

# Flickner Innovation Farm

2.75 miles west of Moundridge, Kansas on Arrowhead Avenue

[https://www.kcare.k-state.edu/irrigation-and-ogallala/Flickner\\_Farm.html](https://www.kcare.k-state.edu/irrigation-and-ogallala/Flickner_Farm.html)

32,552 – 1979  
40,699 – 1992

City of Moundridge – MP3 (vested); 30,413 (1977); 35,695 (1981)

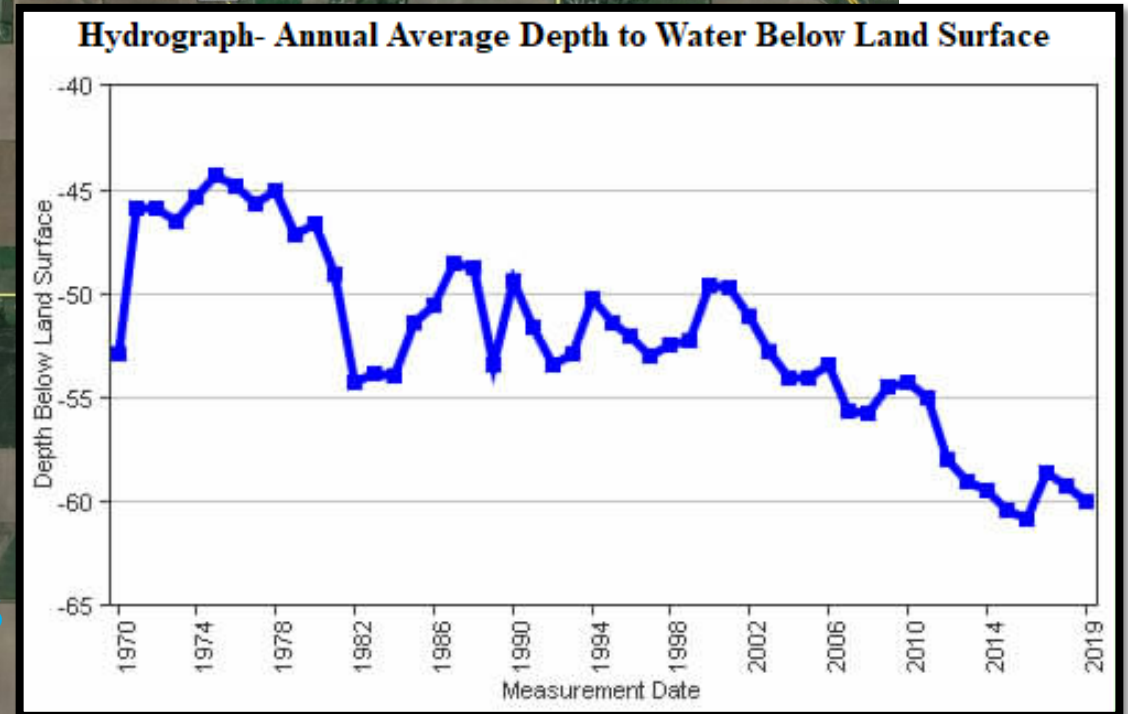
4,894 – 1955

29,958 – 1977

4,537 – 1955

47,591 – 2010

37,213 – 1984



SDI installed **2004**; 154 acres;  
500gpm & 200gpm

SDI installed **2005**; 71 acres

PMDI installed **2019** on a 1996 Valley (3 span)  
& 2005 Reinke (4 span); 123 acres; 450gpm

Rotor 4 span pivot; 33 acres

SDI installed **2001**; 220 acres; 800gpm & 600gpm

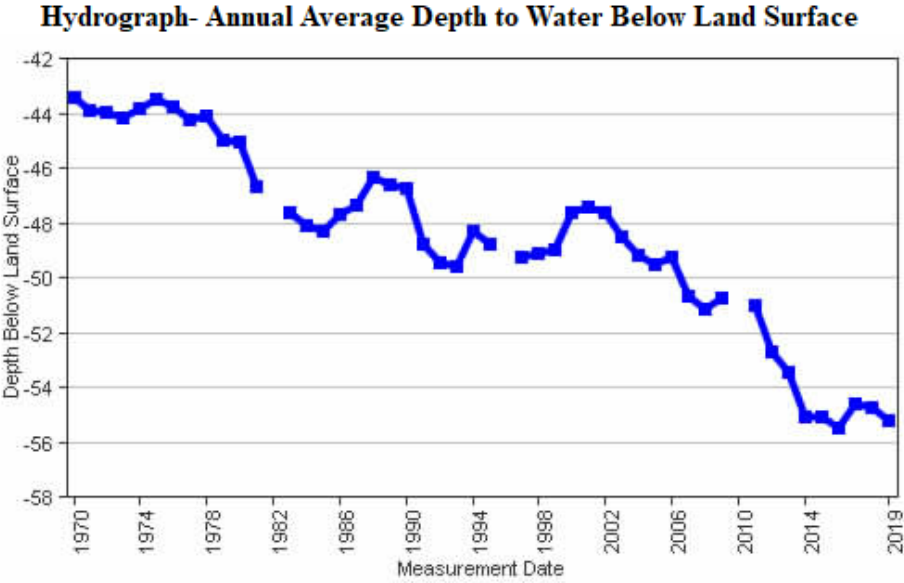
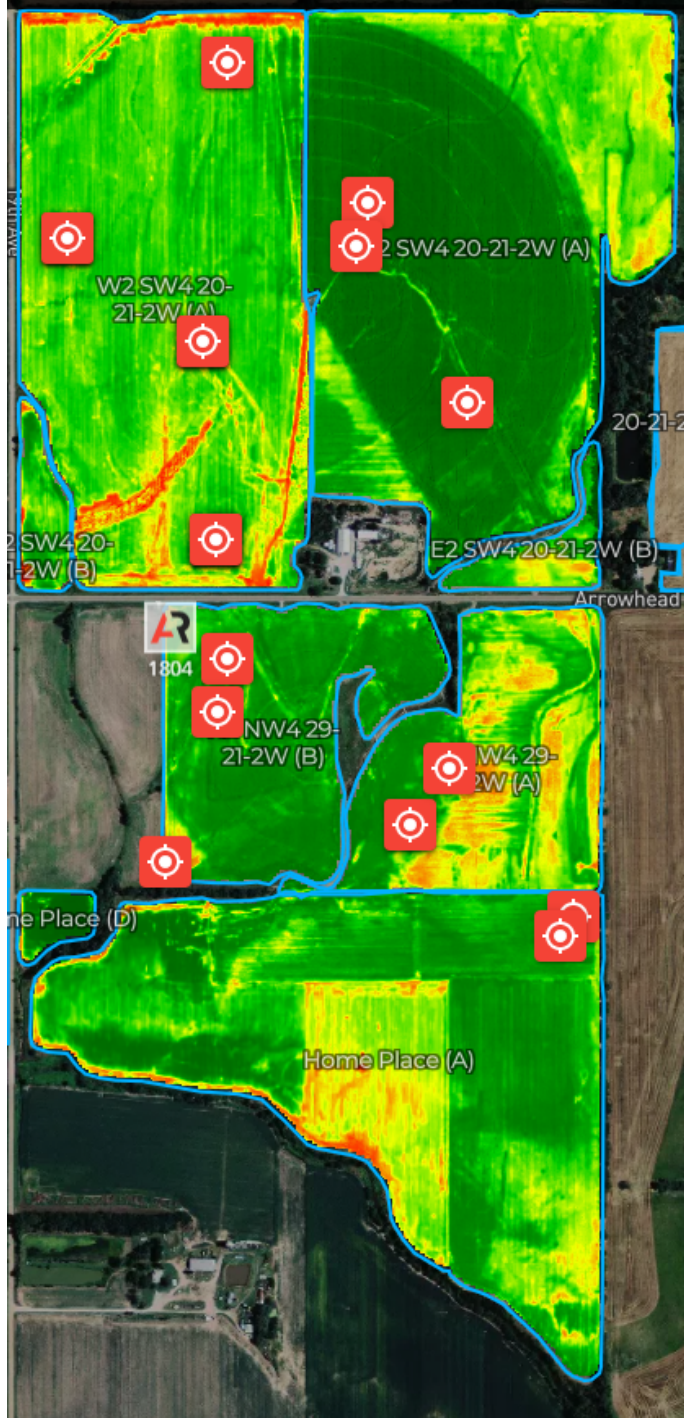
SDI installed **2010**; 40 acres

SDI installed **2006**; 80 acres; 650gpm

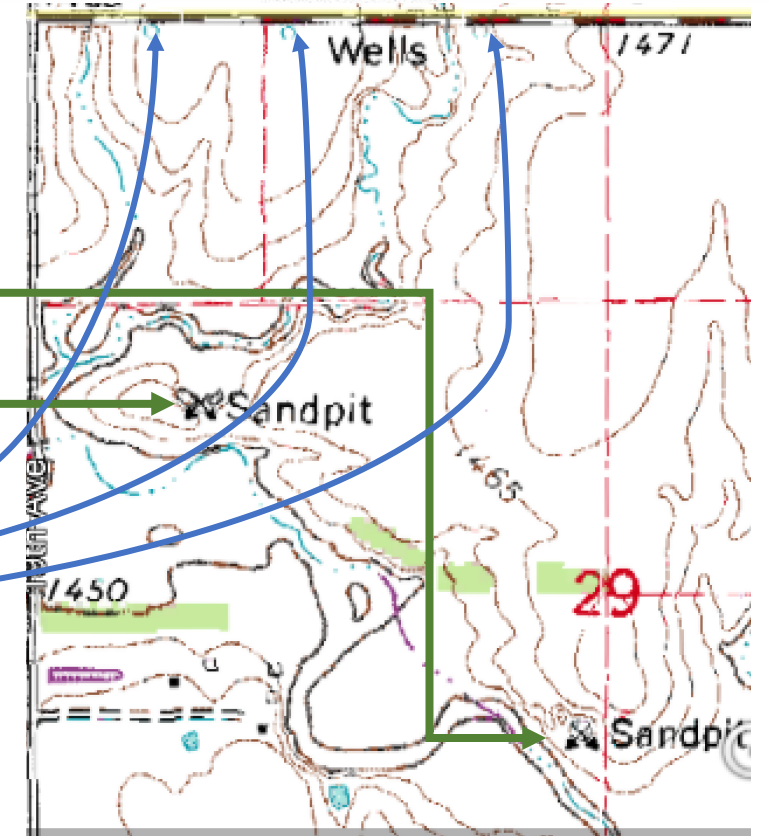
SDI on 40" installed **2015**;  
78 acres; 650gpm



# What are we dealing with?



- Topography (>25' change)
- Sand pits
- Creek & slough
- 3 muni wells (quality concerns)
- Declining aquifer







## Types of Irrigation

- Poly-pipe flood
- PMDI
- Rotor pivot
- Natural flood
- SDI on 60" and 40"







# Mobile drip

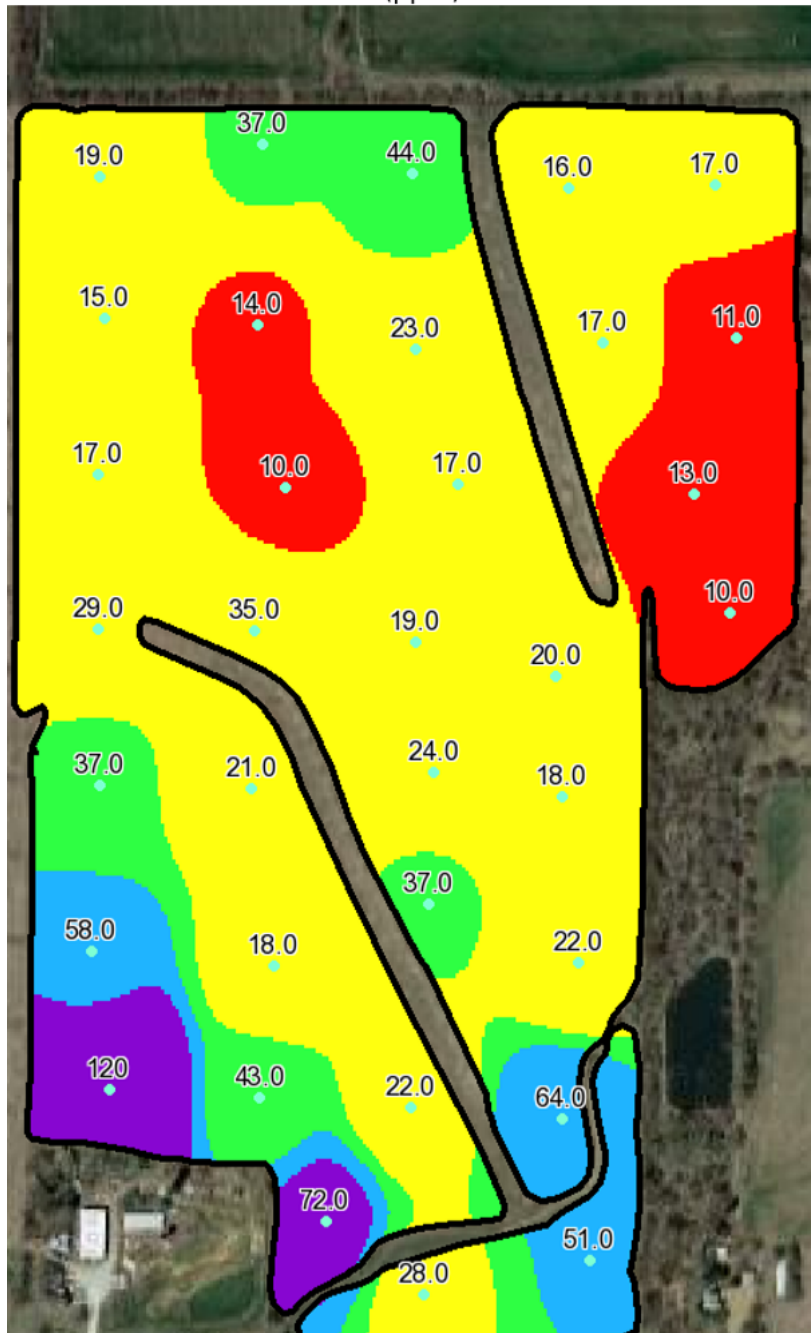
- GMD 3 study
- Mobile drip on inside 3 spans with bubblers on the rest of the system
- Above average rainfall
- Expected difference in yields was not seen
- Water efficiency of inner spans improved by 38%



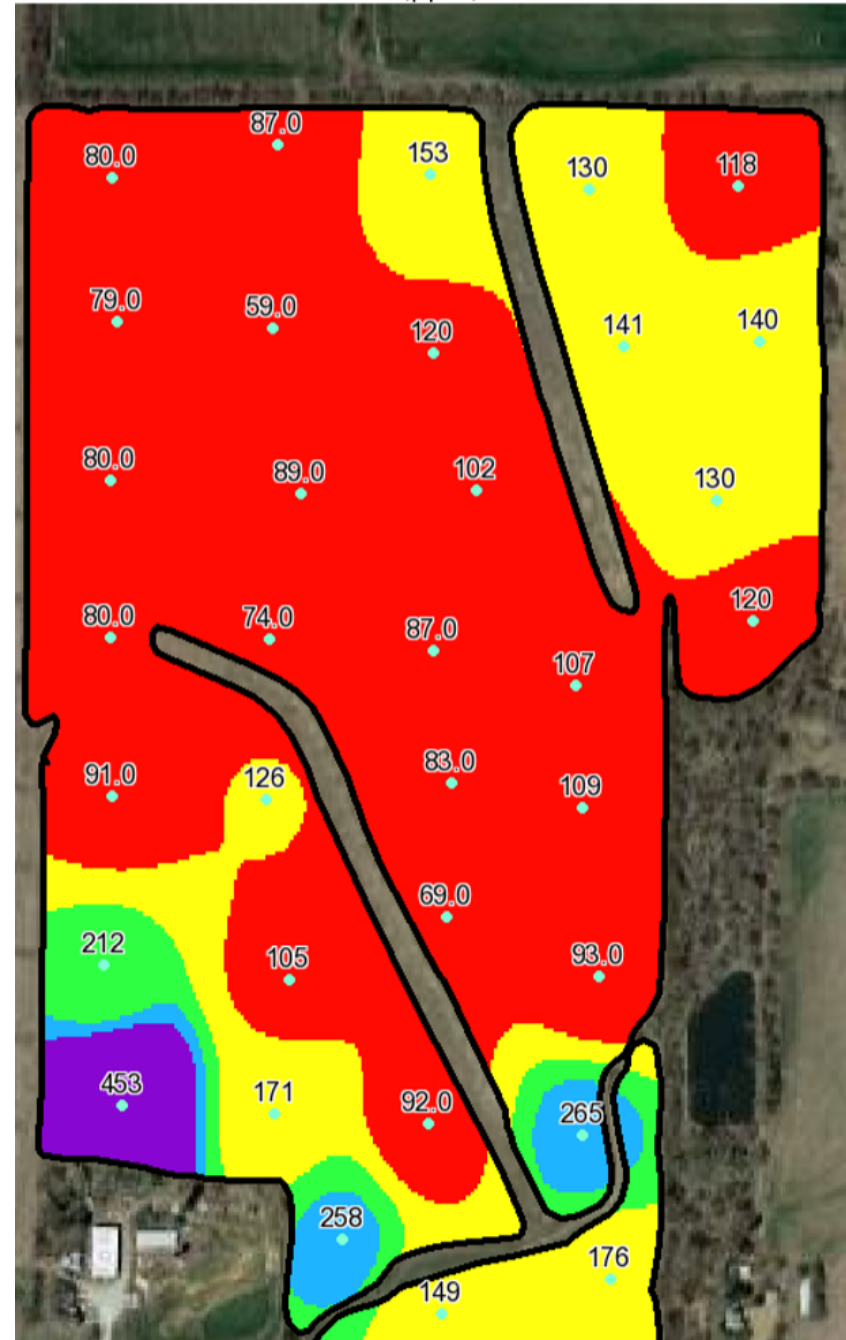
pH (none)



P (ppm)



K (ppm)



Arrowhead Rd

Arrowhea

Arrowhead Rd

Arrowhea

Arrowhead Rd

Arrowhea



# Tissue Sampling = 6/10/2019 @ V5

By WINFIELD UNITED

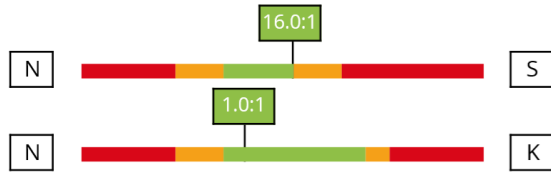
**NutriSolutions**  
By WINFIELD UNITED

Ray Flickner

Crop: CORN  
Stage: V5

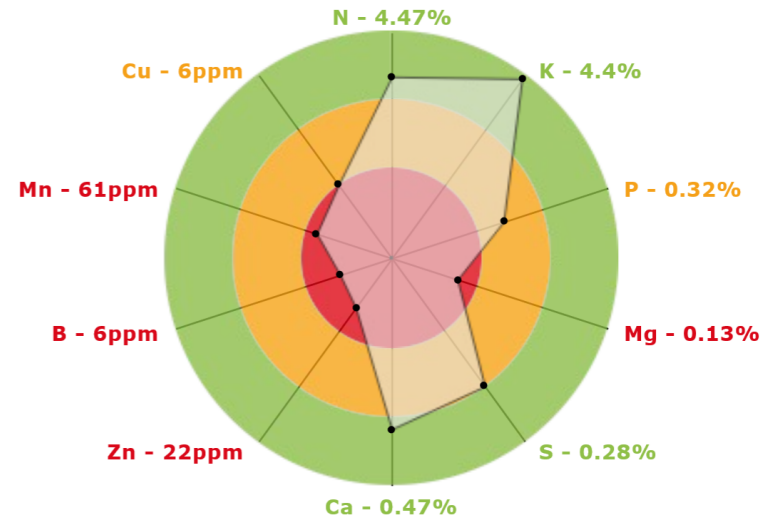
Sample ID: NS999049353  
Lab: Servi-Tech

GPS Latitude: 38.205292    MID KANSAS COOP ASSN-MOUNDRIDGE  
GPS Longitude: -97.568374    307 W COLE ST, PO BOX D, MOUNDRIDGE, KS  
67107-7533 US,  
Kansas,



Farm Name: SW4 20 21 2W  
Field Name: E2 SW4 20 21 2W  
Sample Name: Sample 1  
Submitter Name: Ashleigh Baker  
Report Date: 06/12/2019  
Sample Date: 06/10/2019

Nitrogen 4.47% / N-Adequate	Manganese 61ppm / Mn-Deficient
Phosphorus 0.32% / P-Responsive	Copper 6ppm / Cu-Responsive
Potassium 4.4% / K-Adequate	
Sulfur 0.28% / S-Adequate	
Boron 6ppm / B-Deficient	
Zinc 22ppm / Zn-Deficient	
Magnesium 0.13% / Mg-Deficient	
Calcium 0.47% / Ca-Adequate	





# Tissue Sampling = 6/25/2019 @ V10



Ray Flickner

Crop: CORN  
Stage: V10

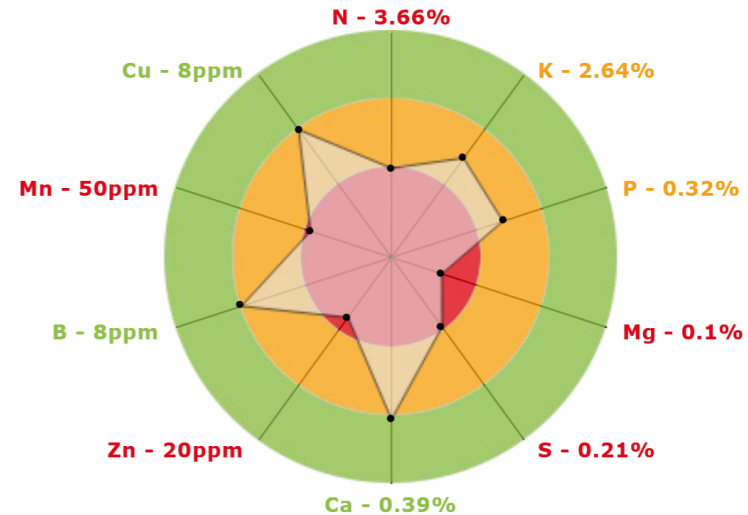
Sample ID: NS999049376  
Lab: Servi-Tech

GPS Latitude: 38.205292    MID KANSAS COOP ASSN-MOUNDRIDGE  
GPS Longitude: -97.568374    307 W COLE ST, PO BOX D, MOUNDRIDGE, KS  
67107-7533 US,  
Kansas,



Farm Name: SW4 20 21 2W  
Field Name: E2 SW4 20 21 2W  
Sample Name: Sample 1  
Submitter Name: Ashleigh Baker  
Report Date: 06/27/2019  
Sample Date: 06/25/2019

Nitrogen 3.66% / N-Deficient	Manganese 50ppm / Mn-Deficient
Phosphorus 0.32% / P-Responsive	Copper 8ppm / Cu-Adequate
Potassium 2.64% / K-Responsive	
Sulfur 0.21% / S-Deficient	
Boron 8ppm / B-Adequate	
Zinc 20ppm / Zn-Deficient	
Magnesium 0.1% / Mg-Deficient	
Calcium 0.39% / Ca-Adequate	



Note: The closer results are to the center of the graph, the more deficient the nutrient.



# Ways We Monitored Crop Stress

Plant Based



Ground Moisture

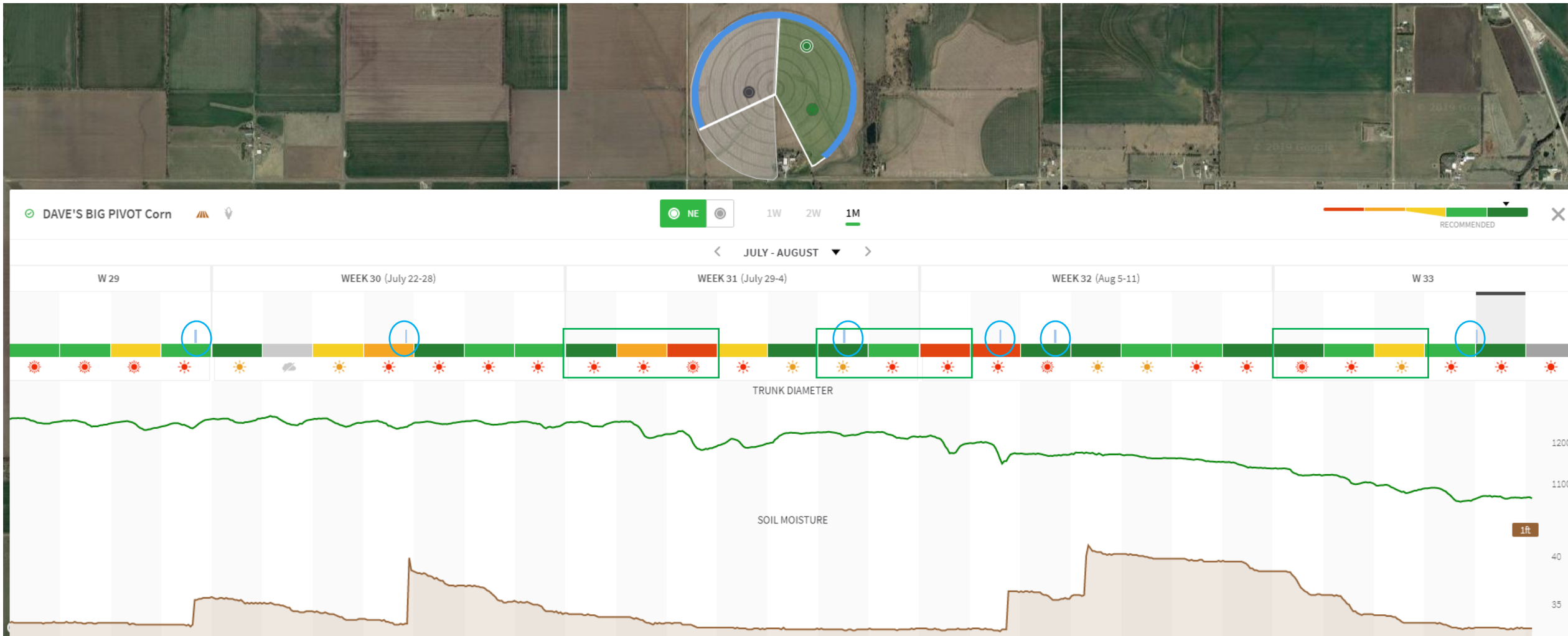


Imagery

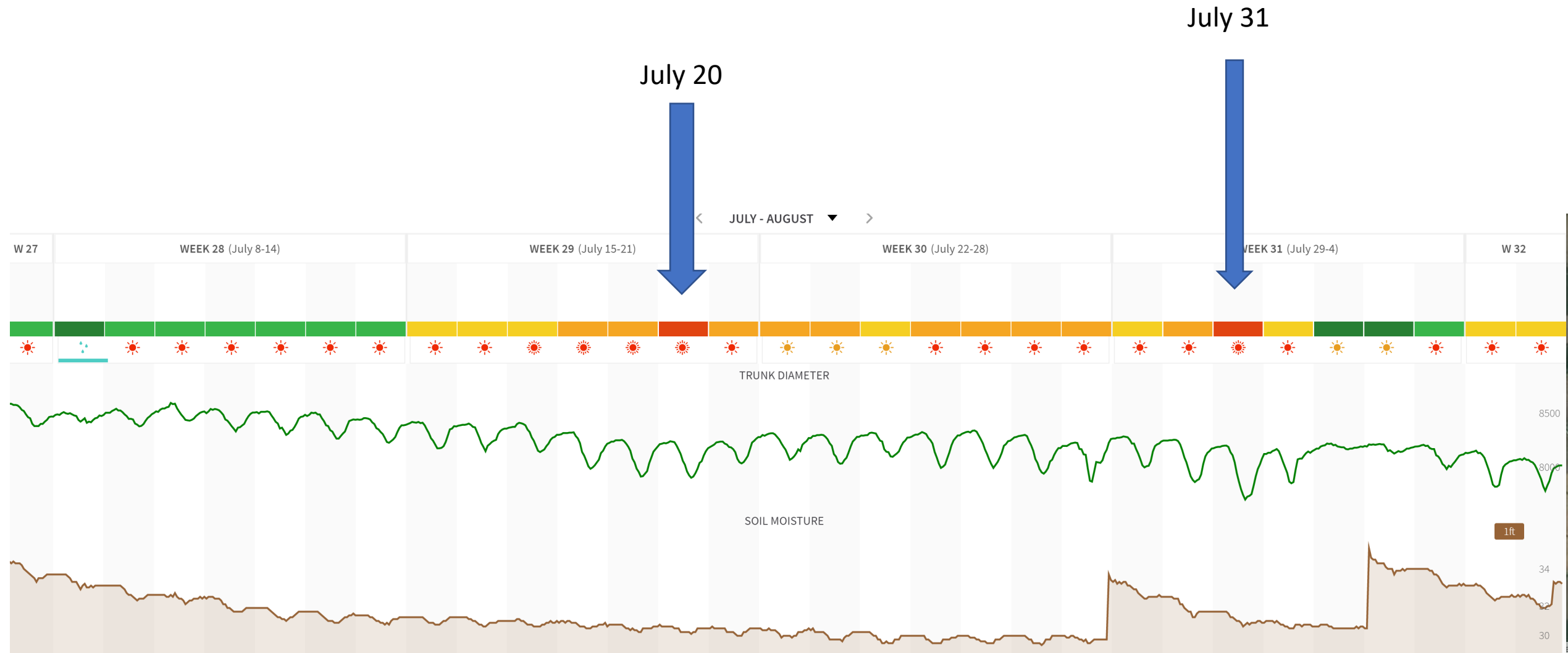




# Phytech – irrigation events; plant health



# Phytech – Home place SDI





Raymond Flickner - Home Drip - Corn '19

- Planted 04/12/2019
- Planted 04/18/2018
- Planted 07/10/2017

Create New Season

98.4°F Clear  
 Humidity: 61.9%  
 Dew Point: 83.1  
 Wind: 11 mph SSW

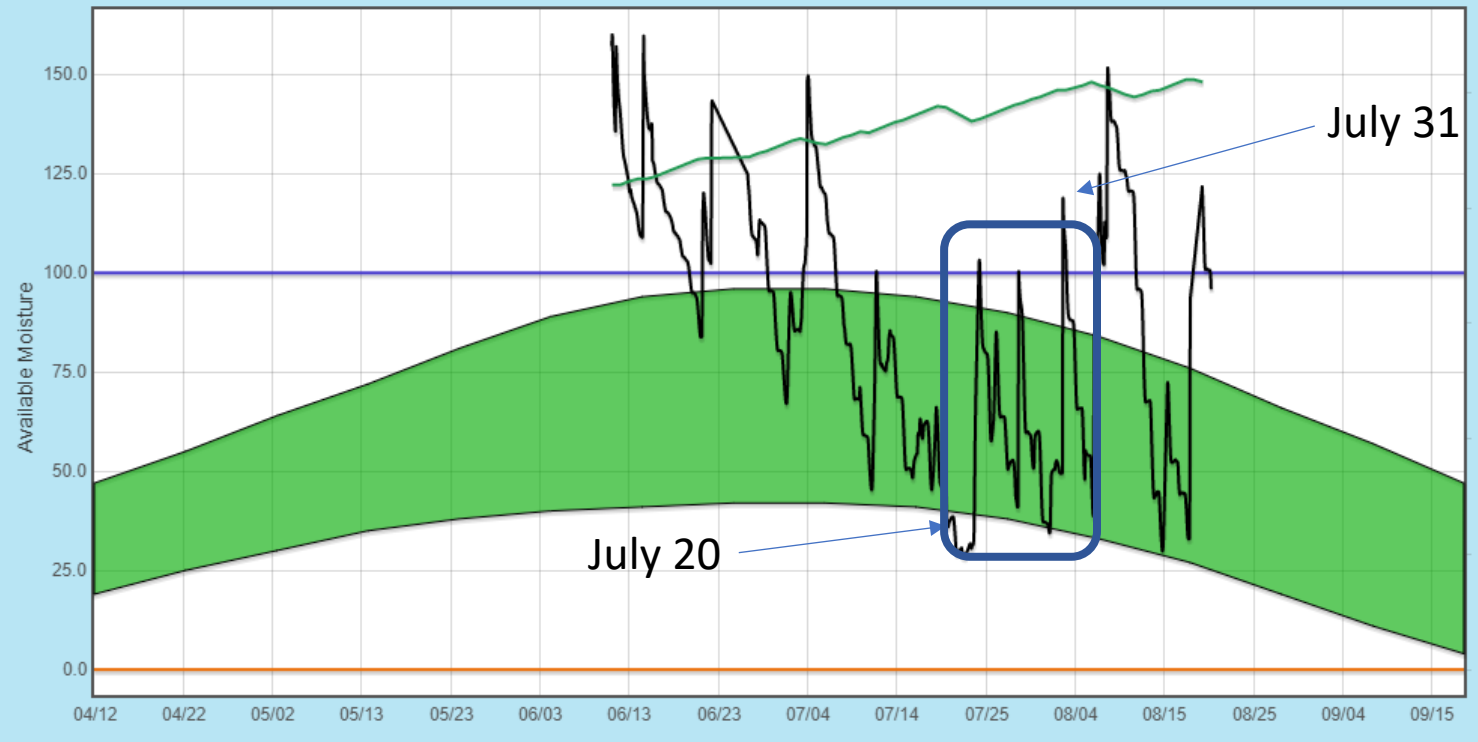


Growing° Days: 611.2  
 Last Irrigation/Rain: 08/14/2019 (44")  
 Days to Refill: 9.0  
 Root Depth: 48"



Conditions Notes

Summary Moisture EC Temp° Weather Template



Show:  Growth Stages  Irrigations  Root Growth  Projected Summary **Active Root Zone: Sensors: 1 - 12**

Full Point Mode: Auto-detected

# AquaSpy/AgSpy – moisture probe

< JULY - AUGUST ▾ >

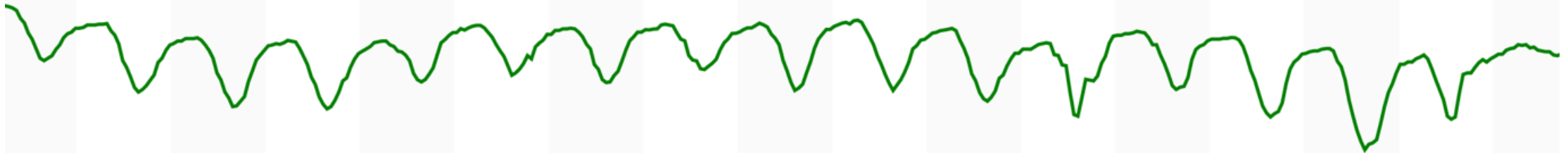
WEEK 29 (July 15-21)

WEEK 30 (July 22-28)

WEEK 31 (July 29-4)



TRUNK DIAMETER

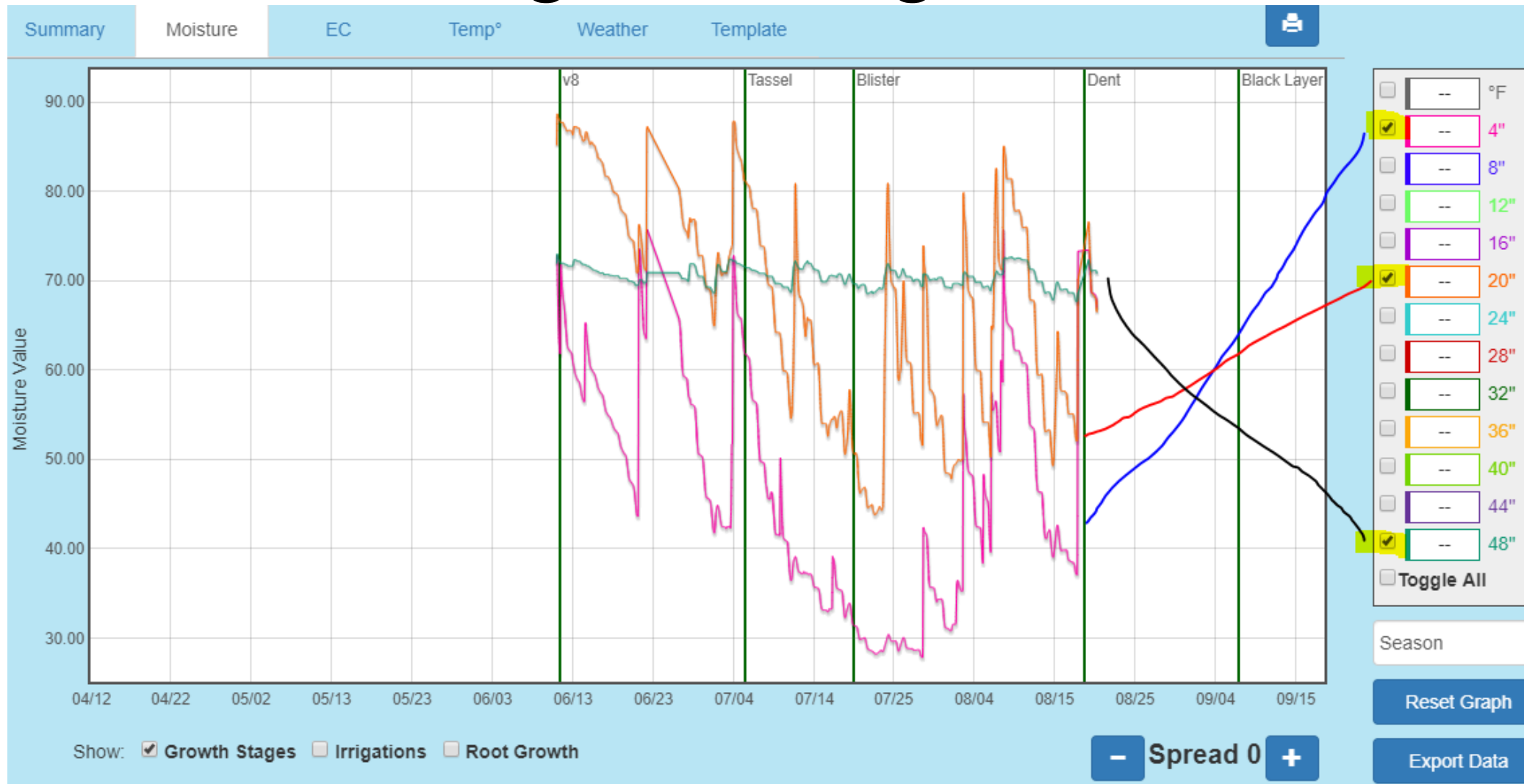


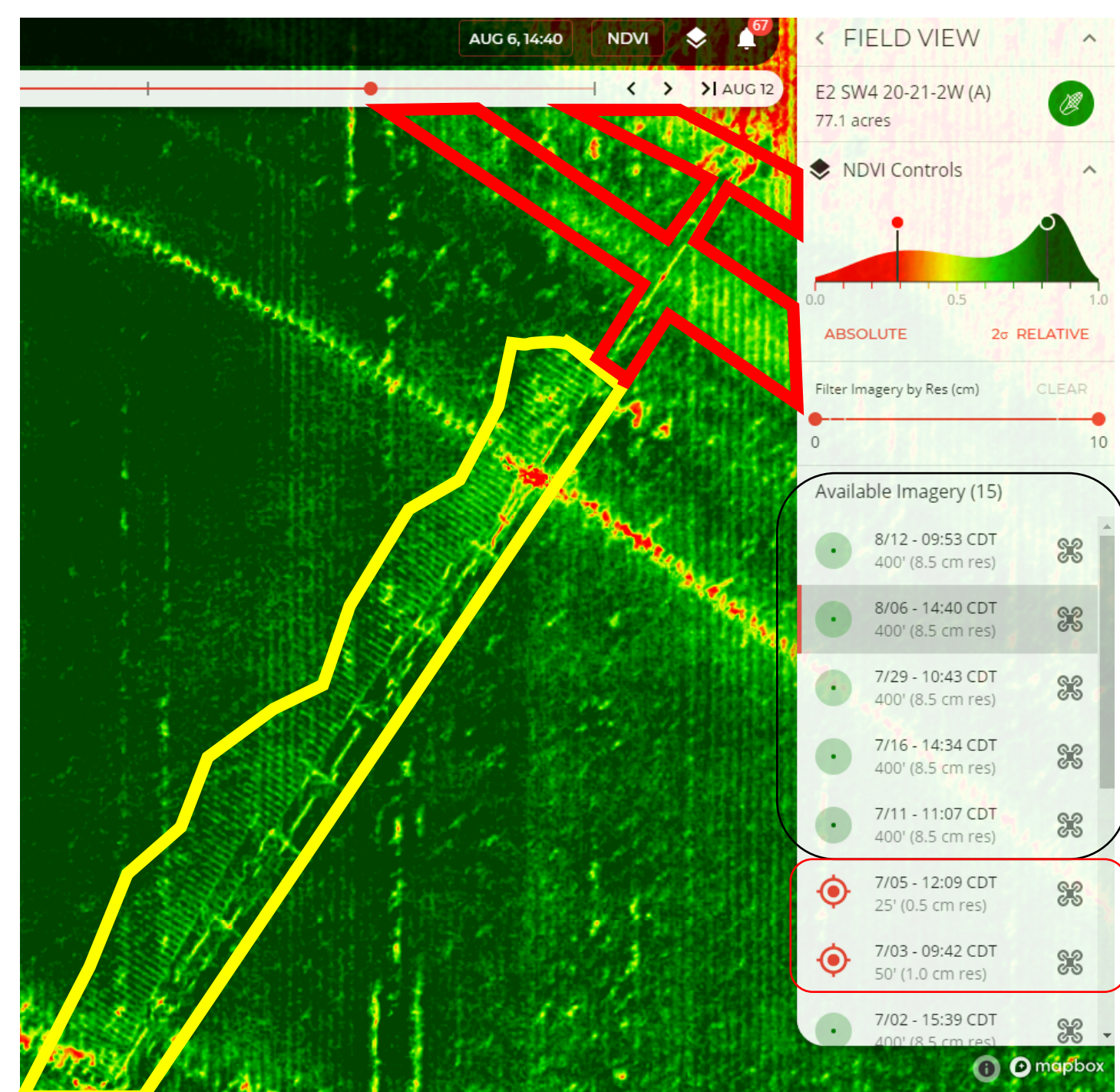
SOIL MOISTURE





# AquaSpy – moisture levels at 4", 20", 48"; growth stages





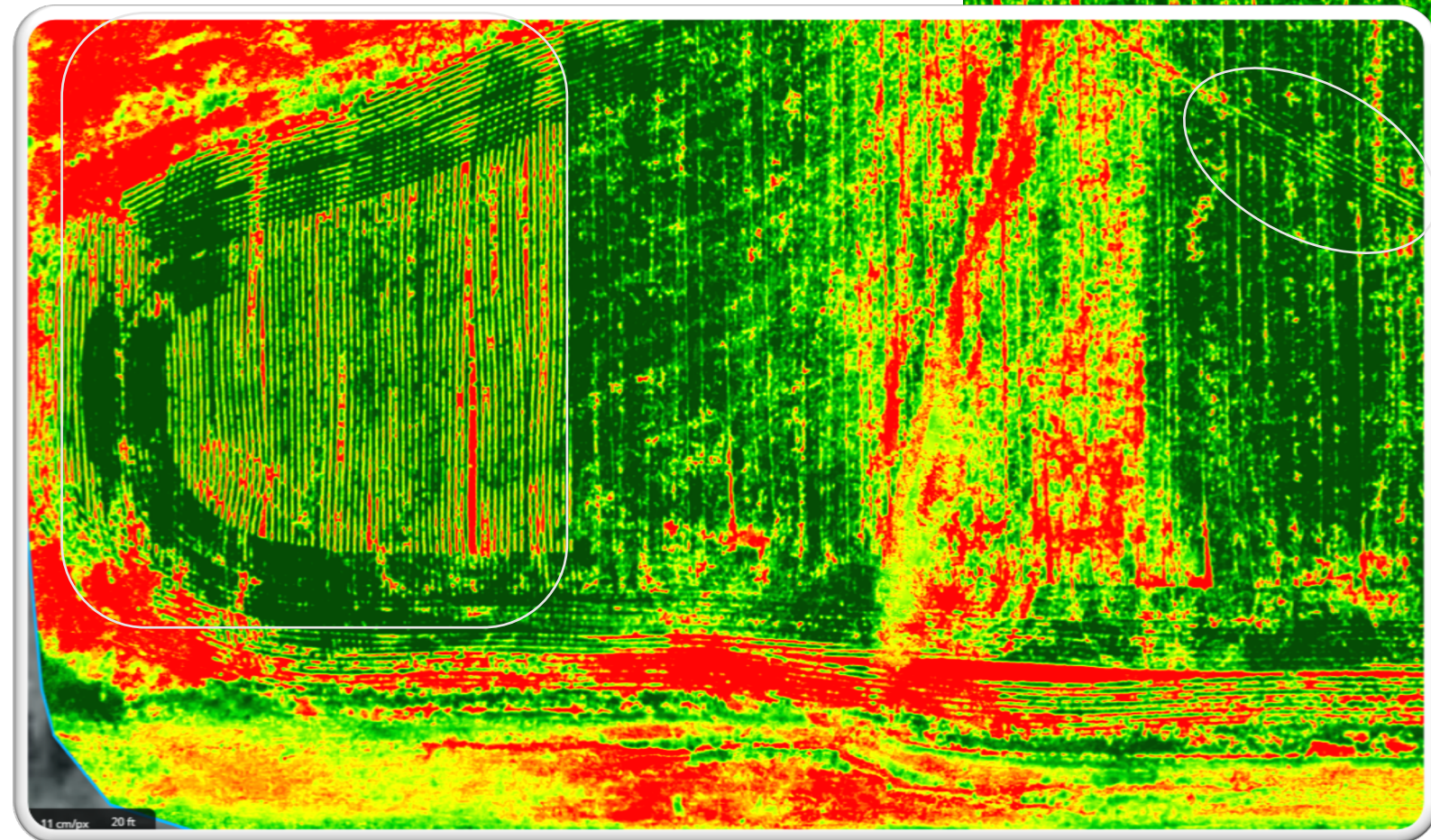
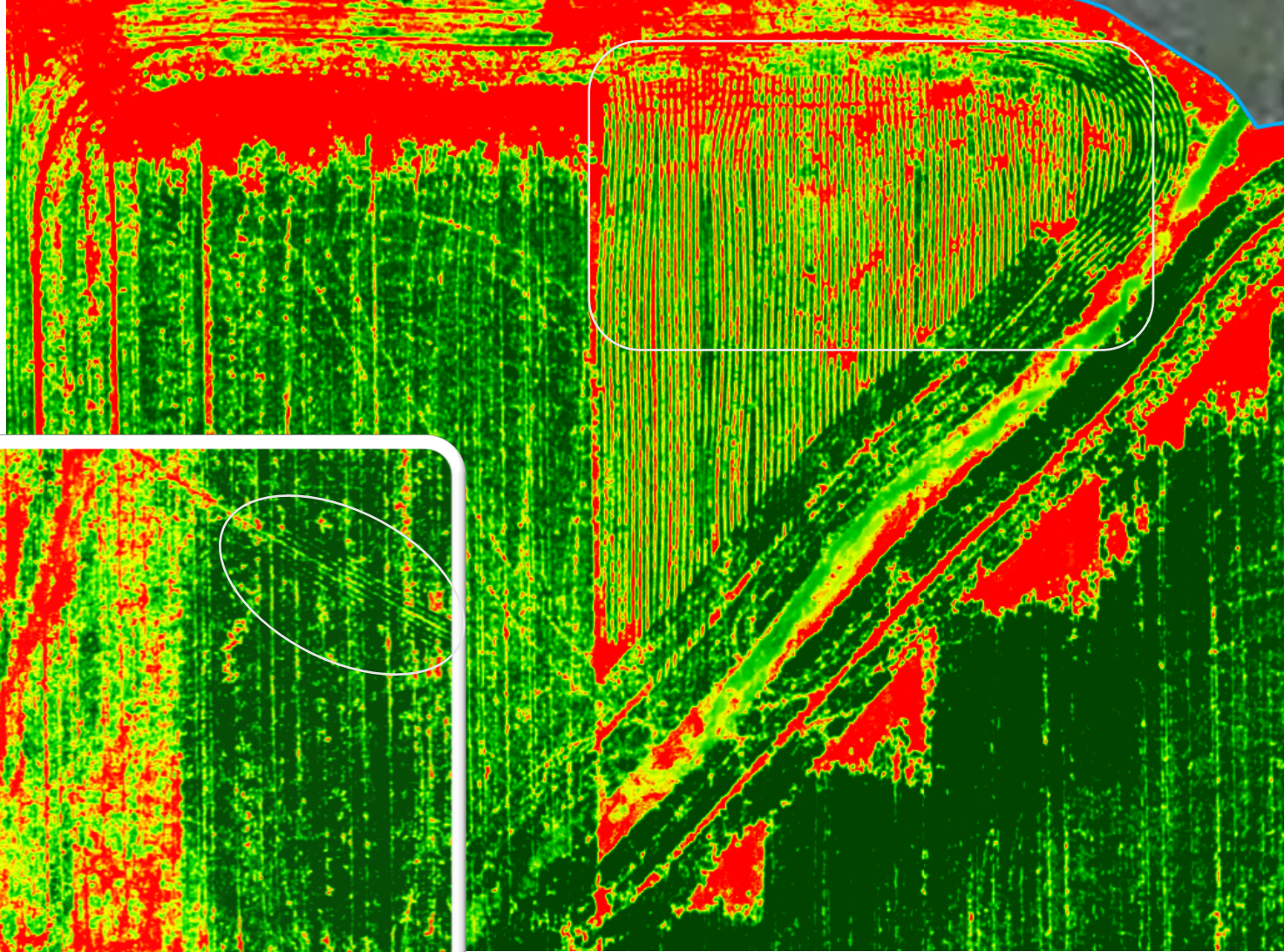
American  
Robotics

—

















UAS/drone in  
a box































Ability to take stand count...





	7/02 - 15:39 CDT 400' (8.5 cm res)	
	7/02 - 14:01 CDT 50' (1.0 cm res)	
	6/27 - 19:25 CDT 50' (1.0 cm res)	
	6/24 - 11:51 CDT 400' (8.5 cm res)	
	6/21 - 19:56 CDT 50' (1.0 cm res)	
	6/21 - 11:11 CDT 50' (1.0 cm res)	
	6/20 - 17:48 CDT 50' (1.0 cm res)	
	6/08 - 10:06 CDT 400' (8.5 cm res)	

	8/12 - 09:53 CDT 400' (8.5 cm res)	
	8/06 - 14:40 CDT 400' (8.5 cm res)	
	7/29 - 10:43 CDT 400' (8.5 cm res)	
	7/16 - 14:34 CDT 400' (8.5 cm res)	
	7/11 - 11:07 CDT 400' (8.5 cm res)	
	7/05 - 12:09 CDT 25' (0.5 cm res)	
	7/03 - 09:42 CDT 50' (1.0 cm res)	

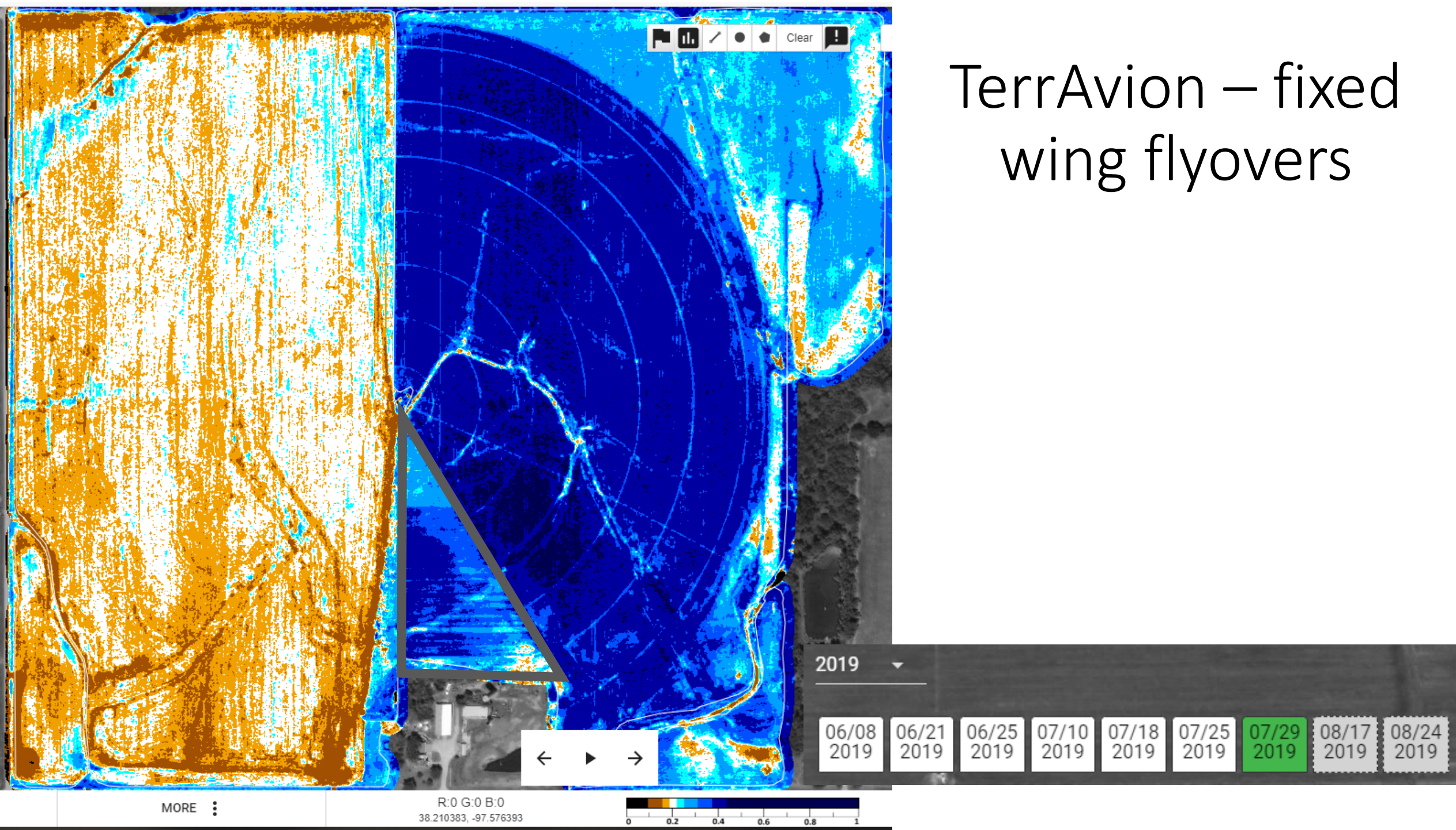
Available Imagery (22)		
	10/07 - 10:41 CDT 400' (8.5 cm res)	
	9/25 - 08:52 CDT 400' (8.5 cm res)	
	9/16 - 10:18 CDT 400' (8.5 cm res)	
	9/13 - 14:32 CDT 400' (8.5 cm res)	
	9/11 - 10:36 CDT 400' (8.5 cm res)	
	9/10 - 15:10 CDT 400' (8.5 cm res)	
	8/19 - 12:00 CDT 400' (8.5 cm res)	

# Drone Flights

- E/2 of SW/4 SECTION 20 - CORN

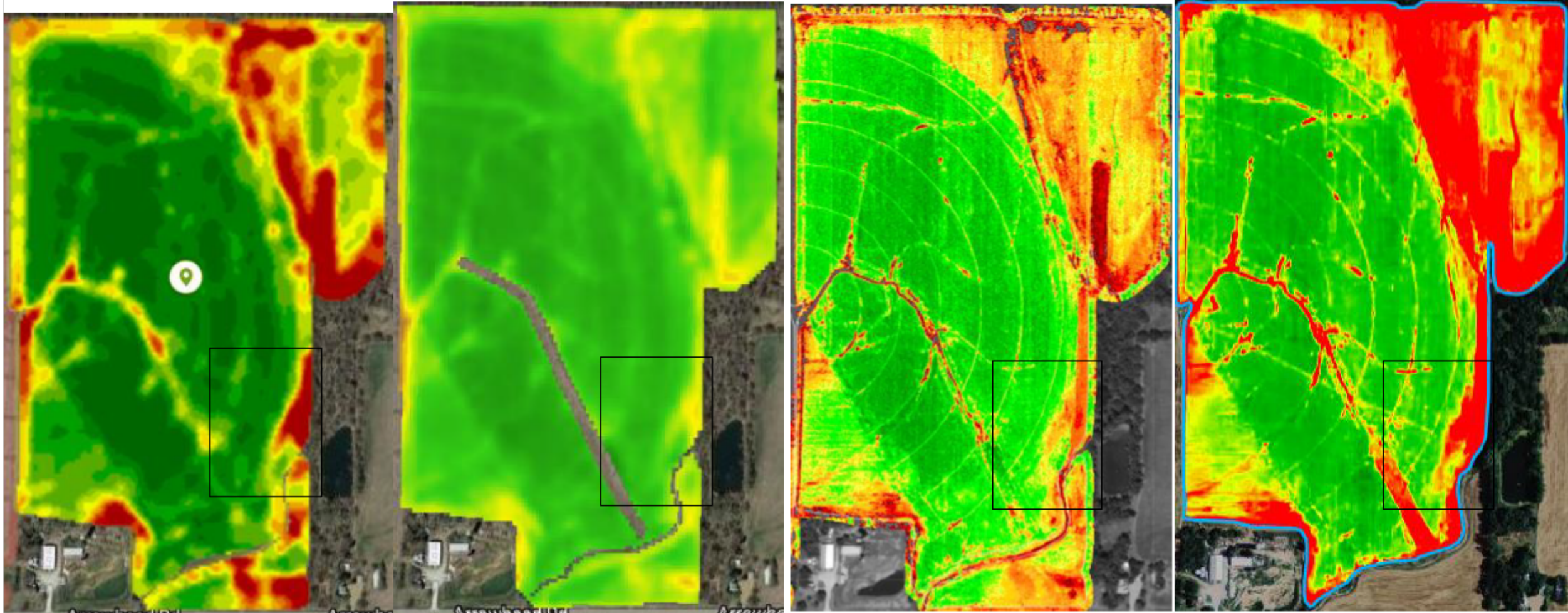


# TerrAvion – fixed wing flyovers





# Imagery comparison = R7, ClimateView, Terravion, American Robotics



R7  
7/19/2019

Climate  
7/19/2019

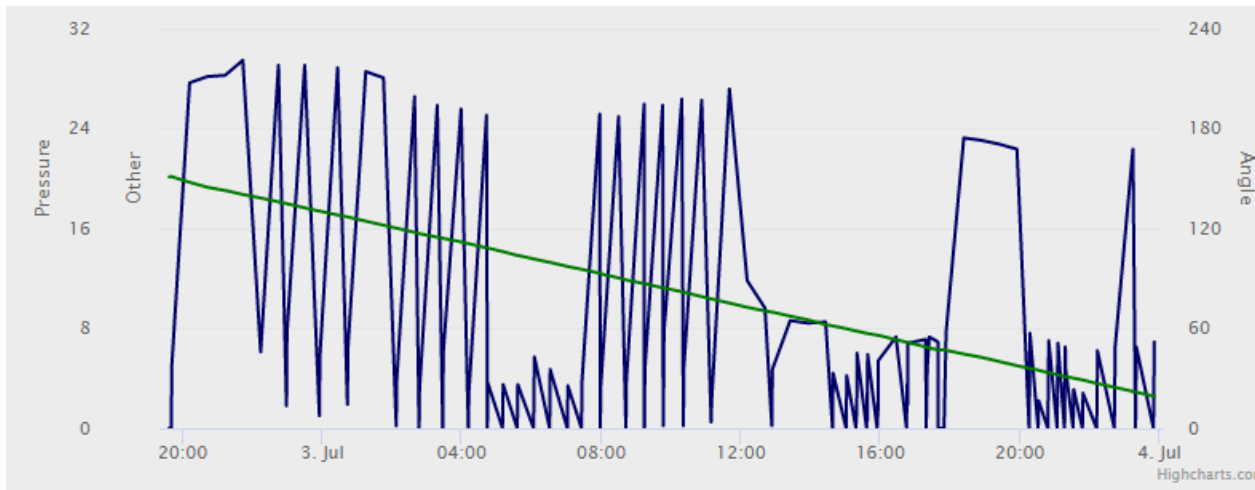
Terravion  
7/18/2019

American Robotics  
7/16/2019



# AgSense

Time	Bat	Pres (psi)	Angle
08/17/19 07:42:50	4.21	21.9	222.3
08/17/19 07:12:15	4.21	21.6	224.7
08/17/19 06:41:44	4.2	21.6	227.8
08/17/19 06:11:08	4.2	21.6	230.5
08/17/19 05:40:35	4.21	21.9	233.5
08/17/19 05:10:13	4.21	22.1	236.2
08/17/19 04:39:37	4.21	22.2	239.1
08/17/19 04:09:11	4.2	22.3	241.9
	4.1	22.2	244.9
	4.1	22.1	248
	4.1	22.1	250.7



### Pivot Info

Last Reading: 08/17/2019 07:42:50  
 Current Cycle: 1 d, 21 h, 52 m  
 Full Revolution: 42 h, 21 m  
 Remaining Revolution: 2 h, 10 m  
 Est. Gallons Used YTD: 8876850  
 Yearly Allotment: 0  
 Est. Acre Inches YTD: 3.34

Refresh

Last 2 Commands

Command	Time	Ack
Stop	07/22/19 16:37:01	Yes
Stop	07/21/19 21:32:56	Yes

Timed Commands - [Clear All](#)

Command	Trigger Time

222.3°

30%

21.9psi

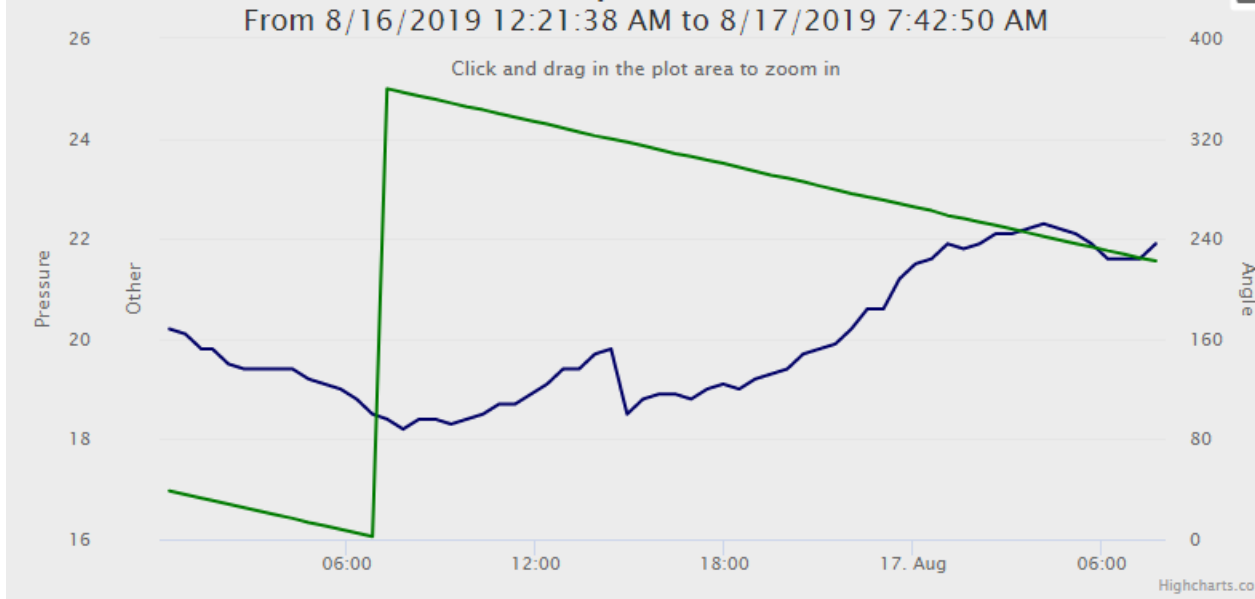
WAAS

18

4.21

Battery
  Pressure
  Angle
  Signal Strength

1 day   2 days   1 week   1 month
 From: 07/02/2019 To: 07/03/2019
Go Back Forward Current



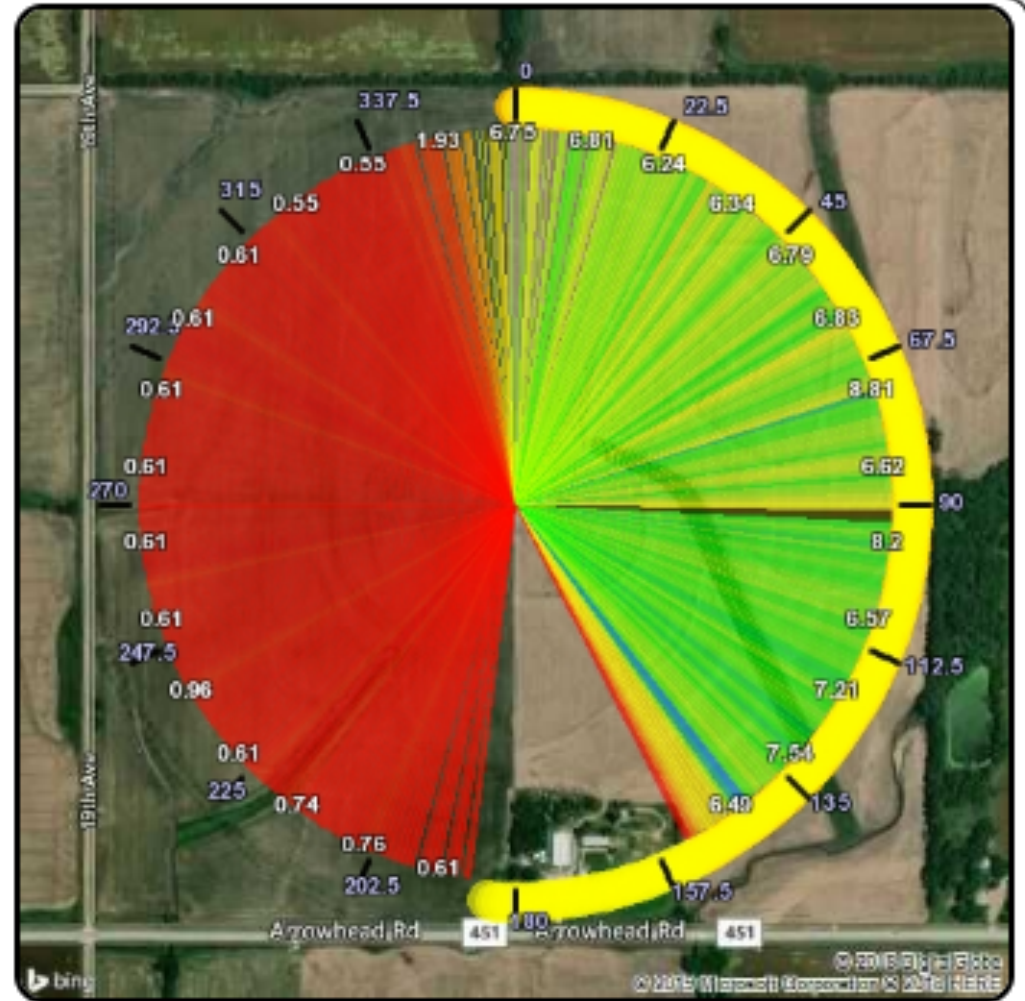
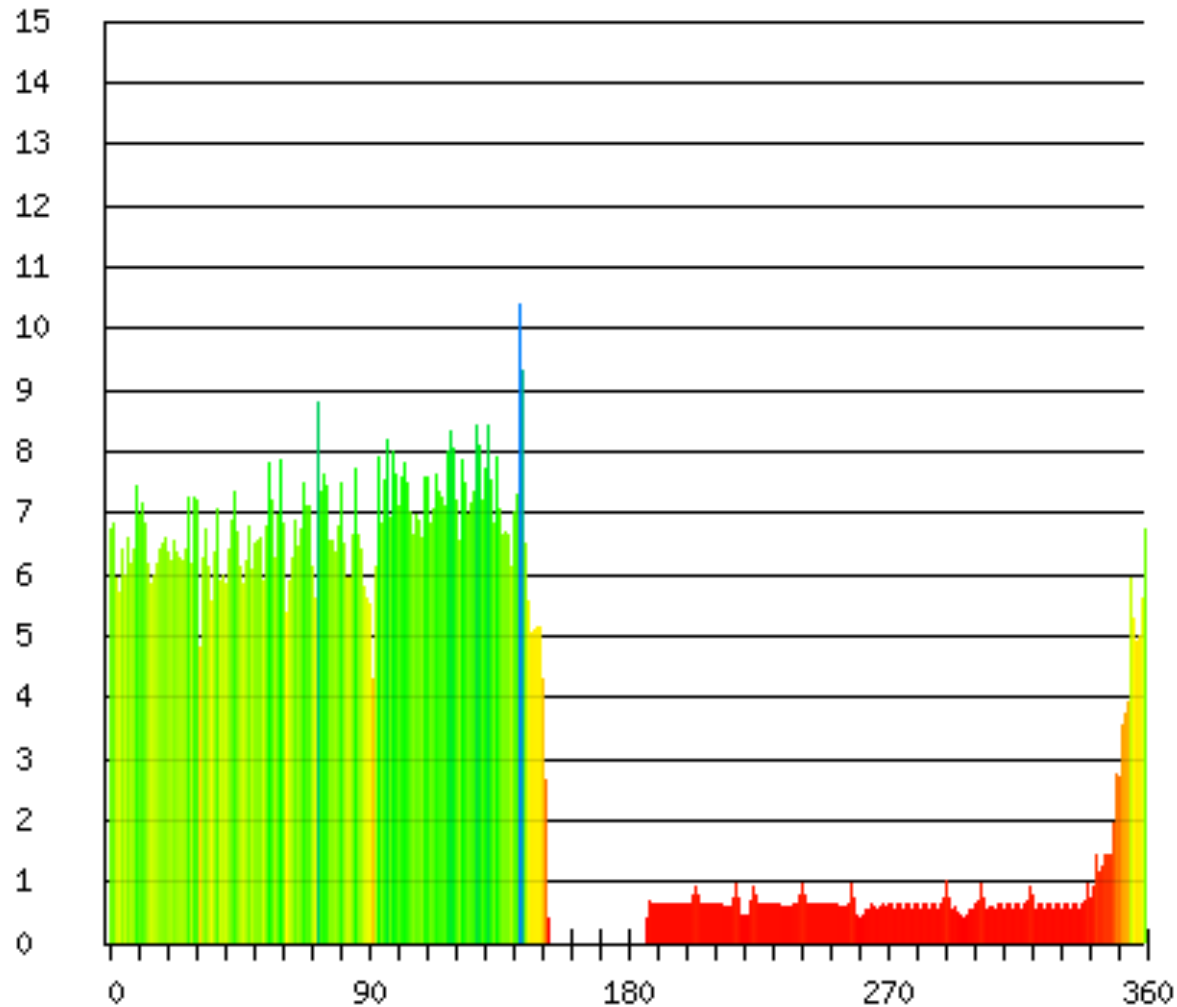
Battery
  Pressure
  Angle
  Signal Strength

1 day   2 days   1 week   1 month
 From: 08/16/2019 To: 08/17/2019
Go Back Forward Current

# AgSense

May 16, 2019 12:00 AM - Aug 20, 2019 11:59 PM - Report Type: Inches Applied by Angle

## Inches Applied by Angle



Total Inches Applied