



Pivot Irrigation Strategies to Maximize Yield and Profitability

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Pivot Basics

Sensor use and placement

- In pivot-irrigated field
- In relation to crop row

When and how much

- Sensor thresholds
- Low volume/fast spin vs more volume/slow spin

Adapting to your scenario

- Pivot capacity
- Full circle vs partial circles



When to Irrigate

Goal: Never stress crop



When to Irrigate

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How do you determine how close to stress?



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When to Irrigate

Goal: Never stress crop

How do you determine how close to stress?

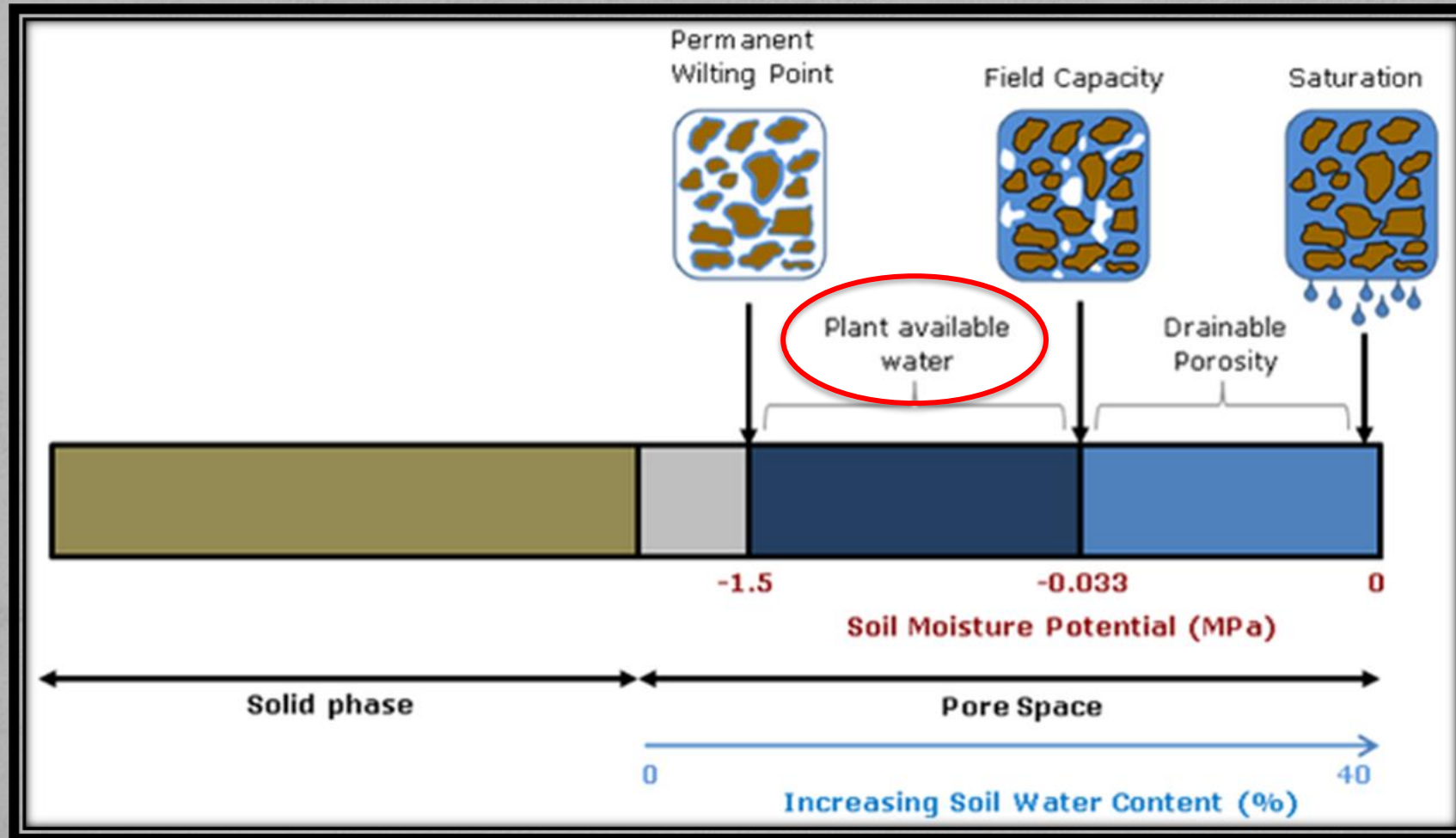


When to Irrigate

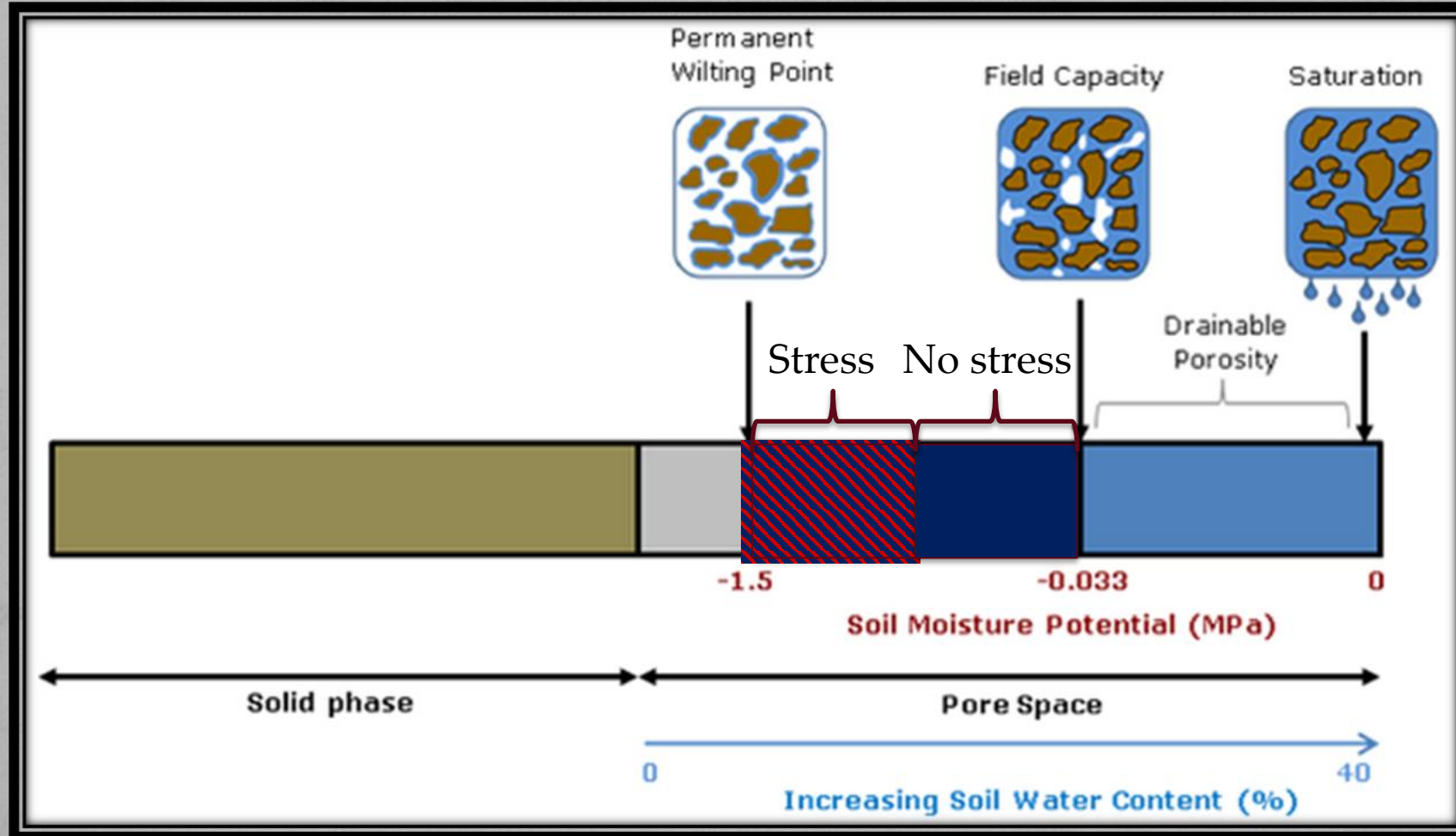
- Most accurate: in-situ measurement
- Soil moisture sensors
- Soil water tension – how hard is it to extract water from soil
- Placement affects performance



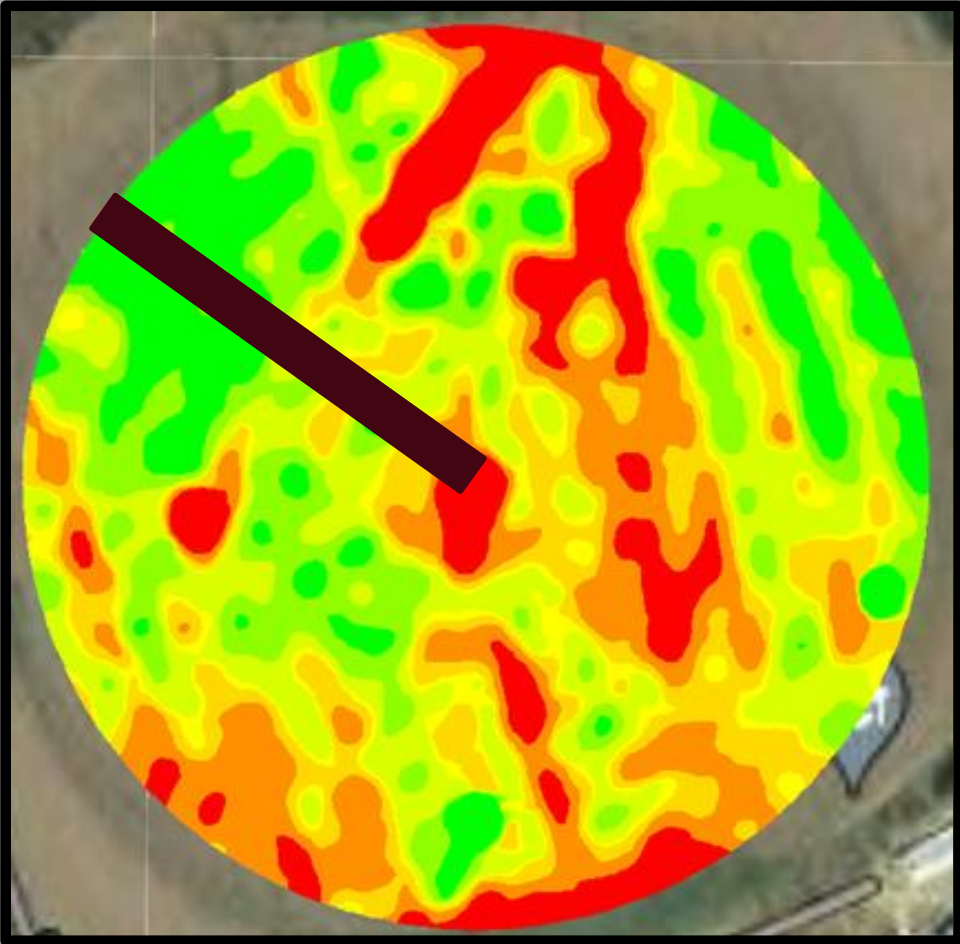
When to Irrigate – Water in Soil Profile



When to Irrigate – Water in Soil Profile



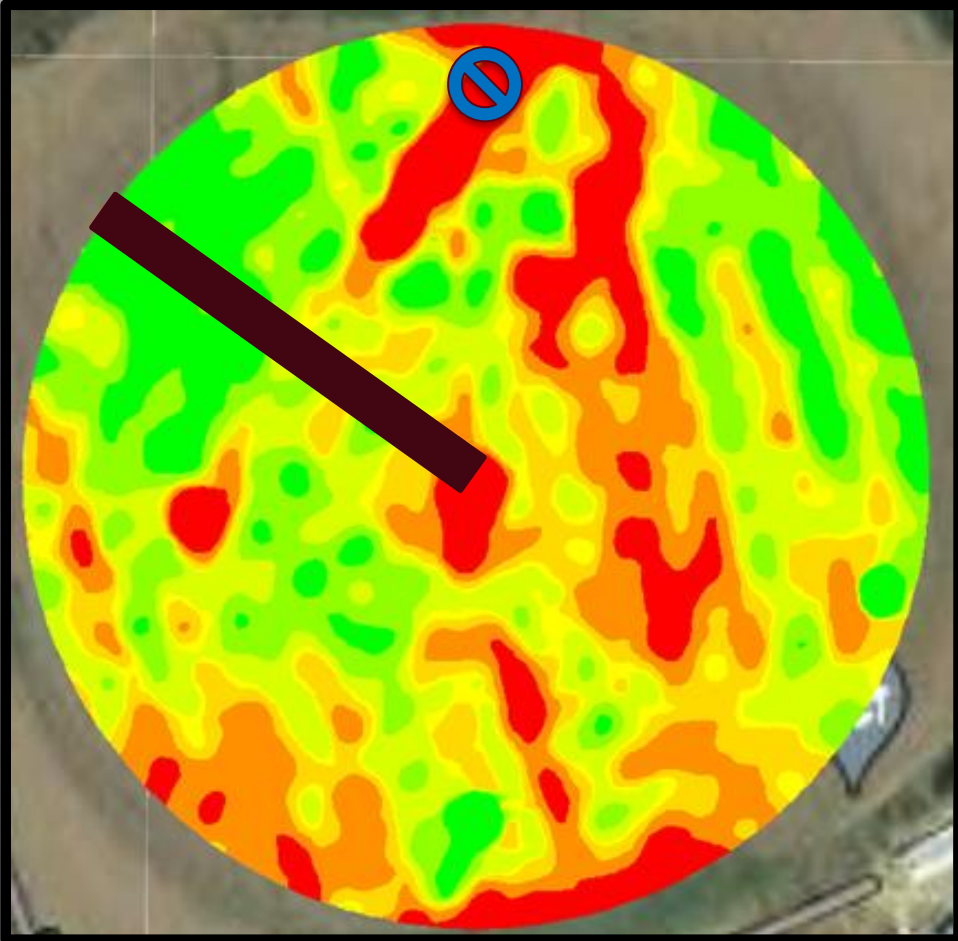
Sensor Placement



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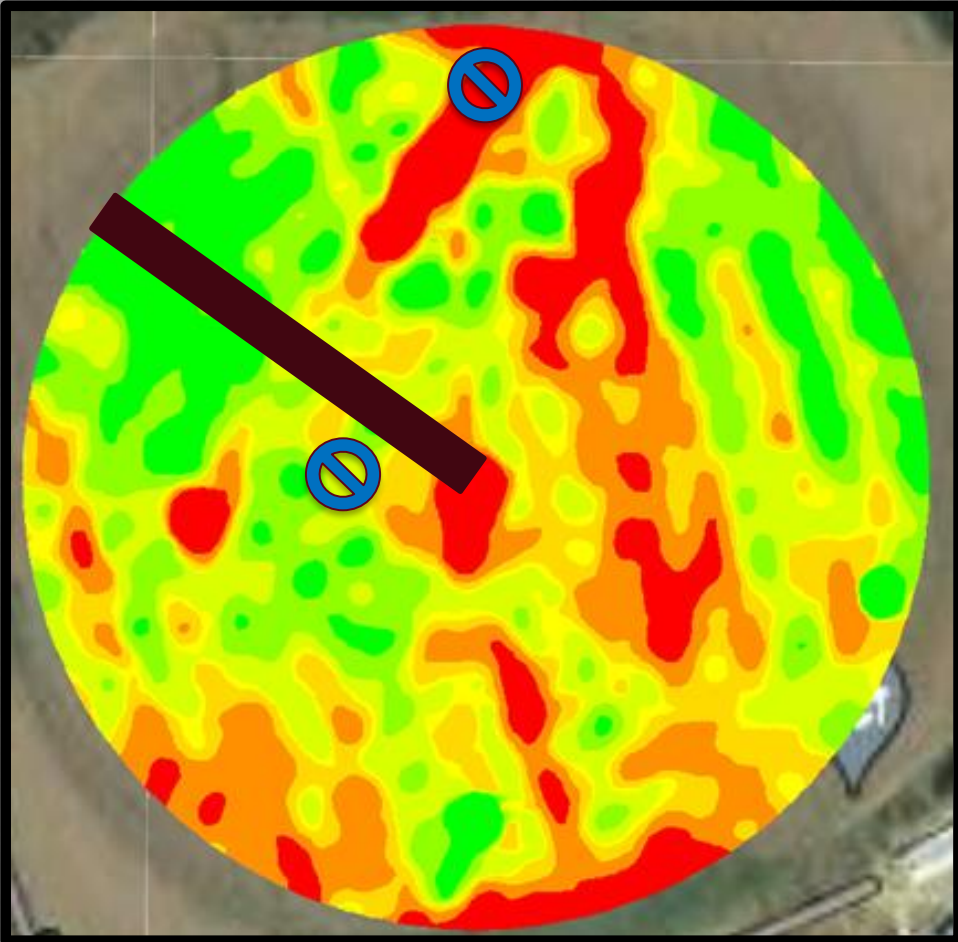
Sensor Placement



- Representative yield area



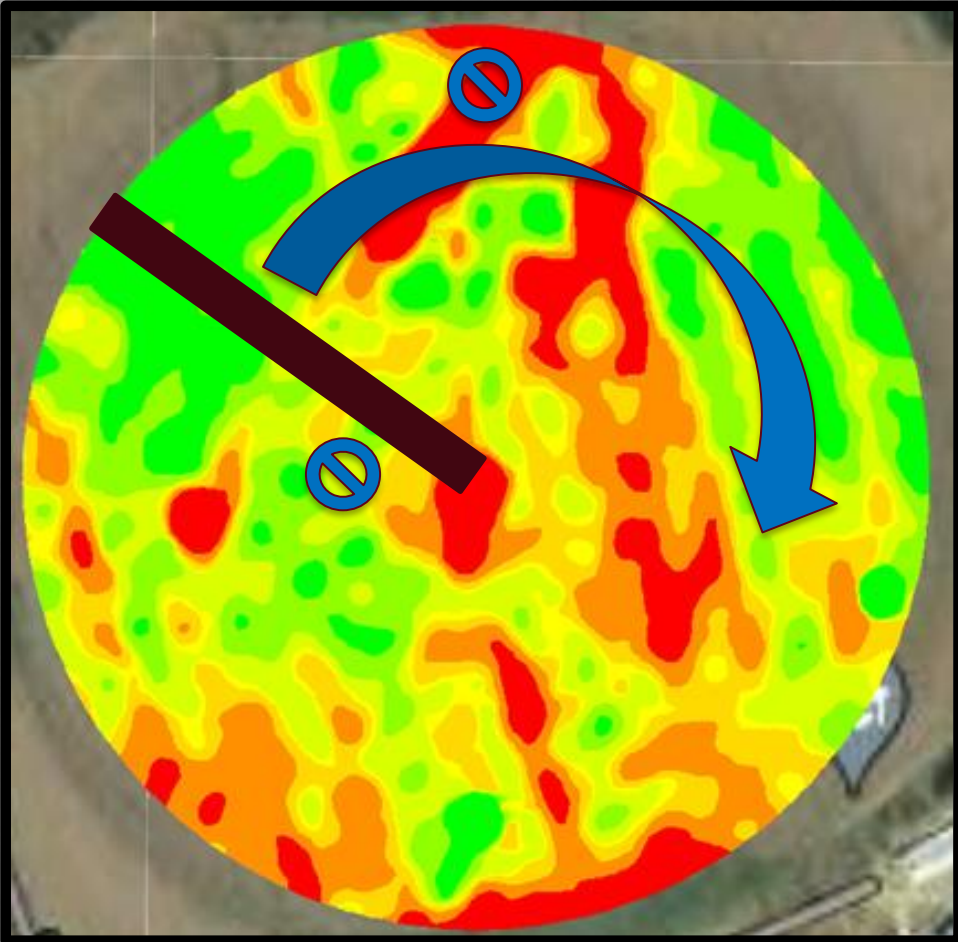
Sensor Placement



- Representative yield area
- Outer spans (not last span)



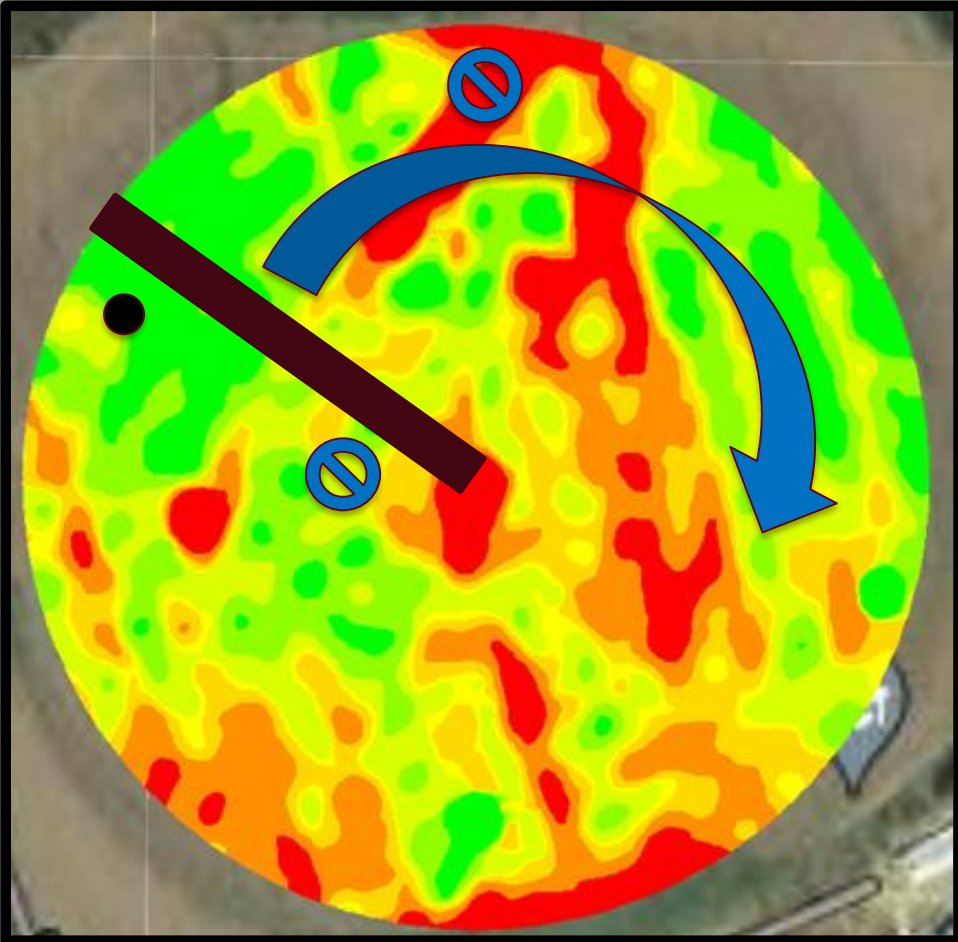
Sensor Placement



- Representative yield area
- Outer spans (not last span)
- End of pivot spin



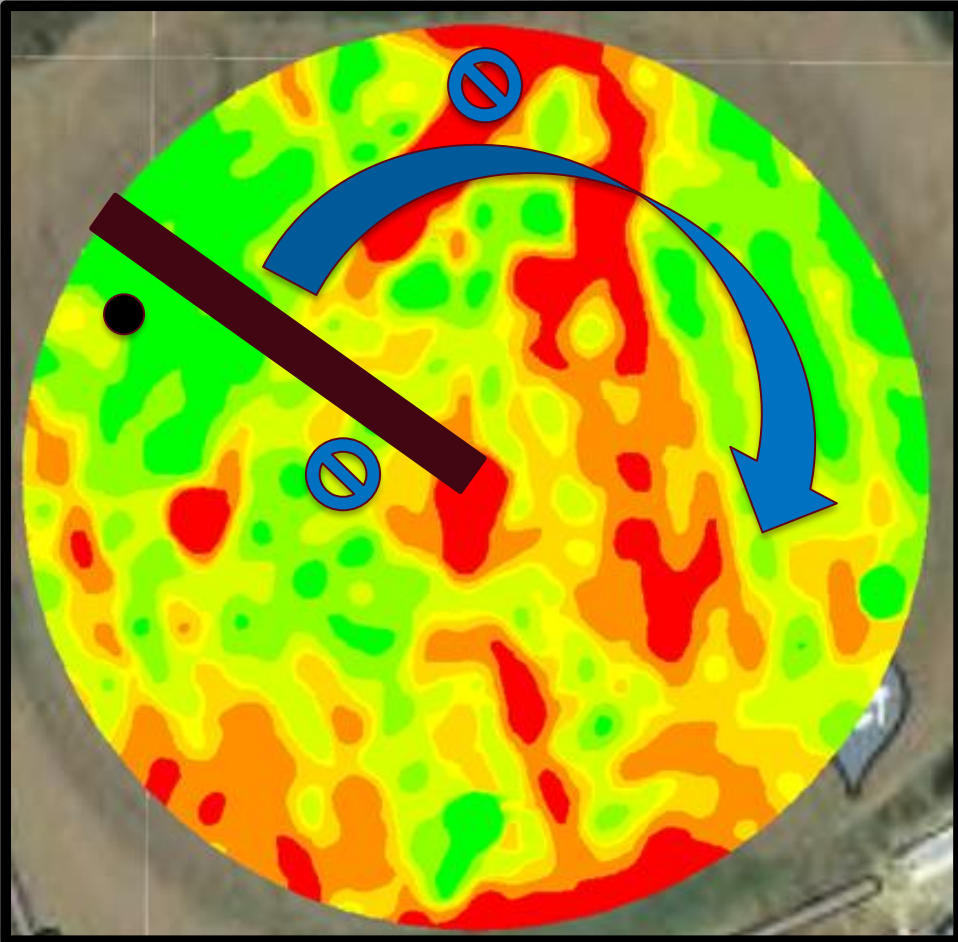
Sensor Placement



- Representative yield area
- Outer spans (not last span)
- End of pivot spin
- On top of bed



Sensor Placement



- Representative yield area
- Outer spans (not last span)
- End of pivot spin
- On top of bed
- Good stand, not traffic row



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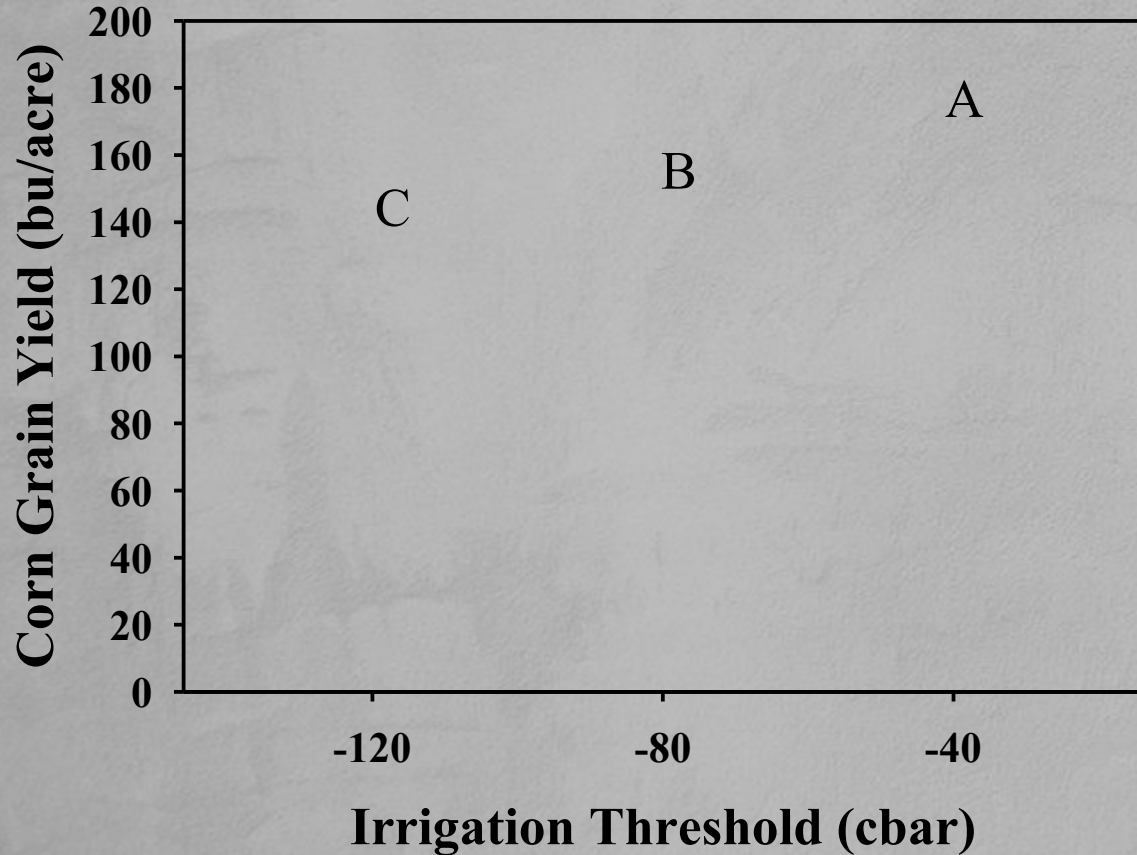
Adapting to your scenario

- Pivot capacity
- Full circle vs partial circles



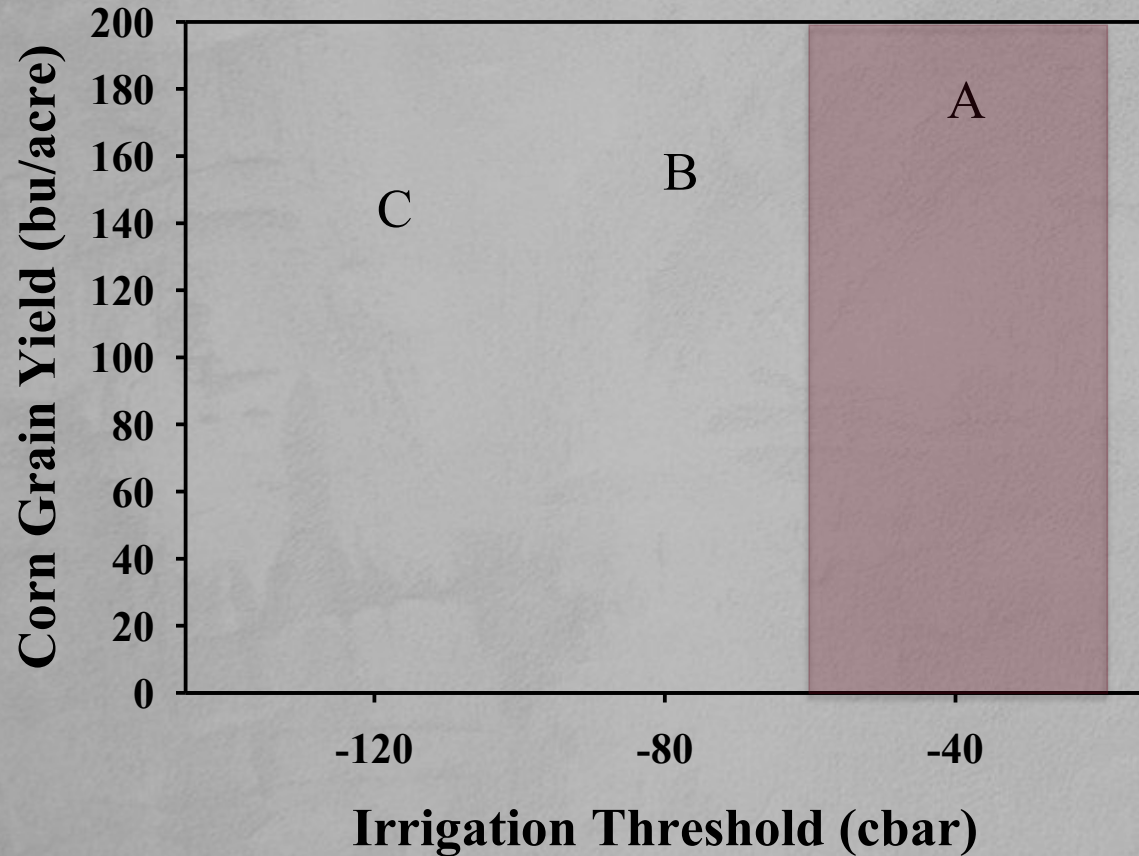
When to Irrigate – Threshold Choice

Pivot – Blackland Prairie



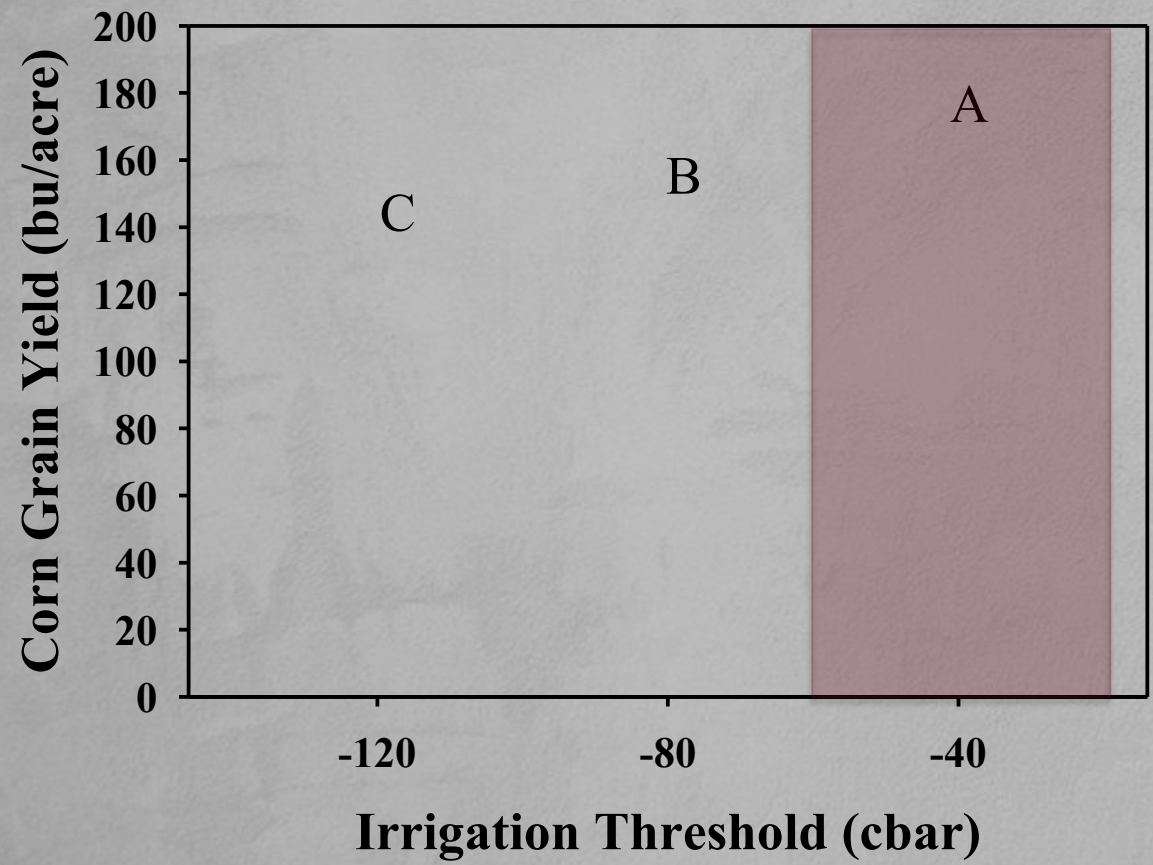
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Pivot – Blackland Prairie



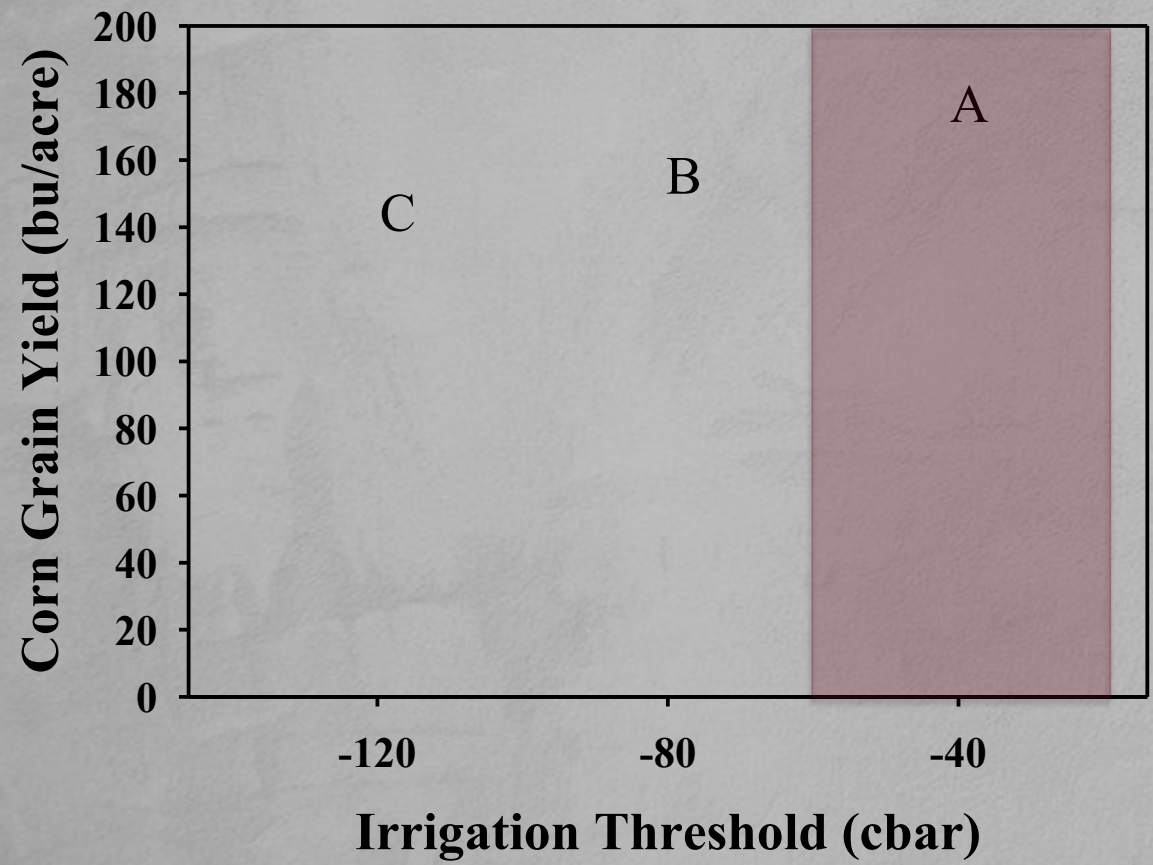
When to Irrigate – Threshold Choice

Pivot – Blackland Prairie



When to Irrigate – Threshold Choice

Pivot – Blackland Prairie



-30 cbar
No Yield Loss



-90 cbar
Yield Loss



How Much – Application Volume

Less volume, faster spin



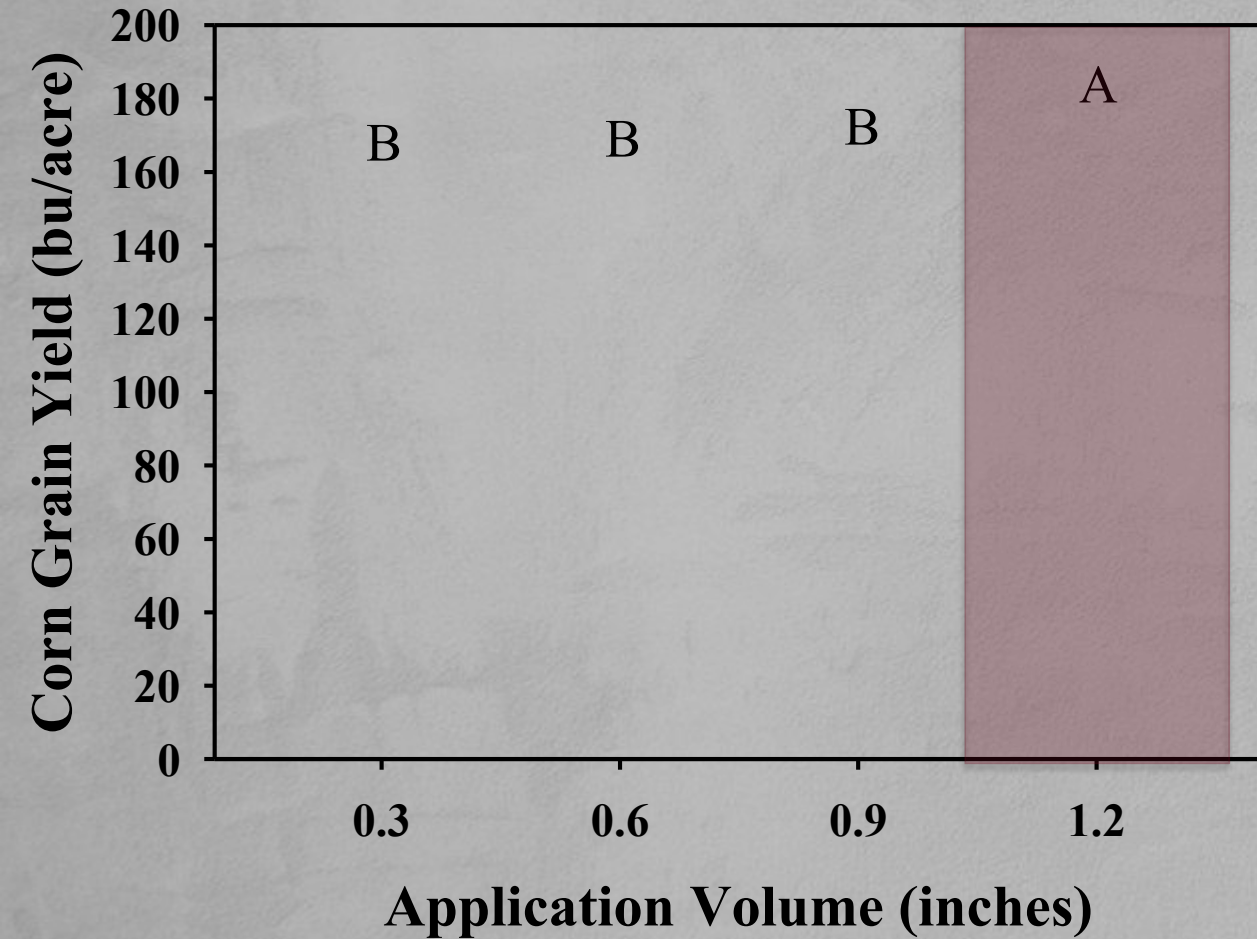
Greater volume, slower spin



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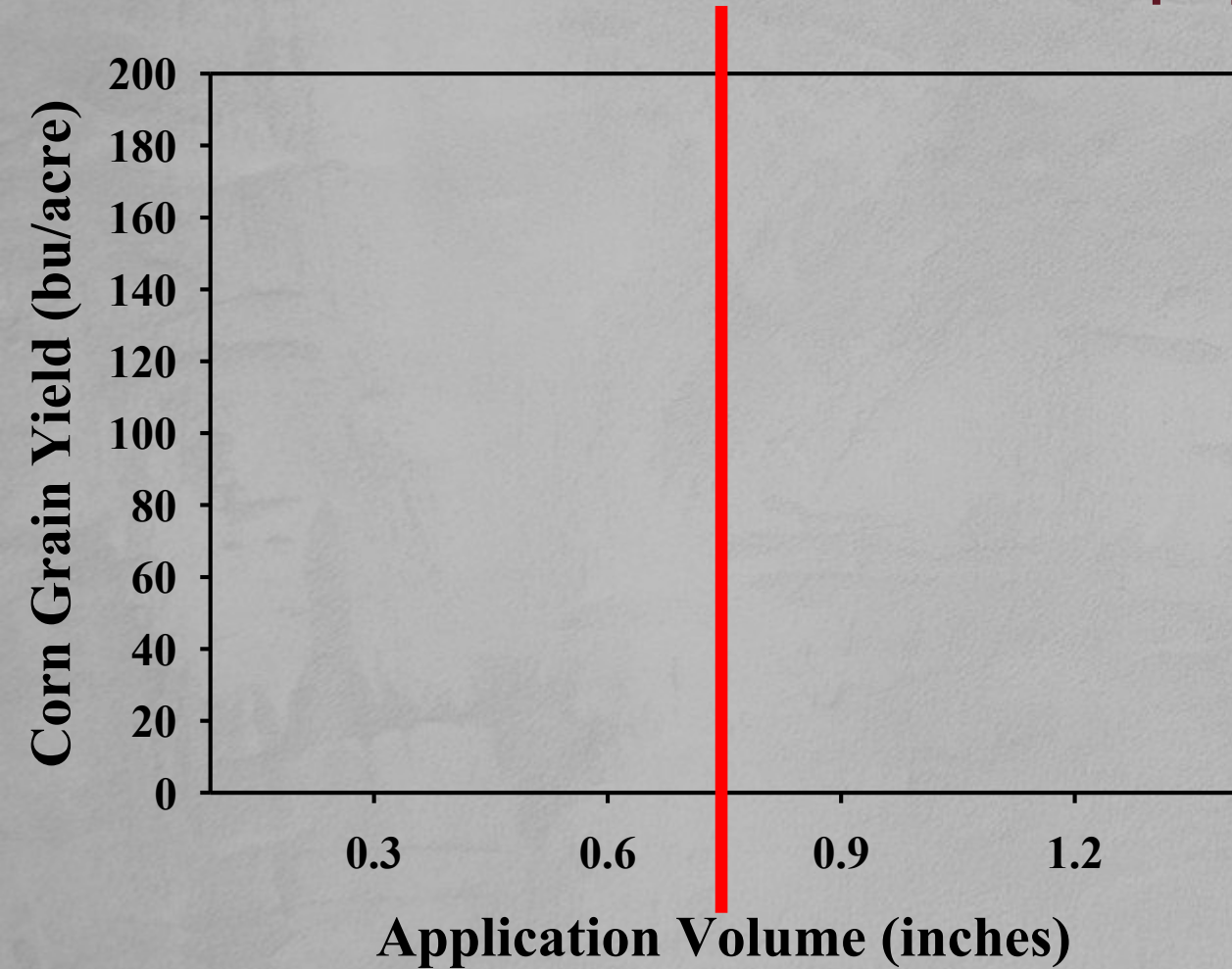
How Much – Application Volume



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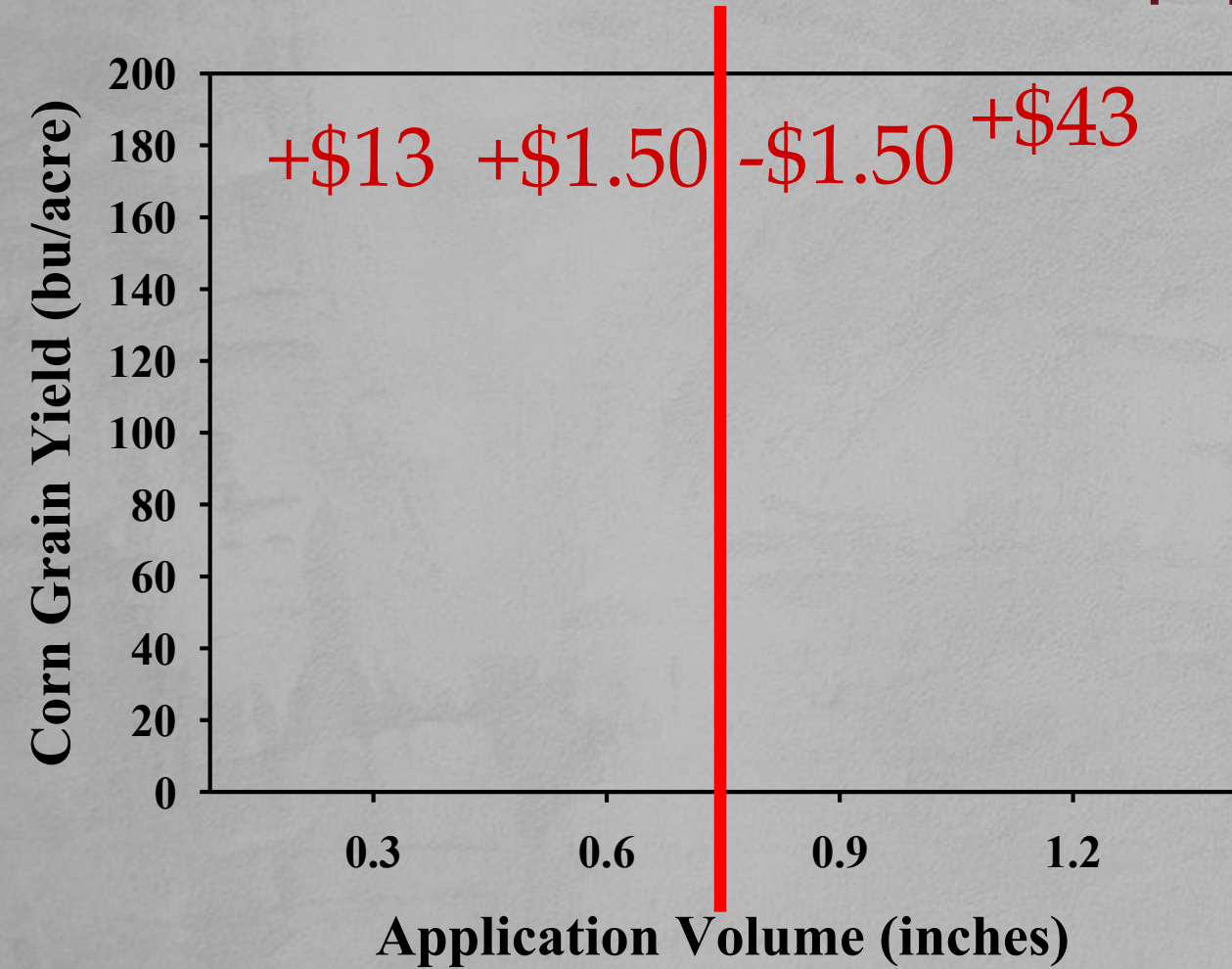
How Much – Application Volume



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How Much – Application Volume



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What is your pivot capacity?



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What is your pivot capacity?

GROSS APPLICATION (INCHES)	MAIN PANEL TIMER (PERCENT)	REVOLUTION TIME (HOURS)
0.1	100.0	7.8
0.1	100.0	7.8
0.2	56.7	13.8
0.3	37.8	20.7
0.4	28.3	27.6
0.5	22.7	34.5
0.6	18.9	41.4
0.7	16.2	48.3
0.8	14.2	55.3
0.9	12.6	62.2
1.0	11.3	69.1
1.1	10.3	76.0
1.2	9.4	82.9
1.3	8.7	89.8
1.4	8.1	96.7

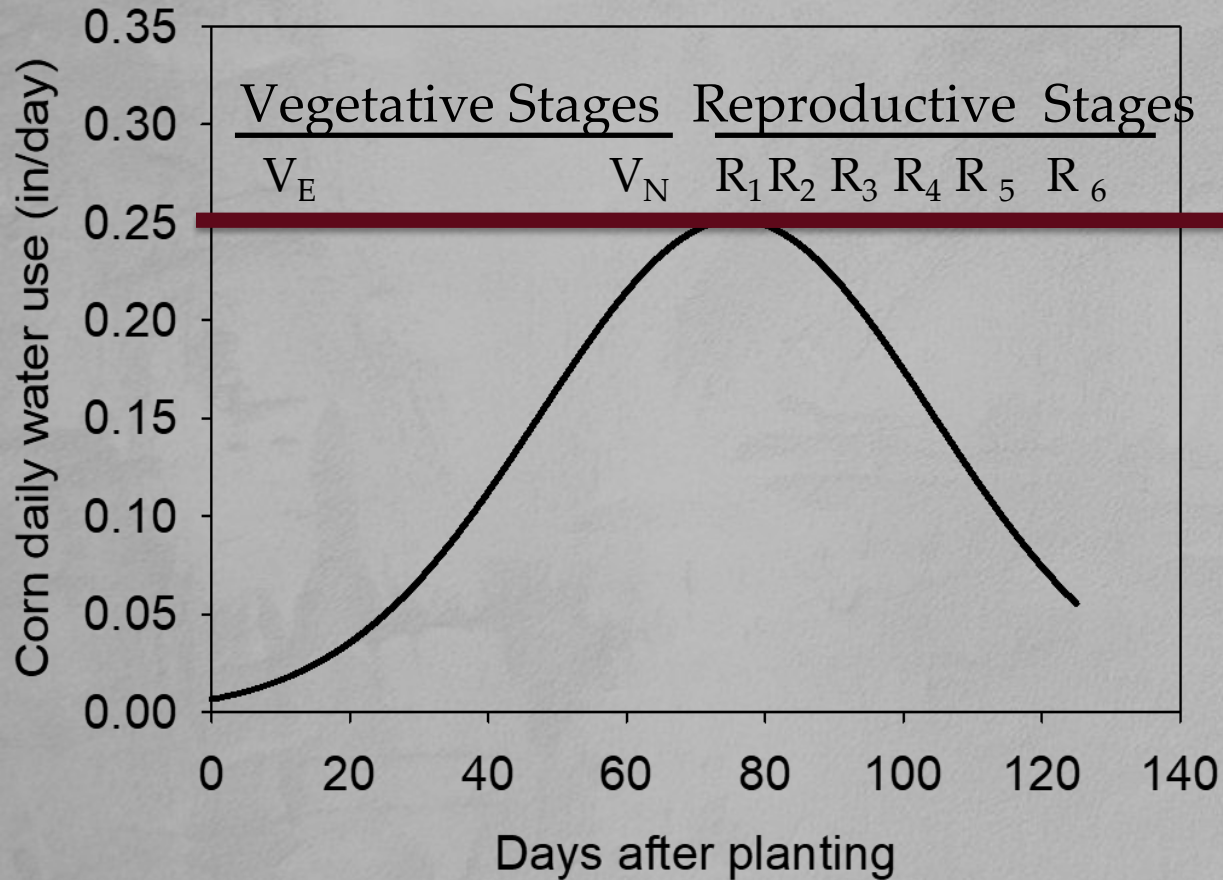


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Crop Water Demand



0.3 inch/day



Does your pivot meet crop demand?

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1.4	8.1	96.7
1.5	7.6	103.6

Meets Demand



Does your pivot meet crop demand?

GROSS APPLICATION RATE (INCHES)	NET APPLICATION RATE (INCHES)	OPERATION TIME (HOURS)
0.05	100.0	7.8
0.1	100.0	7.8
0.2	56.7	13.8
0.3	37.8	20.7
0.4	28.3	27.6
0.5	22.7	34.5
0.6	18.5	41.4
0.7	14.6	48.3
0.8	11.3	55.3
0.9	8.7	62.2
1.0	6.4	69.1
1.1	4.3	76.0
1.2	3.1	82.9
1.3	2.3	89.8
1.4	1.7	96.7
1.5	1.3	103.6

Meets Demand

0.3

20.7

0.35 inches/day



Does your pivot meet crop demand?

GROSS APPLICATION (INCHES)	MAIN PANEL TIMER (PERCENT)	REVOLUTION TIME (HOURS)
0.1	100.0	15.2
0.1	100.0	15.2
0.2	52.3	29.0
0.3	34.9	43.5
0.4	26.1	58.0
0.5	20.9	72.6
0.6	17.4	87.1
0.7	14.9	101.6
0.8	13.1	116.1
0.9	11.6	130.6
1.0	10.5	145.1
1.1	9.5	159.6
1.2	8.7	174.1
1.3	8.0	188.7
1.4	7.5	203.2
1.5	7.0	217.7
1.6	6.5	232.2
1.7	6.2	246.7

Meets Demand

0.3

20.7

0.35 inches/day

GROSS APPLICATION (INCHES)	MAIN PANEL TIMER (PERCENT)	REVOLUTION TIME (HOURS)
0.10	100.0	15.2
0.10	100.0	15.2
0.20	52.3	29.0
0.30	34.9	43.5
0.40	26.1	58.0
0.50	20.9	72.6
0.60	17.4	87.1
0.70	14.9	101.6
0.80	13.1	116.1
0.90	11.6	130.6
1.00	10.5	145.1
1.10	9.5	159.6
1.20	8.7	174.1
1.30	8.0	188.7
1.40	7.5	203.2
1.50	7.0	217.7
1.60	6.5	232.2
1.70	6.2	246.7



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1.30	8.0	188.7
1.40	7.5	203.2
1.50	7.0	217.7
1.60	6.5	232.2
1.70	6.2	246.7

0.30

43.5



Does your pivot meet crop demand?

GROSS APPLICATION RATE (INCHES)	PERCENT OF DEMAND MET	ROTATION TIME (HOURS)
0.05	100.0	7.8
0.1	100.0	7.8
0.2	56.7	13.8
0.3	37.8	20.7
0.4	28.3	27.6
0.5	22.7	34.5
0.6	18.3	41.4
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Does Not Meet Demand

0.30

43.5



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0.1	100.0	7.8
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Does Not Meet Demand

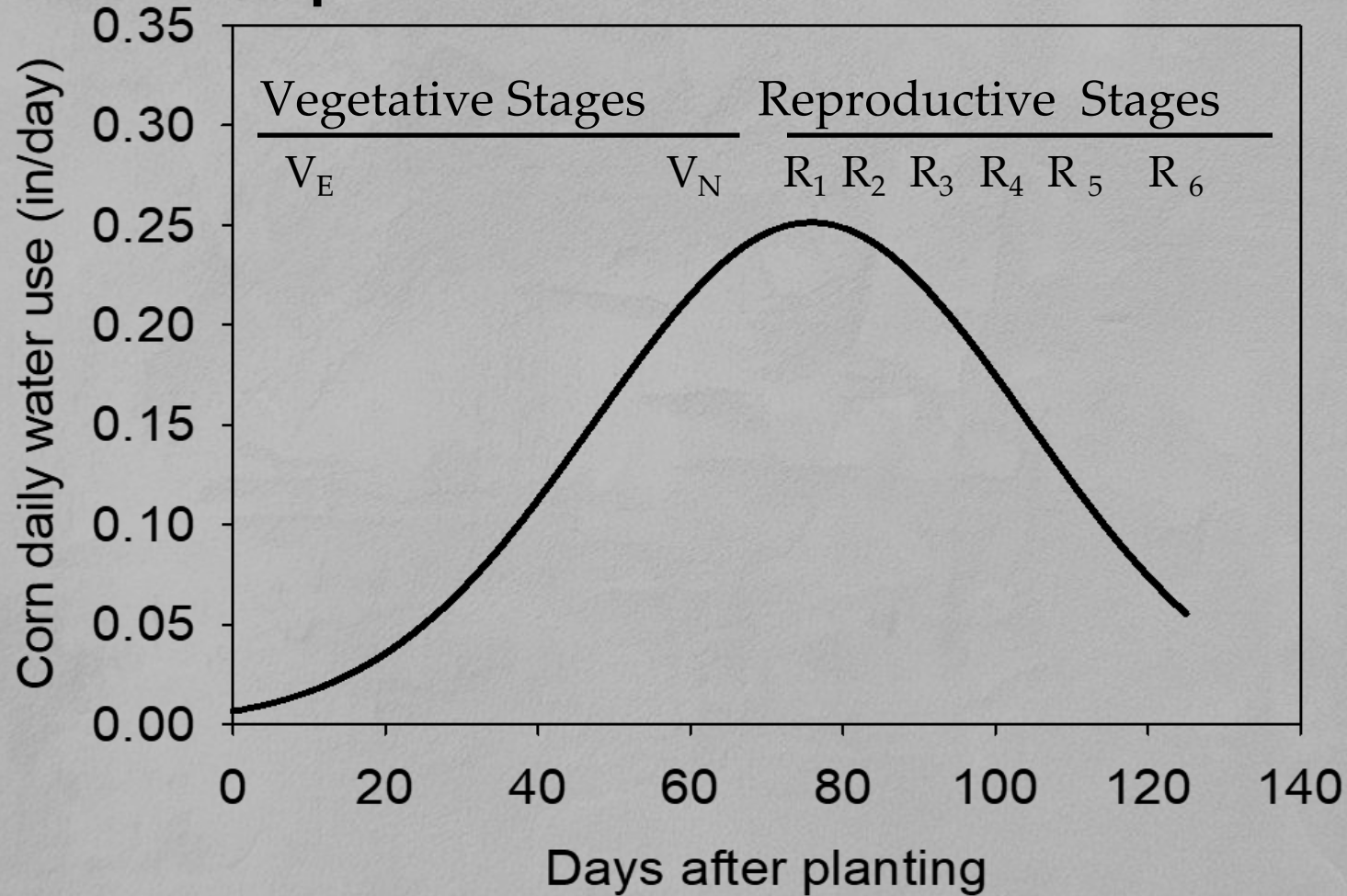
0.30

43.5

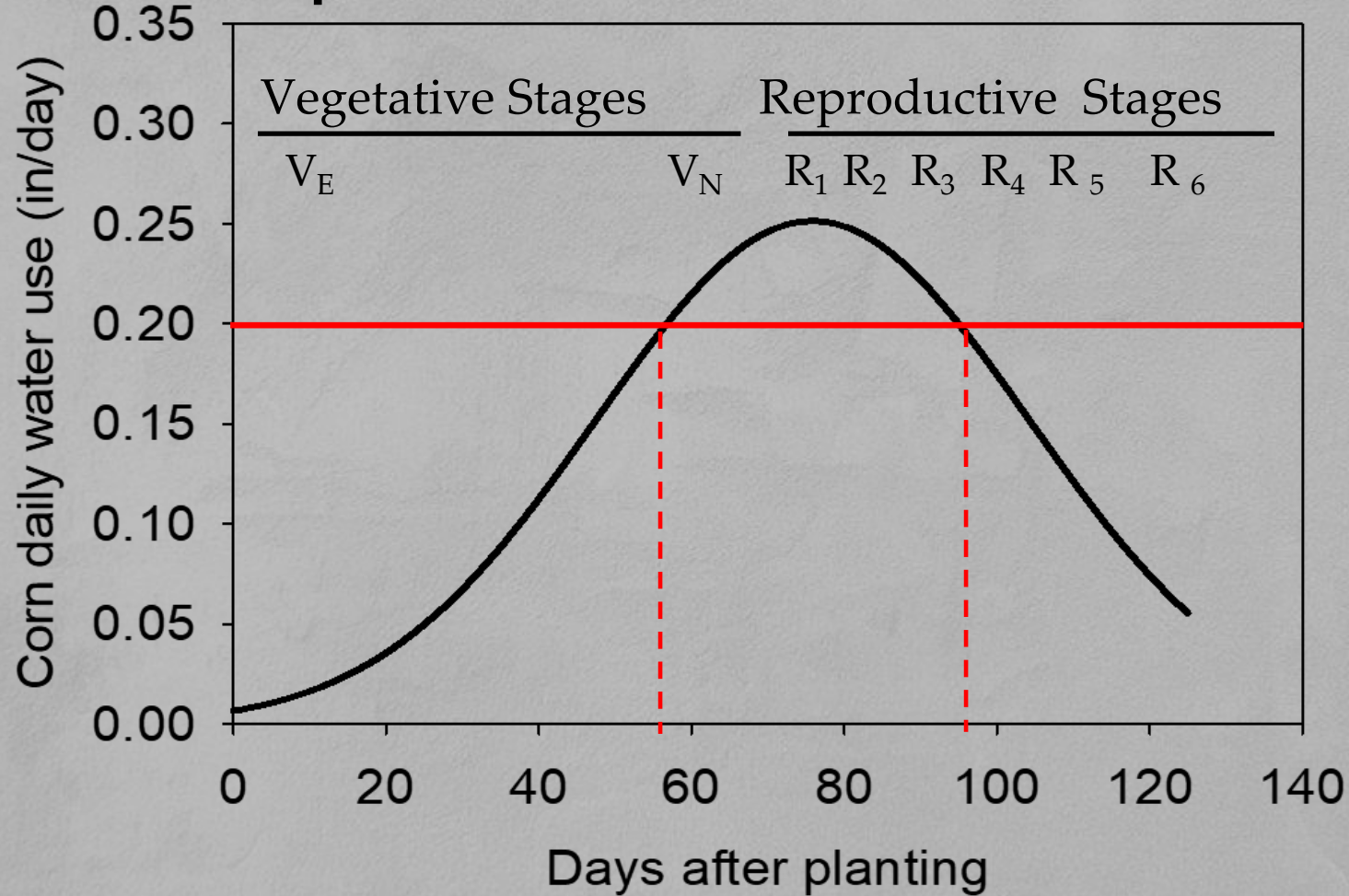
0.17 inches/day



Crop Water Demand



Crop Water Demand



Scenario #1: Full Circle, Meets Demand

Available –
No Stress



Available –
Crop Stress



Scenario #2: Full Circle, Doesn't Meet Demand

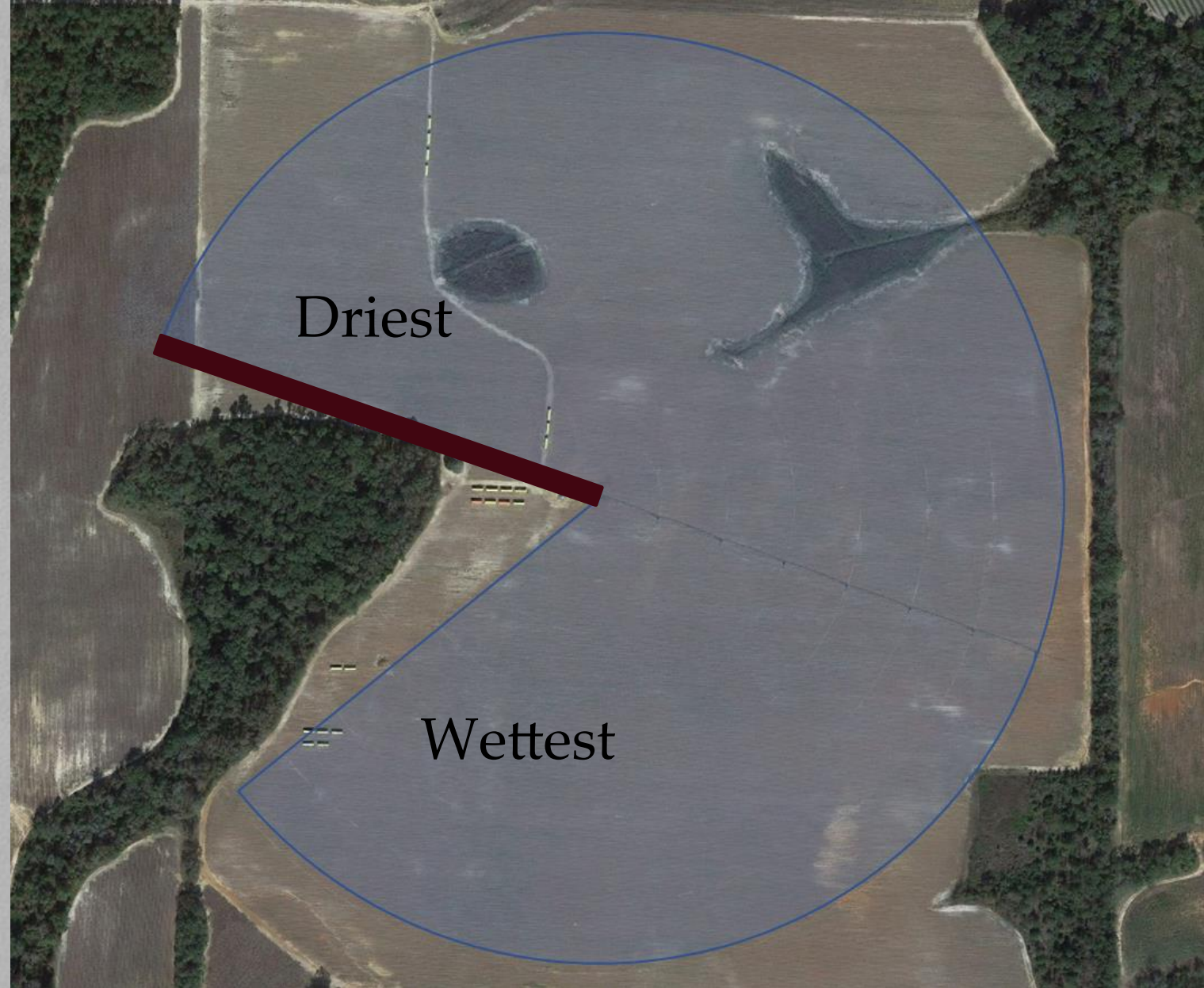
Available –
No Stress

Available –
Crop Stress



Scenario #3

- Semi-circle pivot
- Pivot designed to meet crop water demand on one spin



Scenario #3

- Semi-circle pivot
- Pivot designed to meet crop water demand on one spin

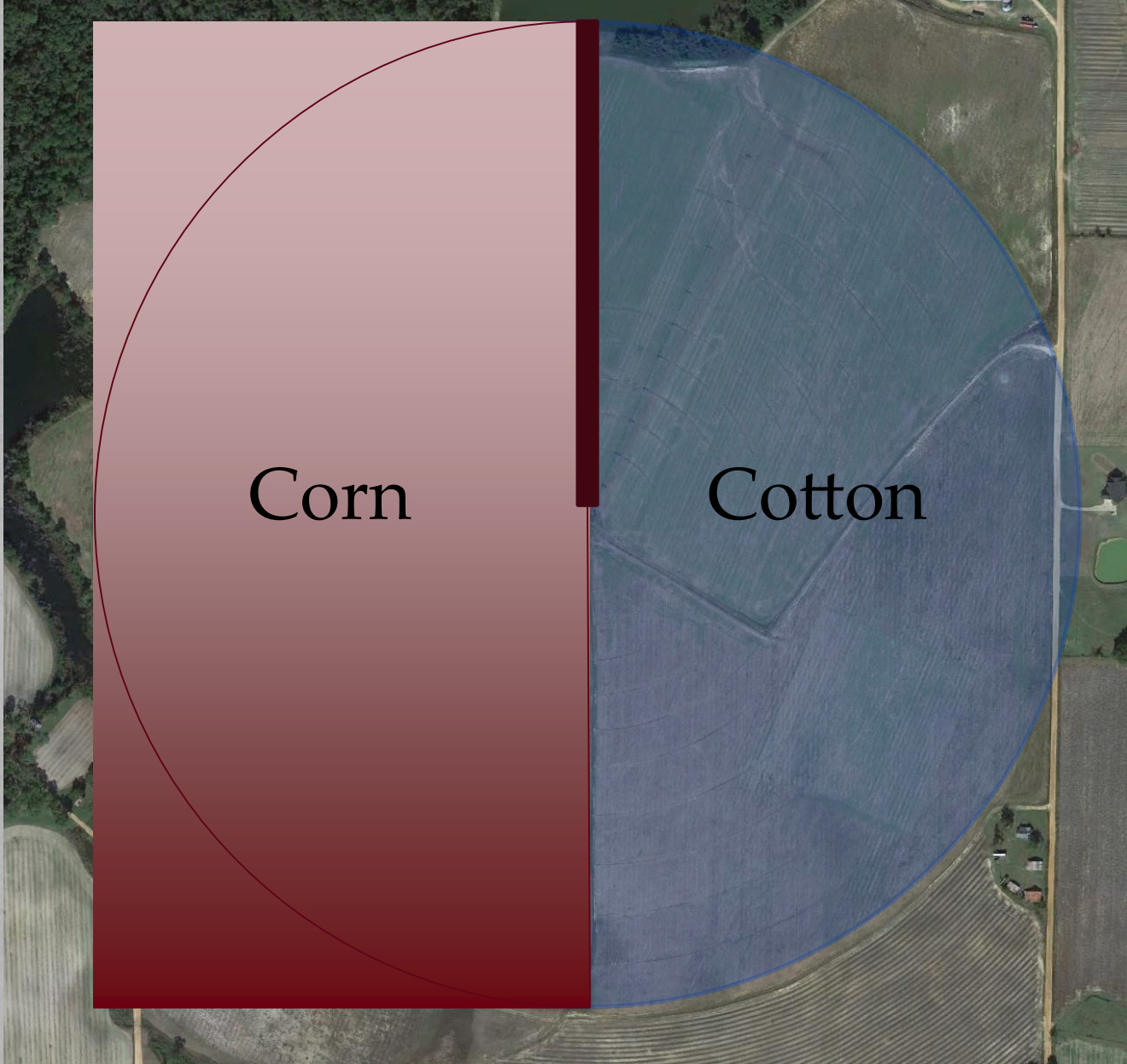
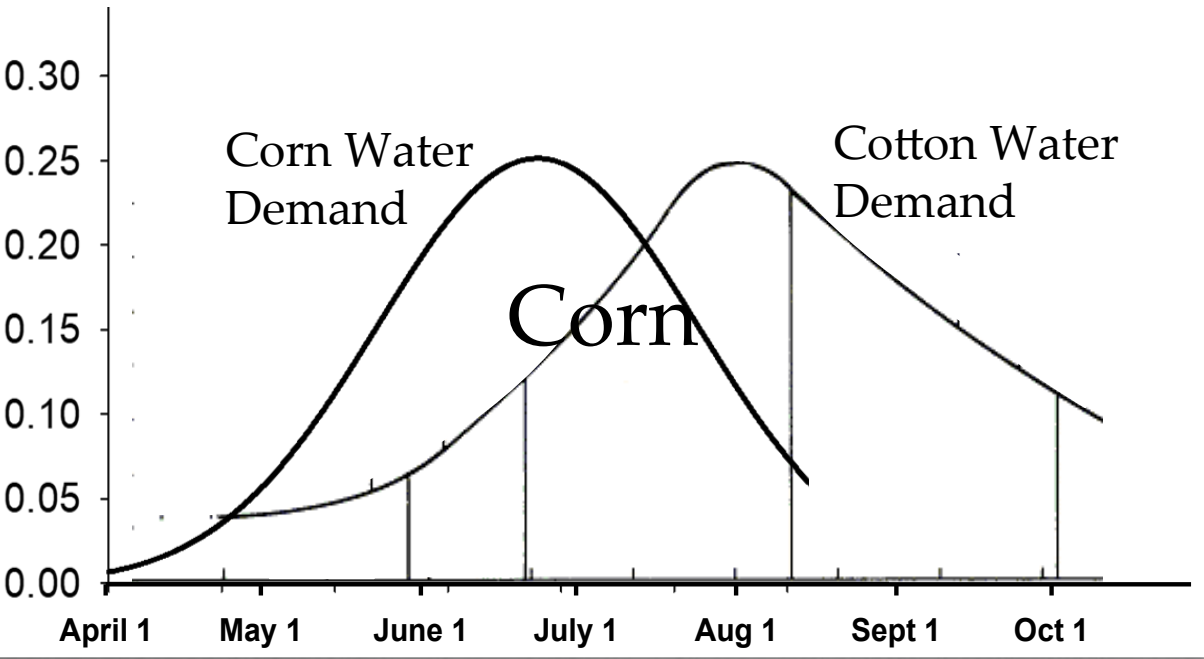


Other Management Options

- Full-circle pivot
- Pond is undersized or application rate too low



Other Management Options



Summary

- Don't guess – measure soil moisture
- Keep bank full with pivots
 - Start early – don't fall behind!
 - Apply as much as you can
- Adapt management to your pivot design
 - Semi-circle: consider different sections
 - Consider crop mix



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