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A Discussion On Cattle Size

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What Is Right For The Beef Business?

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How Big?
How Small?
How Much Muscle?

A Story Of

Opportunity

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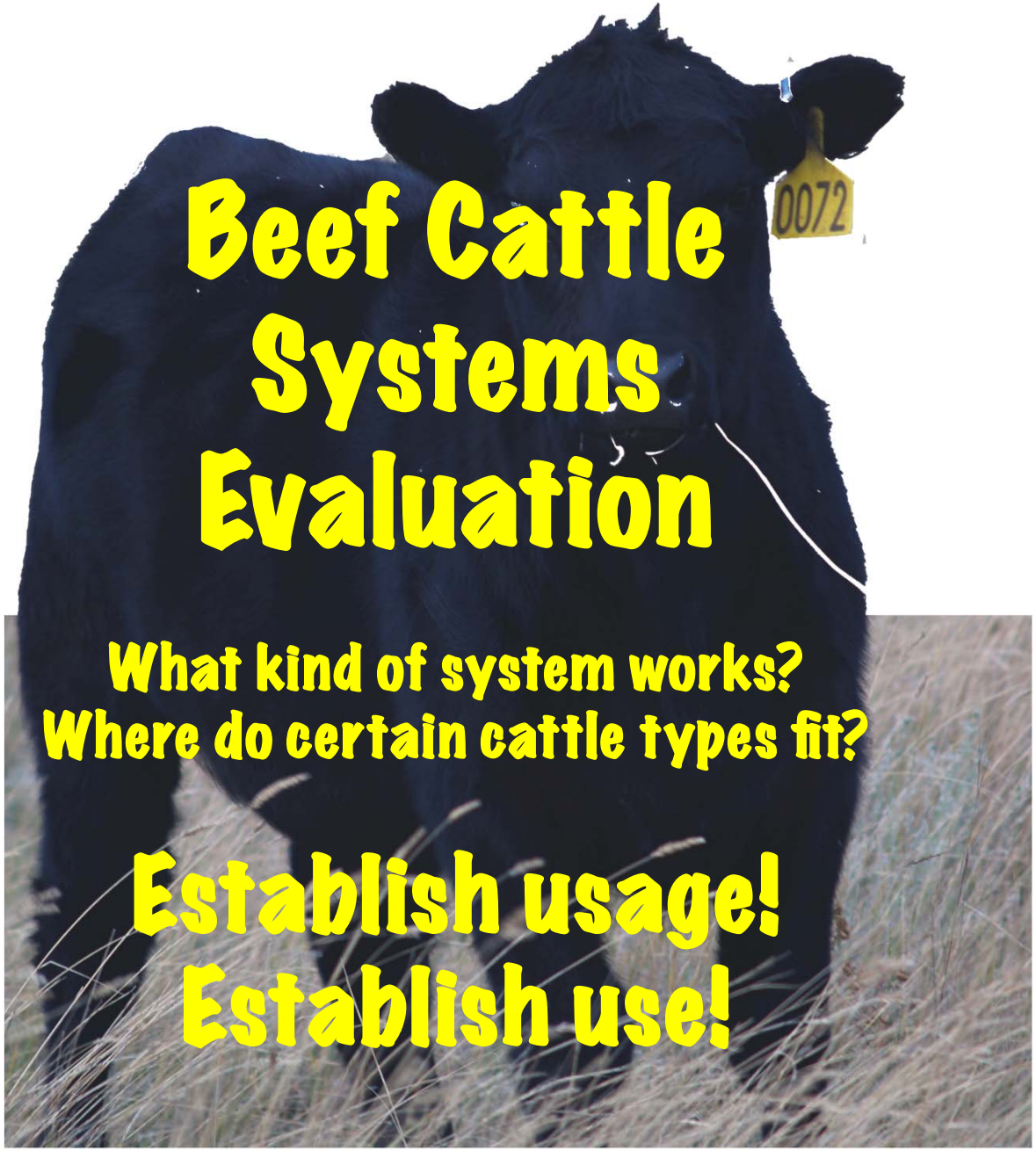


Beef Cattle Systems Evaluation

What kind of system works?
Where do certain cattle types fit?

Establish usage!
Establish use!

Can they get the job done?

When the first set of Lowline bulls were delivered, I wondered if they were big enough to breed the cows!

Following is what happened.

Calving Ease

Success in the beef business is predicated upon the principal that one needs a live calf to market. Reaching this goal is the result of careful planning, sire evaluation and good husbandry.

Caesarean section births are not desired in the beef business. Such births place stress on the cow and the calf and can create many other complications.

Calving Ease

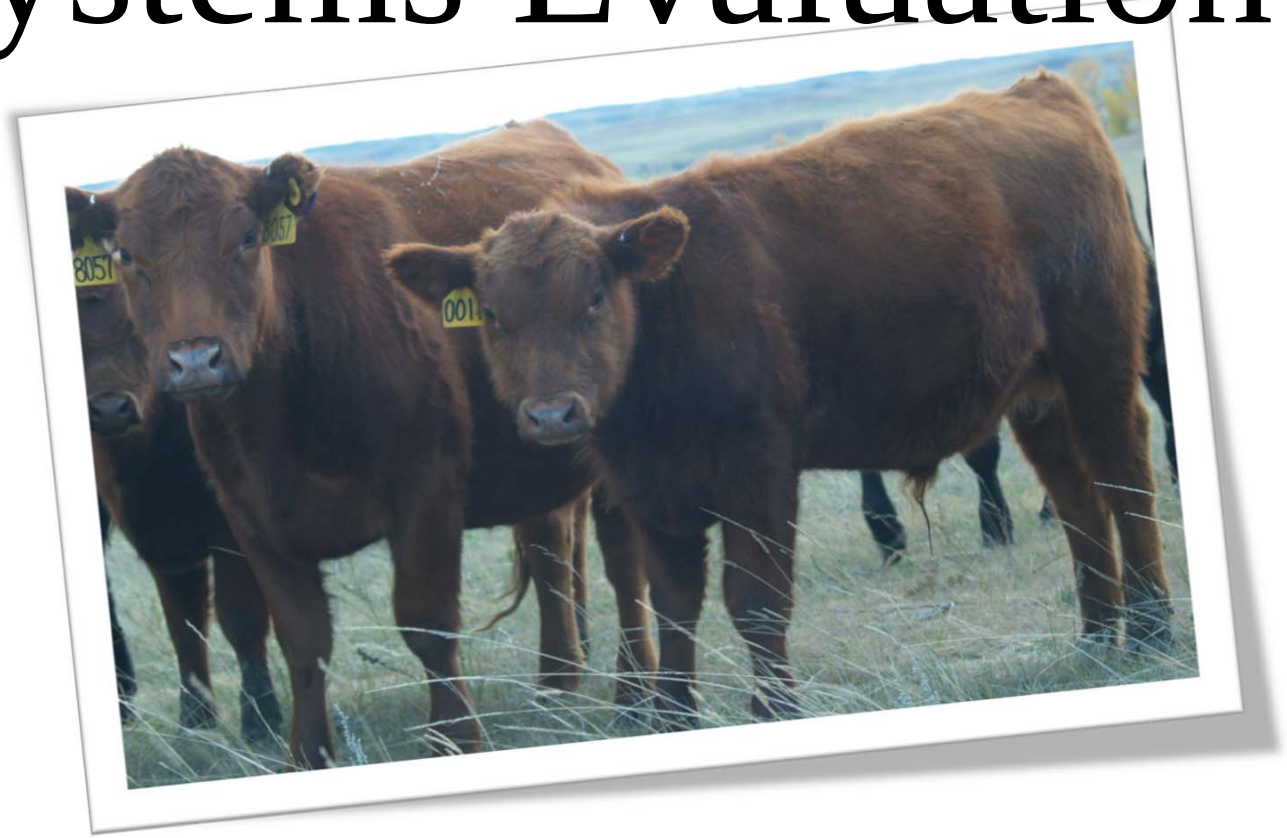
Data collected since 2004

The Dickinson Research Extension Center has been collecting data on low birthweight, Lowline bulls.
Following is the chart compiled from data collected at the Center.

Year	No	BW	Unassisted	Assisted
2004	9	68.6	9	0
2005	25	64.9	24	1
2006	48	63.8	48	0
2007	44	74.7	42	2

Beef Cattle Systems Evaluation

Our research has shown the male calves can work. Data has verified that Lowline influenced steers can produce carcasses suitable for the industry.



Carcass Data Summary

(Compiled in 2008)

	2004	2005	2006	2007
Arrival Weight	945	994	830	786
Frame Score	4.4	4.7	4.8	5.2
Harvest Weight	1186	1297	1179	1309
Harvest Value (in dollars)	1093	1223	1074	1176
Number of Steers	22	26	38	24
Days on Feed	85	95	110	138
Average Daily Gain	2.85	2.73	3.03	3.81
% Choice or Higher	77%	100%	68%	88%
Percentage YG3 or Lower	86%	76%	97%	75%

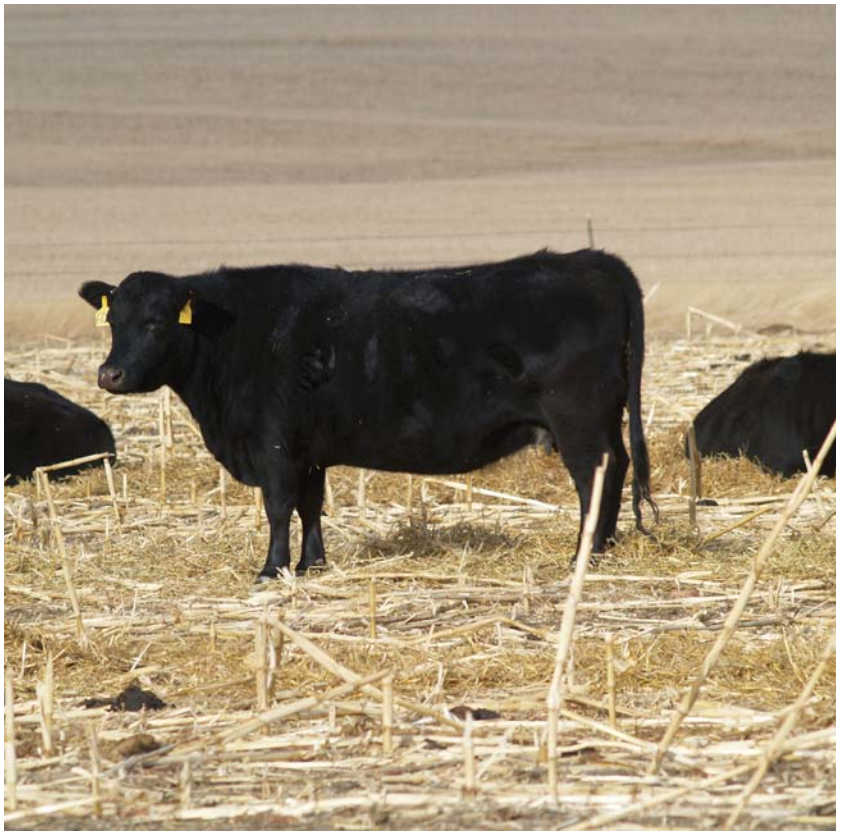
So What?

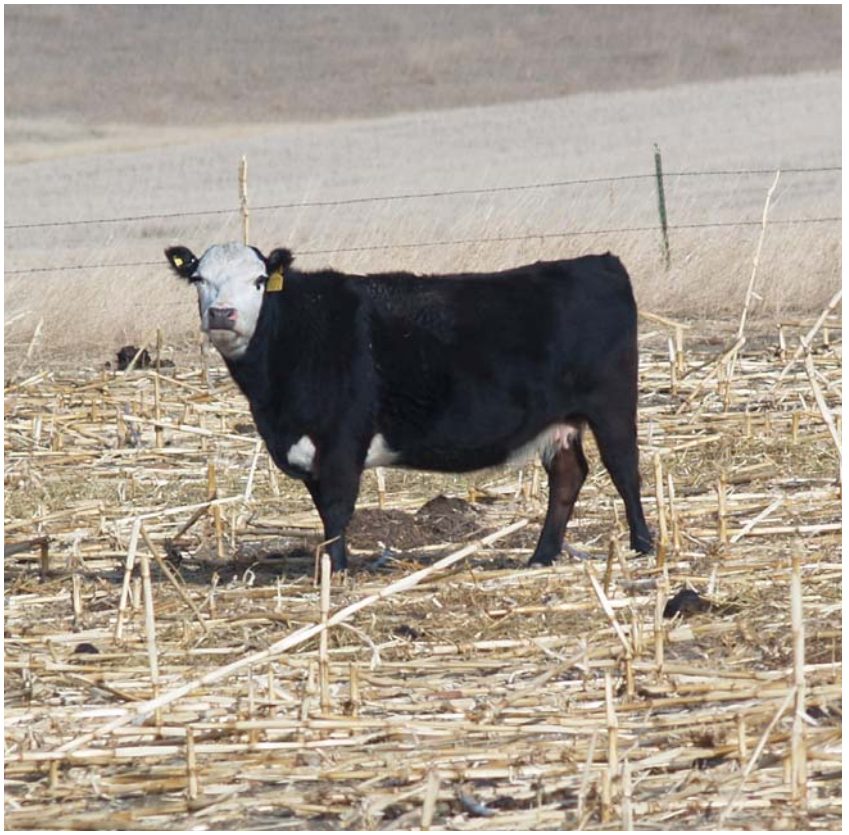
Beef Cattle Systems Evaluation

The Center returned to traditional calving ease bulls.

End of story?

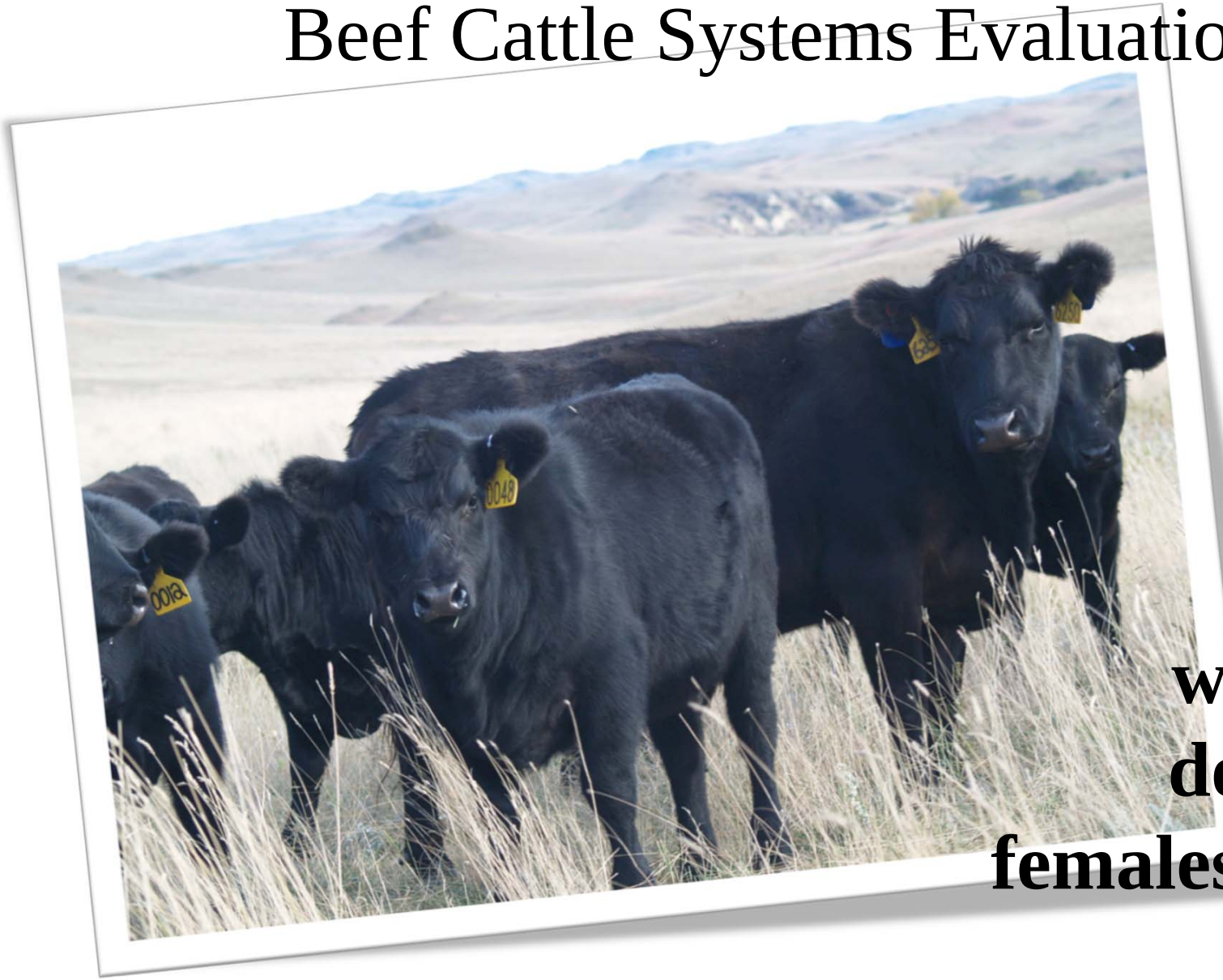
Opportunity Grows





F1 Lowline heifers grew up!

Beef Cattle Systems Evaluation



So, where do the females fit?

Initial Heifer Look

(From 2007 data)

	No.	Hip Height	Avg. Wt
Angus	36	48.6	752.6
Red Angus	11	49.4	758.7
Lowline Influence	38	42.5	515.9

Heifers	Hip Height & Frame Score								
Age (months)	1	2	3	4	5	6	7	8	9
5	33.1	35.1	37.2	39.3	41.3	43.4	45.5	47.5	49.6
6	34.1	36.2	38.2	40.3	42.3	44.4	46.5	48.5	50.6
7	35.1	37.1	39.2	41.2	43.3	45.3	47.4	49.4	51.5
8	36.0	38.0	40.1	42.1	44.1	46.2	48.2	50.2	52.3
9	36.8	38.9	40.9	42.9	44.9	47.0	49.0	51.0	53.0
10	37.6	39.6	41.6	43.7	45.7	47.7	49.7	51.7	53.8
11	38.3	40.3	42.3	44.3	46.4	48.4	50.4	52.4	54.4
12	39.0	41.0	43.0	45.0	47.0	49.0	51.0	53.0	55.0
13	39.6	41.6	43.6	45.5	47.5	49.5	51.5	53.5	55.5
14	40.1	42.1	44.1	46.1	48.0	50.0	52.0	54.0	56.0
15	40.6	42.6	44.5	46.5	48.5	50.5	52.4	54.4	56.4
16	41.0	43.0	44.9	46.9	48.9	50.8	52.8	54.8	56.7
17	41.4	43.3	45.3	47.2	49.2	51.1	53.1	55.1	57.0
18	41.7	43.6	45.6	47.5	49.5	51.4	53.4	55.3	57.3
19	41.9	43.9	45.8	47.7	49.7	51.6	53.6	55.5	57.4
20	42.1	44.1	46.0	47.9	49.8	51.8	53.7	55.6	57.6
21	42.3	44.2	56.1	48.0	50.0	51.9	53.8	55.7	57.7

BIF Guidelines

2010 Replacement Heifers

WW	Hip HT (in)	Frame Score	Winter Weight	REA/cwt	REA	Fat Depth	Spring Weight
Conventional Herd (63 head)							
574	43.3	5.26	626	0.82	5.94	0.25	664
Lowline Influence Herd (58 head)							
487	41.1	3.75	577	0.92	5.31	0.08	552

2010 Lowline Influence Herd Replacements

(Sample of growth variances)

	WW	Hip HT (in)	Frame Score	Winter Weight	REA/cwt	REA	Fat Depth	Spring Weight
Avg	**487**	**41.1**	**3.75**	**577**	**0.92**	**5.31**	**0.08**	**552**
Lowline Influence Herd -- 3 Smallest Frame Score								
X0293	288	40.5	1.50	418	1.30	5.43	0.05	450
X0262	364	41.5	1.80	474	0.93	4.40	0.09	480
X0269	360	42.0	2.10	496	1.09	5.38	0.07	506

2010 Lowline Influence Herd Replacements

(Sample of growth variances)

	WW	Hip HT (in)	Frame Score	Winter Weight	REA/cwt	REA	Fat Depth	Spring Weight
Avg	**487**	**41.1**	**3.75**	**577**	**0.92**	**5.31**	**0.08**	**552**
Lowline Influence Herd – 3 Middle Frame Score								
X0036	532	41	3.80	630	0.91	5.74	0.08	620
X0202	562	40	3.80	610	0.77	4.71	0.11	548
X0054	440	41	3.90	486	1.13	5.48	0.06	496

2010 Lowline Influence Herd Replacements

(Sample of growth variances)

	WW	Hip HT (in)	Frame Score	Winter Weight	REA/cwt	REA	Fat Depth	Spring Weight
Avg	**487**	**41.1**	**3.75**	**577**	**0.92**	**5.31**	**0.08**	**552**
Lowline Influence Herd -- 3 Largest Frame Score								
X0081	654	43.5	5.20	728	0.74	5.38	0.09	728
X0125	554	43.5	5.30	644	0.90	5.82	0.09	592
X0070	586	44.5	5.60	612	0.87	5.34	0.07	616

2010 Conventional Herd Replacements

(Sample of growth variances)

	WW	Hip HT (in)	Frame Score	Winter Weight	REA/cwt	REA	Fat Depth	Spring Weight
Avg	**574**	**43.3**	**5.26**	**626**	**0.82**	**5.94**	**0.25**	**664**
Conventional Herd -- 3 Smallest Frame Score								
X0175	490	39	3.30	662	0.88	5.85	0.09	620
X0168	554	40	3.70	644	1.08	6.96	0.06	648
X0051	582	41	3.90	692	0.77	5.32	0.11	656

2010 Conventional Herd Replacements

(Sample of growth variances)

	WW	Hip HT (in)	Frame Score	Winter Weight	REA/cwt	REA	Fat Depth	Spring Weight
Avg	**574**	**43.3**	**5.26**	**626**	**0.82**	**5.94**	**0.25**	**664**
Conventional Herd -- 3 Middle Frame Score								
X0208	580	43	5.30	590	0.91	5.37	0.07	582
X0205	570	43	5.30	662	0.91	6.04	0.07	634
X0218	620	43	5.40	676	0.88	5.93	0.07	666

2010 Conventional Herd Replacements

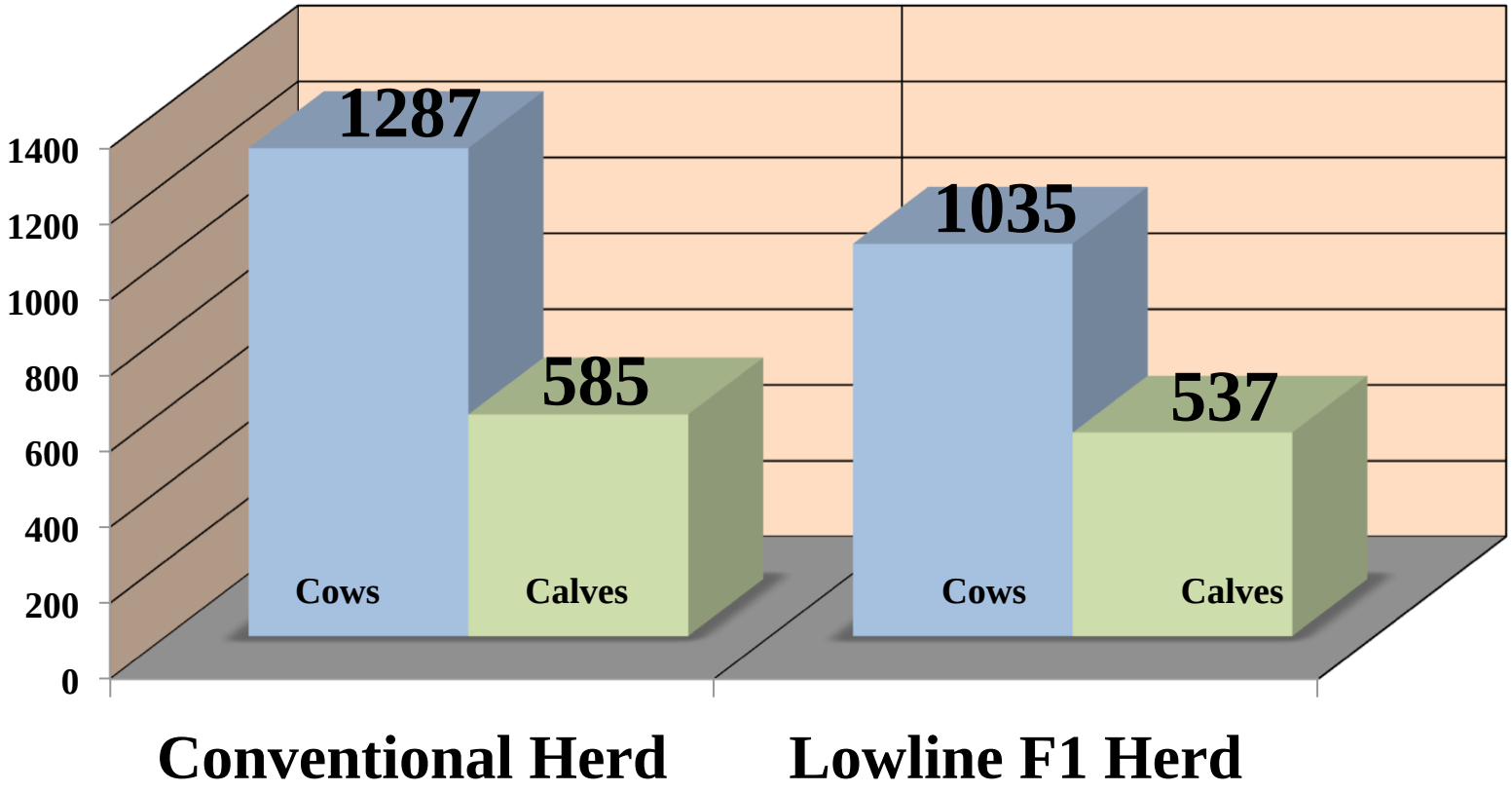
(Sample of growth variances)

	WW	Hip HT (in)	Frame Score	Winter Weight	REA/cwt	REA	Fat Depth	Spring Weight
Avg	**574**	**43.3**	**5.26**	**626**	**0.82**	**5.94**	**0.25**	**664**
Conventional Herd -- 3 Largest Frame Score								
X0139	632	46	6.60	734	0.94	8.37	0.09	930
X0181	634	46	6.70	678	0.71	4.82	0.05	676
X0203	650	47	7.30	736	0.8	5.91	0.1	786

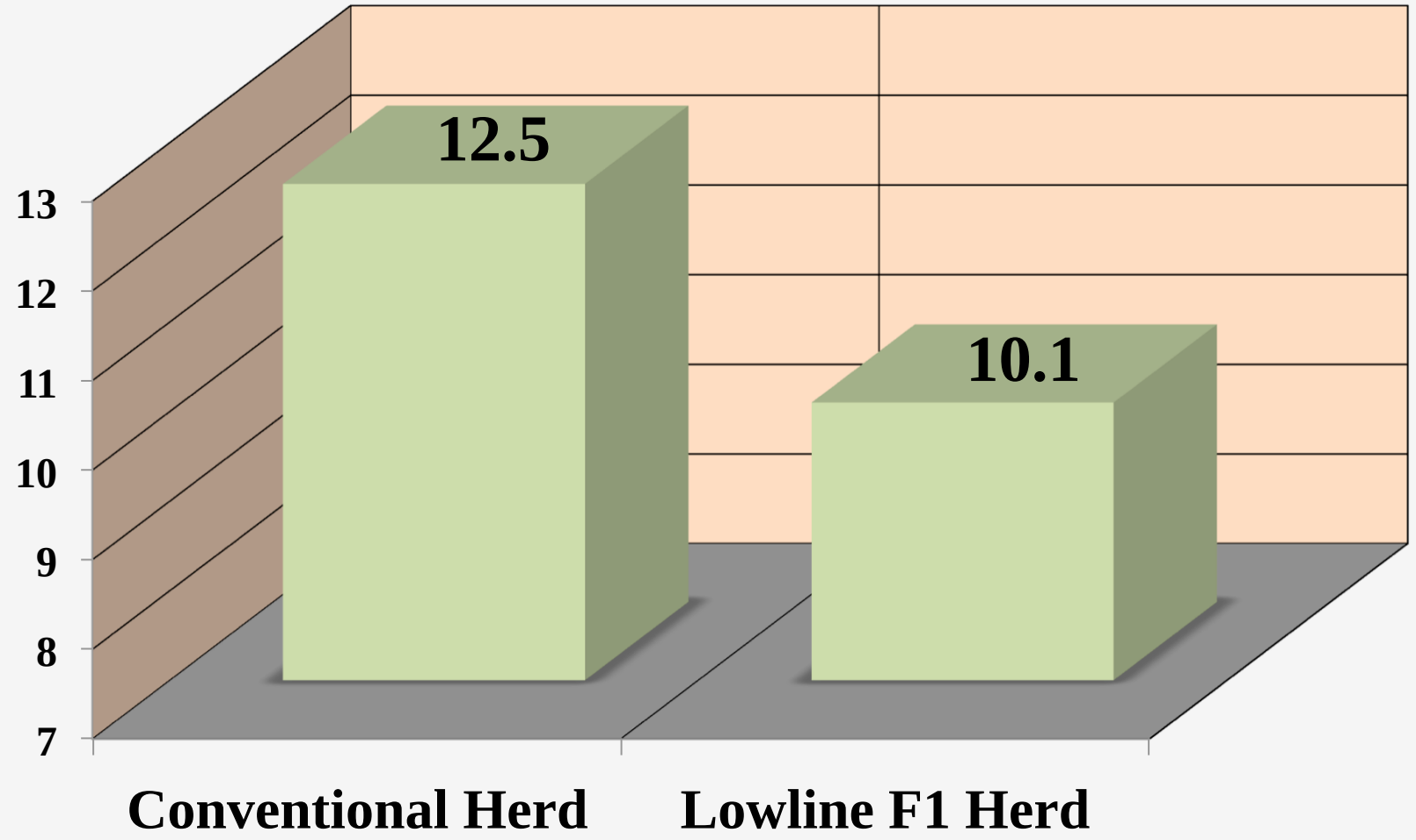
Let's continue the story . . .

Cow size and calf birth size 2011 calves				
Cow group	**No.**	**Calving Date**	**Calf BW**	**Cow Wt**
Conventional cows	68	1-Apr	91	1358
Lowline F1 cows	53	17-Mar	68	999

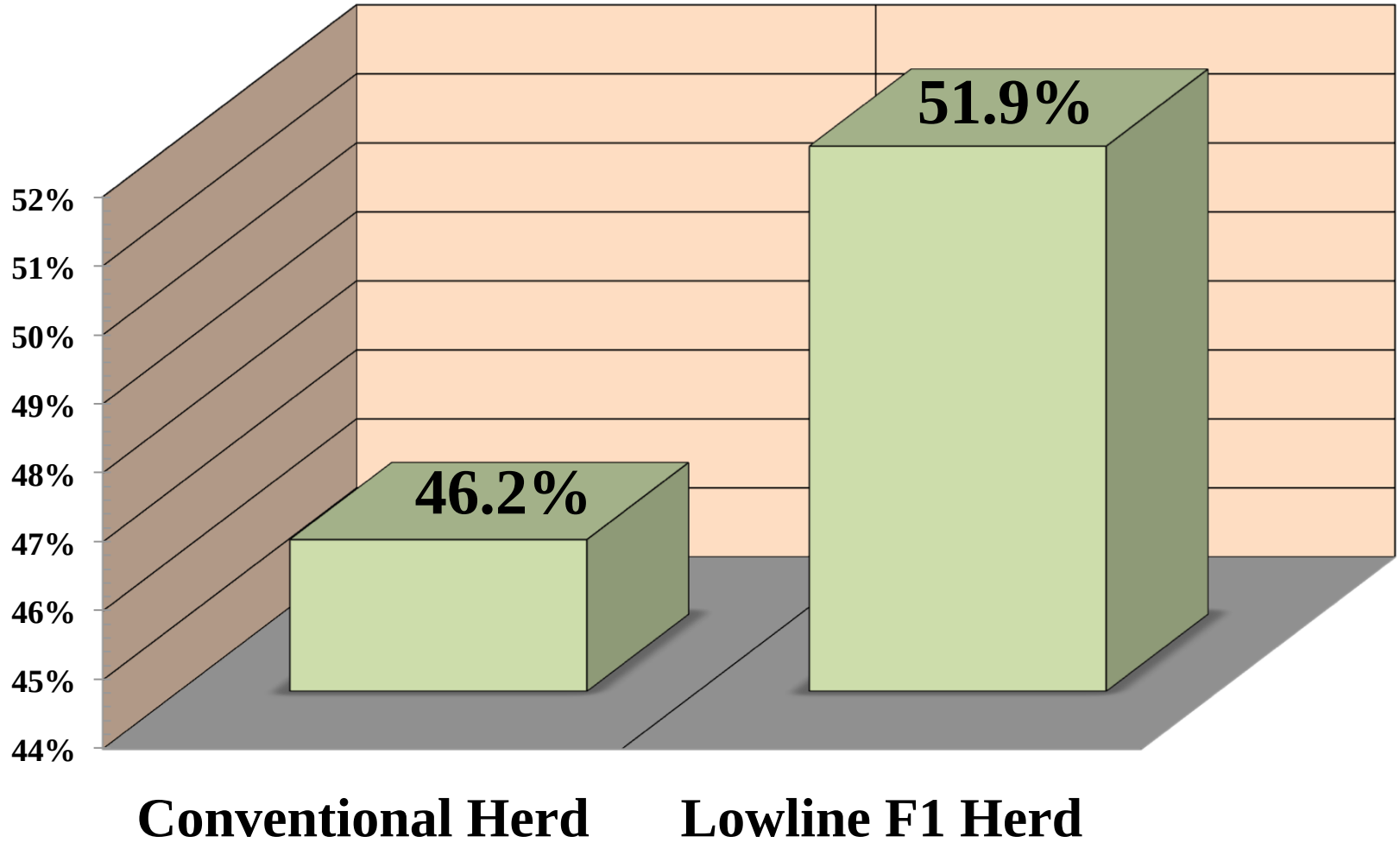
Cow and Calf Weights



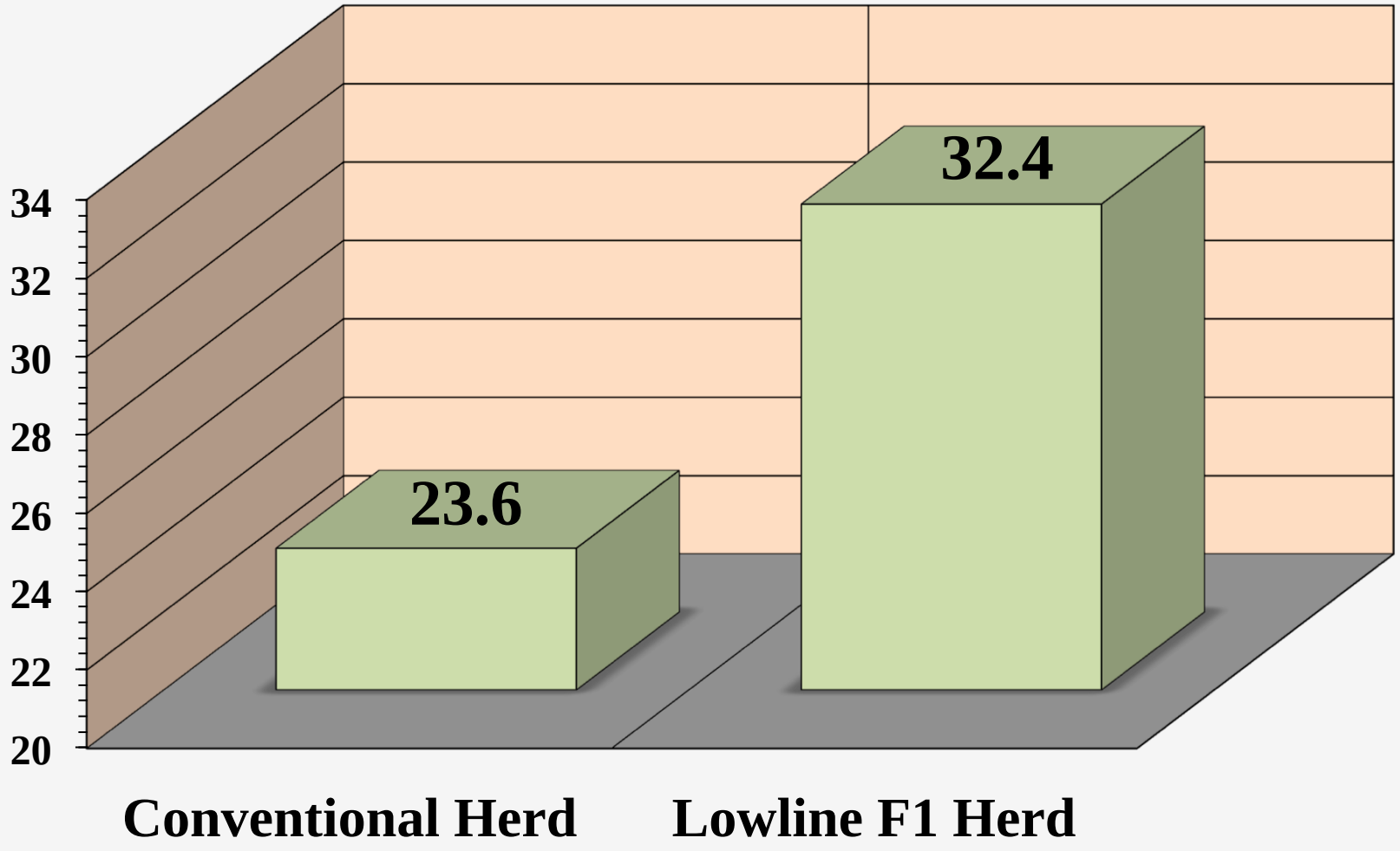
Acres/Pair



% Cow Wt Weaned



Gain/Acre


34
32
30
28
26
24
22
20
23.6
32.4
Conventional Herd
Lowline F1 Herd

Herd H38
Animal Performance

Critical Success Factors		
	Conventional 2012-2014	Lowline Influence 2012-2014
Average Daily Gain	2.52	2.09
Weight Per Day of Age	3.06	2.51
Birth Weight	89	75
Adjusted 205 Day Weight	639	535
Frame Score	5.0	3.7

Herd H38
Animal Performance

Critical Success Factors		
	Conventional 2012-2014	Lowline Influence 2012-2014
Average Age at Weaning	168	175
Steers	537	452
Heifers	487	430
Bulls	NA	NA
Average Weaning Weight	514	441
Pounds Weaned/Cow Exposed	472	394

Herd H38
Animal Performance

Critical Success Factors		
	Conventional 2012-2014	Lowline Influence 2012-2014
% Pregnant	98.23	95.50
% Pregnancy Loss	0.85	0.80
% Cows Calving	97.38	94.7
% Calf Death Loss	3.72	6.13
% Cows Weaning Calves	93.66	88.90

Herd H38
Reproductive Efficiency

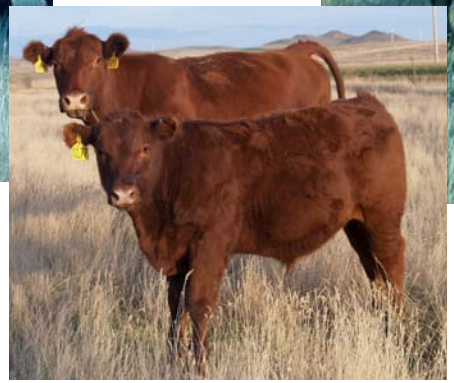
Critical Success Factors		
	Conventional 2012-2014	Lowline Influence 2012-2014
% Cows Calving in 42 Days	95.52	96.0
Cow Age	5.0	4.5
Cow Weight	1437	1094
Cow Condition	5.3	5.2

Herd H38
Animal Performance
Adjusted to Equivalent Body Weight

	Conventional	Lowline Influence	Lowline Adjusted 130%	Lowline Adjusted 120%
Cow Weight	1437	1094	1422	1313
Adjusted 205 Day WT	639	535	696	642
Lbs Weaned/Cow Exposed	472	394	512	473


Here's The Beef!

Conventional Herd Production



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Effective Use Of EPDs

BULL SELECTION WORKSHEET

BREED	RED ANGUS										
Reg. No.	Sire Name	BW	WW	YW	Milk	Marb	REA	HBI	GMI		
1617778	A079	0.7	59	97	23	0.71	0.27	113	51		
1617805	A042	-2.5	67	121	26	0.46	0.27	152	52		
1691764	B143	1.0	73	114	27	0.89	0.47	119	52		
1700517	4152	-3.7	51	76	16	0.67	0.22	150	50		
1700525	4165	-3.8	58	88	20	0.44	0.27	130	50		
1700534	4161	-2.5	58	91	21	0.50	0.35	119	50		
1717588	B83	-1.7	67	109	19	0.59	0.21	191	52		
1724651	B112	-1.3	53	87	20	0.33	0.28	94	49		
	Avg	-1.7	61	98	22	0.57	0.29	134	51	#DIV/0!	#DIV/0!
Percentile Scores For Actual EPD											
Breed 10%		-4.7	78	122	37	0.98	0.41	155	52		
Breed 30%		-2.7	67	104	24	0.59	0.23	125	50		
Breed 50%		-1.3	59	91	20	0.48	0.12	104	49		
Breed 70%		0.1	51	78	16	0.36	0.00	83	48		

Beef Cattle Systems Evaluation

We know we can put cattle through the feedyard.

So, where do the females fit?

Lowline F1 cow and Lowline influence calves

Beef Cattle Systems Evaluation

Lowline Influence

- Reduce cow size
- Reduce calving issues
- Produce more ribeye/cwt
- Produce more gain/acre
- Create management options

Beef Cattle Systems Evaluation

Reduce cow size

Conventional heifers

-- Breed Lowline

-- Males finished through traditional channels

-- Heifers are ½ Lowline x ½ conventional and become replacement heifers in terminal Lowline herd

Net result

Shave 300 pounds off cows while maintaining muscle and producing mainstream industry beef carcasses

Beef Cattle Systems Evaluation

Reduce calving issues

Conventional heifers

Data has shown that conventional heifers bred Lowline experienced much reduced calving issues.

Net result

A calf with an eye on the future; looking for milk and green grass under the care of a good mother!

Beef Cattle Systems Evaluation

More ribeye/cwt

Conventional herd

-- Lowline crossbred steers tend to produce more ribeye/cwt

Net result

Lowline crossbred cattle maintain more muscle per pound of body weight. The net result is the ability to downsize cows and maintain muscle.

Beef Cattle Systems Evaluation

More gain/acre

-- Lowline influence cows show the ability to increase total gain per acre

Net result

Additional managerial options matching the number of cows and stocking rate for land use.

Beef Cattle Systems Evaluation

Management options

-- Terminal crossbreeding system mainstreams Lowline genetics with conventional beef genetics.

-- Marketing opportunities

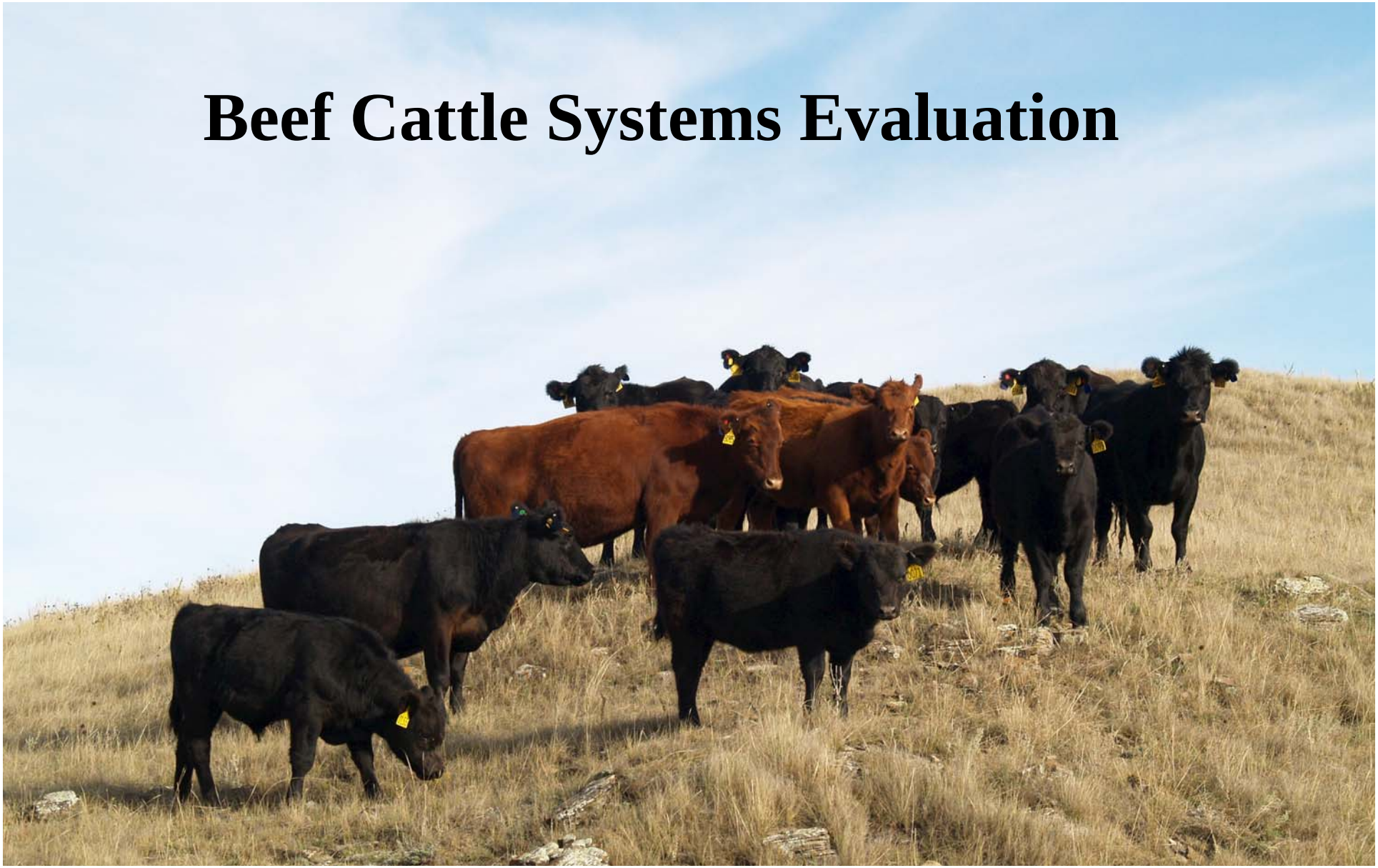
Net result

-- Establish F1 Lowline females for base cow herd

-- Breed more heifers Lowline

-- Create marketing opportunity for Lowline steers

Beef Cattle Systems Evaluation



What did we do? – Established 2 Herds

Conventional females

Lowline F1 females

Beef Cattle Systems Evaluation

How we continue!

Conventional Cows

F1 Lowline Cows

Conventional Bulls

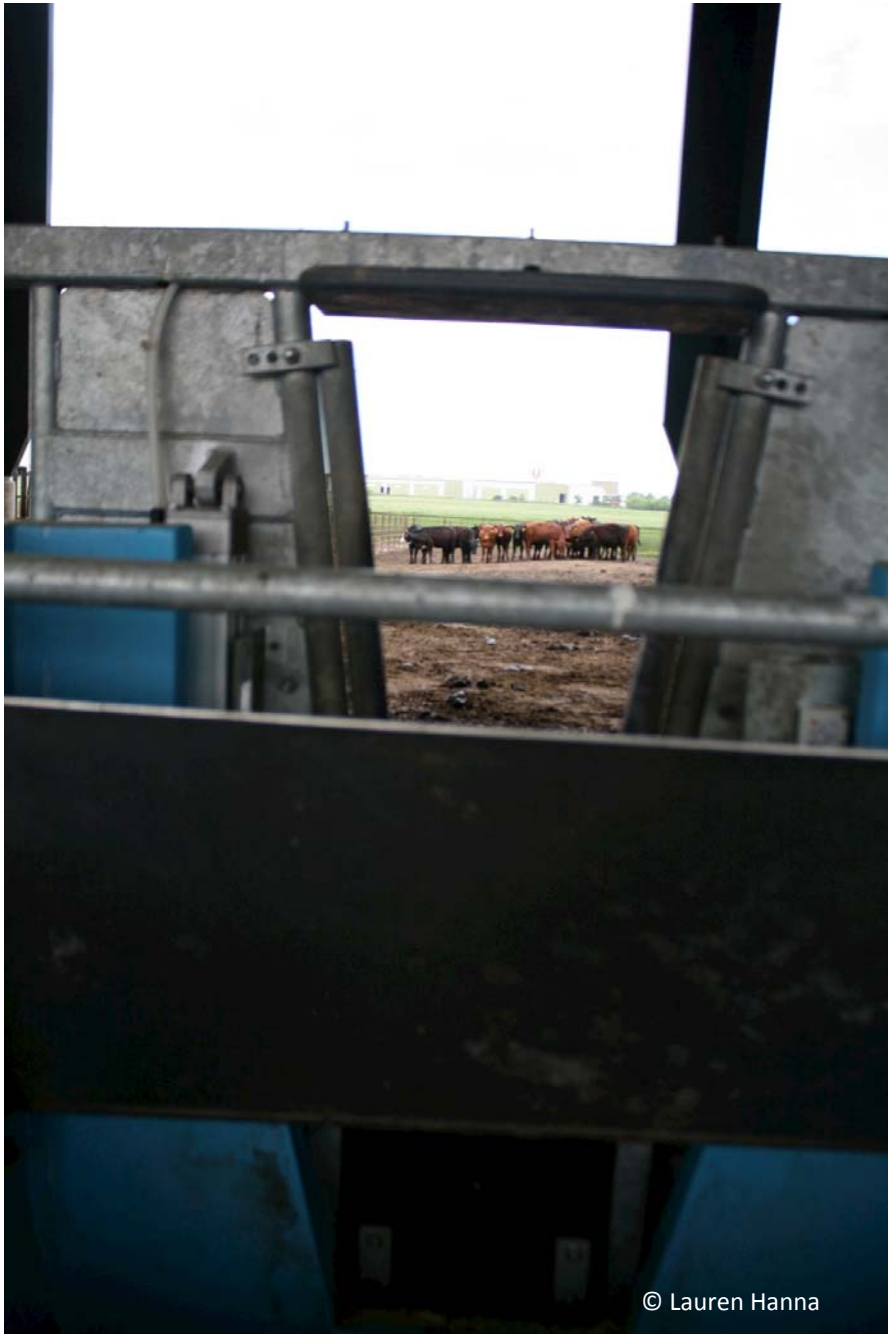
Impact of frame size, efficiency, and longevity in the commercial beef cow herd

a.k.a the "never been done before" project

A Discussion with Lauren Hanna, Ph. D.

Project Objectives

- **To identify measurable and practical criteria as preferred indicators of efficiency and longevity for potential use in genetic evaluation programs.**
- **To identify genomic regions contributing to efficiency, longevity, or both in beef cows.**
- **To determine relationship of the dam's longevity, efficiency, frame size, or a combination of these traits on progeny (steers and heifers) performance or value.**



Current Progress

2014 born heifers

Data Collection Initiated

Summer 2015:

- Feed Trial
- Breeding at NDSU Beef Cattle Research Center (BCRC)
- Trait Data Collection Begins

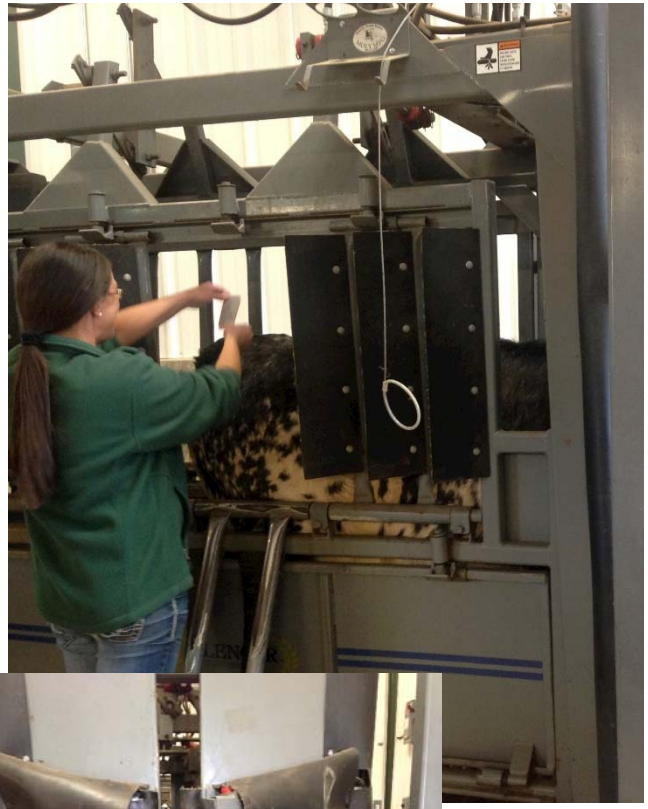
Current Progress

Data Traits Collected

- Feed intake, feeding behavior, weights/gains
- Reproductive characteristics (follicle counts, ovary characteristics, reproductive tract score, uterine characteristics, pregnancy status, estrus behavior)
- Docility score, udder characteristics, frame score, body measurements, carcass ultrasounds

Current Progress

- Heifers are currently on winter pasture at DREC
- 2014 heifers + parents are being genotyped on 150K SNP chip
- Current data on 2014 heifers is being processed for information to assist with future heifer collections
- Sample size is biggest limitation currently, as more heifers will be added in subsequent years of the project.



Future Plans

Development of project herd

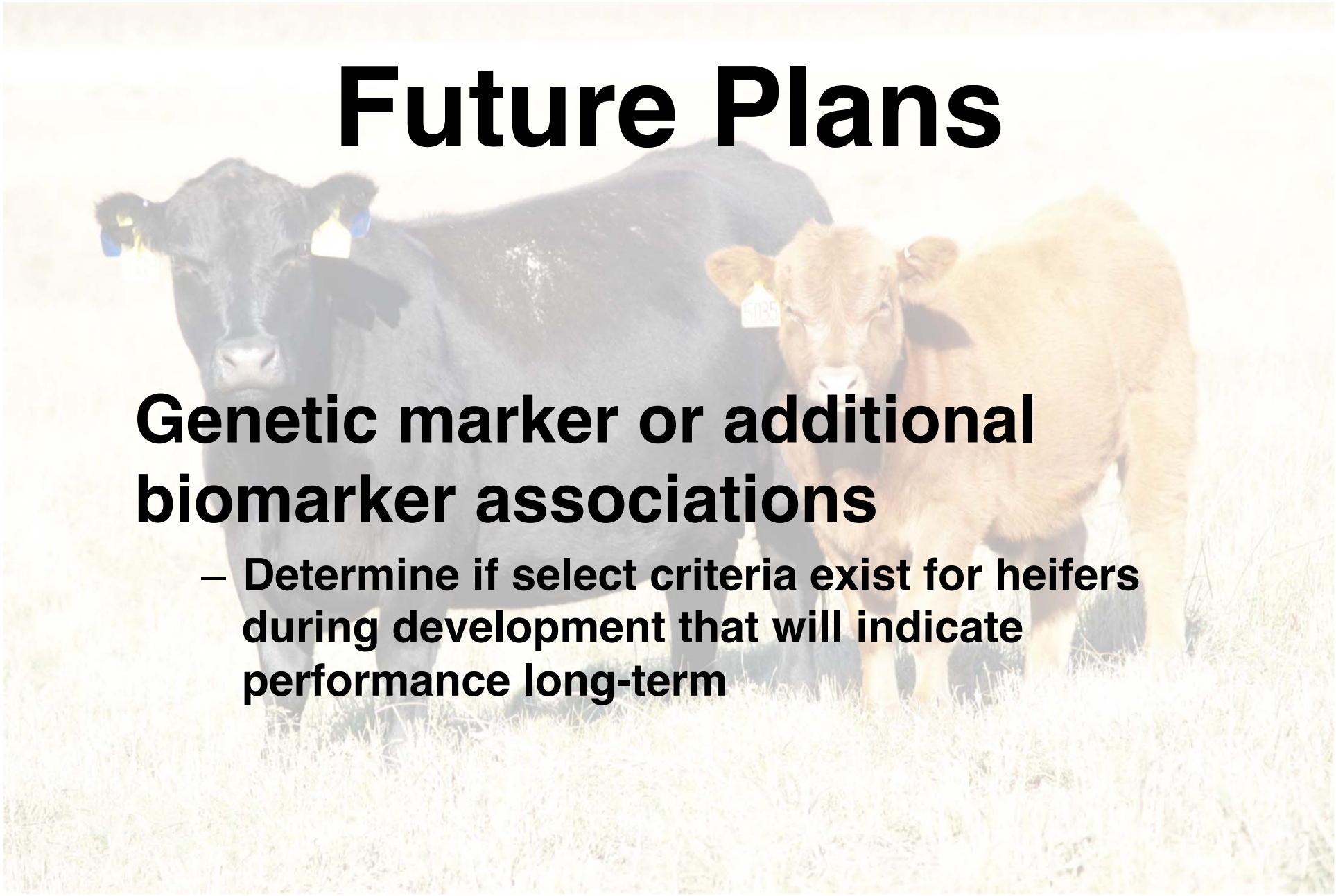
2014, 2015 and 2016 born heifers will be selected based on attributes collected during feeding trial and first breeding

Future Plans

Characterization of progeny (steers and heifers) from project herd

- **Feed efficiency + performance attributes (i.e., carcass) from steers**
- **Feed efficiency, longevity, reproductive efficiency attributes from heifers**
- **Understand relationship of these characteristics with dam type/performance records**

Future Plans



Genetic marker or additional biomarker associations

- Determine if select criteria exist for heifers during development that will indicate performance long-term

2014 Heifer Summary

Average ± Standard deviation							
	n	Docility Score	Frame Size	ADG	iBWT	fBWT	G:F
Lowline Influence Heifers	49	2.98 ± 0.75	4.34 ± 1.00	3.57 ± 0.97	690.85 ± 72.17	833.93 ± 104.89	0.18 ± 0.04
Conventional Heifers	40	2.63 ± 0.77	6.42 ± 0.57	3.24 ± 0.75	810.09 ± 80.95	991.63 ± 94.77	0.17 ± 0.03

2014 Heifer Summary

Average ± Standard deviation							
	n	IMF	REA	CPYG	RIB FAT	RUMP FAT	# PREG
Lowline Influence Heifers	49	0.25 ± 0.48	1.40 ± 0.73	0.13 ± 0.15	0.05 ± 0.06	0.08 ± 0.08	46
Conventional Heifers	40	0.18 ± 0.68	1.07 ± 0.93	0.05 ± 0.14	0.02 ± 0.06	0.02 ± 0.05	36

Winter 2016 Cows

	Fall Weight	Winter Wean Weight	Fall BCS	Winter BCS	Weight Loss
Conventional Cows	1473	1400	5.3	4.6	-.92 lb/ day
Lowline Influence Cows	1230	1168	5.4	4.5	-.67 lb/ day

Winter 2016 Calves

	Fall Weight	Winter Wean Weight	Weight Gain/Day	Hip Height
Conventional Cows	534	609	1.19	44.8
Lowline Influence Cows	443	540	1.31	42.6

Beef Cattle Systems Evaluation

Beef Cattle Systems Evaluation

Thoughts

Conventional females

Lowline females

Beef Cattle Systems Evaluation

Thoughts

Conventional bulls

Work on cows

Lowline bulls
F1 & High %

Work on heifers

Beef Cattle Systems Evaluation

Foundation breed improvement & stability

¾ heifer herd about one-half size of F1 heifer herd!

Outcome
Transition to PB herd

Breed Lowline

Outcome
¾ Lowline

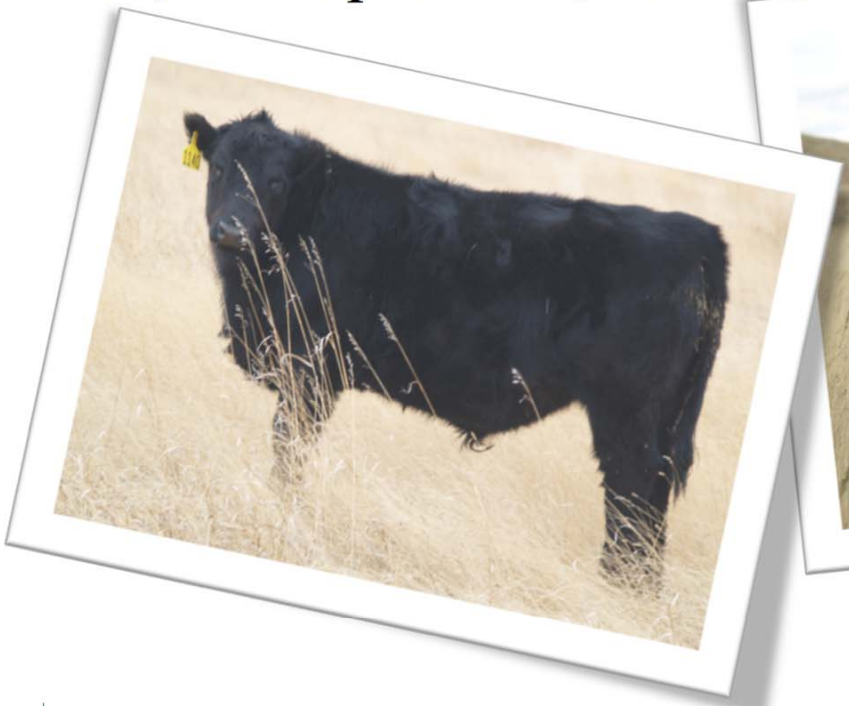
Breed Lowline

Beef Cattle Systems Evaluation

Thoughts

There are opportunities in the beef business.

You, as the producer, set the course for the future!



Beef Cattle Systems Evaluation

Lowline Influence

- Reduce cow size
- Reduce calving issues
- Produce more ribeye/cwt
- Produce more gain/acre
- Create management options

Thank you

for your interest and your dedication to growing the beef cattle industry!