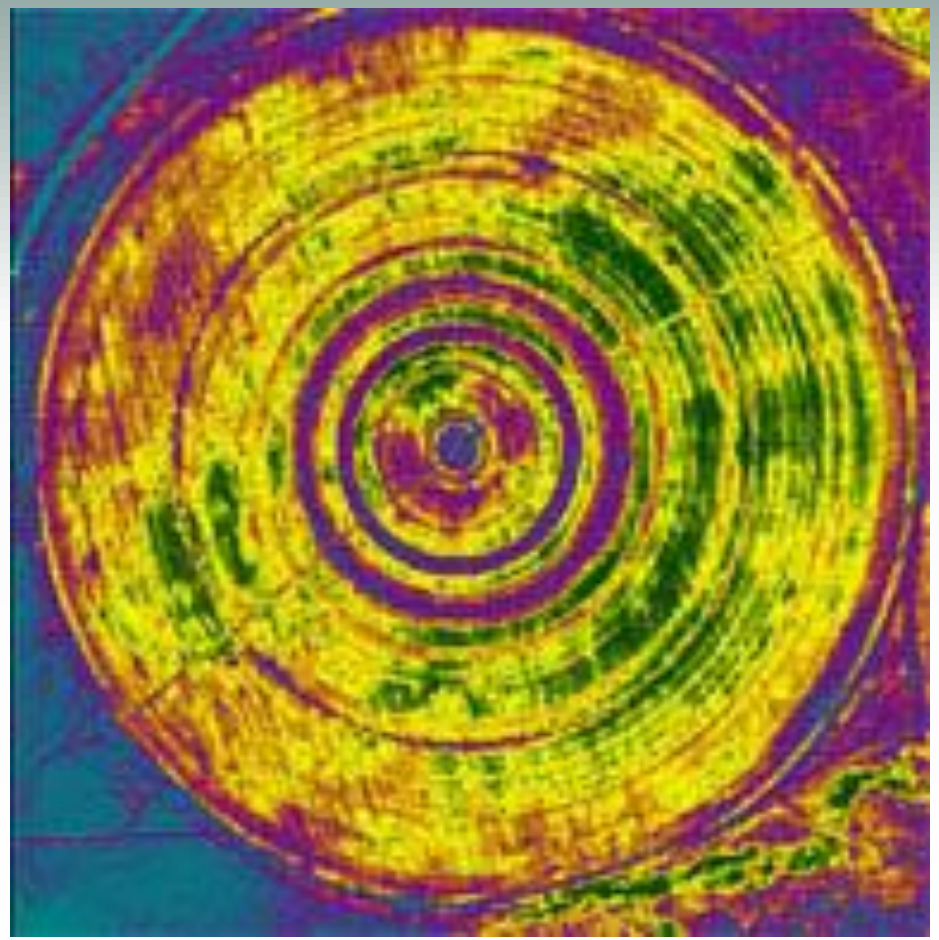
114.39	- 199.36	(0.00	ac)
105.60	- 114.39	(0.00	ac)
98.27	- 105.60	(0.00	ac)
90.37	- 98.27	(0.00	ac)
59.05	- 90.37	(0.00	ac)

Statistics(Selected / All)

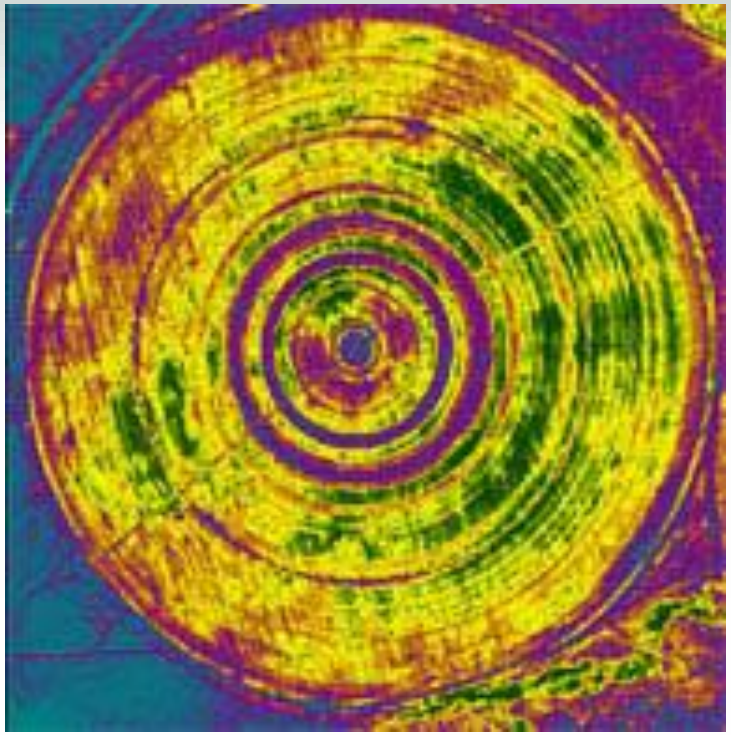
Minimum	102.04 / 59.05 bu/ac
Maximum	132.65 / 199.36 bu/ac
Average	115.50 / 102.65 bu/ac
Total	0.00 / 0.00 bu
Area	0.00 / 0.00 ac
Length	0.00 / 0.00 ft
Count	80 / 5305

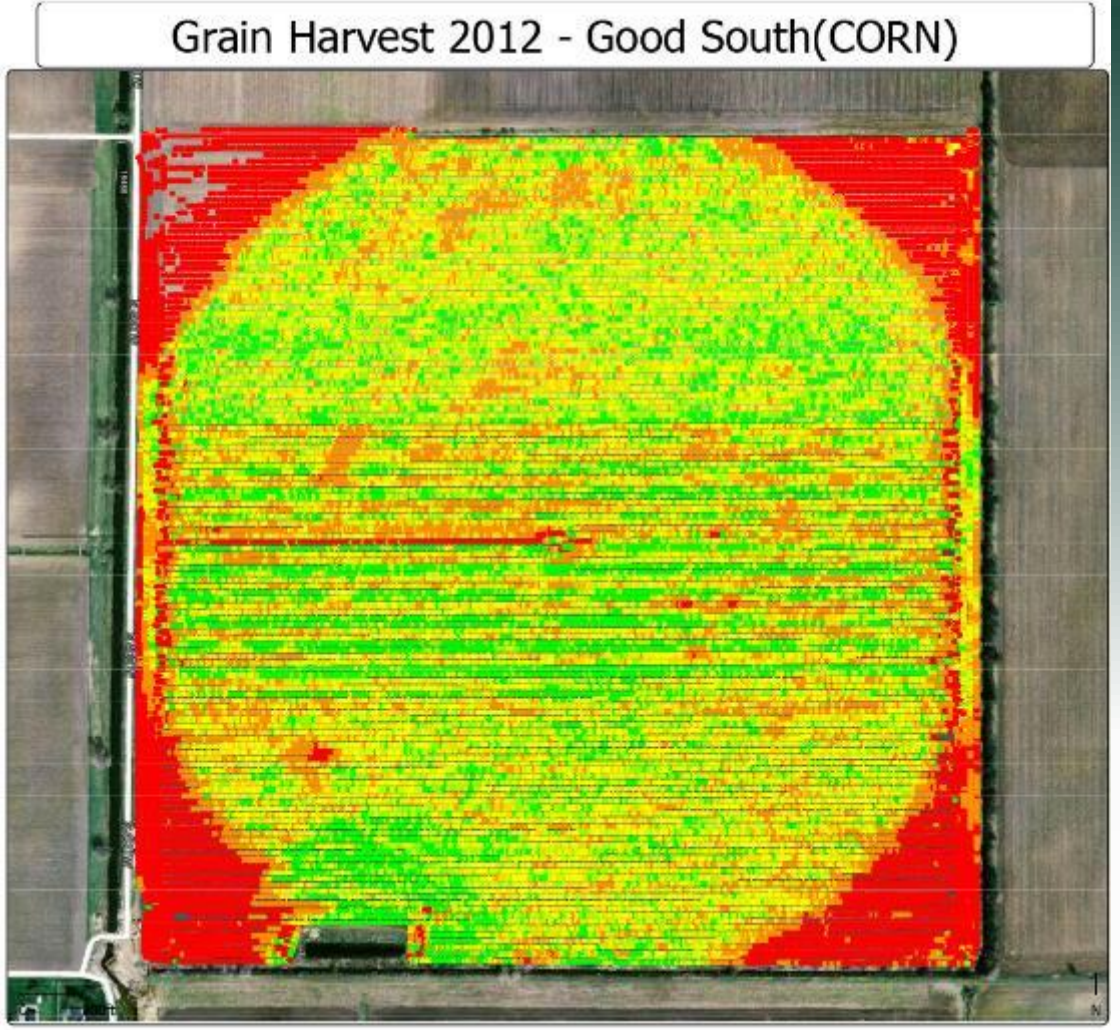
Low Uniformity
= Under Application in areas
= Reduced Yields

Even with adequate scheduling a 30% deviation in application uniformity can result in a 40% yield reduction in low application areas of the field.



Have you seen yield map patterns that match the irrigation system configuration?





Questions?

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