



# Maximizing the Value of Your Yield Data

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Extension





# 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!

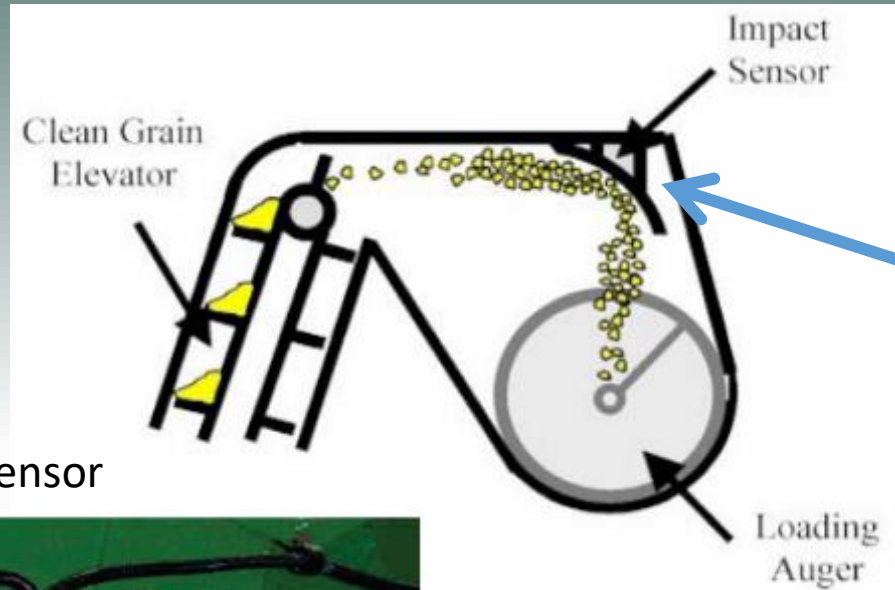


# Why Calibrate?

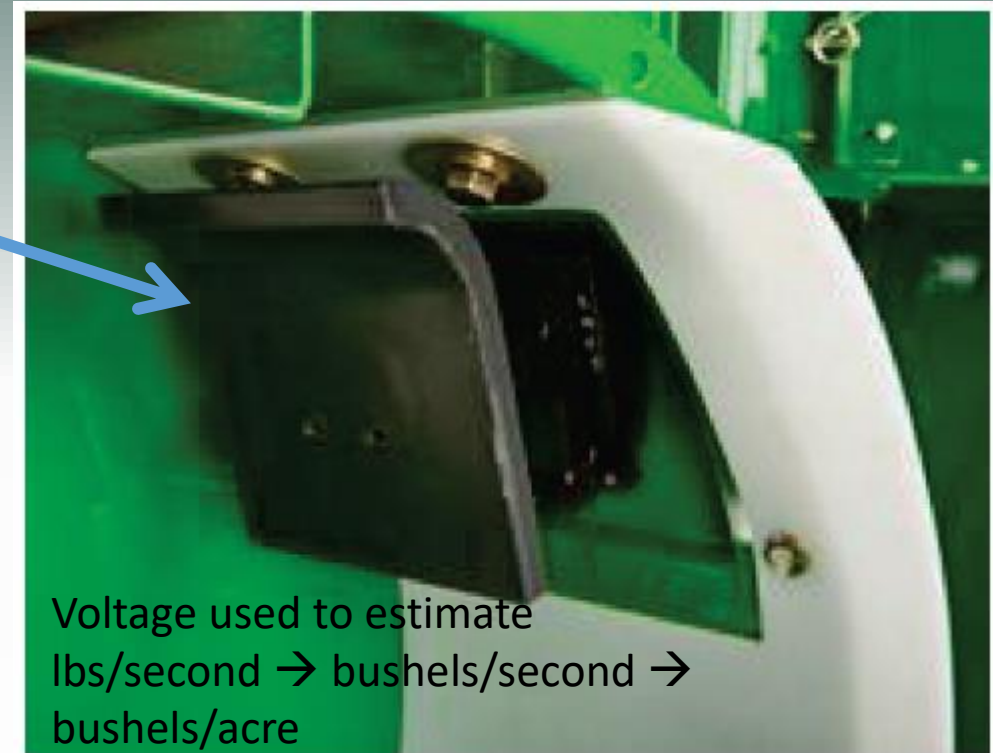
- To ensure accurate data collection
- On farm research
- Create management zones
- Yield data used to create prescriptions
- VRT
  - Fertilizer & lime
  - Seeding rate
  - Varieties



# How a Yield Monitor Works



Mass flow sensor



Moisture sensor

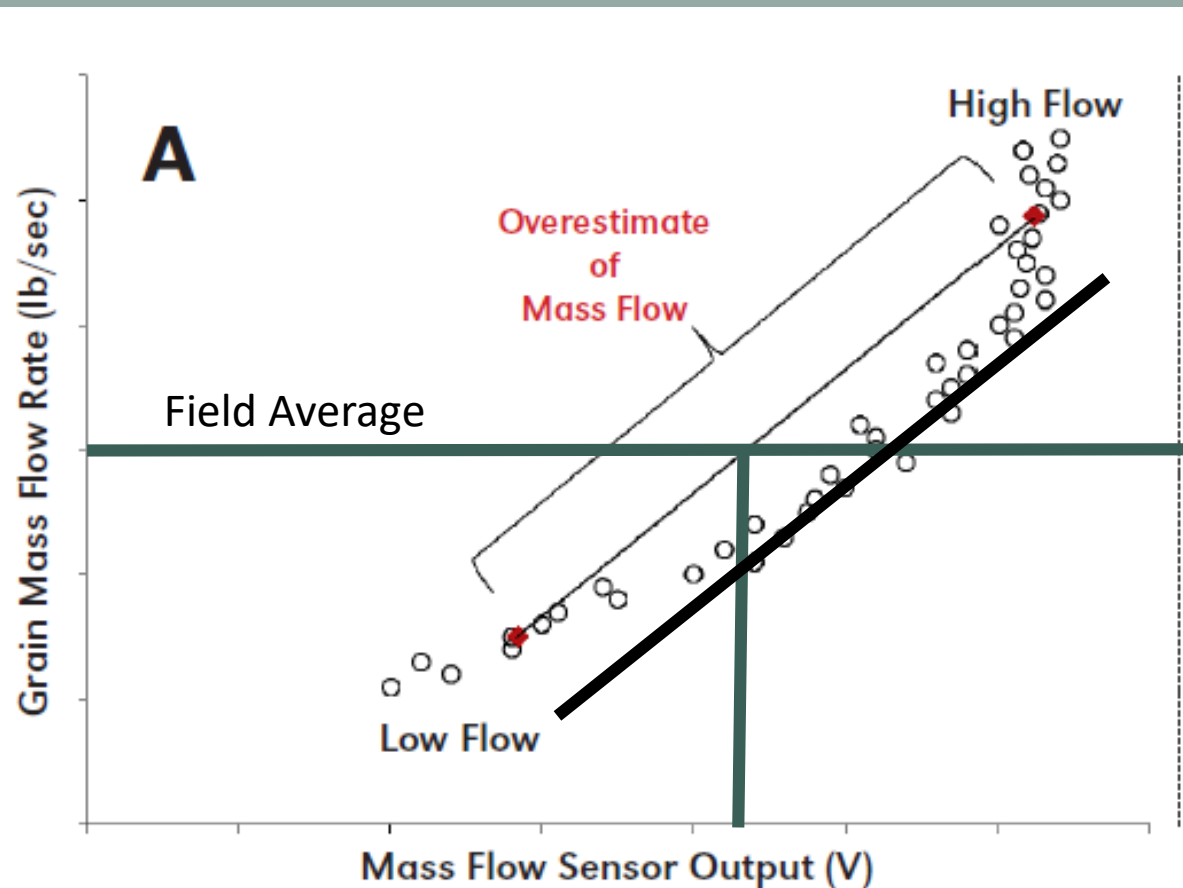


Best Management Practices for Collecting Accurate Yield Data and Avoiding Errors During Harvest, Luck, J. and Fulton, J. UNL Bulletin EC2004.





# Mass Flow Sensor Response

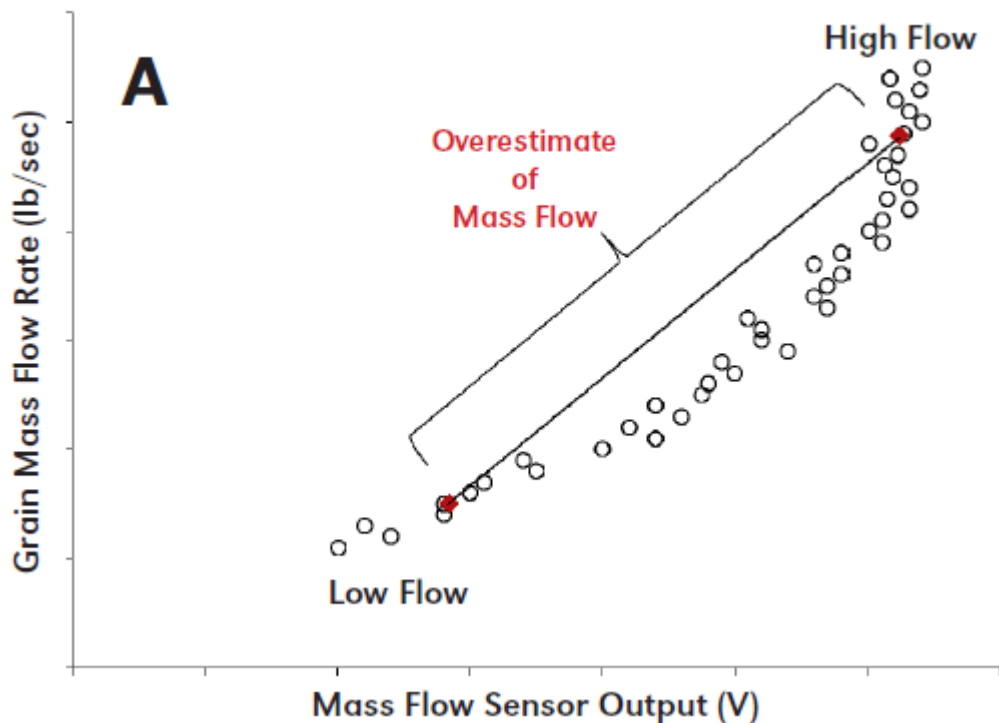


- Non-linear
- Different between combines
- Varies between crops
- Influenced by:
  - Grain moisture
  - Test weight
  - Clean grain elevator
  - Operator behavior
  - Maintenance
  - Other

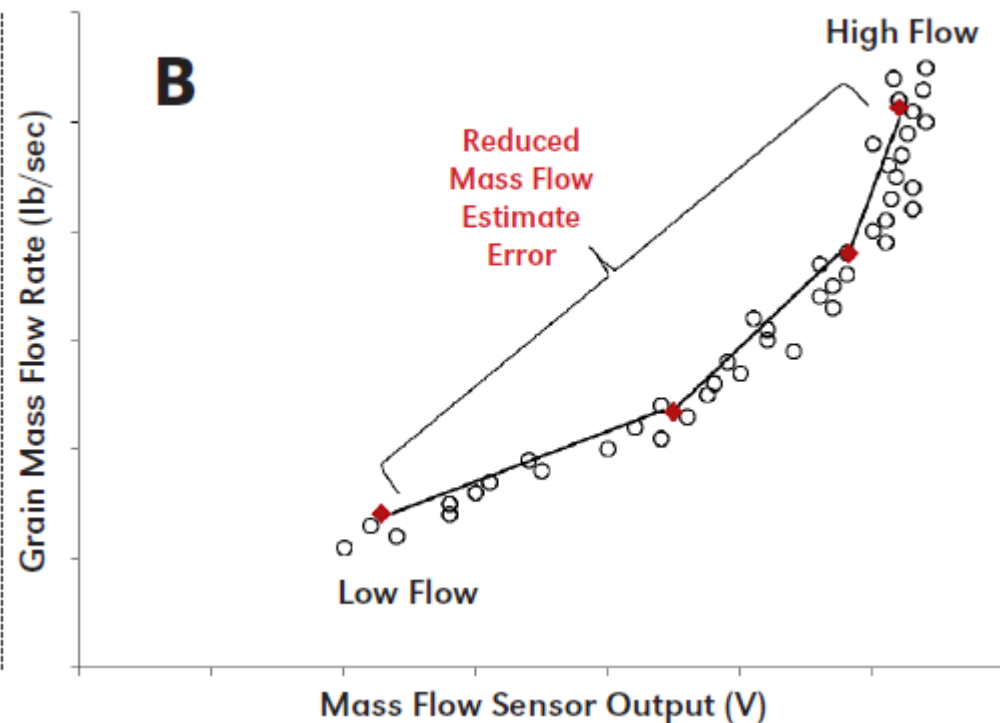


# Calibrating the mass flow sensor

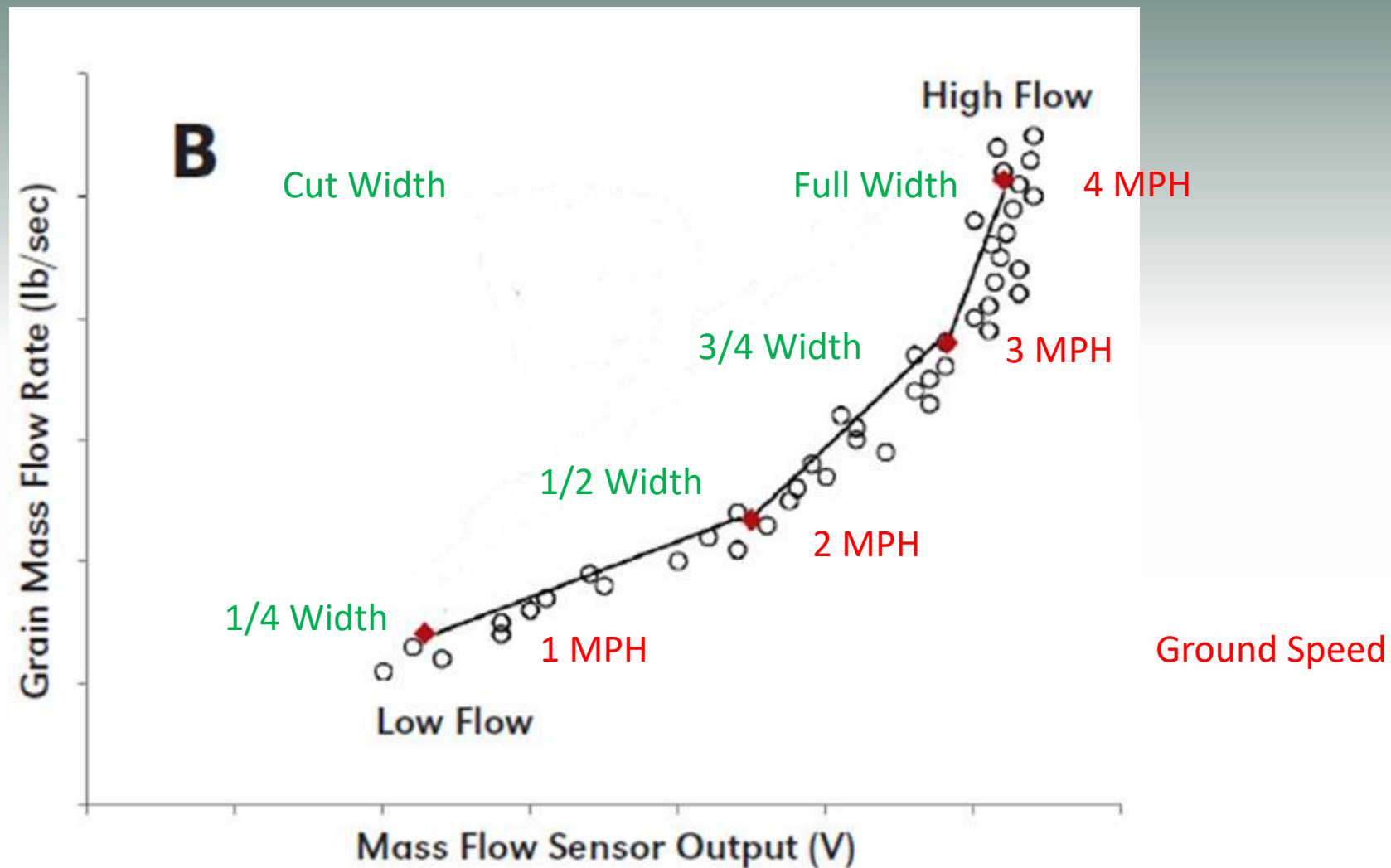
Two point calibration



Multi-point calibration



# How to get desired flow rate?





Don't take the shortcut!



# Yield Monitor Calibration – Corn '16

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

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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	<b>-17.2%</b>
2	Medium	4158	4161	-3	<b>-0.1%</b>
3	Medium	5422	4736	686	<b>14.5%</b>
4	High	4120	3762	358	<b>9.5%</b>

CaseIH combine, Berrien County, MI.





# Yield Monitor Calibration – Corn '16

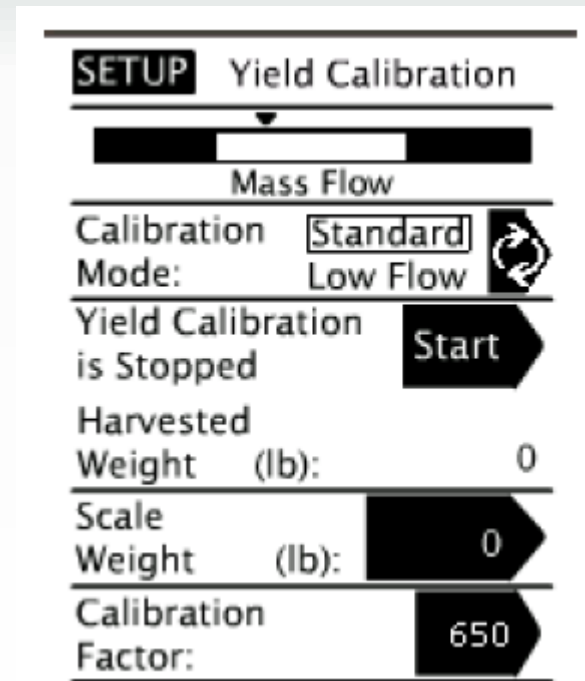
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3	Medium	5422	4736	686	<b>14.5%</b>
4	High	4120	3762	358	<b>9.5%</b>
		16,993	16,635	358	<b>2.1%</b>

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.

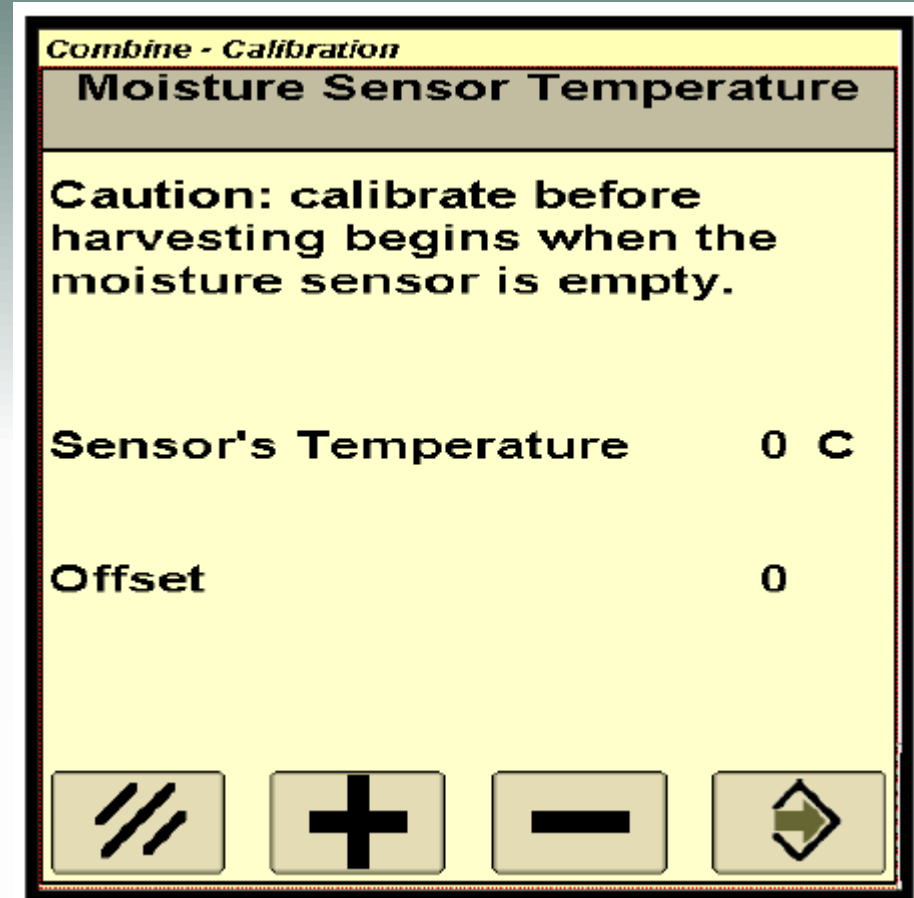


Once per season

# Calibrations

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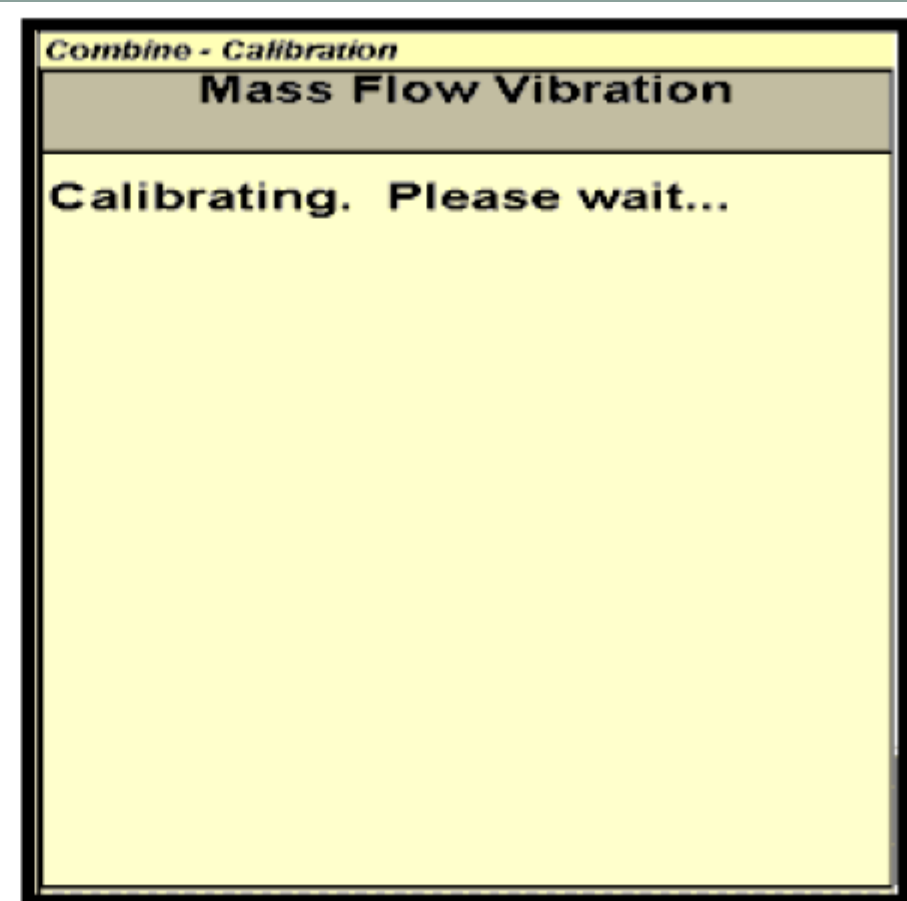
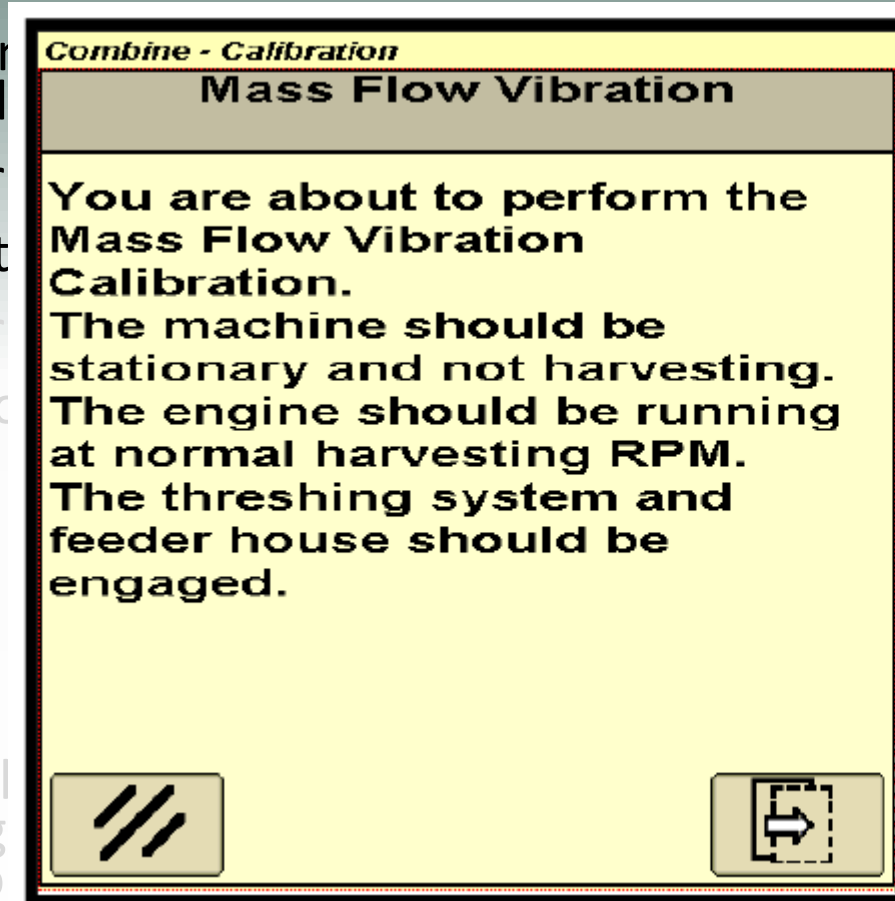


Once per season (not after sunlight)

# Calibrations

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

Recommended: if collecting research data – ask to 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

Combine - Setup Moisture

**Moisture Alarm**

ON  OFF

Minimum % Maximum %

Moisture Correction

Fixed Moisture

**Yield Units**

Once per season for each crop

# Calibrations

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

Yield					
	Load ID	Estimated lb	Actual lb	%	
<input checked="" type="checkbox"/>	1	11348 23.4 %	10980	3.4	↘
<input type="checkbox"/>	2	9663 25.0 %	9874	-2.1	↘
<input type="checkbox"/>	3	13611 23.9 %	13956	-2.5	↘
<input type="checkbox"/>	4	11330 24.2 %	11120	1.9	↘
<input type="checkbox"/>	5	13301 16.6 %	13214	0.7	↘

Navigation icons: Back, Down Arrow, Home



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
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Navigation icons: back, down arrow, home

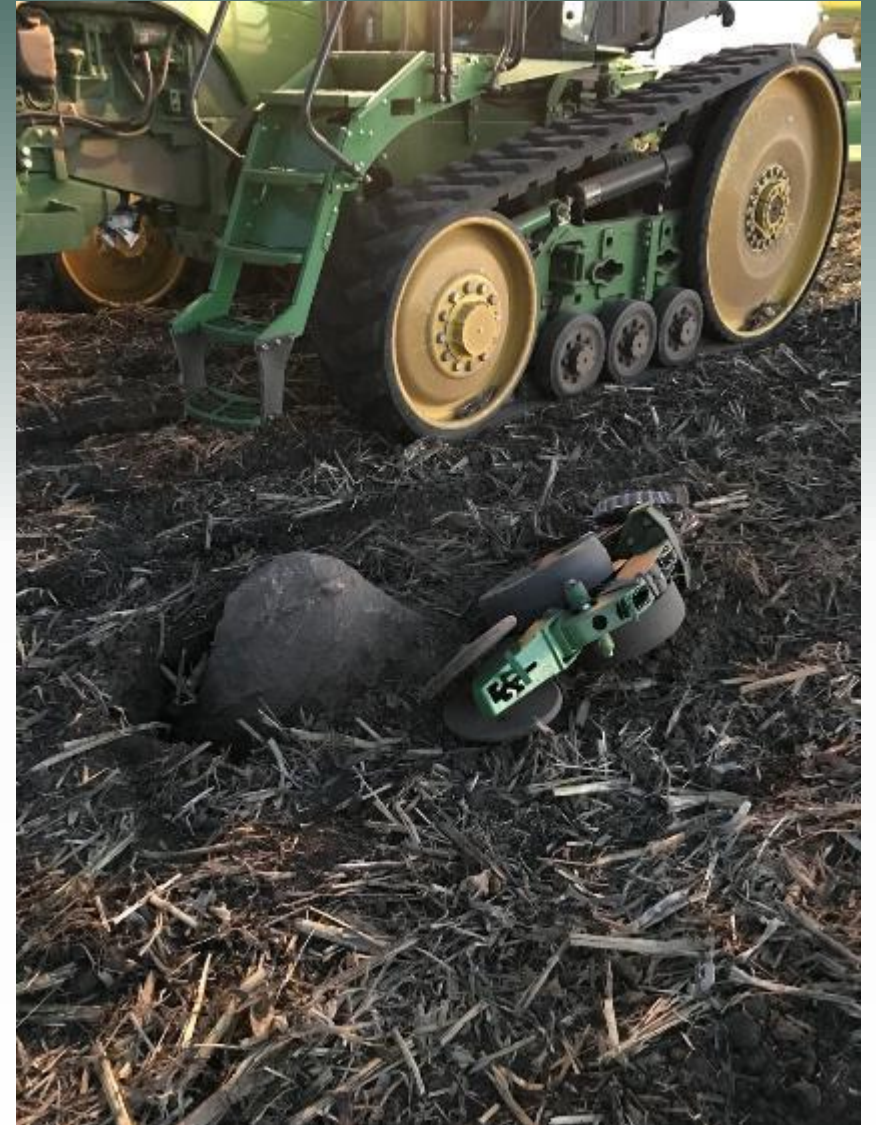


Once per season per crop (wet & dry)



# 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

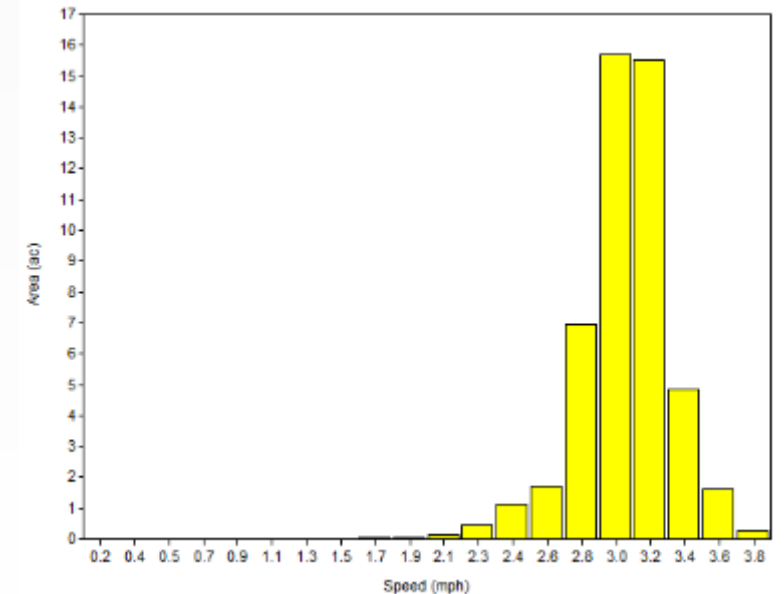
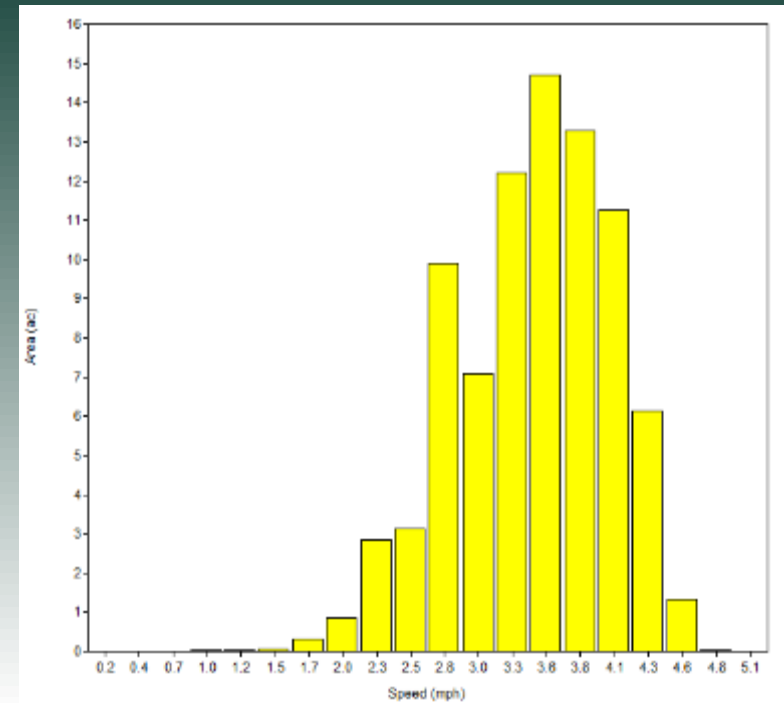


# Variation in Operators???

Soybean Harvest – Ground Speed

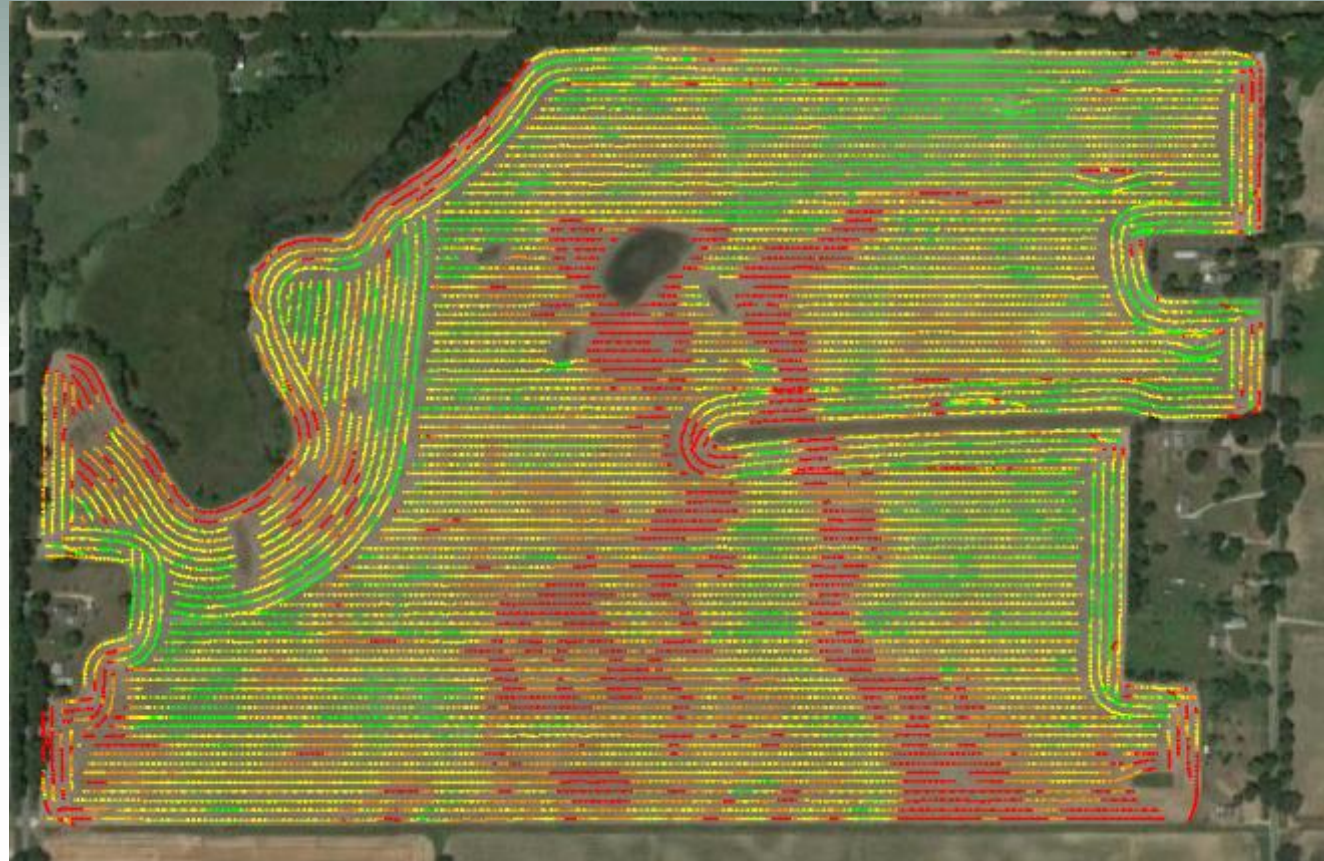
## *2 Type of Operators*

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

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### 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.

# Agronomic Data

## Yield Maps

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## 2 common issues these days...

- Limited yield maps per field
- Poor quality yield data

Honey Creek

# 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

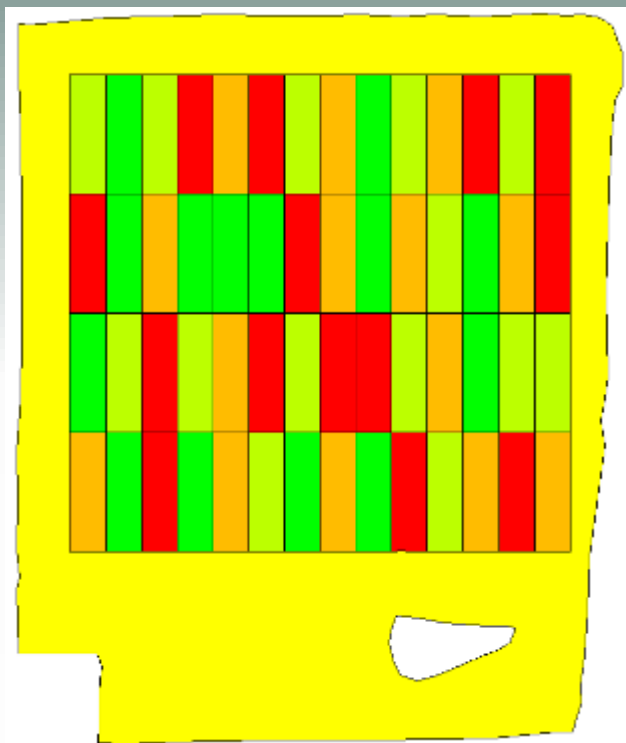


# Plot Layout Considerations

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



# Operate: on farm research - seeding rate

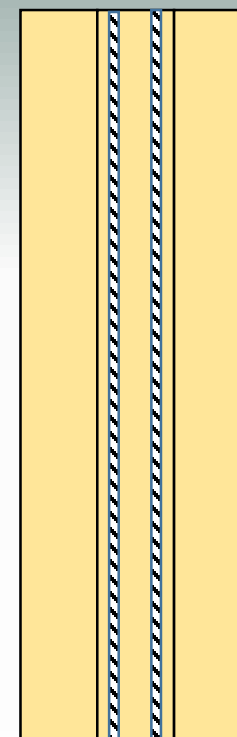


Target Rate (Mass) (lb/ac)	
■	183.0 ( 8.678 ac)
■	162.0 ( 8.678 ac)
■	158.0 (24.740 ac)
■	142.0 ( 8.678 ac)
■	121.0 ( 8.676 ac)

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

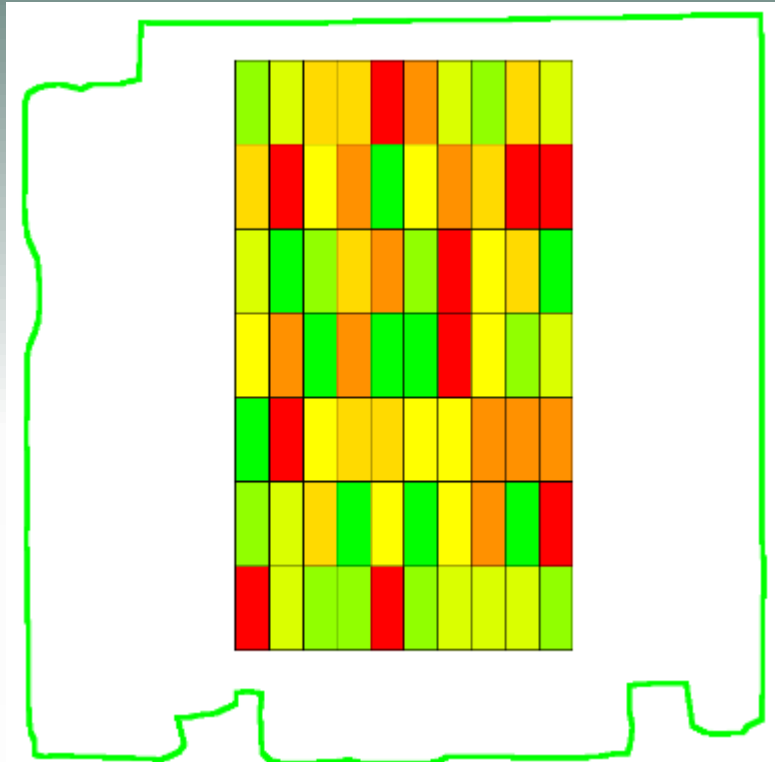


Plot Traffic





# Operate: on farm research – nitrogen rate

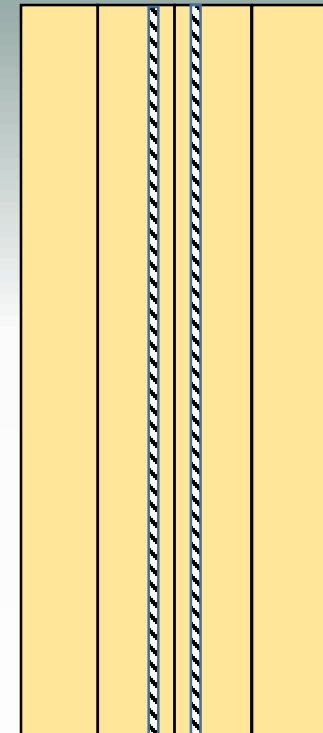


Target Rate (Mass) (lb/ac)	
150.0	(8.264 ac)
135.0	(8.264 ac)
120.0	(8.264 ac)
105.0	(8.264 ac)
90.0	(8.264 ac)
75.0	(8.264 ac)
60.0	(8.264 ac)

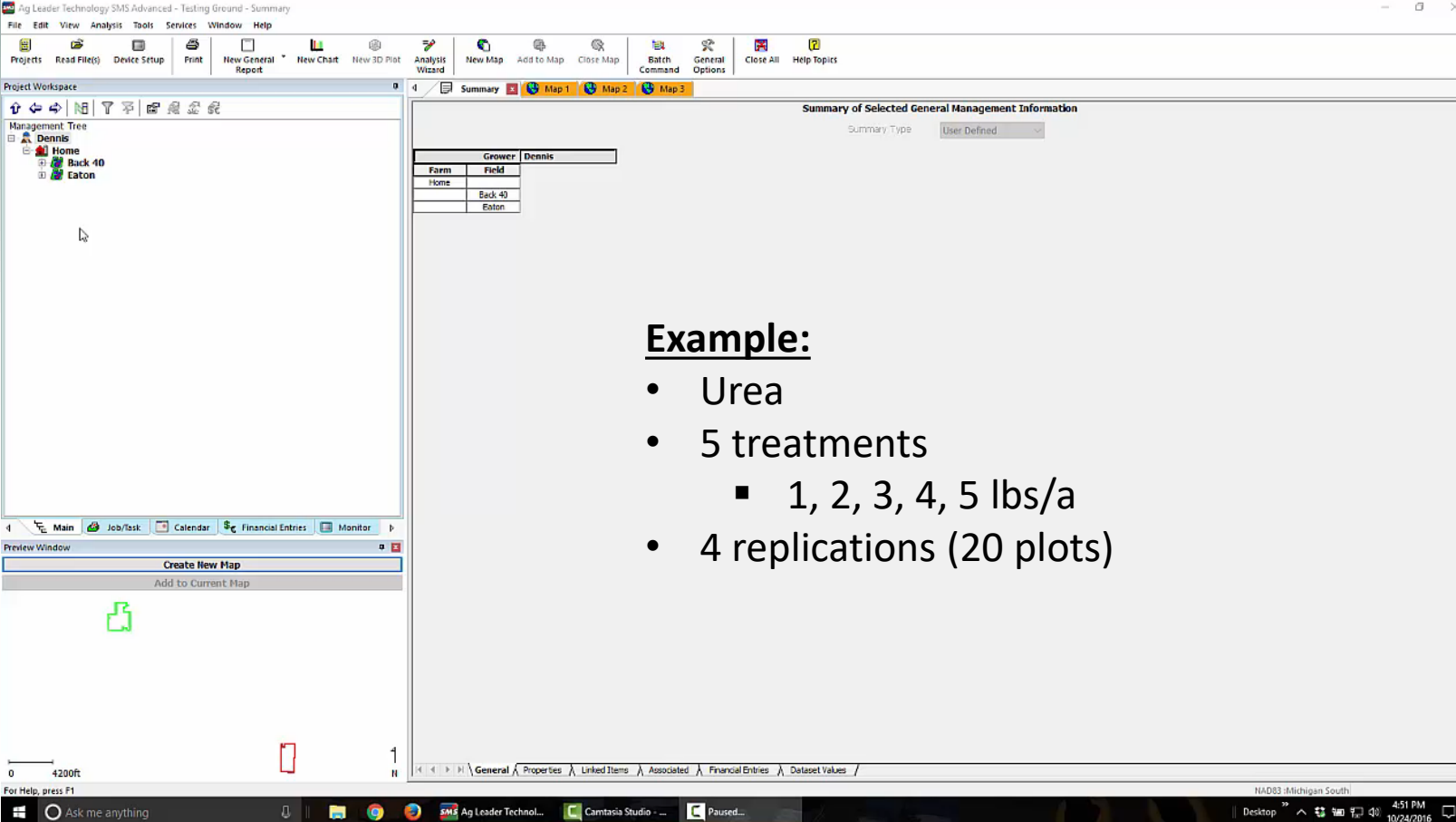
120 foot x 300 ft  
7 rates x 10 reps  
30 foot combine header  
120 foot sprayer



Plot Traffic



# Create plots in SMS Advanced



The screenshot displays the Ag Leader Technology SMS Advanced software interface. The main window shows a summary of selected general management information for a grower named Dennis. The summary type is set to "User Defined". A table lists the farms and fields managed by Dennis:

Grower: Dennis	
Farm	Field
Home	
	Back 40
	Eaton

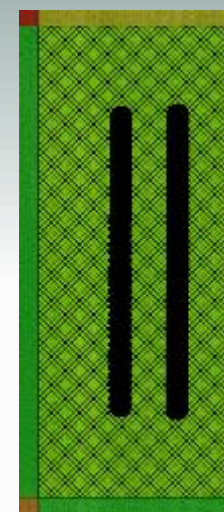
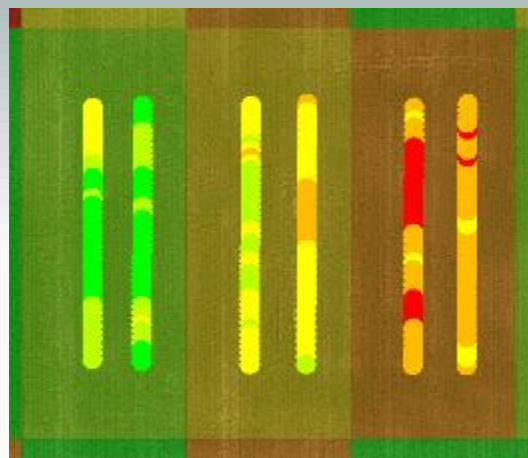
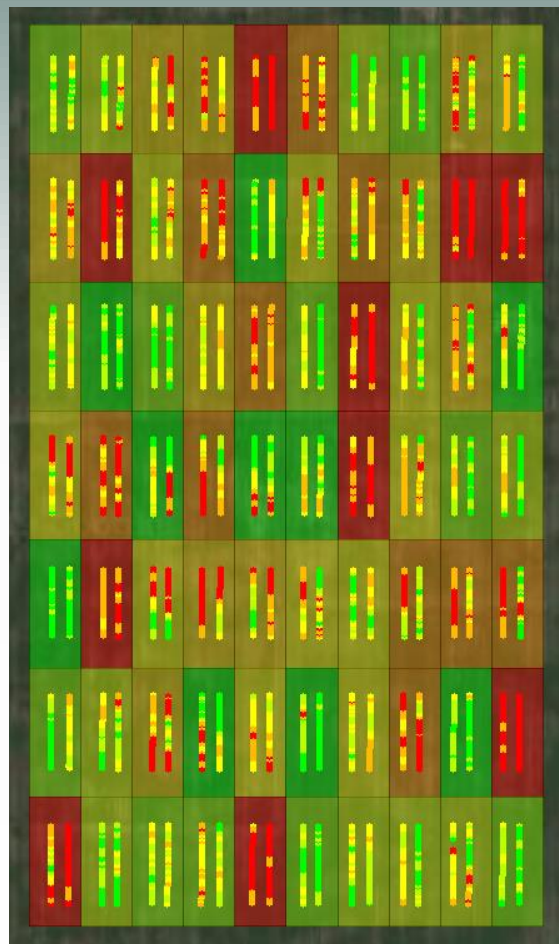
The interface also includes a Project Workspace on the left with a Management Tree showing the hierarchy: Dennis > Home > Back 40 > Eaton. A Preview Window at the bottom left shows options to "Create New Map" or "Add to Current Map". The bottom status bar indicates the location is NAD83 Michigan South and the date is 10/24/2016 at 4:51 PM.

## Example:

- Urea
- 5 treatments
  - 1, 2, 3, 4, 5 lbs/a
- 4 replications (20 plots)



# Manipulate: edit yield layer to obtain data



Yield (Dry)  
(bu/ac)

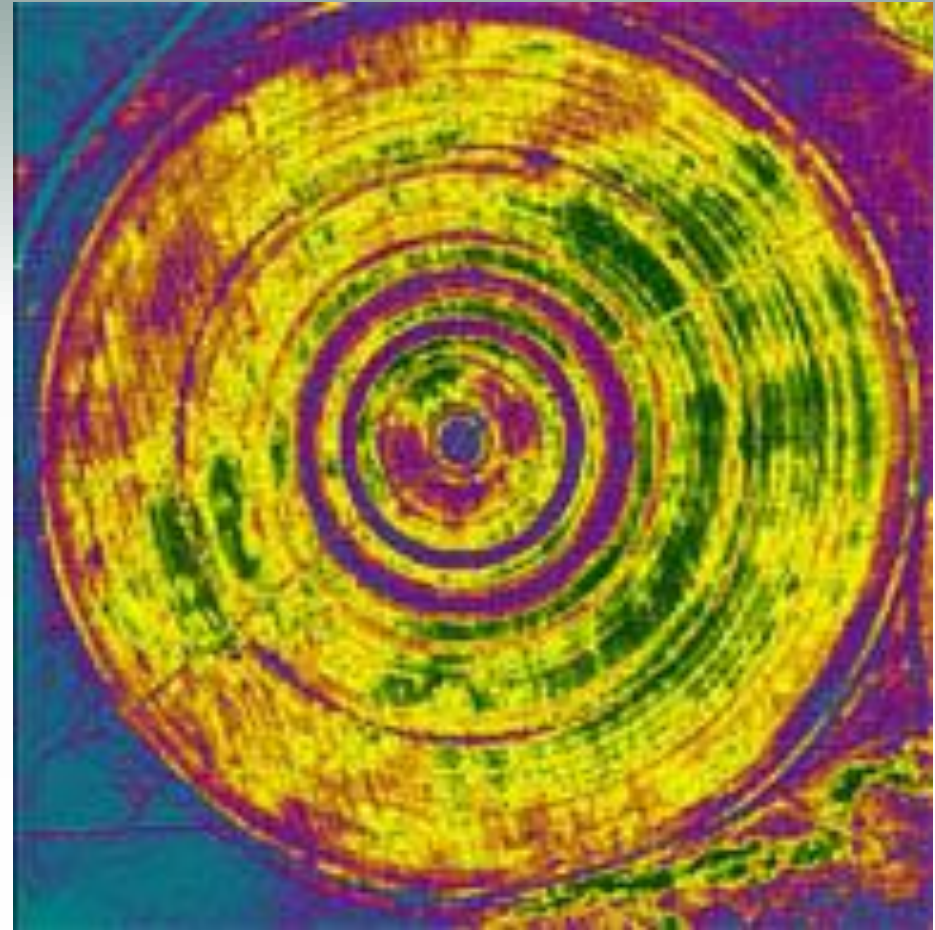
■	114.39 - 199.36	(0.00 ac)
■	105.60 - 114.39	(0.00 ac)
■	98.27 - 105.60	(0.00 ac)
■	90.37 - 98.27	(0.00 ac)
■	59.05 - 90.37	(0.00 ac)

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

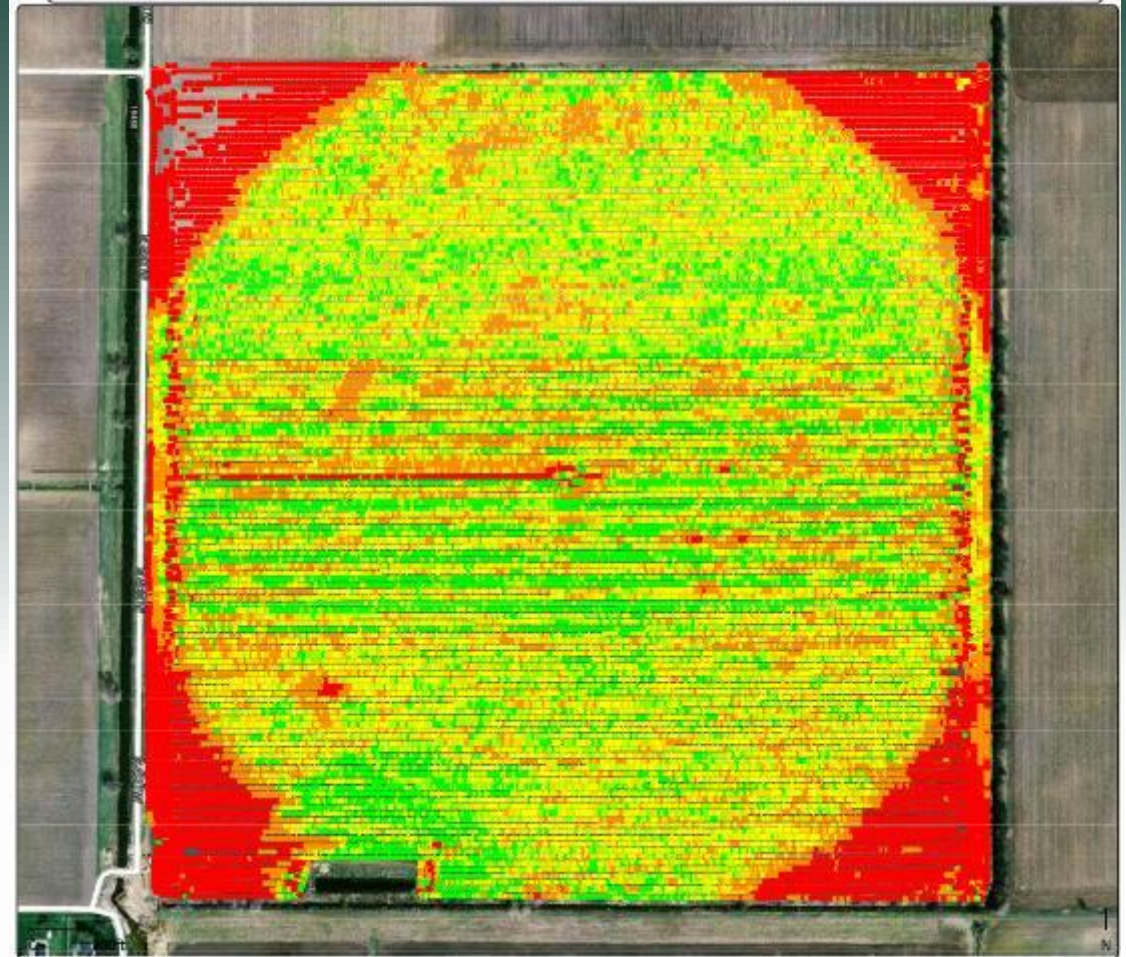
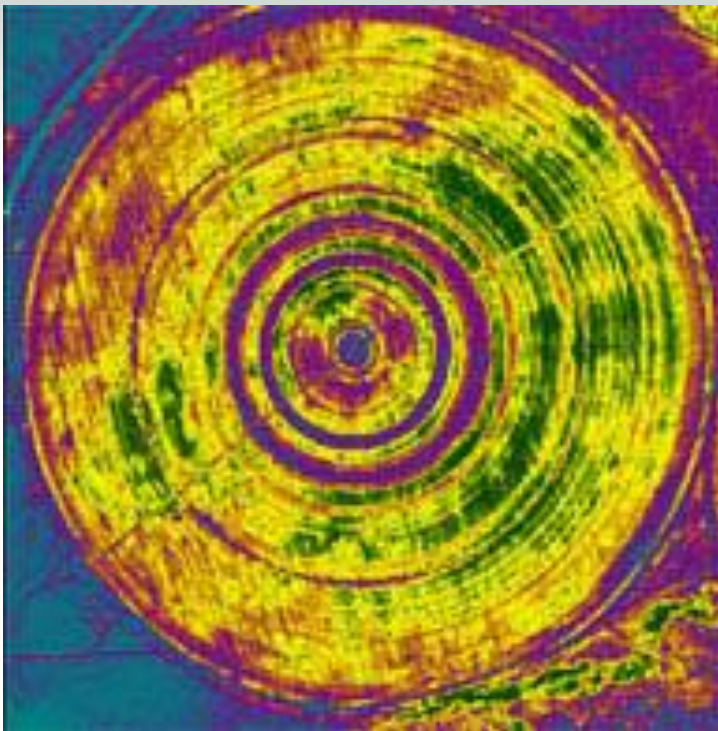


Low Uniformity  
= Under Application in areas  
= Reduced Yields

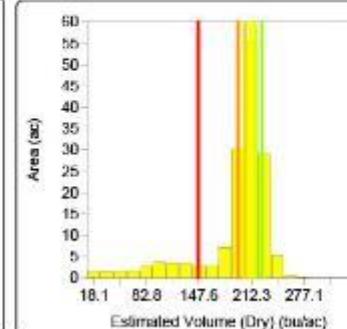
Even with adequate scheduling a 30% deviation in application uniformity can result in a 40% yield reduction in low application areas of the field.



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



Field : Good South  
 Year : 2012  
 Operation : Grain Harvest  
 Crop / Product : CORN  
 Op. Instance : Harvest - 1  
 Area : 152.77 ac  
 Avg. Yield : 187.77 bu/ac  
 Avg. Moisture : 18.55 %



Estimated Volume (Dry) (bu/ac)	
225.46 - 399.32	(21.80 ac)
217.56 - 225.46	(22.02 ac)
211.28 - 217.56	(22.04 ac)
204.93 - 211.28	(22.17 ac)
195.98 - 204.93	(22.32 ac)
146.88 - 195.98	(21.48 ac)
10.00 - 146.88	(20.95 ac)



# Questions?

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