Using Intensive Early Stocking in Cow/Calf Production Systems

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COLLEGE OF AGRICULTURE
KANSAS STATE UNIVERSITY

USDA Ag Census for Kansas

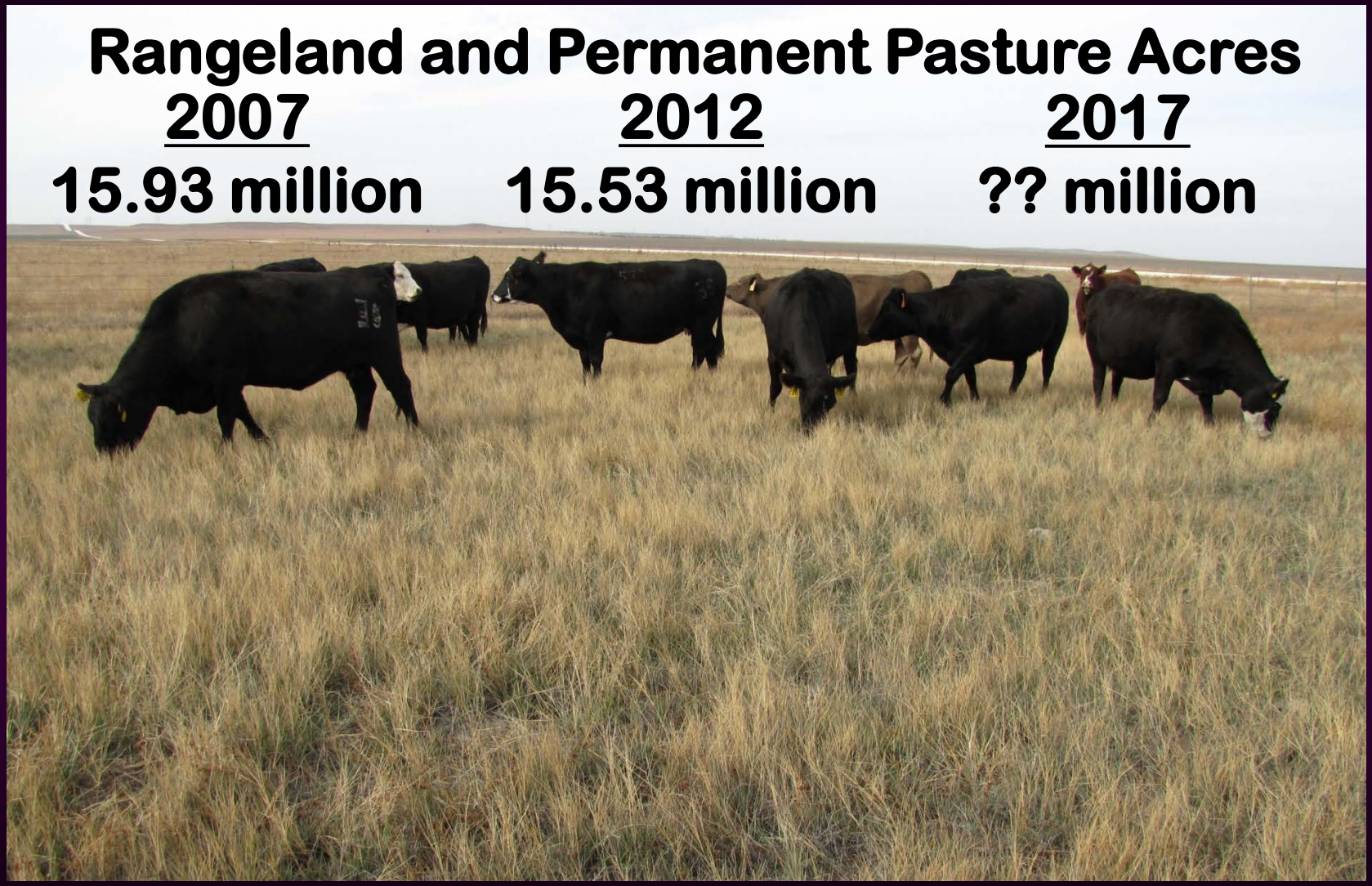


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Image U.S. Geological Survey
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USDA Ag Census for Kansas

A need to be efficient with acres

Modified Intensive Early Stocking (1.6X+1)

-Utilize positive components of both SLS and 2X IES systems to maintain individual performance and increase production per acre of stockers

-1.6X animal density for first half of growing season, heaviest animals removed at mid-season
-1X animal density the last half of growing season

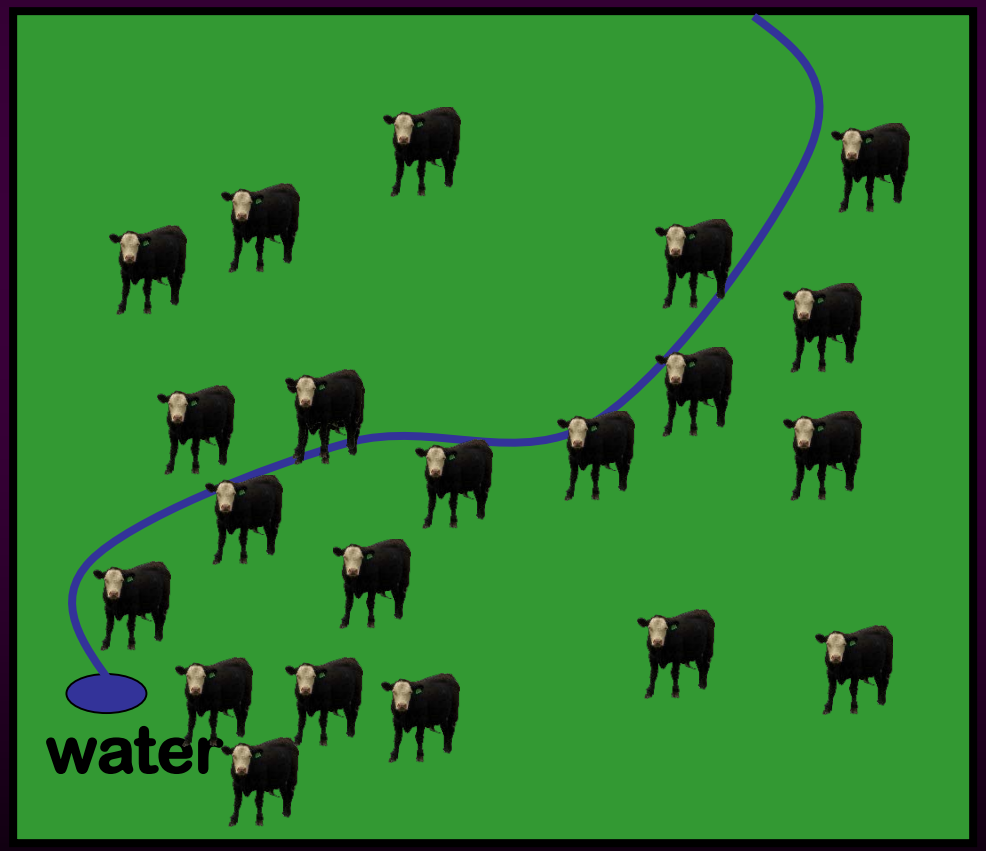
-Animal density greatest in spring when grass is most nutritious
-Allows more animal selectivity late in the season

Modified IES (1.6X + 1)

-stocking 1.6X the season-long number of animals during the early grazing season (2.5 – 3.0 months)

Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

1.6X



Modified IES (1.6X + 1)

- reducing density to 1X during the late season

Jan
Feb
Mar
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May
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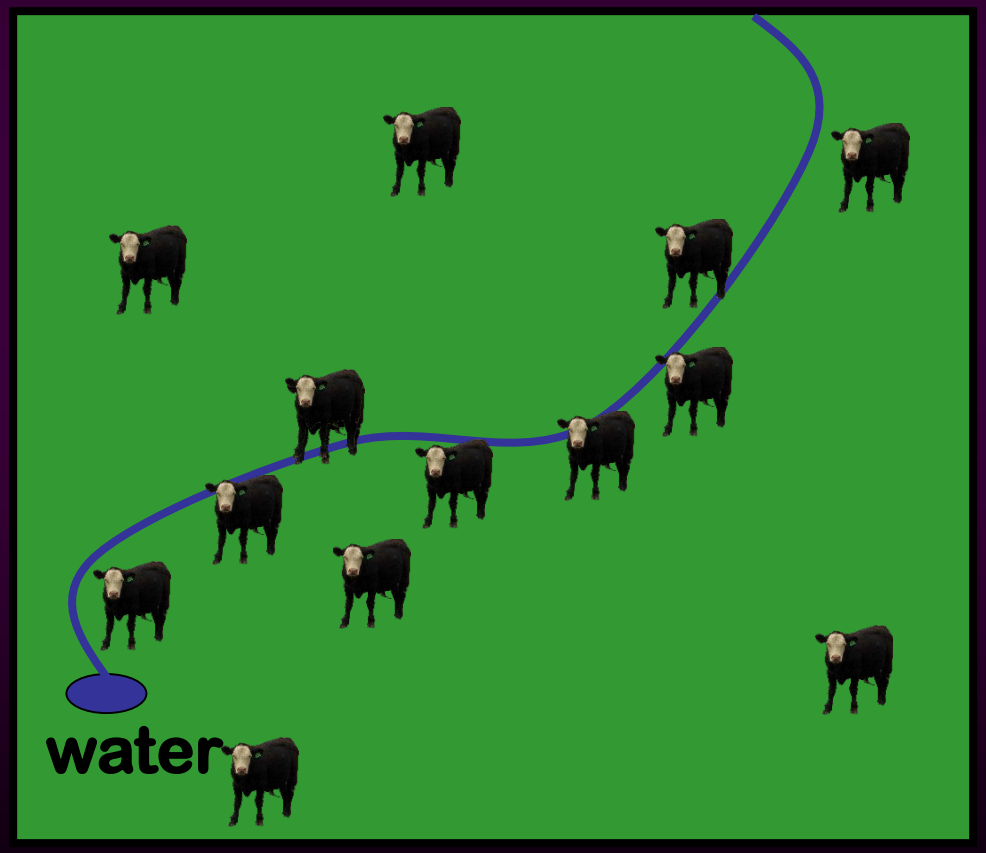
Jul
Aug
Sep
Oct
Nov
Dec

1.6X

1X



Main benefits of Modified IES 1.6X+1 or 2X+1 System

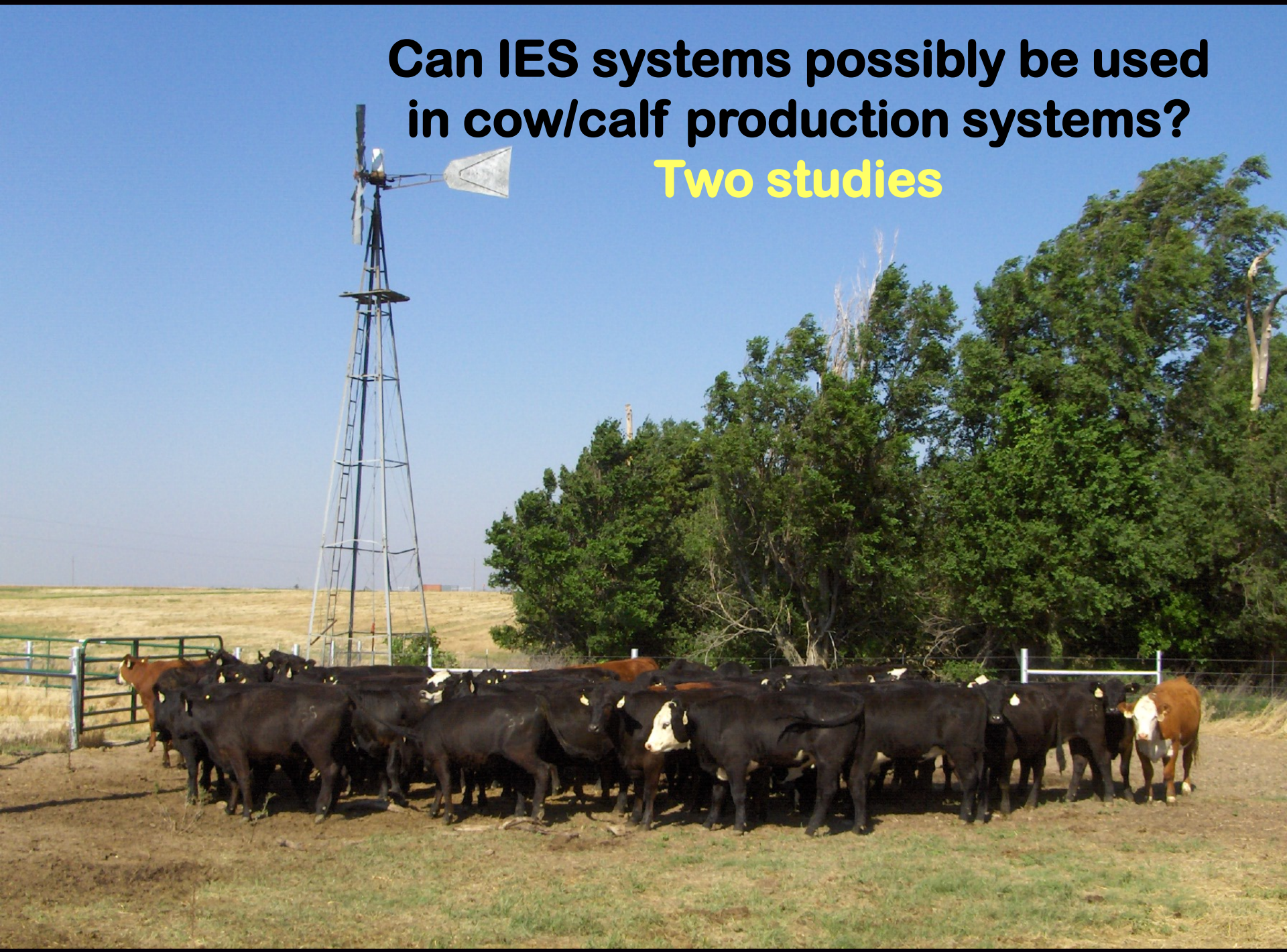
-Increased beef lb/acre produced (26% at Hays, 43 and 23% at Manhattan)

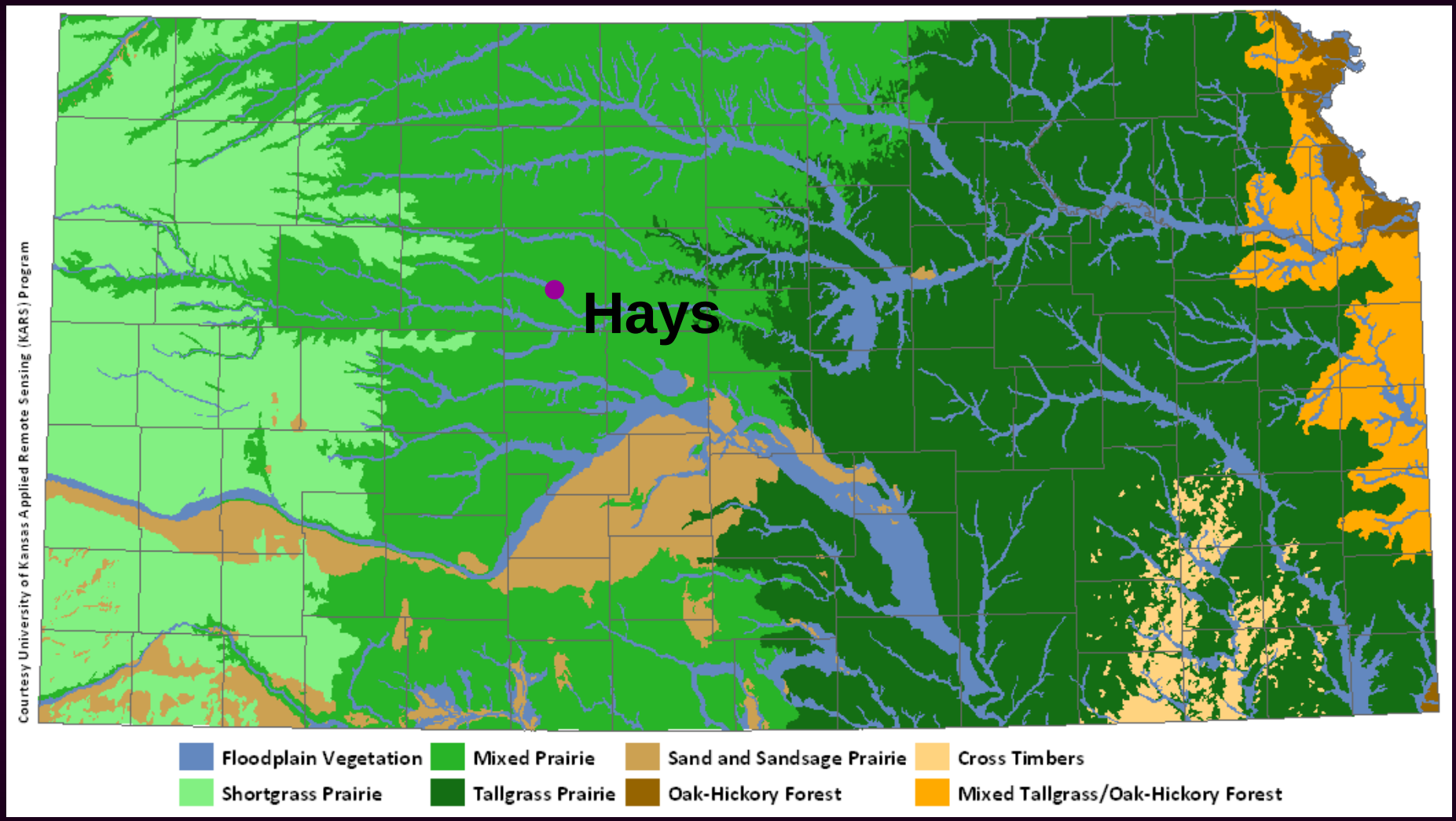
-Increased net returns/acre (19% at Hays, 75 and 18% at Manhattan) and lessened returns risk

-No change in vegetative production the year after modified stocking or late season grazing

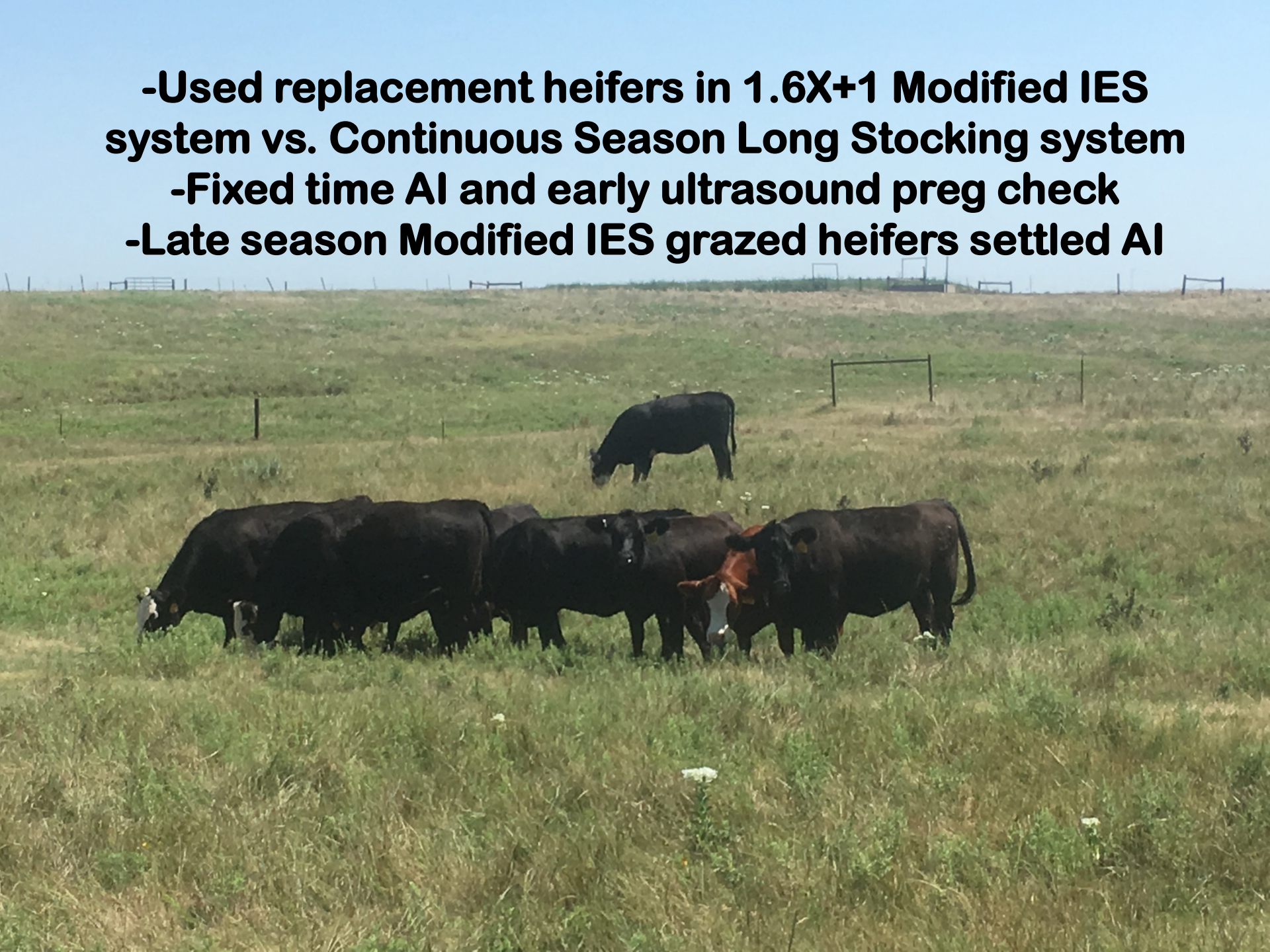
Harmoney and Jaeger. 2011. REM 64:619-624
Owensby et al. 2008. REM 61:204-210
Owensby and Auen. 2013. REM 66:700-705

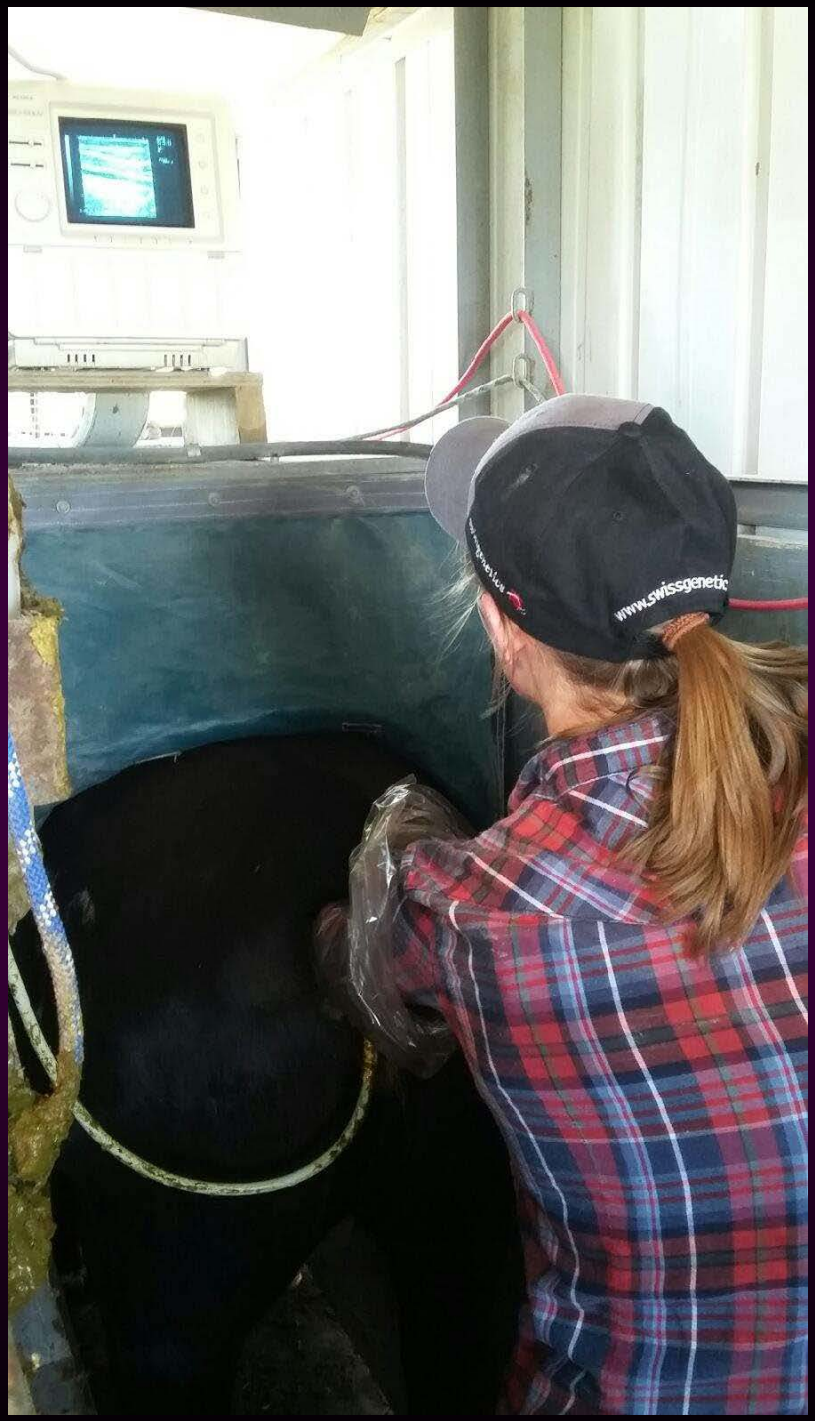
Even though MIES systems for stockers are efficient and productive, cow/calf systems still dominate western Kansas


Can IES systems possibly be used in cow/calf production systems?
Two studies


Hays
Floodplain Vegetation
Shortgrass Prairie
Mixed Prairie
Tallgrass Prairie
Sand and Sandsage Prairie
Oak-Hickory Forest
Cross Timbers
Mixed Tallgrass/Oak-Hickory Forest
Courtesy University of Kansas Applied Remote Sensing (KARS) Program

-Used replacement heifers in 1.6X+1 Modified IES system vs. Continuous Season Long Stocking system
-Fixed time AI and early ultrasound preg check
-Late season Modified IES grazed heifers settled AI





Animal Data:

-Start, mid, and end of grazing heifer weights and body condition scores

-First service conception rates and final conception rates

-High % Angus yearling heifers, wintered on dormant native rangeland
-4 replications/trt of 35 acre pastures, 8 hd/pasture SLS or 13 hd/pasture MIES

Vegetative Data:

-Mid and end of season available dry matter

-Mid season litter and basal cover

-Mid season basal species composition

Loamy and Limy upland ecological sites, transition between southern mixedgrass and shortgrass

Comparison of SLS and Modified IES 1.6X+1 with Heifers

	May Heifer BW	July Heifer BW	October Heifer BW
	lb	lb	lb
SLS	772	909	986
MIES	770	900	989

	lb/day*	lb/day
SLS	1.84	1.03
MIES	1.72	1.09

Comparison of SLS and Modified IES 1.6X+1 with Heifers

	Heifer Early Gain	Heifer Total Gain	Heifer FSCR	Pasture End AI	Pasture End Preg
	lb/acre*	lb/acre*	%	%	%
SLS	34	52	52	51	82
MIES	52	72	44	69	94

Comparison of SLS and Modified IES 1.6X+1 with Heifers

-Residual Pasture Dry Matter Availability

	July*	October
	lb/acre	
SLS	2153	1943
MIES	2008	1901

Comparison of SLS and Modified IES 1.6X+1 with Heifers

-Basal composition

-Not different for litter cover (85%), blue grama (41%), buffalograss (25%), western wheatgrass (10%), sideoats grama (6%), western ragweed (2%)

	Sand dropseed 2017	2014 - 2017 Change	Sedges 2017	2014 - 2017 Change
	%	%*	%	%*
SLS	3.0	-1.4	5.1	- 4.4
MIES	2.3	0.0	5.3	- 0.1

Comparison of SLS and Modified IES 1.6X+1 with Heifers

-Replacement heifer gain trends similar to 7 year average MIES steer gain (Harmoney and Jaeger. 2011. REM 64:619-624)

-Slight species composition change similar to 7 year MIES stocking study (Harmoney and Jaeger. 2011. REM 64:619-624)

-No change in residual standing dry matter after modified stocking, similar to MIES steer studies (Harmoney and Jaeger. 2011. REM 64:619-624;Owensby et al. 2008.REM 61:204-210;Owensby and Auen. 2013. REM 66:700-705)

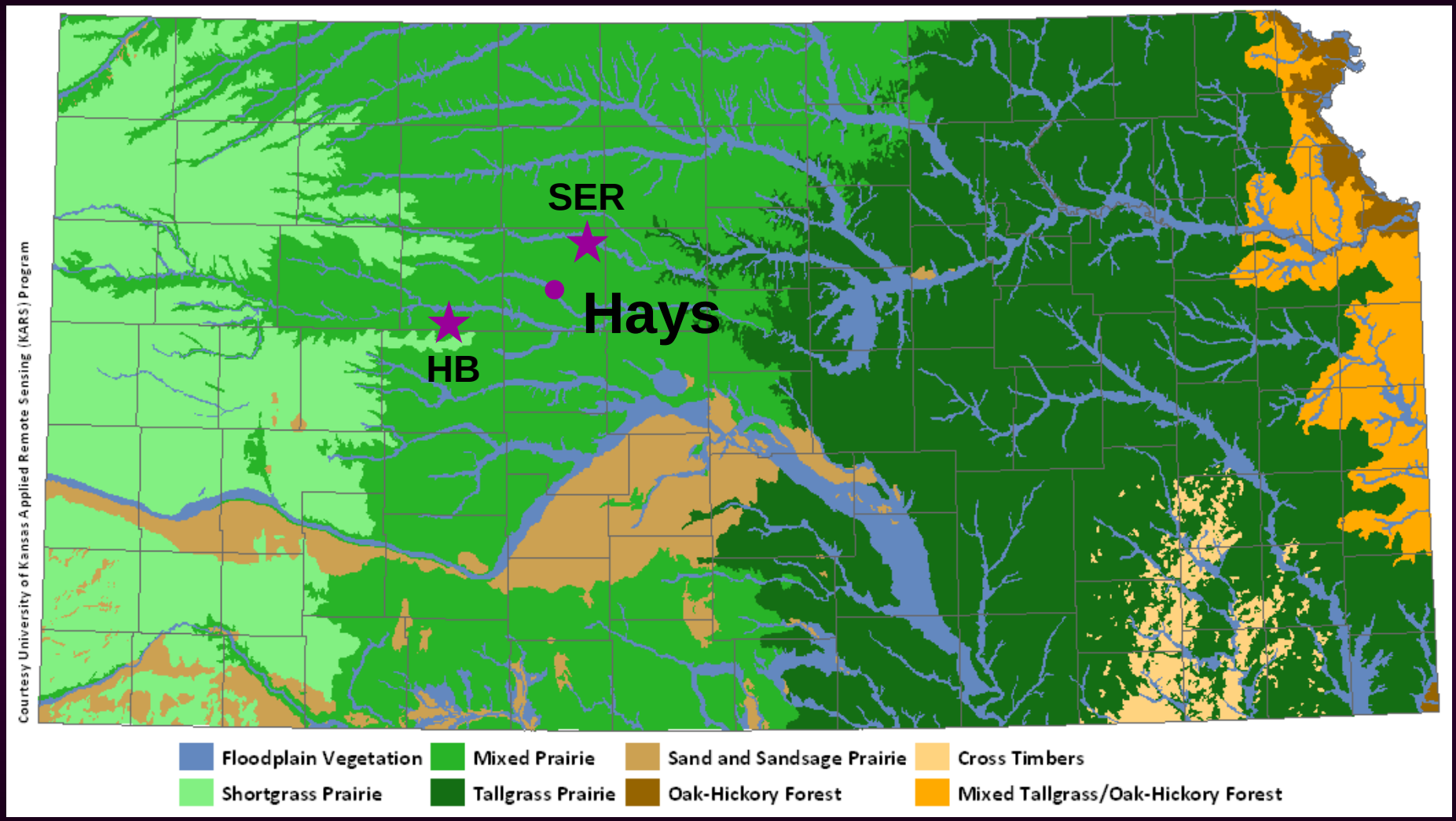
Comparison of SLS and Modified IES 1.6X+1 with Heifers

SUMMER GRAZING OF REPLACEMENT HEIFERS IN WESTERN KANSAS			
		Continuous	Mod 1.6x +1
RETURNS PER HEAD			
	1. Market animal (see Table 1)	$ 1,243.82	$ 1,189.75
	2. Less cost of animal (see Table 1)	$ 954.66	$ 952.18
	3. Less death loss	$ 18.66	$ 17.85
	4. Other income	$ -	$ -
A. GROSS RETURNS PER HEAD		$ 270.50	$ 219.72
COSTS PER HEAD			
	5. Summer pasture	$ 78.75	$ 48.46
	6. Harvested forage		
	7. Grain		
	8. Supplement, mineral and salt	$ 5.62	$ 5.62
	9. Other feed		
	10. Labor	$ 6.00	$ 3.75
	11. Veterinary, drugs, and supplies	$ 67.00	$ 67.00
	12. Marketing costs	$ 5.00	$ 3.13
	13. Hauling		
	14. Utilities, fuel, and oil	$ 4.00	$ 4.00
	15. Facility and equipment repairs	$ 7.00	$ 4.38
	16. Professional fees (legal, accounting, etc.)	$ 0.60	$ 0.38
	17. Miscellaneous	$ 6.00	$ 3.75
	18. Depreciation on facilities and equipment	$ 1.30	$ 0.82
	19. Interest on facilities and equipment	$ 1.62	$ 1.01
	20. Insurance and taxes on facilities and equipment		
B. SUB TOTAL		$ 182.89	$ 142.30
	21. Interest on feeder and 1/2 operating costs	$ 34.26	$ 33.56
C. TOTAL COSTS		$ 217.15	$ 175.86
D. RETURNS OVER TOTAL COSTS (A - C)		$ 53.35	$ 43.87
E. INTEREST ON ROTC		$ -	$ 0.37
F. TOTAL RETURNS		$ 53.35	$ 44.24
	acres/hd	4.38	2.69
G. RETURN PER ACRE		$ 12.18	$ 16.45

Conclusion

-Modified IES 1.6X+1 appears to be ideally suited to fit an sustainable AI replacement heifer program for the mixed to shortgrass prairie regions

Potential use with cow/calf herds?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-Cow/calf pairs stocked in two treatments at both locations

-Continuous SLS, or modified IES at a 1.45X+1 rate

How does MIES work with cow/calf pairs?

-Early weaning reduces grazing pressure, often used during drought periods

-Use the same concept to reduce late season grazing pressure, but start with a greater density

At mid-season, calves were early weaned and removed from pasture

Animal Data:

-Start, mid, and end of grazing cow weights and body condition scores

-First service conception rates and final conception rates

-calf start, mid, and end of grazing weights

Vegetative Data:

-Mid and end of season available dry matter

-Mid season litter and basal cover

-Mid season basal species composition

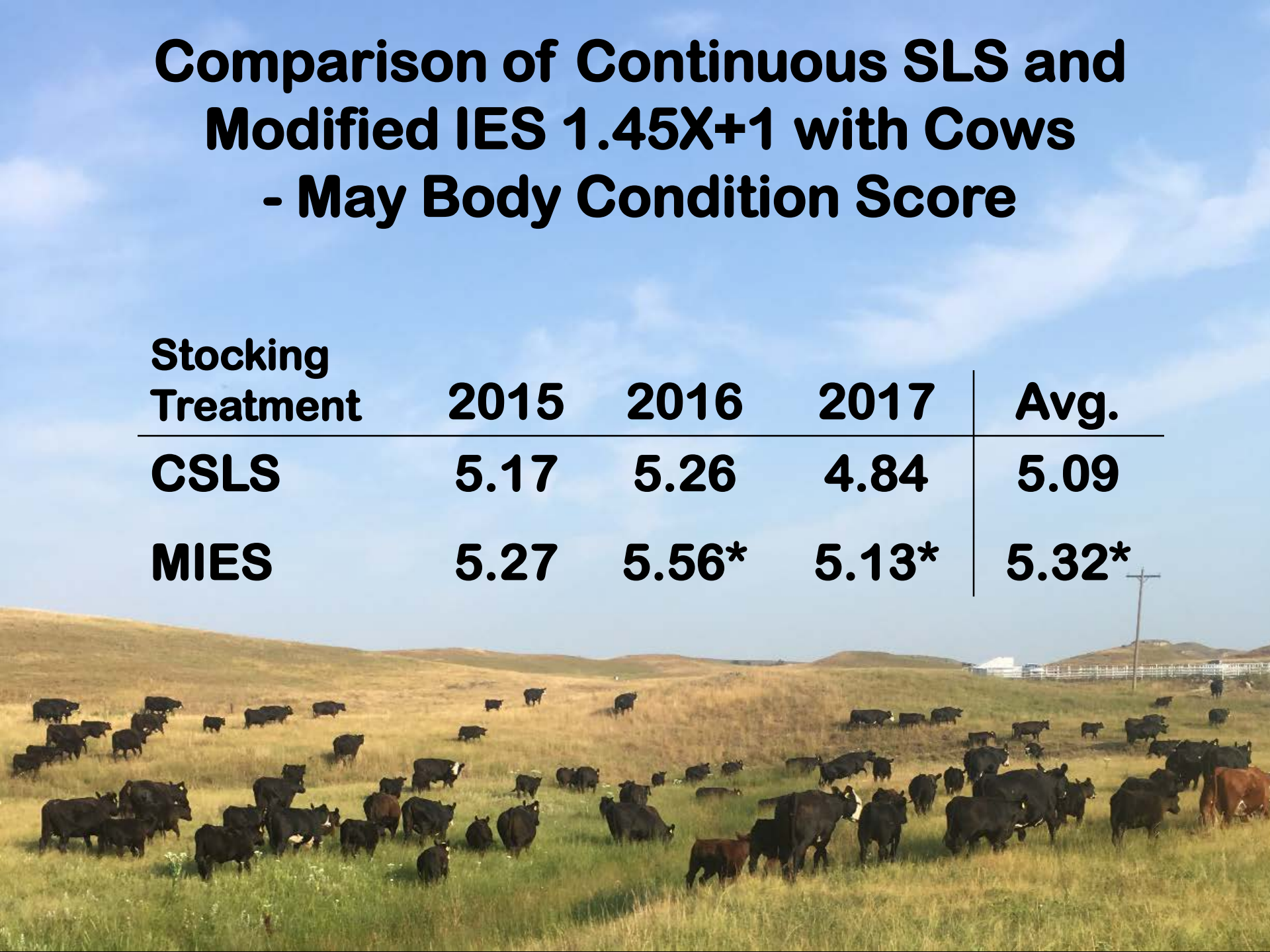
Limy upland and blue shale ecological sites, mixedgrass rangelands, with tall-, mid-, and shortgrasses

Comparison of Continuous SLS and Modified IES 1.45X+1 with Cows

	CSLS	MIES
Cow May weight, lb	1131	1169
Cow May BCS	5.09	5.32*
Calf May weight, lb	188	189
Cow July weight, lb	1256	1270
Cow July BCS	5.31	5.40
Calf July weight, lb	377	376
Cow October weight, lb	1267	1365*
Cow October BCS	5.22	5.74*
Calf October weight, lb	555	568
Cow FSCR, %	45.5	54.9
Cow Final Conception Rate, %	86.0	91.0*

Comparison of Continuous SLS and Modified IES 1.45X+1 with Cows - May Body Condition Score

Stocking Treatment	2015	2016	2017	Avg.
CSLS	5.17	5.26	4.84	5.09
MIES	5.27	5.56*	5.13*	5.32*



Mixed Grass Vegetation

Sideoats grama (24%)

Blue grama (17%)

Little bluestem (15%)

Big bluestem (9%)

Buffalograss (8%)

Western wheatgrass (5%)

Comparison of Continuous SLS and Modified IES 1.45X+1 with Cows - Pasture Dry Matter

	July		October	
	CSLS	MIES	CSLS	MIES
	Residual lb/acre			
2014			1831	1861
2015	2298	2261	1997	1980
2016	2655	2526	2365	2279
2017	1970	2026	1579	1584
Avg.	2308	2271	1980	1948

Comparison of Continuous SLS and Modified IES 1.45X+1 with Cows

-MIES Cow weight gain and BCS increase similar to other early weaning studies (Johnson et al. 2015. CFT. DOI.10.2134/cftm2014.0090; Preedy et al. 2018. Roundup 2018 DOI.org/10.4148/2378-5977.7554).

-No species composition change, similar to 7 year MIES stocking study with steers (Harmoney and Jaeger. 2011. REM 64:619-624) and current replacement heifer study.

-No change in residual standing dry matter after modified stocking, similar to steer studies (Harmoney and Jaeger. 2011. REM 64:619-624;Owensby et al. 2008.REM 61:204-210;Owensby and Auen. 2013. REM 66:700-705) and current heifer study.

Comparison of Continuous SLS and Modified IES 1.45X+1 with Cows

SUMMER GRAZING OF COW/CALF PAIRS IN WESTERN KANSAS			
		Continuous	Mod 1.45x+1
RETURNS PER HEAD			
	1. Market animal (see Table 1)	$ 923.34	$ 757.05
	2. Less cost of animal (see Table 1)		
	3. Less death loss	$ 13.85	$ 11.36
	4. Other income	$ -	$ -
A. GROSS RETURNS PER HEAD		$ 909.49	$ 745.69
COSTS PER HEAD			
	5. Summer pasture	$ 248.00	$ 171.03
	6. Harvested forage	$ 59.00	$ 59.00
	7. Grain	$ 11.25	$ 11.25
	8. Supplement, mineral and salt	$ 7.00	$ 7.00
	9. Other feed	$ 105.00	$ 105.00
	10. Labor	$ 5.00	$ 5.00
	11. Veterinary, drugs, and supplies	$ 12.00	$ 12.00
	12. Marketing costs	$ 5.00	$ 5.00
	13. Hauling	$ -	$ -
	14. Utilities, fuel, and oil	$ 6.00	$ 6.00
	15. Facility and equipment repairs	$ 7.00	$ 4.83
	16. Professional fees (legal, accounting, etc.)	$ 1.20	$ 0.83
	17. Miscellaneous	$ 6.00	$ 4.13
	18. Depreciation on facilities and equipment	$ 1.30	$ 0.90
	19. Interest on facilities and equipment	$ 1.62	$ 1.12
	20. Insurance and taxes on facilities and equipment	$ 0.53	$ 0.37
B. SUB TOTAL		$ 475.89	$ 393.46
	21. Interest on feeder and 1/2 operating costs	$ 10.77	$ 8.89
C. TOTAL COSTS		$ 486.66	$ 402.35
D. RETURNS OVER TOTAL COSTS (A - C)		$ 422.83	$ 343.34
E. INTEREST ON ROTC		$ -	$ 2.86
F. TOTAL RETURNS		$ 422.83	$ 346.20
	acres/hd	17	13.55
G. RETURN PER ACRE		$ 24.87	$ 25.55

-Modified IES 1.45X+1 appears to have a similar net return as continuous SLS at typical stocking rates in western Kansas. However, MIES improved cow body condition and conception rates, which may have long-term benefits.

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Intensive-Early Stocking (2X IES)

-1X moderate stocking rate, but 2X stocking density for the first half of growing season, animals removed at mid-season

-Animal density greater when grass is most nutritious

-Reduces some selectivity, ≈70% of area grazed

-Early season animal gains equal to Season Long Stocking

-Production per acre greater than SLS in the east, equal to SLS in the west

2X IES + Late Season Grazing (2X IES+LSG)

-Utilize positive components of both SLS and 2X IES systems to maintain individual performance and increase production per acre

-2X animal density for first half of growing season, half of the animals removed at mid-season
-1X animal density the last half of growing season

-A System that alternates years between 2X IES and 2X IES+LSG

After 7 years and 10 years of grazing studies, stocker beef production and net return showed:

1.6X+1 IES > SLS

and 2X IES+LSG System > 2X IES > SLS

Comparison of Continuous SLS and Modified IES 1.45X+1 with Cows

	CSLS	MIES		
Cow May weight, lb	1131	1169		
Cow May BCS	5.09	5.32*		
Calf May weight, lb	188	189		
Cow July weight, lb	1256	1270	124	101
Cow July BCS	5.31	5.40	0.22	0.07
Calf July weight, lb	377	376	189	187
Cow October weight, lb	1267	1365*	12	95*
Cow October BCS	5.22	5.74*	-0.09	0.35*
Calf October weight, lb	555	568	179	193
Cow FSCR, %	45.5	54.9		
Cow Final Conception Rate, %	86.0	91.0*		