



H2-Oh! Keeping Farms and Families Thriving for Generations

Ray & Ryan Flickner



# Flickner Innovation Farm

[https://www.kcare.k-state.edu/wrip/flickner/Flickner\\_Farm.html](https://www.kcare.k-state.edu/wrip/flickner/Flickner_Farm.html)

Overview

Facebook



# What is our WHY?

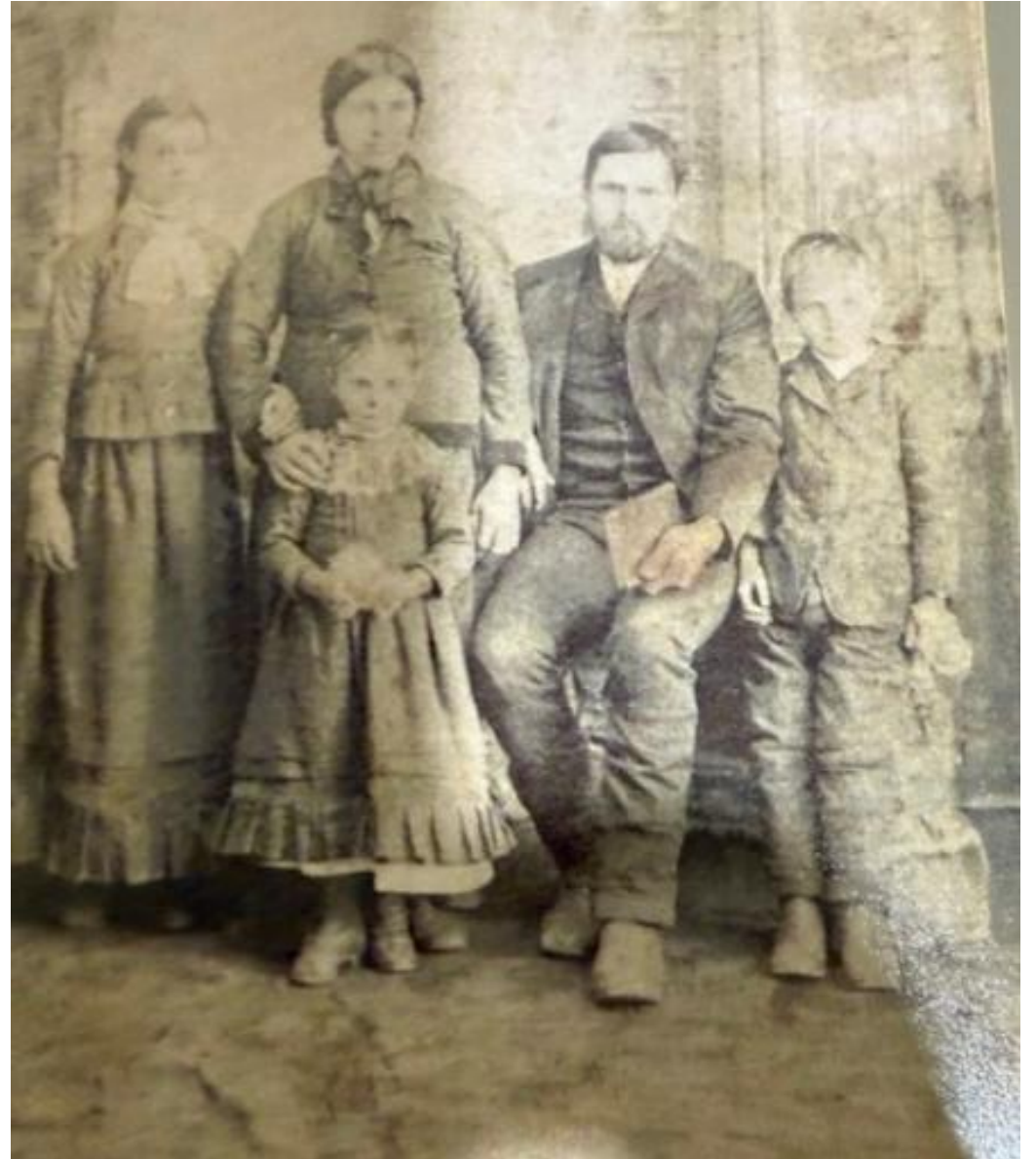
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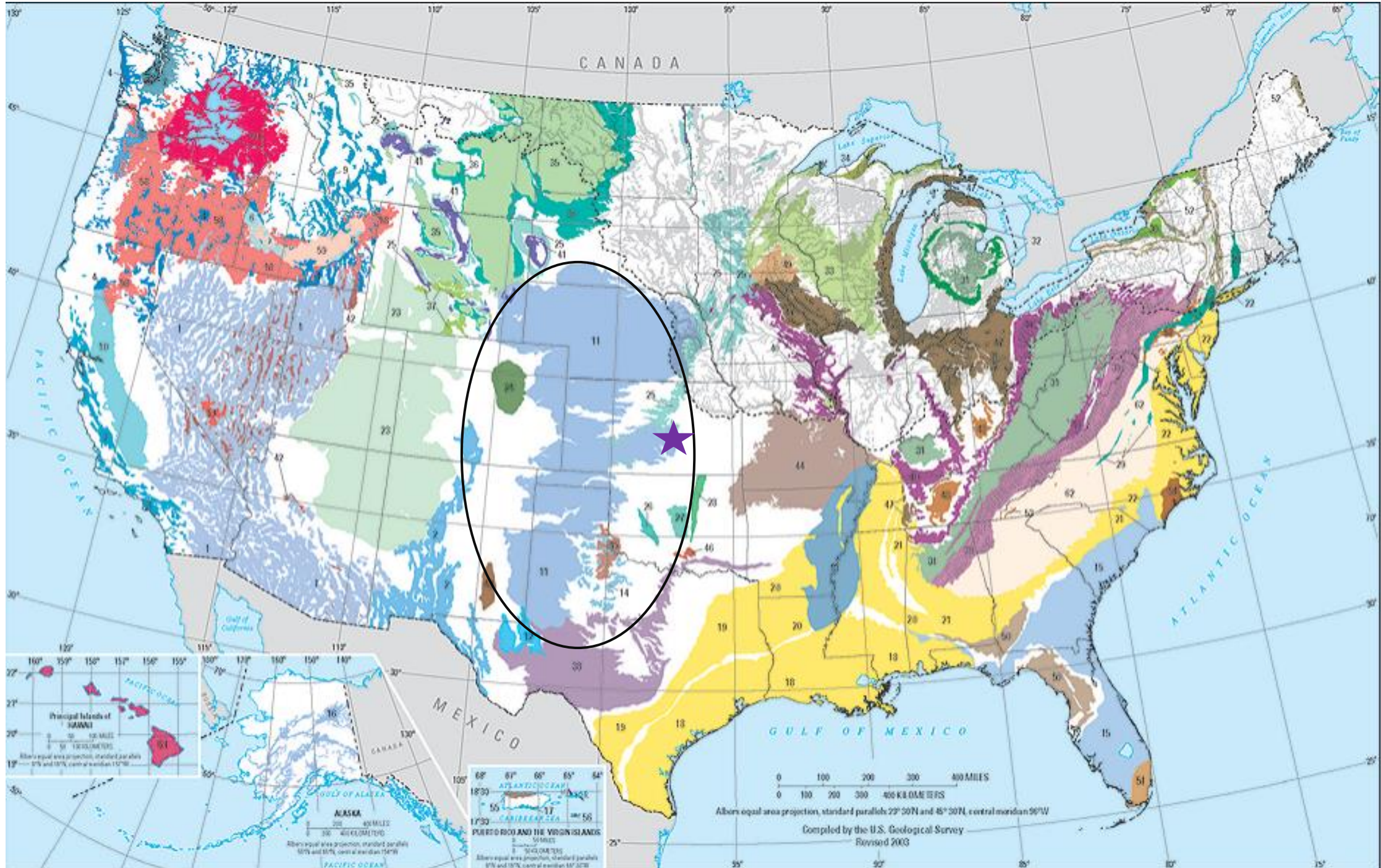
- Generational knowledge
  - Entrusted with valuable limited resources
- 
- WATER
  - SOIL
  - WILDLIFE
  - FINANCIAL
  - SELF



# Food security is national security

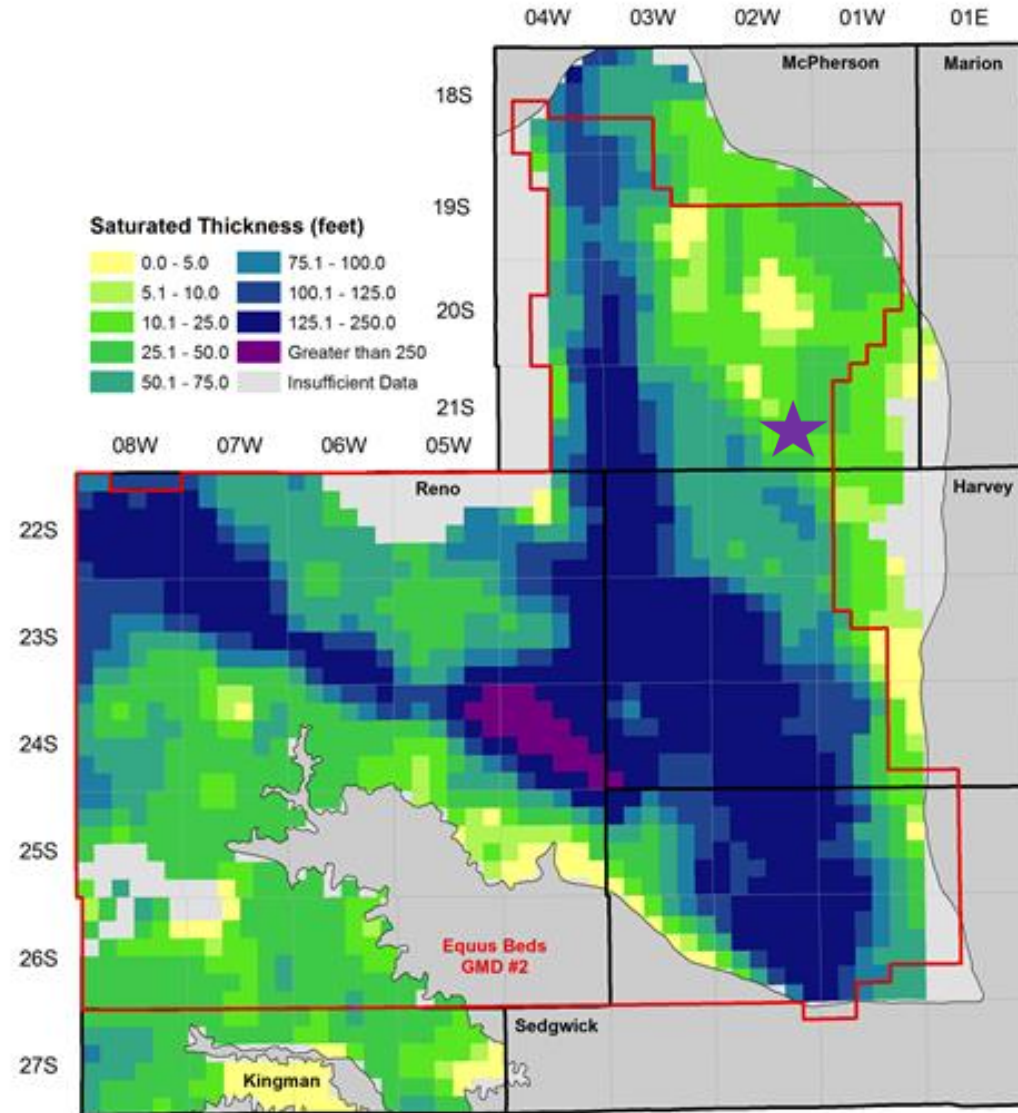
- What can I do to **make the best use** of our limited resources?
- What steps can I take to **leave this farm better** than when I started?
- How can I **help those around me** develop and improve?
  - *Family*
  - *Peers*
  - *Students*
  - *Community*



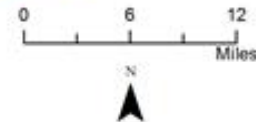
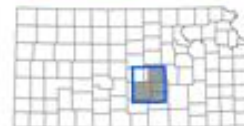


# Average Saturated Thickness by Section near GMD No. 2

Average 2014-2016 saturated thickness in the High Plains Aquifer, data provided by the Kansas Geological Survey



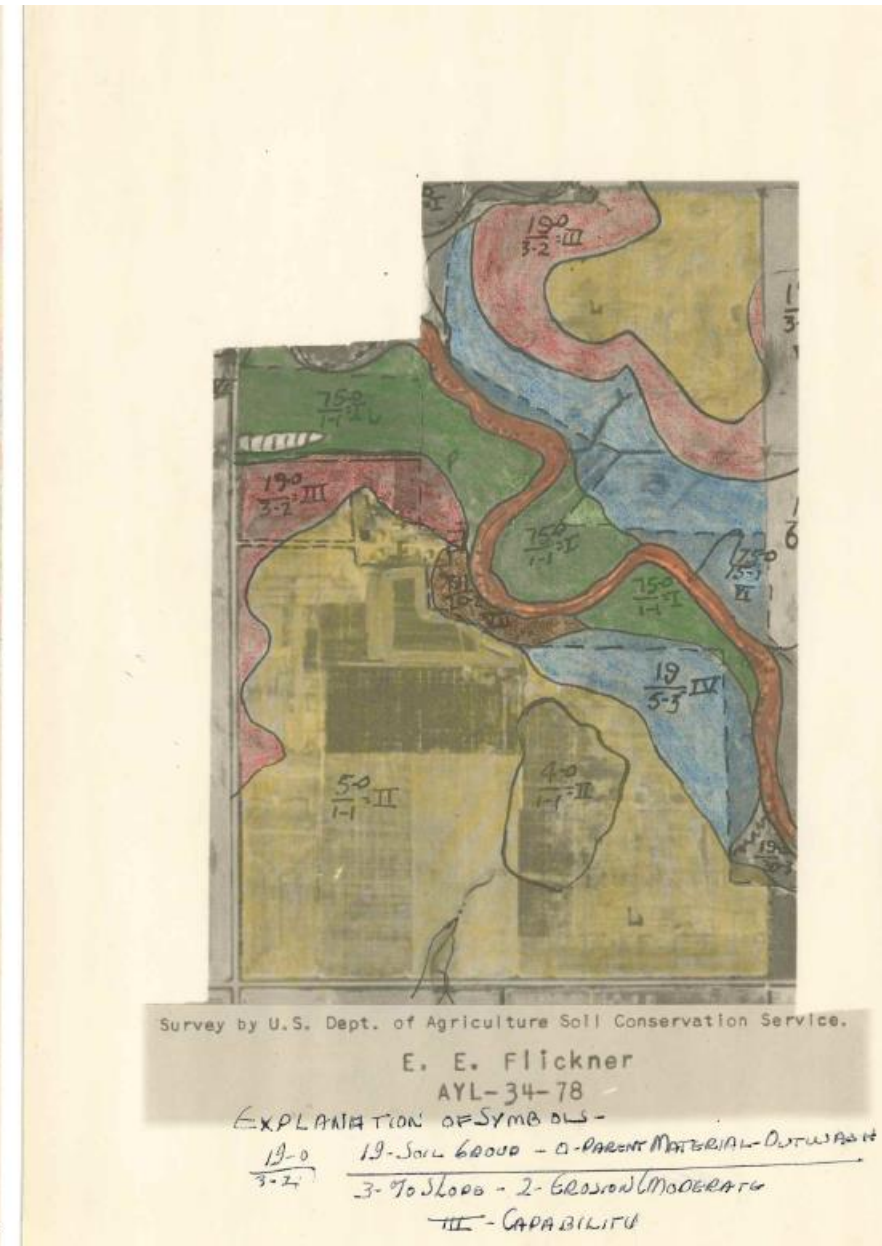
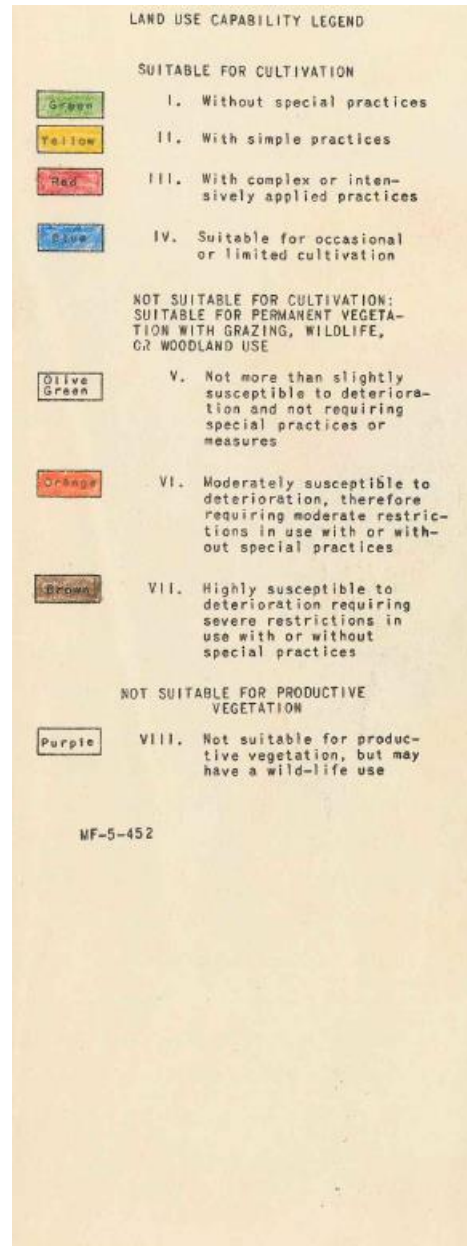
Thinnest well = 30 feet  
Thickest well = 80 feet



Kansas Department of Agriculture  
Division of Water Resources  
Data: Kansas Geological Survey  
July 10, 2017



December 1955



1946 McPherson County Soil Conservation District Farmer-District Cooperative Agreement Map

# Flickner Innovation Farm

2.75 miles west of Moundridge, Kansas on Arrowhead Avenue

[https://www.kcare.k-state.edu/wrip/flickner/Flickner\\_Farm.html](https://www.kcare.k-state.edu/wrip/flickner/Flickner_Farm.html)

32,552 – 1979  
40,699 – 1992

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

4,894 – 1955

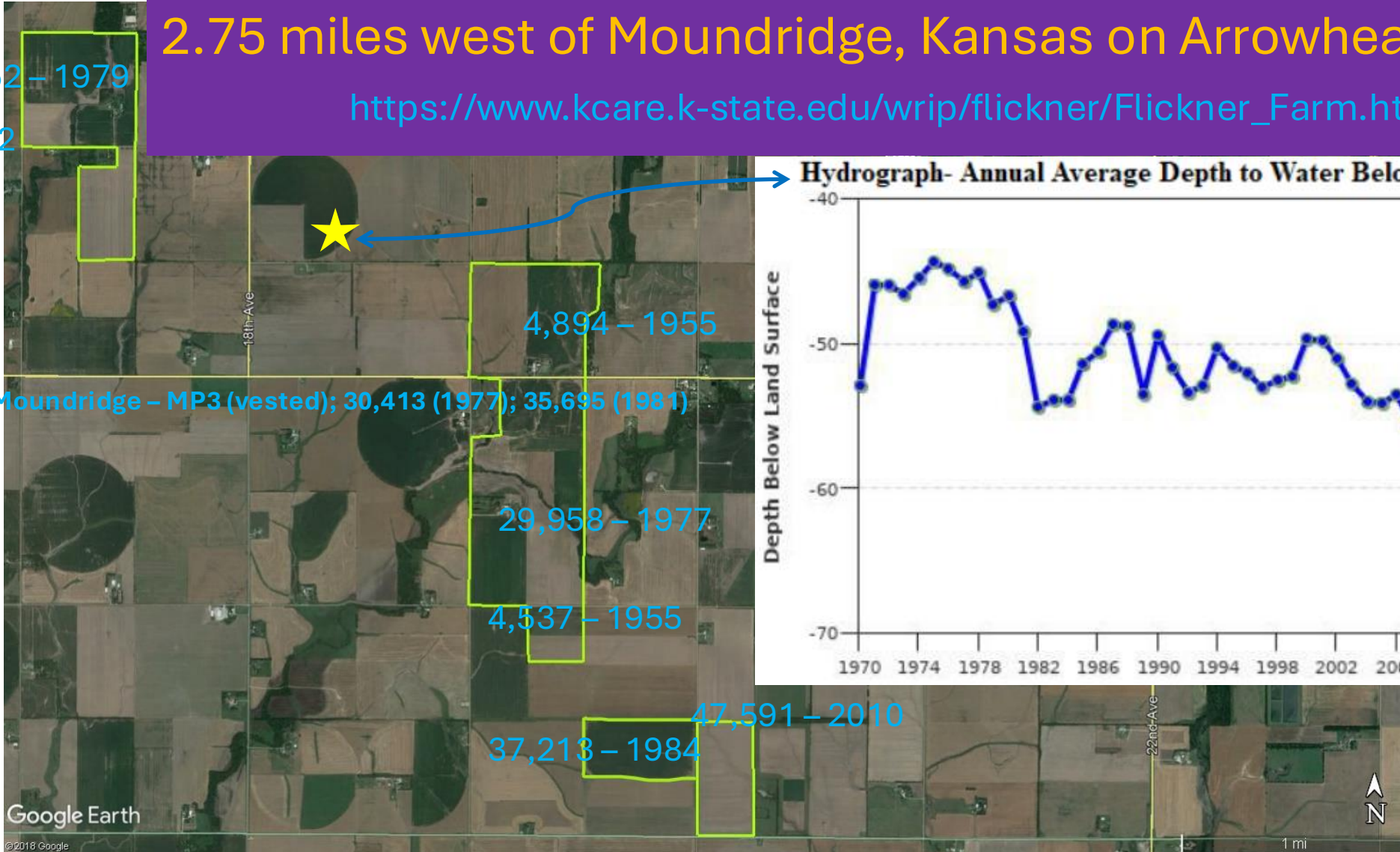
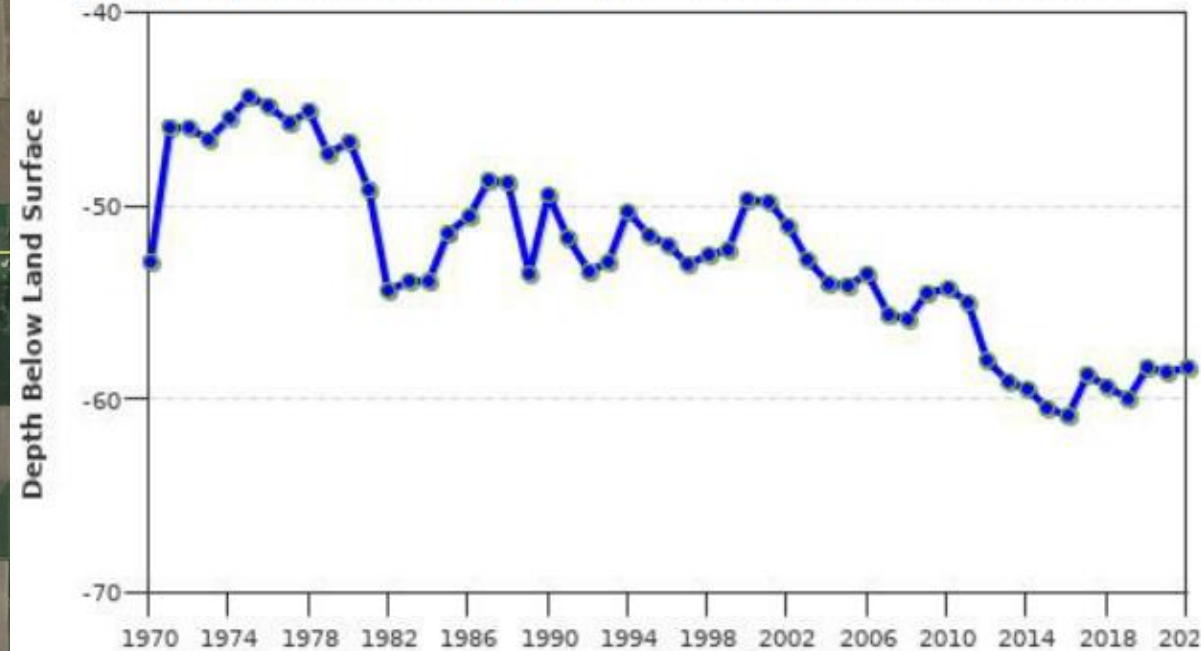
29,958 – 1977

4,537 – 1955

47,591 – 2010

37,213 – 1984

Hydrograph- Annual Average Depth to Water Below Land Surface



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

3 span Valley collapsed July 2024. 2025 = ~140 acres will be irrigated with a 360 RAIN

Rotor 4 span pivot; 33 acres

SDI on 40" installed **2020**; 23 acres

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

SDI installed **2010**; 40 acres

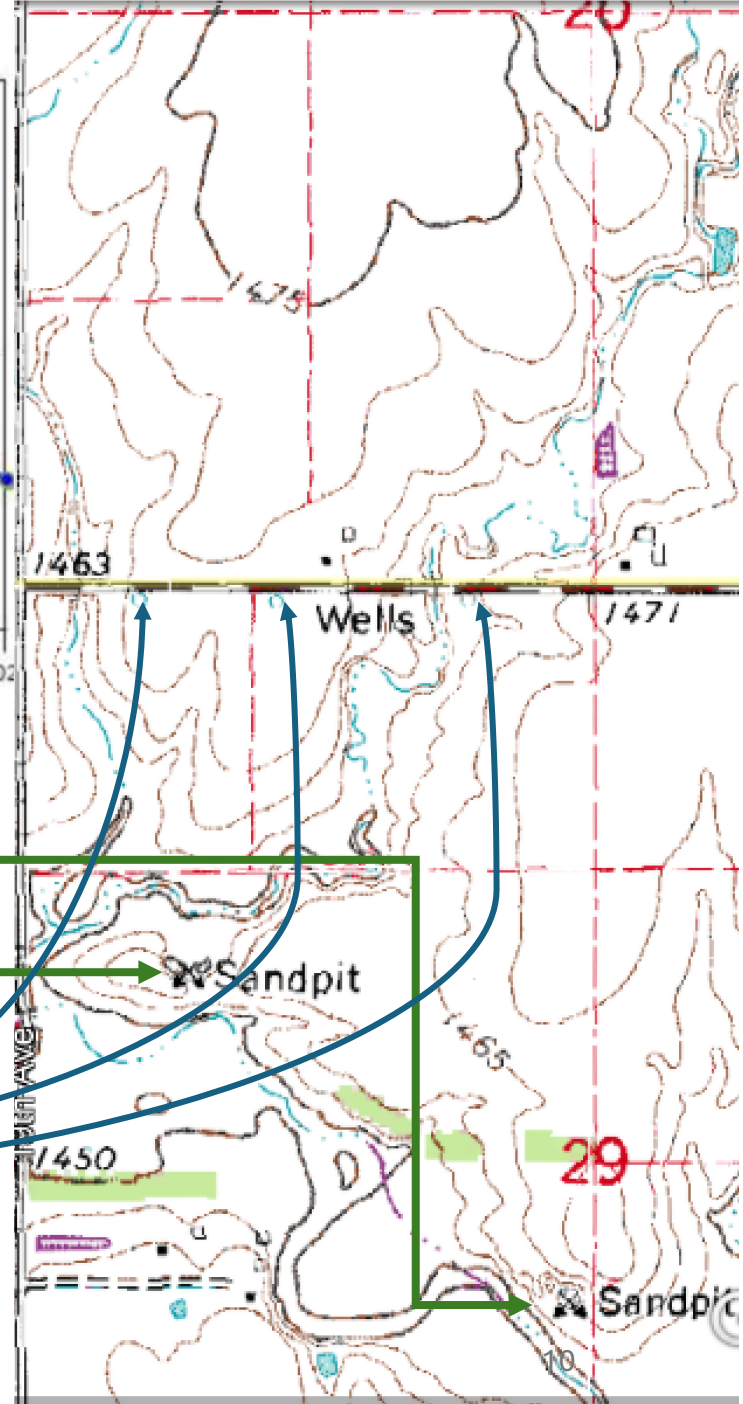
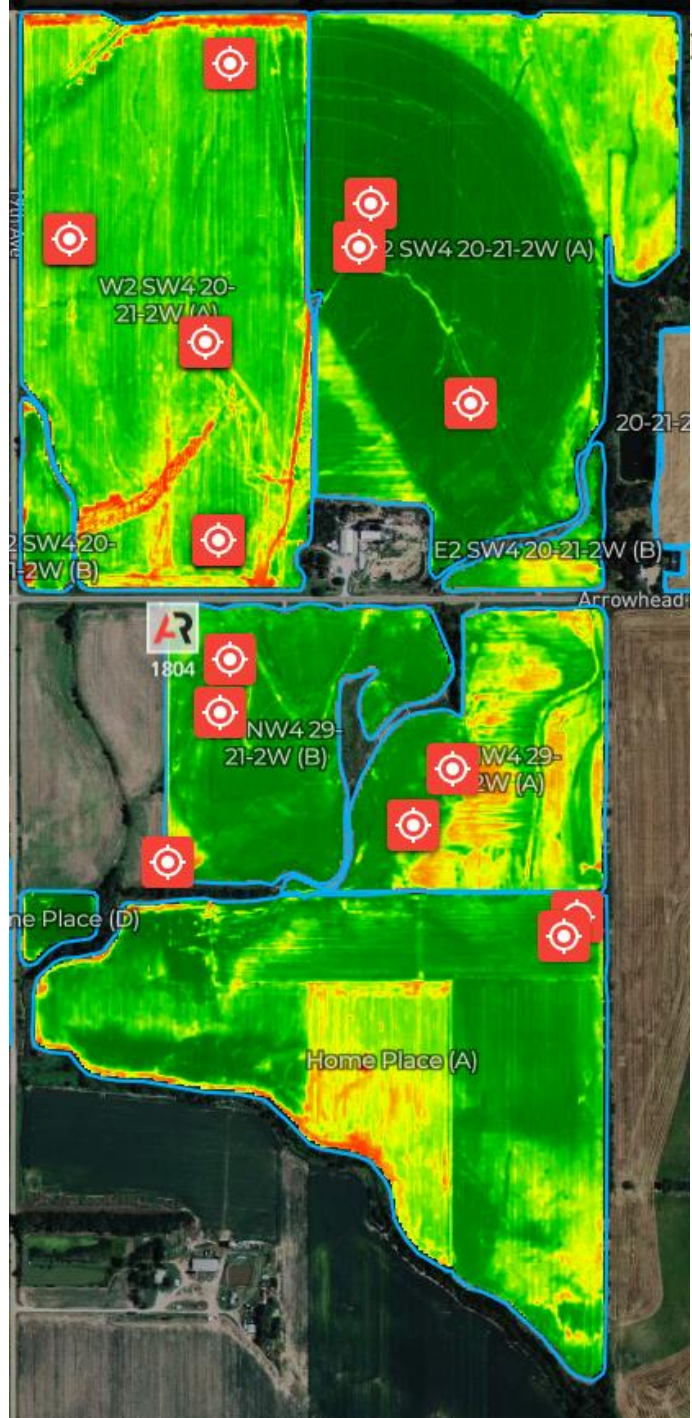
SDI installed **2006**; 80 acres; 650gpm

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

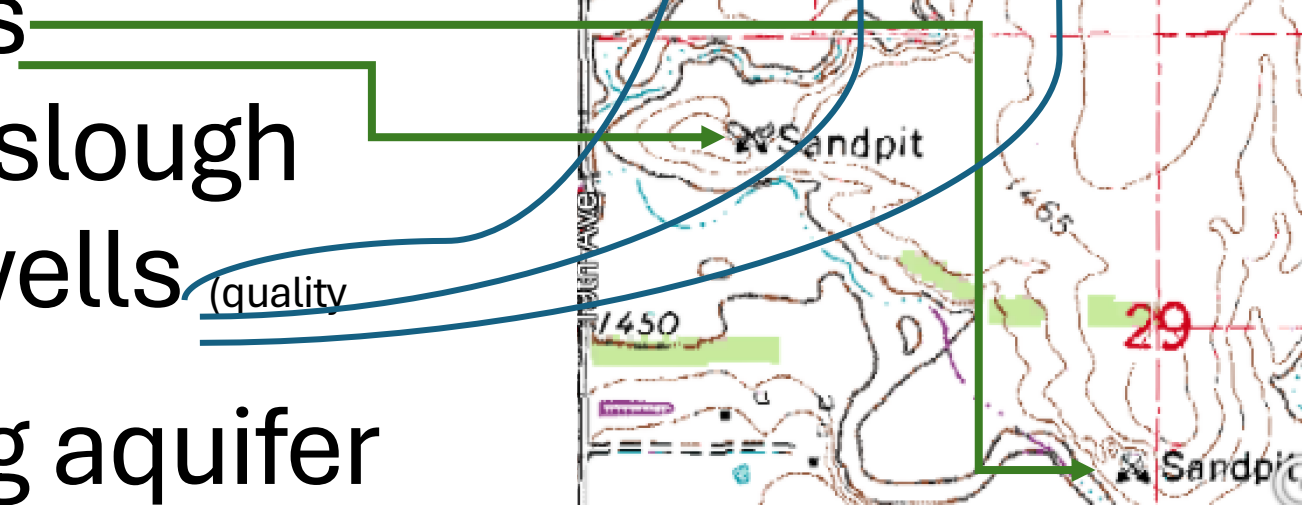
Hydrograph- Annual Average Depth to Water Below Land Surface



# What are we dealing with?

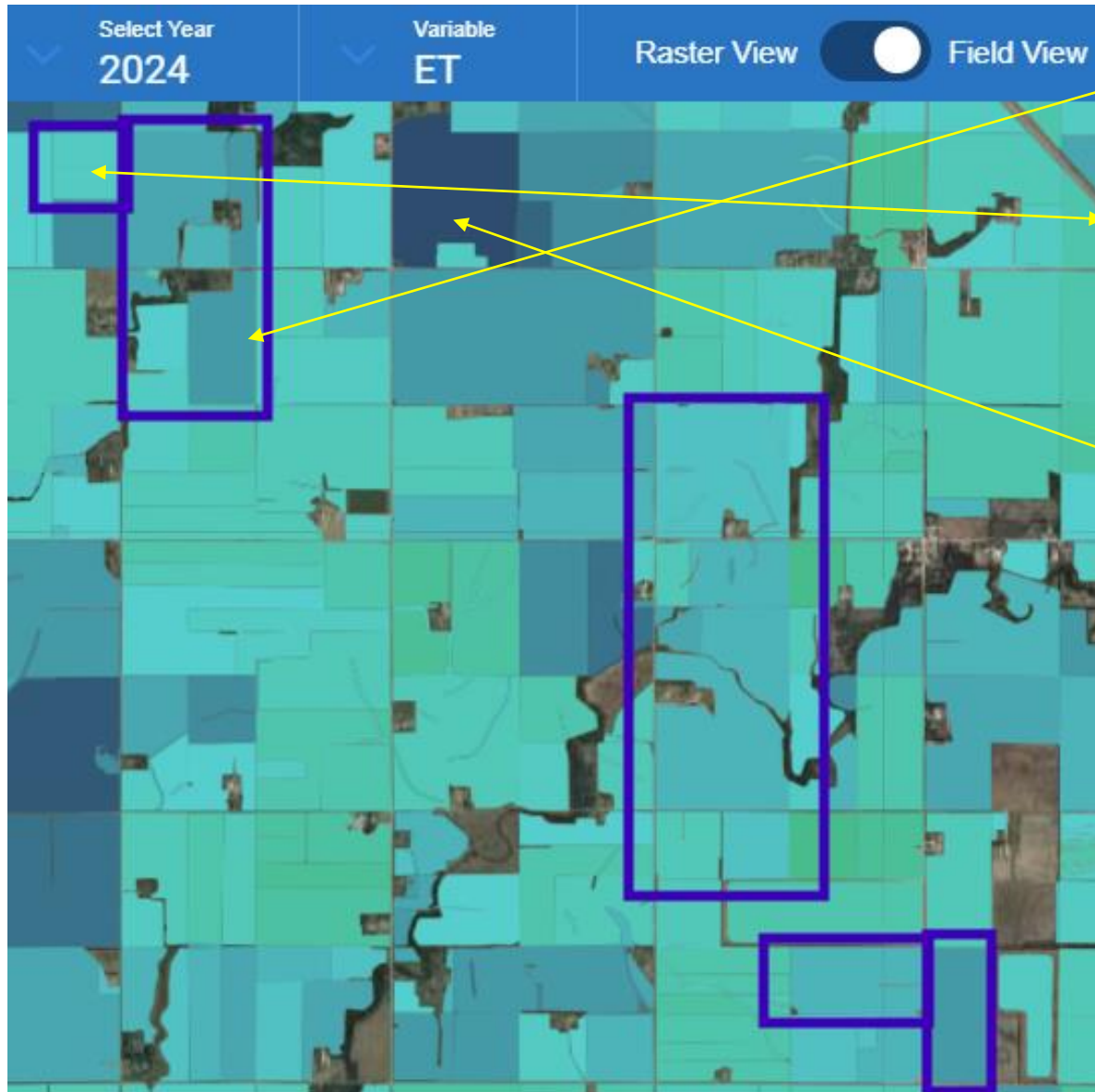


- Topography (>25' change)
- Sand pits
- Creek & slough
- 3 muni wells (quality concerns)
- Declining aquifer



# OpenET

- Blue colors = irrigated
- Green colors = dryland



Jonas South (corn = 255bpa)  
Water duty = 26bu/in of irr

2024 ET: 33 in

71.33 Acres

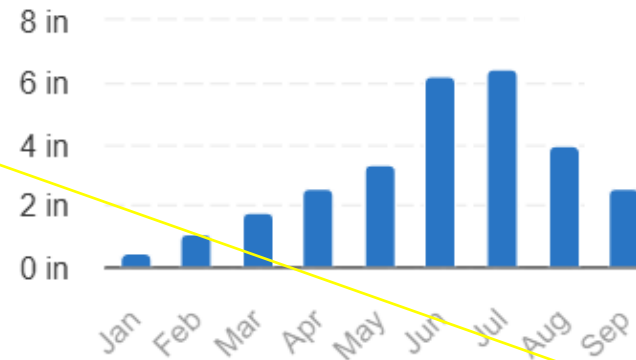
USDA/CDWR Crop Type: Soybeans



2024 ET: 29 in

20.14 Acres

USDA/CDWR Crop Type: Winter Wheat



Krehbiel 40 [dryland] (corn = 50bpa)  
Water duty = 6bu/in of rain

2024 ET: 40 in

144.70 Acres

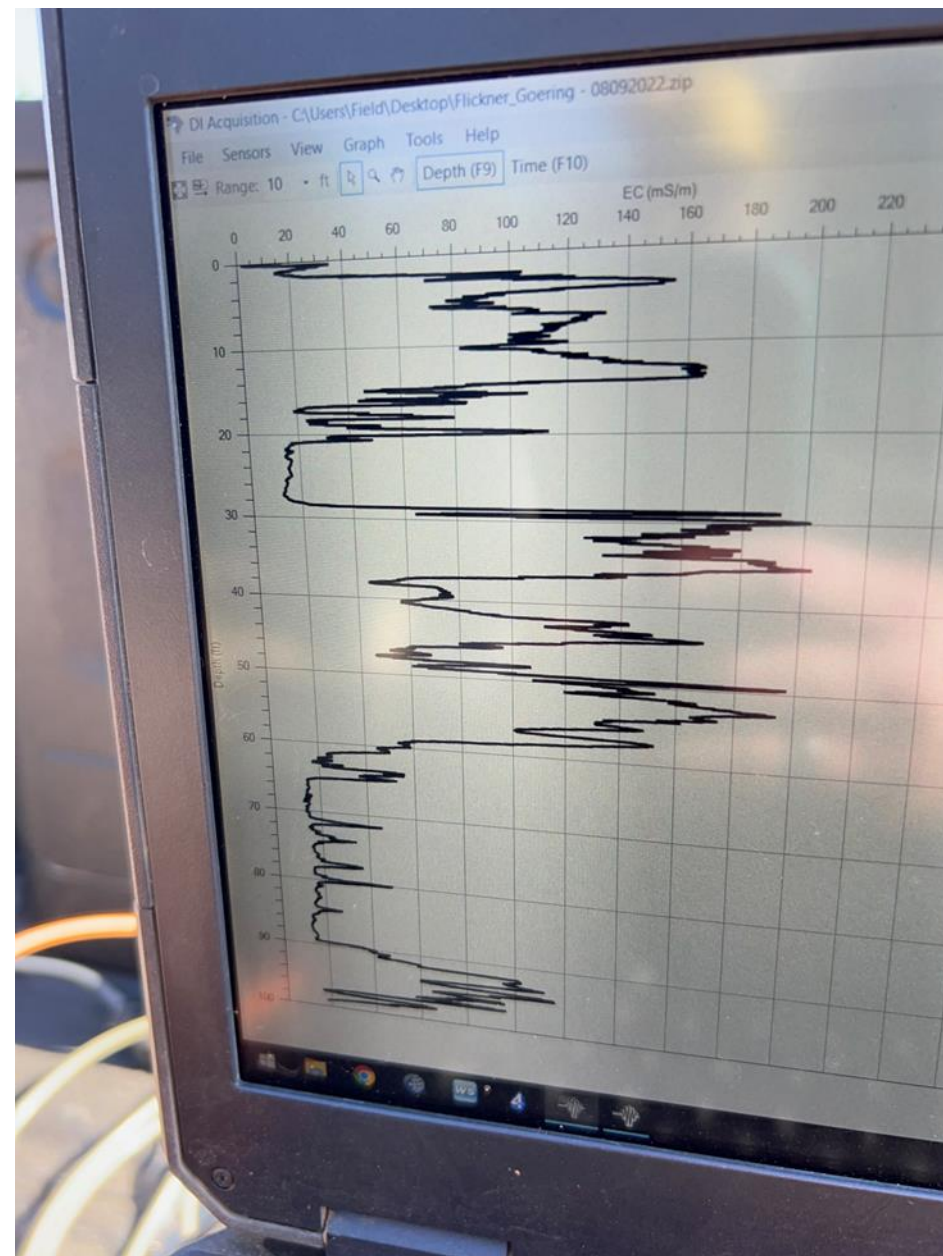
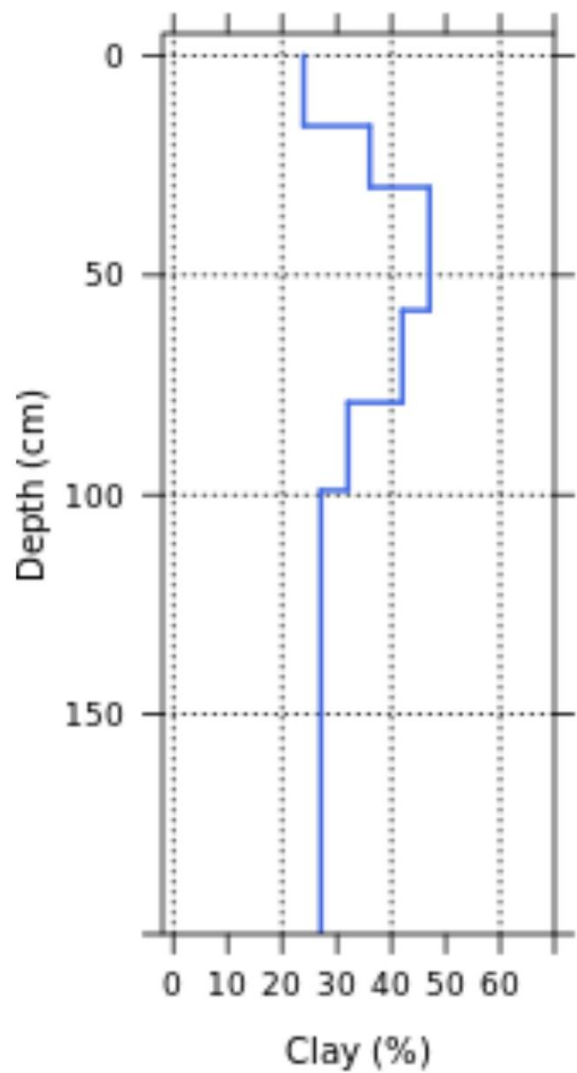
USDA/CDWR Crop Type: Corn



Highest ET in the neighborhood.  
Corn. BPA = unknown.

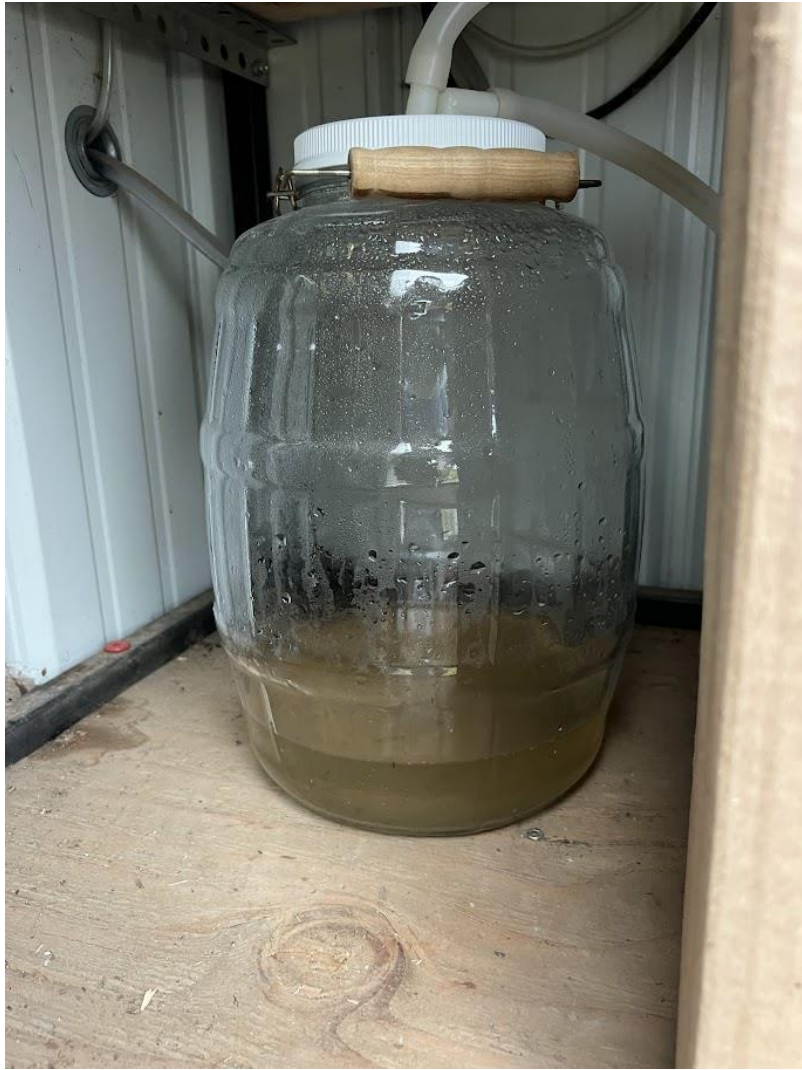
# Crete

[Series Extent Explorer](#) | [Description](#)

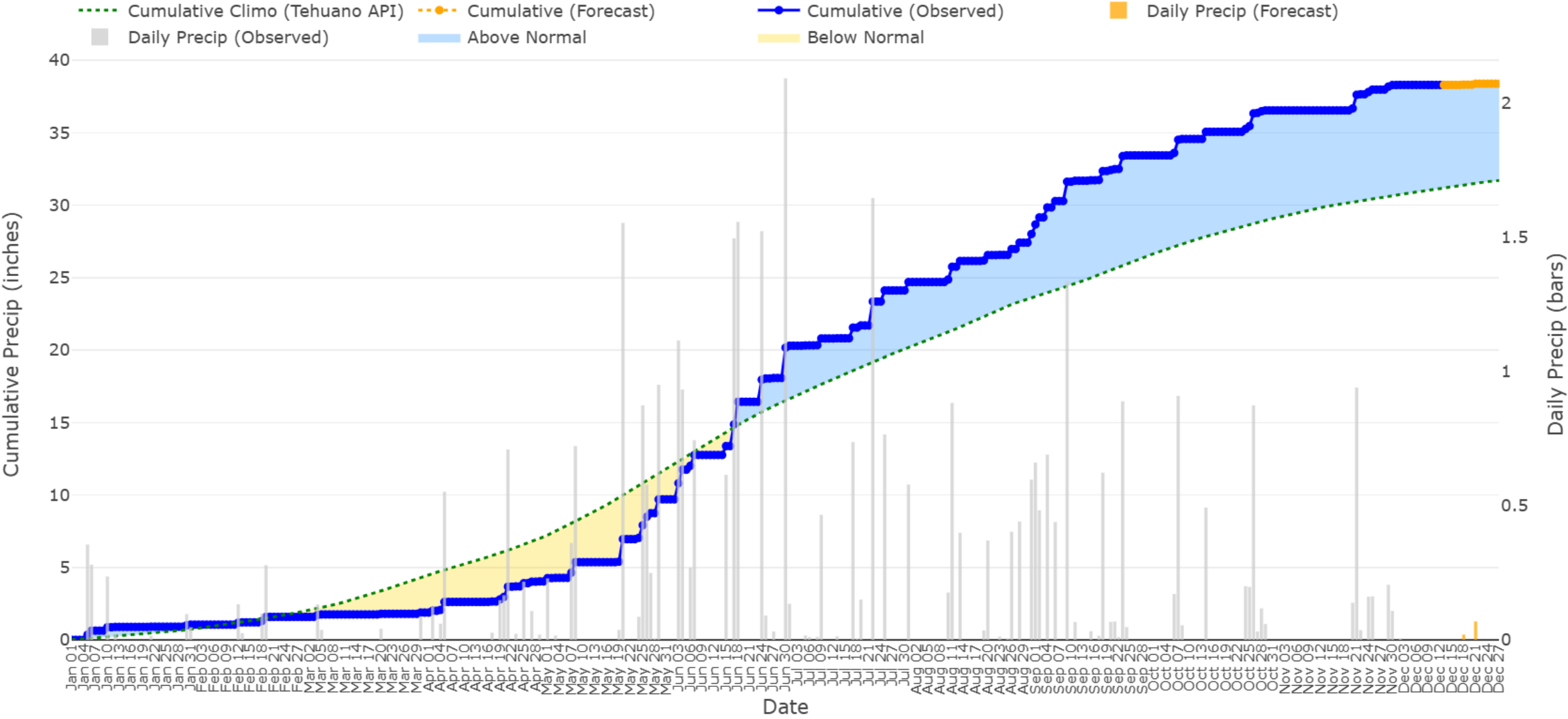


Sample Name	EC	pH	NH4-N	No3-n	Na	date Analyzed	Water Right#	Date	
								collected	WR#
Home South	0.5	7.19	<0.01	7.52	21.49	6/18/2020	4537	6/15/2020	4537
Home South	0.44	7.15	<0.01	6.88	21.17	7/24/2020	4537	7/21/2020	
Dave	0.6	7.3	<0.01	7	28.41	6/18/2020	4894	6/15/2020	4894
Dave	0.67	7.27	0.02	8.65	33.51	9/19/2020	4894	9/16/2020	
Home Yard									
White bottle	0.56	7.9	<0.01	18	27.72	6/18/2020	29958	5/20/2020	29958
Home Yard									
Nalgene	0.52	7.48	0.54	9.2	22.58	6/18/2020	29958	6/15/2020	
Home Yard	0.5	7.37	0.33	7.89	24.82	7/24/2020	29958	7/21/2020	
Home Yard	0.56	7.06	0.01	9.01	26.23	9/19/2020	29958	9/16/2020	
Jonas Yard	0.7	7.11	<0.01	8.42	23.45	6/18/2020	32552	6/15/2020	32552
Jonas Yard	0.67	7.25	0.02	7.94	26.2	8/13/2020	32552	7/30/2020	
Jonas Yard	0.74	7.18	0.03	9.03	27.97	9/19/2020	32552	9/16/2020	
Kirby	0.85	7.2	<0.01	3.68	40.79	6/18/2020	37027	6/15/2020	37027
Kirby	0.78	7.28	0.01	4.3	45.76	8/13/2020	37027	8/6/2020	
Kirby	0.88	7.25	0.02	4.21	47.77	9/19/2020	37027	9/16/2020	
Gringo	1440	7.46		28.4		2/22/2006	37213		
Gringo	1400	7.3		19.3		7/12/2019	37213	7/11/2019	37213
Gringo	1.28	7.25	0.39	20.58	92.51	7/24/2020	37213	7/18/2020	
Gringo	0.71	7.22	0.01	7.57	34.34	9/19/2020	37213	9/16/2020	
Jonas West	0.66	7.17	0.06	3.92	23.65	7/1/2020	40699	6/29/2020	40699
Jonas West	0.61	7.38	0.01	3.96	26.17	7/24/2020	40699	7/21/2020	
Jonas West	0.68	7.24	0.02	4.02	25.68	9/19/2020	40699	9/16/2020	
Lone Elm	524	7.28		1.6		12/12/2014	47591	12/8/2014	47591
Lone Elm	0.46	7.18	0.01	2.31	21.17	7/1/2020	47591	7/1/2020	
Lone Elm	0.55	7.35	0.01	3.08	20.89	8/13/2020	47591	7/30/2020	
House	0.51	7.23	<0.01	4.42	18.66	7/1/2020		7/1/2020	Domestic

Date	City Well nitrate					Well # 10	Well # 13	POE	
	Well # 8	Well # 9	Well # 12	POE	Lab				
5/23/2016				1.6	KDHE			6	KDHE
8/30/2016	13.9				SDK				
8/30/2016				1.8	SDK				
8/30/2016		7.84			SDK				
8/30/2016			1.91		SDK				
8/29/2016					SDK	5.68			SDK
8/29/2016					SDK		3.1		SDK
8/29/2016					SDK			6.48	SDK
5/22/2017	14.00				SDK				
5/22/2017				10.2	SDK				
5/22/2017		5.77			SDK				
5/22/2017			2.07		SDK				
5/22/2017					SDK	5.86			SDK
5/22/2017					SDK		2.54		SDK
5/22/2017					KDHE			2.2	KDHE
5/22/2017				9.1	KDHE				
5/22/2017					SDK			2.62	SDK
5/7/2018	12.6				SDK				
5/7/2018		19.2			SDK				
5/7/2018			2.32		SDK				
5/7/2018				9.65	SDK				
5/7/2018					SDK	7.07			SDK
5/7/2018					SDK		2.71		SDK
5/7/2018					SDK			NA	NA
5/16/2018					KDHE			2.2	KDHE
5/16/2018				6.3	KDHE				
5/21/2019				6.3	KDHE			13	
5/21/2019					KDHE			6.7	KDHE



# Year-to-Date Observed + 15-Day ECMWF Forecast Precipitation near Moundridge, Kansas 67107, United States

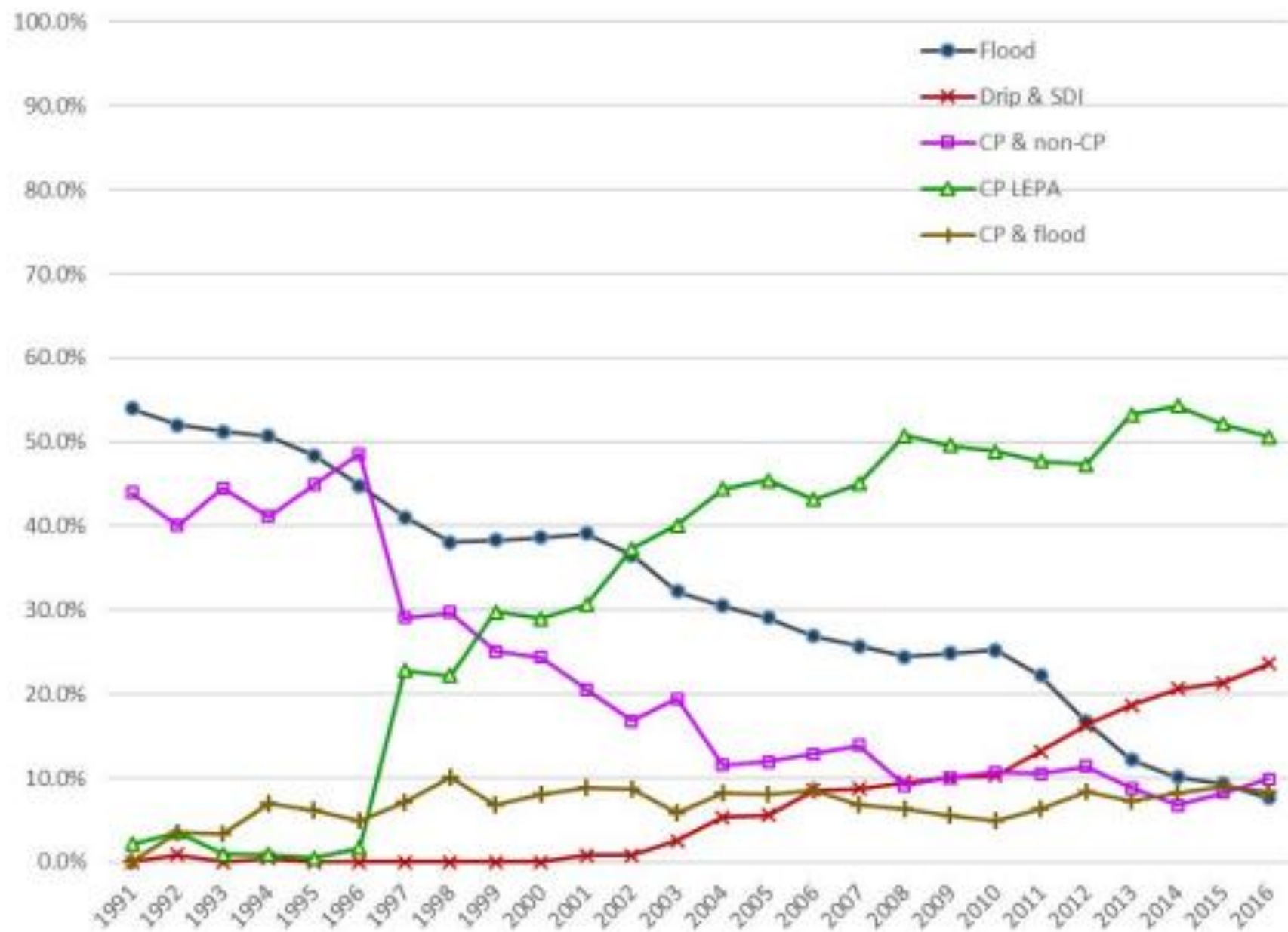




## Types of Irrigation

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





**26. Reported irrigation system types, McPherson County GMD2 model area, 1990**

# Irrigation wetting pattern

Still allows  
for rainfall  
to soak in



# SDI installation video



# SDI install pictures





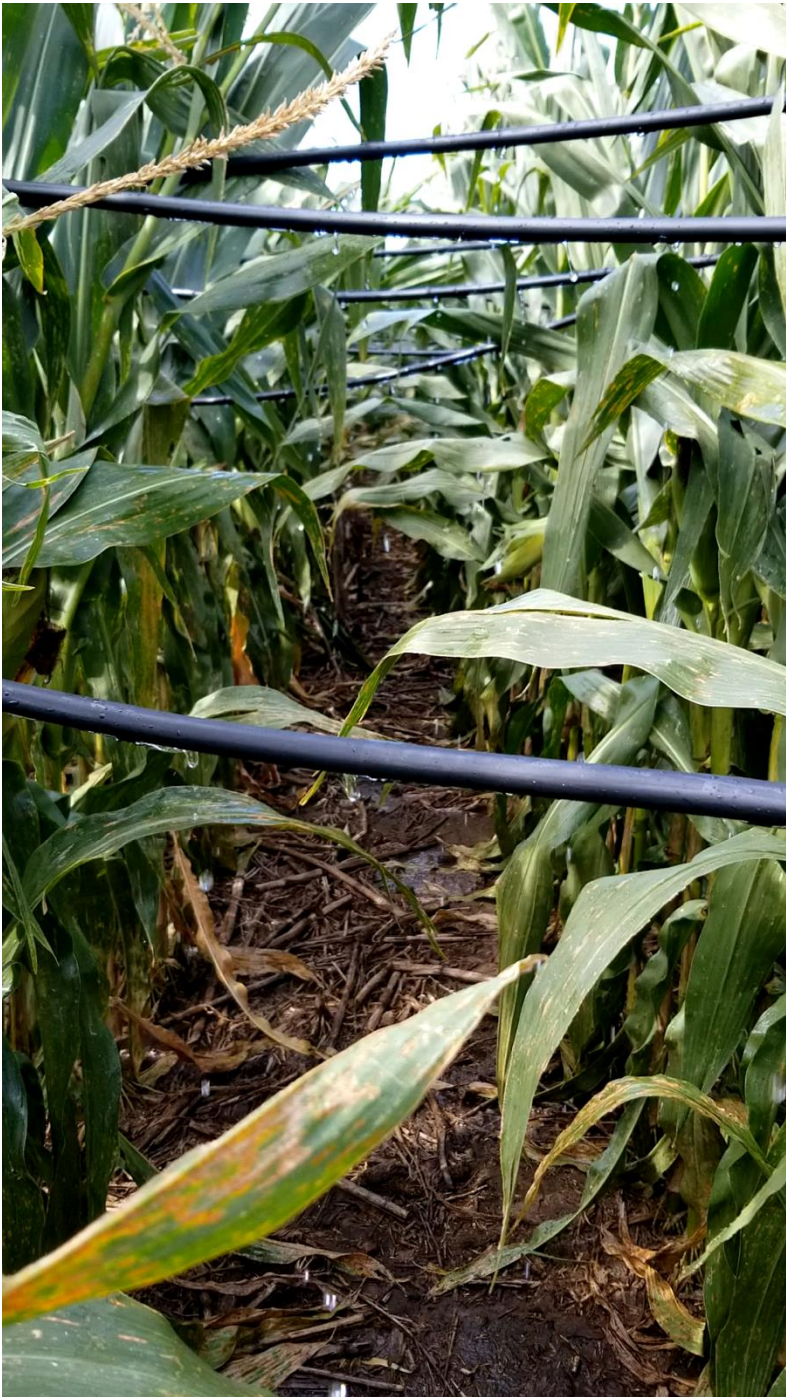
# Precision Mobile drip Irrigation (PMDI)

6 spans on 20", 1 span on 30"

Windshield wiper pivot irrigations ~123 acres

# PMDI





# PMDI in action



## 360 Rain

- Manufactured by 360 Yield Center
- 60-foot boom
- Outside 30 feet irrigate “down”
- Inside 30 feet irrigated “back”
- Chemigation port
- Low end: volume water = 130gpm
- High end: volume water = 225gpm





# Ways We Monitored Crop Stress

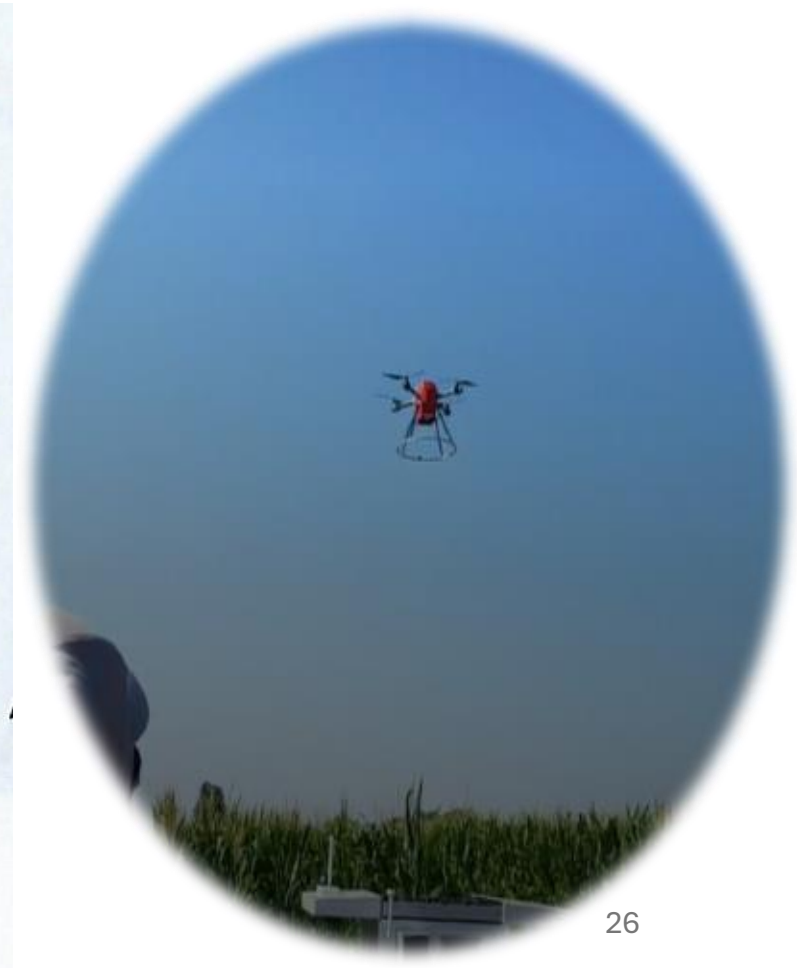
Plant Based

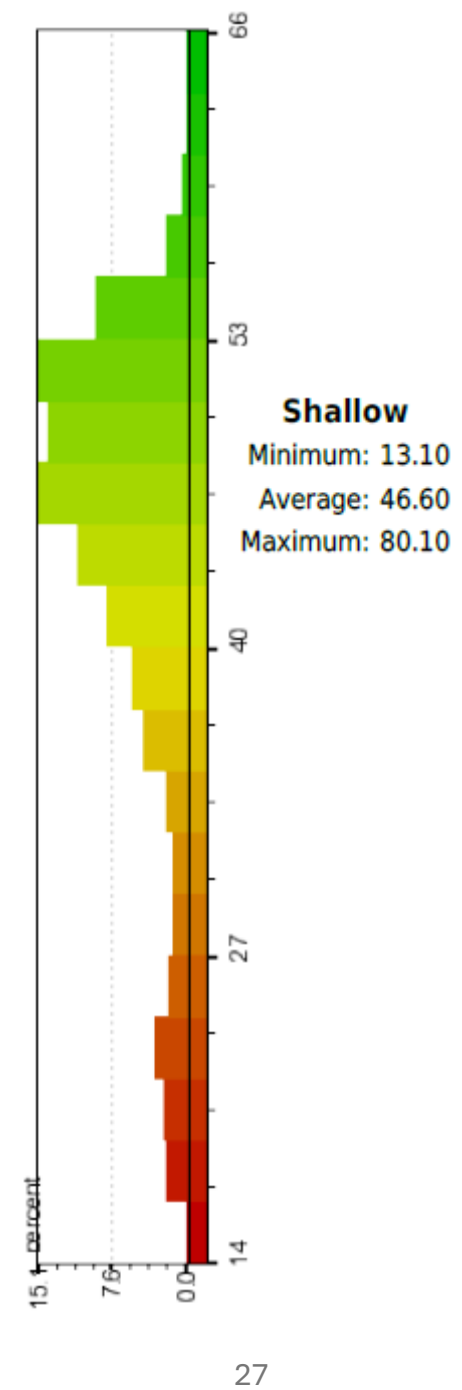
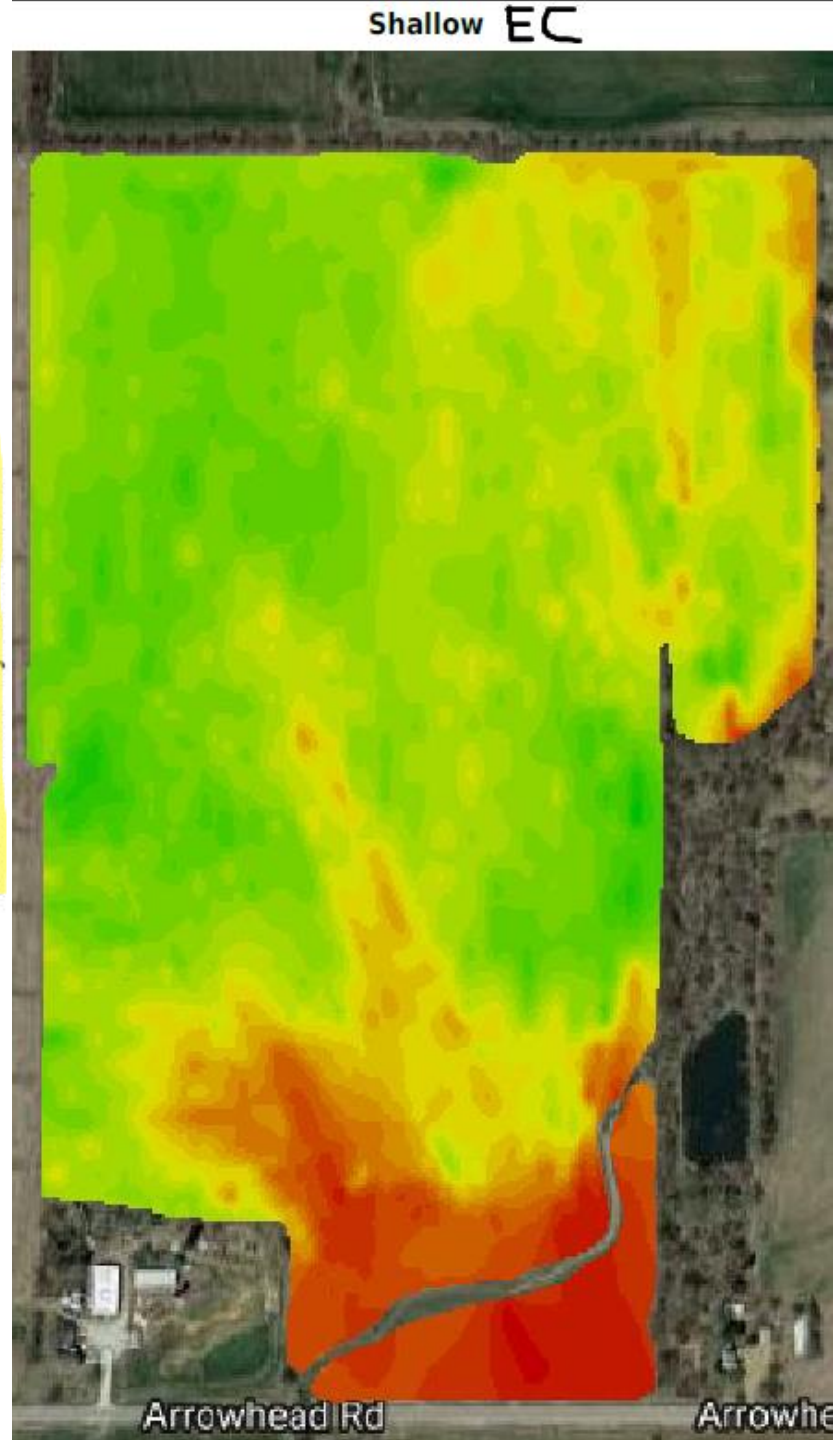
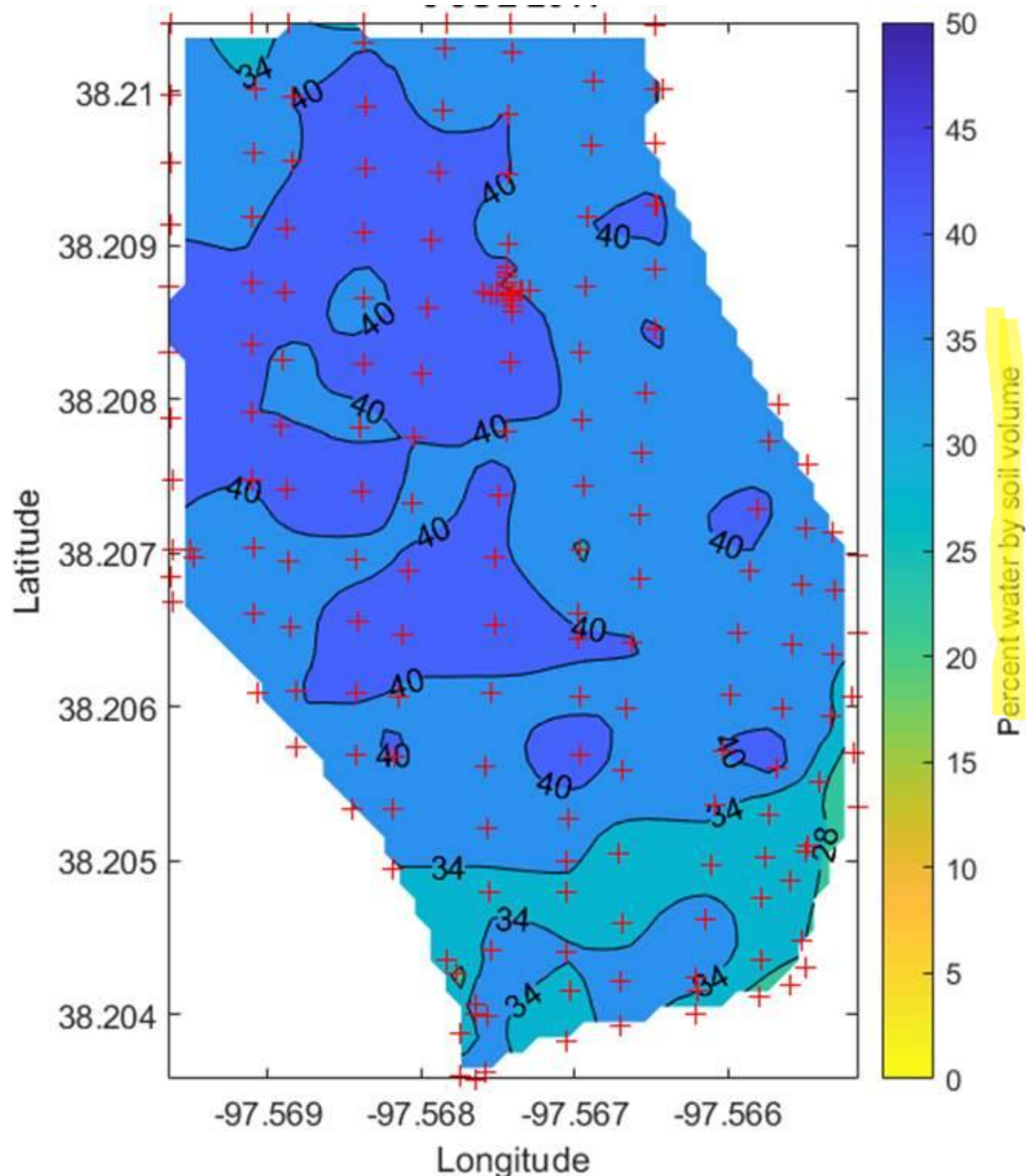


Ground Moisture



Imagery





# NASA Farm Innovation Ambassador Team (NASA FIAT)




“Bringing NASA down to earth!”

# Flickner Innovation Farm

Overview



*Live* like you will die tomorrow;



*farm* like you will live forever.

A central graphic featuring a group photo of the Flickner family. The photo is set against a blue background with white text at the top and yellow text at the bottom. The text at the top reads "Live like you will die tomorrow;" and the text at the bottom reads "farm like you will live forever." The family consists of seven people: a man in a green cap and grey shirt, a woman in a light blue jacket, an older man in a dark vest, a woman in a purple scarf, a man in a brown vest, a woman in a blue jacket, and two young boys in blue shirts. The shirts of the boys and the woman in the blue jacket have "FLICKNER FARMS" printed on them.

Facebook

