

Animal Welfare and Grazing Management in Silvopasture

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Animal Welfare 5 Freedoms and grazing systems

- **FREEDOM FROM HUNGER AND THIRST** Ready access to fresh water and diet to maintain health and vigor.
- **FREEDOM FROM FEAR AND DISTRESS**
- **FREEDOM FROM PAIN, INJURY OR DISEASE**
- **FREEDOM TO EXPRESS NORMAL BEHAVIOR**
- **FREEDOM FROM DISCOMFORT** Provide an appropriate environment including shelter and a comfortable resting area.

Thermal comfort options in grazing systems

Bring animals to a barn



Bring shelter to the pasture



Trees



Silvopasture



Silvopasture is not 1 tree in the pasture or cows in the woods







Silvopasture welfare goal

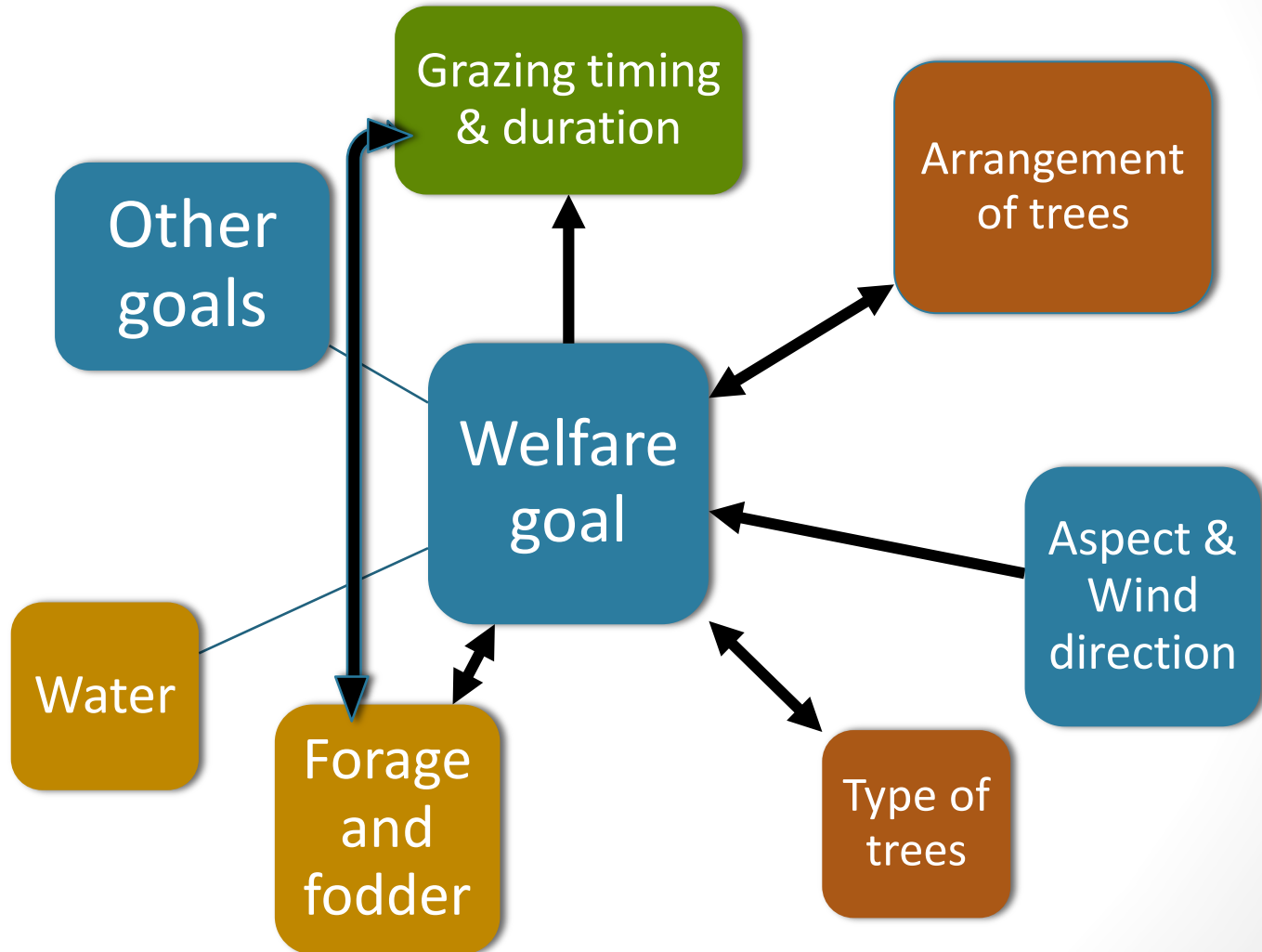
Provide shade and/or shelter for livestock while:

- Protecting soil and water quality
- Providing good forage
- Minimizing damage to trees
- Maintaining animal health

Supplementary welfare goals?

- Scratching or rubbing resources
- Medicinal or nutritional benefits of woodland plants?

Management considerations



Lancaster silvopasture research



Research questions:

- What is the value of the shade?
- How does silvopasture affect vegetation and soils?

4 treatments:

- Open pasture
- Silvopasture
- Grazed woods
- Woodland control (ungrazed woods)



Establishment

- Thinned woods to 72 ft² basal area
- Cleared slash
- Planted forage in Silvopasture understory





Grazed Woods



Silvopasture



Rep 2

SP

LF

CHI

OP

Rep 1

CHI

OP

SP

LF

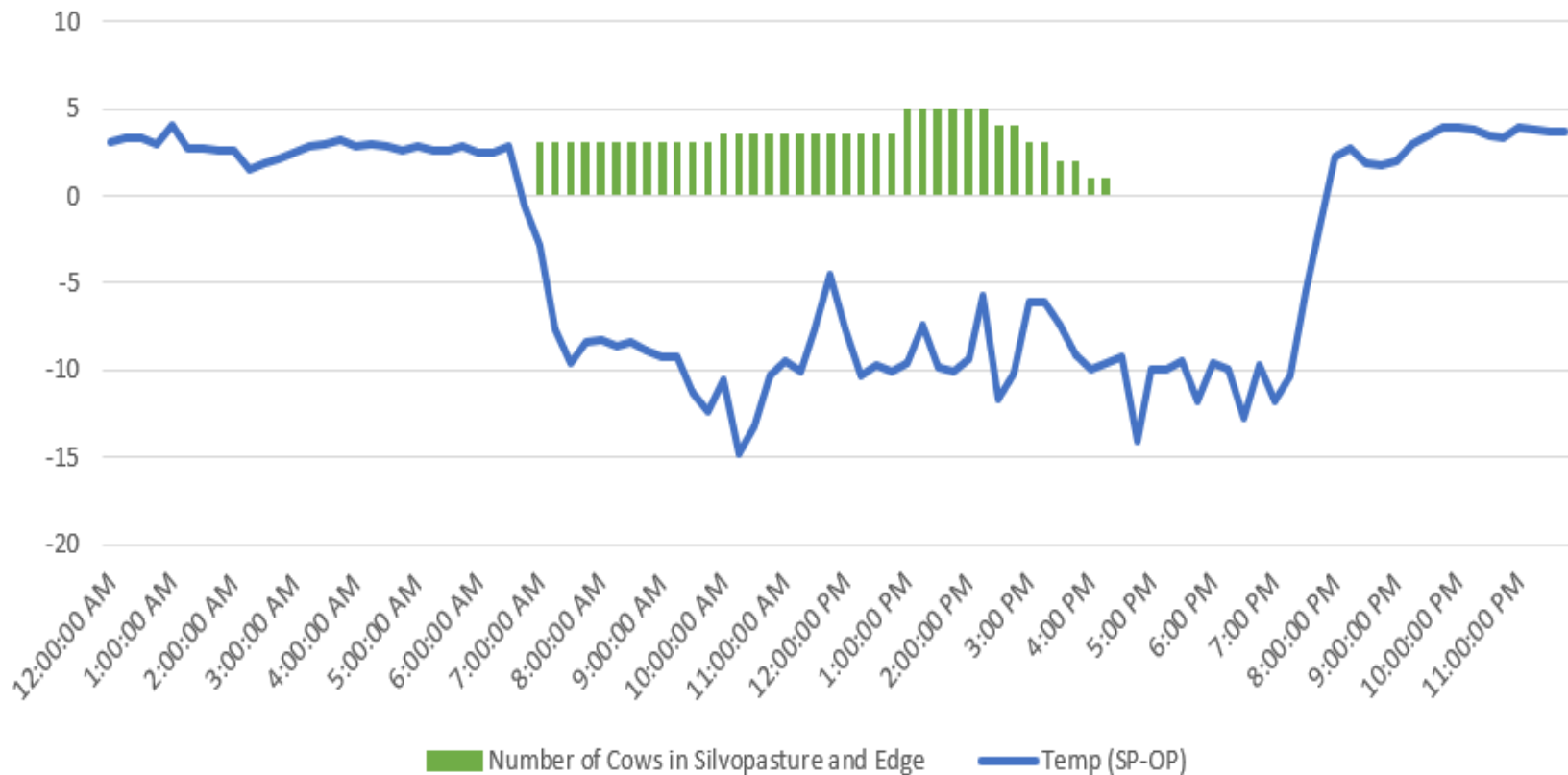
Access to shade & welfare

- Did cows choose to access shade?
- Did access to shade reduce heat stress?



When do cows seek shade?

Location of Cows in Relation to Temperature Changes

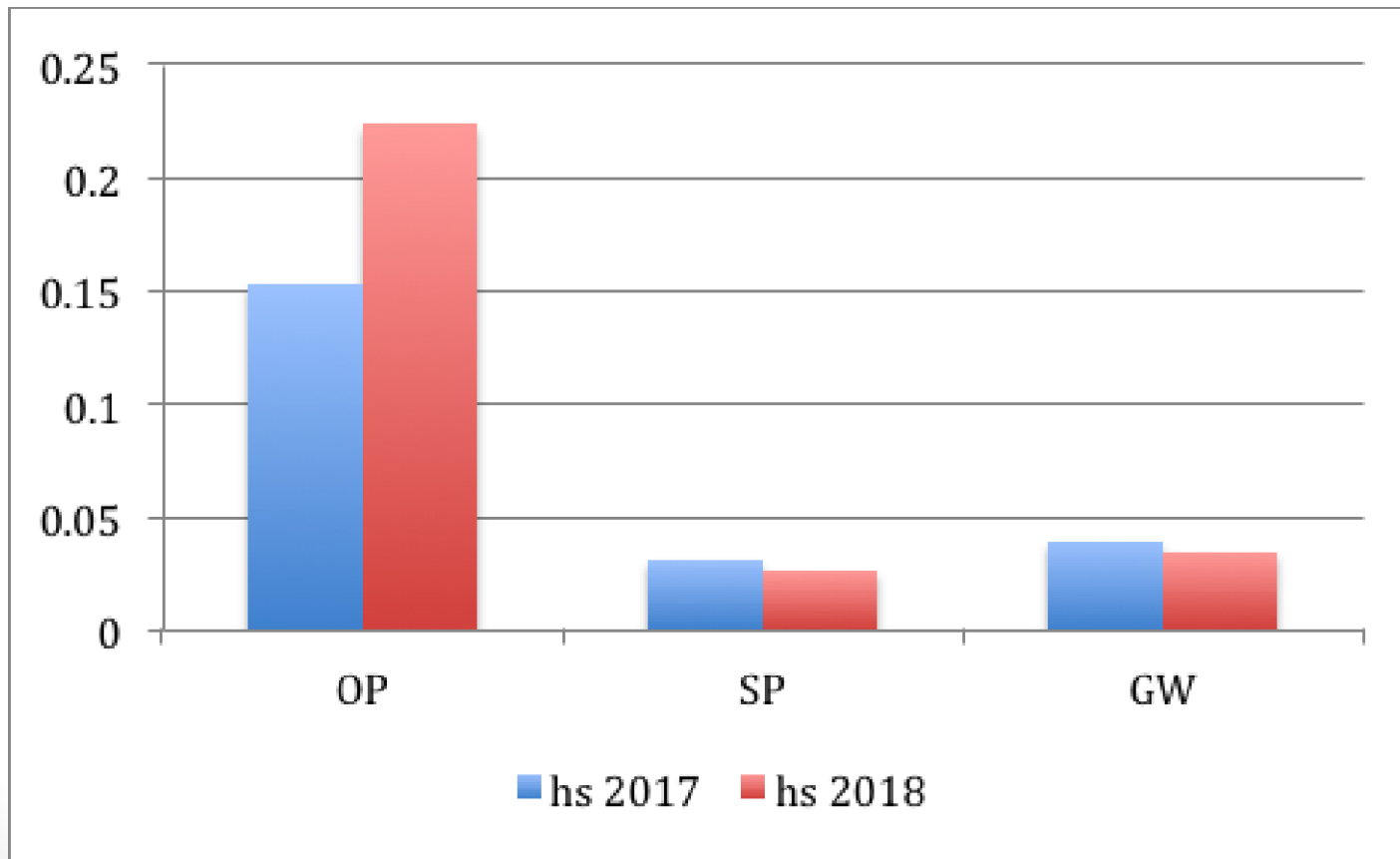


Heat stress scoring

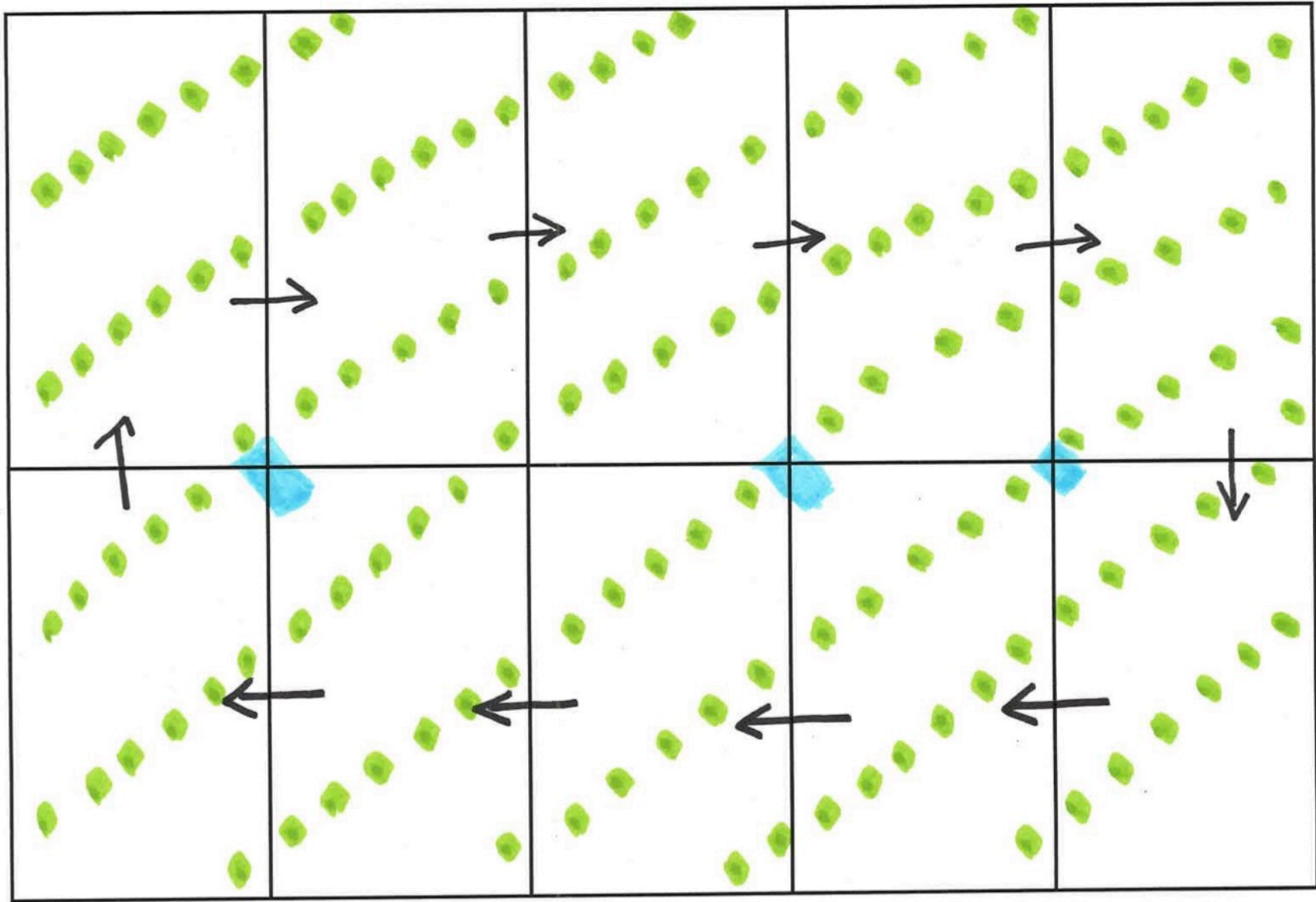
- **Panting scores as a measure of heat load in cattle** (Mader et al. 2006; Gaughan et al. 2008)
- 0 Normal respiration / no panting (~60 to 90 breaths/minute (bpm))
- 1 Elevated respiration (~80 to 110 bpm) mouth closed, no drool, easy to see chest movement
- 2 Moderate panting and/or presence of drool (~100 to 130 bpm), no open mouth
- 2.5 As for 2 but occasional open-mouth panting, tongue not extended
- 3 Heavy open-mouthed panting; saliva usually present (~120 to 140 bpm), neck extended, head held up
- 3.5 As for 3 but with the tongue out slightly and occasionally fully extended for short periods
- 4 Severe open-mouthed panting with protruding tongue and excessive salivation; usually with neck extended forward
- 4.5 As for 4 but head down and breathing from flank. Drooling may cease

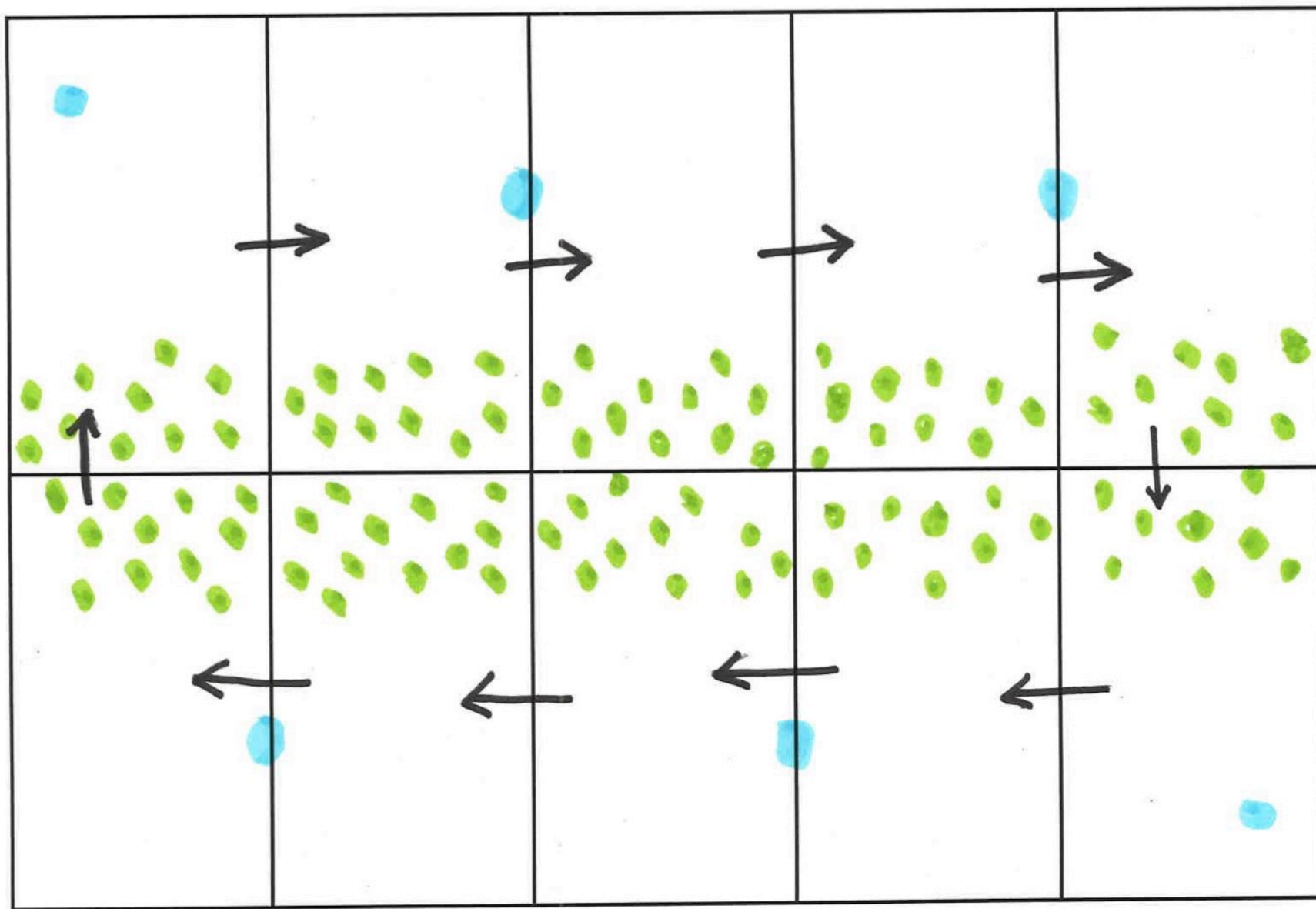
Shade

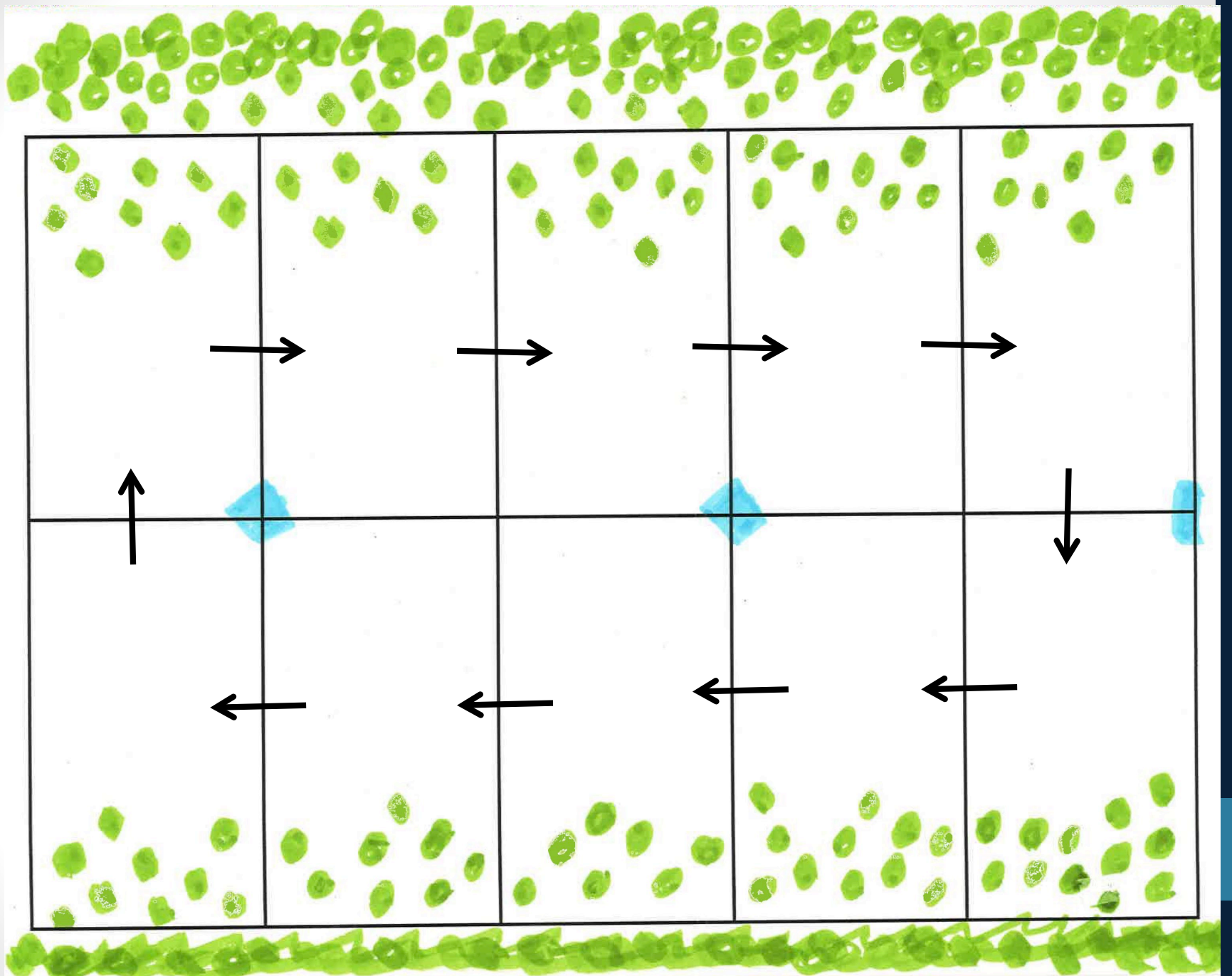
- Cows in the open pasture more likely to show signs of heat stress













Larry Godsey Ph.D.

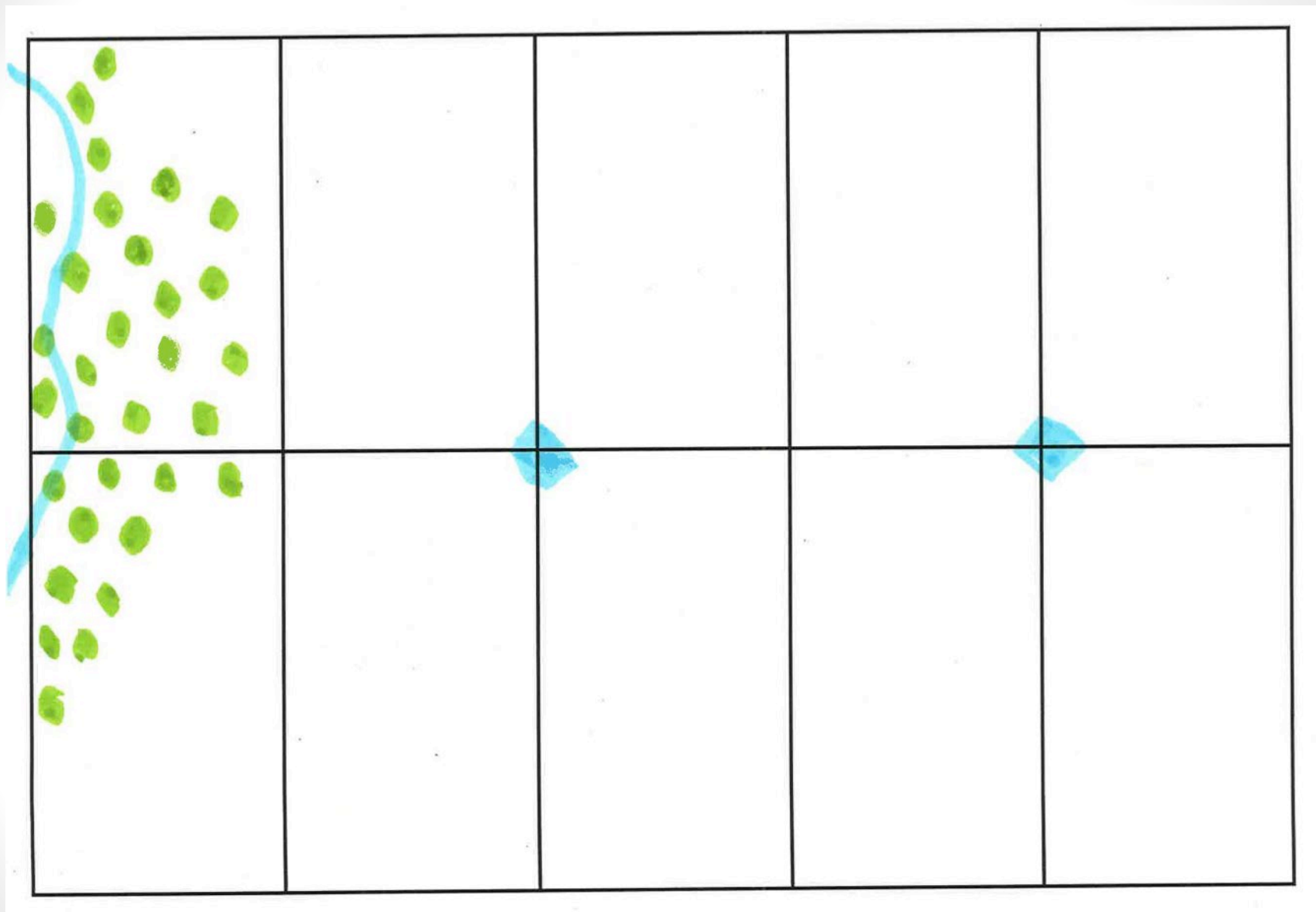


The Center for Agroforestry
University of Missouri

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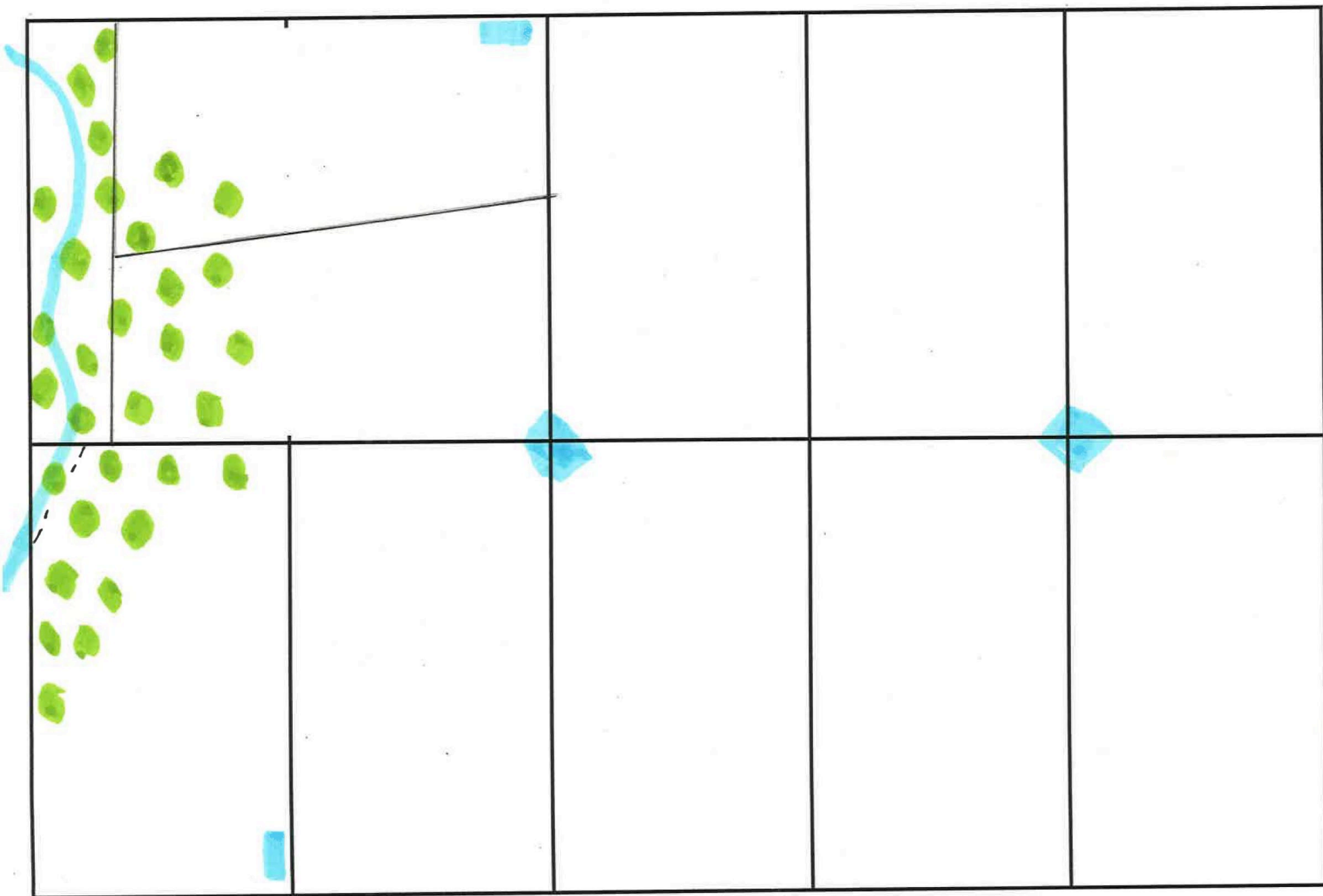
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Edge 1 = 0.98 acres
Edge 2 = 0.56 acres
Edge 3 = 1.40 acres
2.94 acres total



Beef Cattle Temperature Humidity Chart

		Relative Humidity (%)											
		30	35	40	45	50	55	60	65	70	75	80	85
Temperature (°F)	100	84	85	86	87	88	90	91	92	93	94	95	97
	98	83	84	85	86	87	88	89	90	91	93	94	95
	96	81	82	83	85	86	87	88	89	90	91	92	93
	94	80	81	82	83	84	85	86	87	88	89	90	91
	92	79	80	81	82	83	84	85	85	86	87	88	89
	90	78	79	79	80	81	82	83	84	85	86	86	87
	88	76	77	78	79	80	81	81	82	83	84	85	86
	86	75	76	77	78	78	79	80	81	81	82	83	84
	84	74	75	75	76	77	78	78	79	80	80	81	82
	82	73	73	74	75	75	76	77	77	78	79	79	80
	80	72	72	73	73	74	75	75	76	76	77	78	78
	78	70	71	71	72	73	73	74	74	75	78	76	76
	76	69	70	70	71	71	72	72	73	73	74	72	75
		Temperature Humidity Index (THI)											
		Normal <75			Alert 75-78			Danger 79-83			Emergency >84		



Toxic plants



Heat Stress Factors

- Temperature
- Radiation (shade)
- Humidity
- Wind



Edges

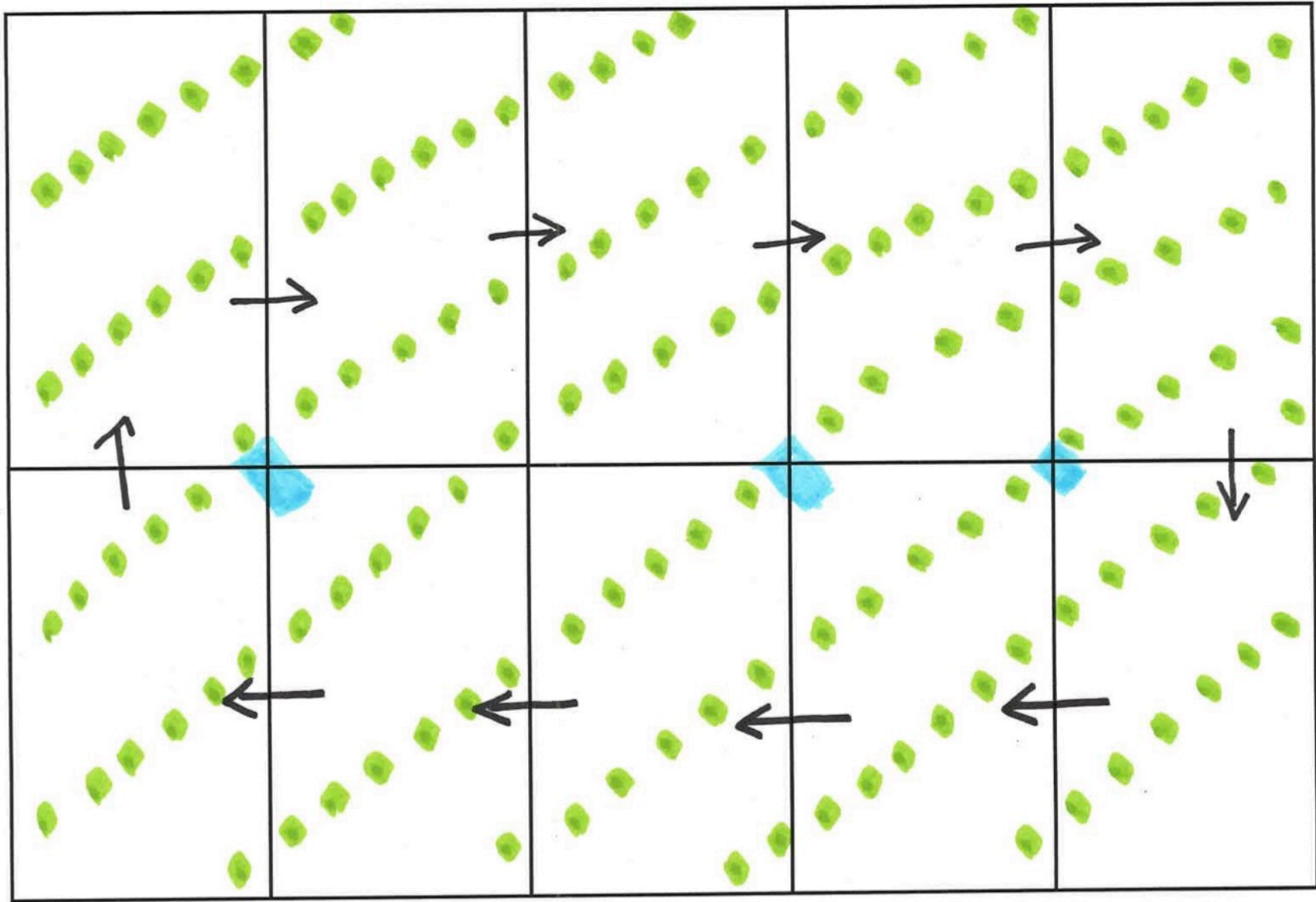
2018-06-16 8:47:56 AM M 5/5 79°F



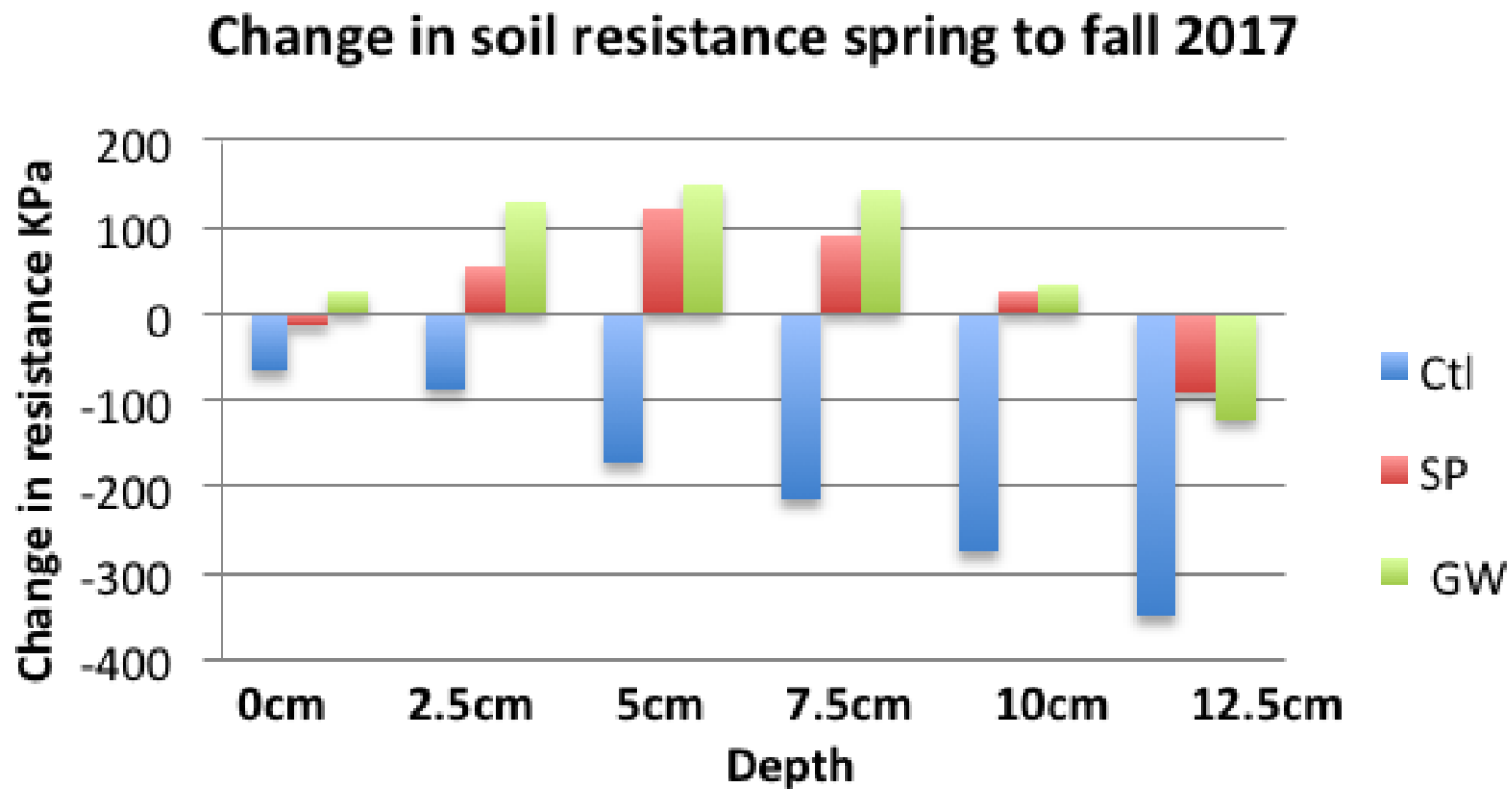


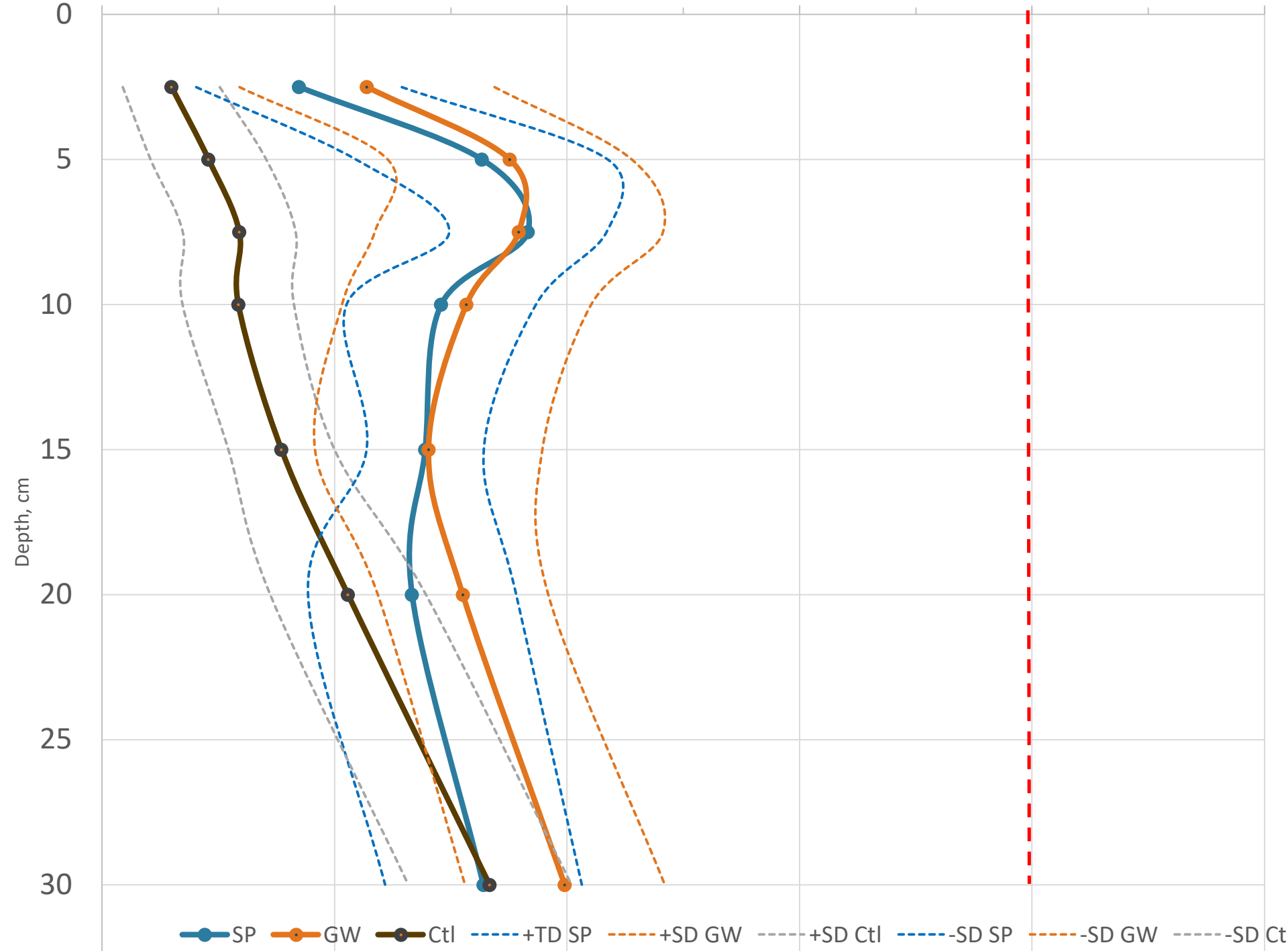






Soil compaction?





Silvopasture vs Grazed Woods



- Grass in the understory slows the spread of species such as thistles, white snakeroot, and pokeweed.
- Grass in silvopasture holds up better to cattle impact than the species in grazed woods, but not as well as the open pasture.



Silvopasture

Can improve animal welfare (esp. thermal comfort), but requires thoughtful management of grazing to prevent environmental damage:

- Manage grazing timing to maintain good forage layer
- Re-seed high traffic areas
- Manage shade to maintain good forage layer
- Ensure animals always have access to good forage

Thank you to:

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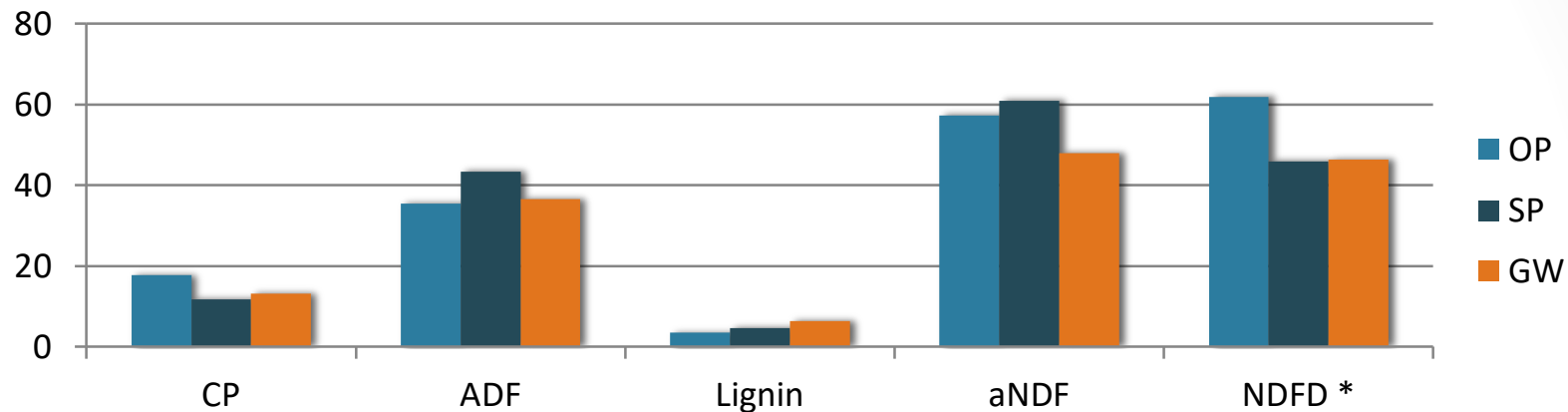
and many others...

Questions?



Forage quality comparable among treatments

July 2017 forage quality



August 2017 forage quality

