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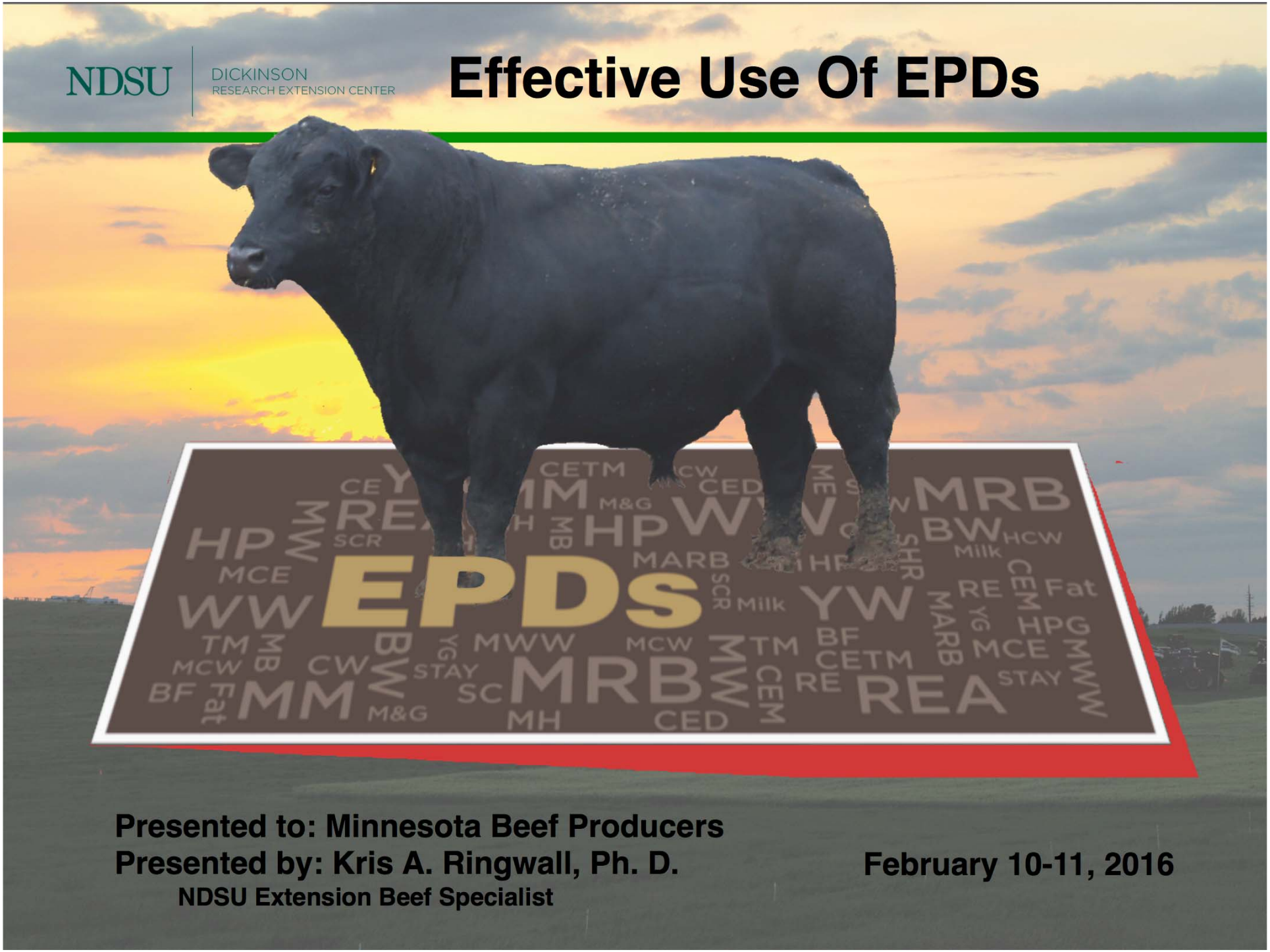
Effective Use Of EPDs



Presented to: Minnesota Beef Producers

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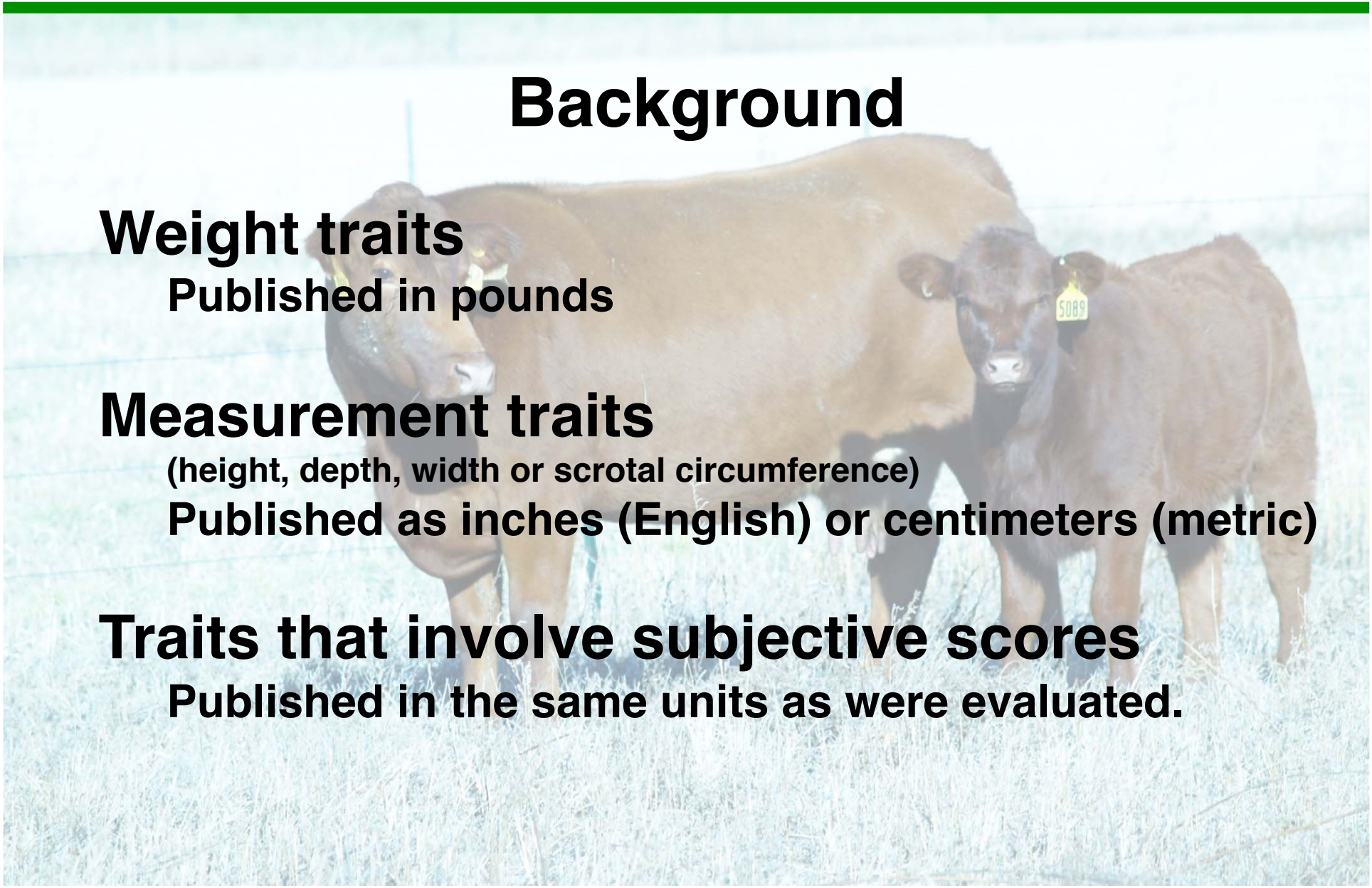
Effective Use Of EPDs

Background

EPDs have been available for more than 30 years.

The use of EPD technology can be a key component of meeting current and future beef production demands.

EPD usage requires beef producers establish goals for their operation.



Background

Weight traits

Published in pounds

Measurement traits

(height, depth, width or scrotal circumference)

Published as inches (English) or centimeters (metric)

Traits that involve subjective scores

Published in the same units as were evaluated.

Effective Use Of EPDs

Estimated Progeny Differences (EPDs)

Predictions of the genetic transmitting ability of a parent to its offspring

= Numerical representations based on actual measurements and genomic information for traits on the animal or related animals.

= Predictions refined to provide the best prediction possible to help guide sire selection and are presented in the same units of the trait being measured.

Effective Use Of EPDs

Background

How to Read EPD Chart

Trait

Accuracy

Percentile Rank

Sample Angus EPD Chart

Production							
CED Acc % Prog	BW Acc % Prog	WW Acc % Prog	YW Acc % Prog	RADG Acc % Prog	DMI Acc % Prog	YH Acc % Prog	SC Acc % Prog
+11 .38 15%	-.3 .44 15%	+49 .33 55%	+90 .36 50%	+.22 .35 35%	-.06 .35 15%	+.3 .47 75%	+1.16 .46 30%

Sample Red Angus EPD Chart

	HerdBuilder	GridMaster	CED	BW	WW
EPD	79	50	4	-1.3	52
ACC			30	33	28
PCTL	66%	34%	51%	35%	63%

Effective Use Of EPDs

What is ACC (Accuracy)?

ACC (Accuracy) reflects the precision of a prediction for a given animal's EPD. Accuracy increases as more data is available. As accuracy approaches 1, the EPDs are more reliable and will change little with additional progeny. Bulls with greater accuracy values may be called "proven sires."

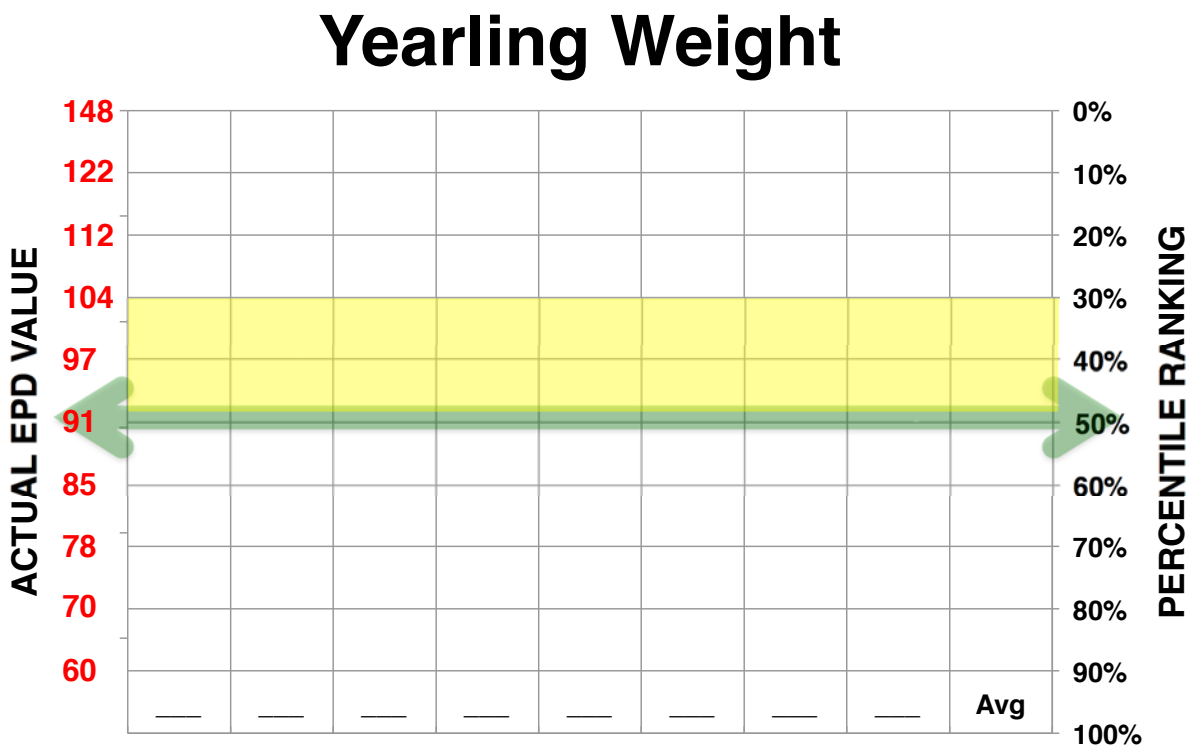
Genomic (DNA) sampling can improve the accuracy for younger bulls. A DNA sample, depending on the trait, typically equates to about 10 progeny records. As more progeny data is obtained, the relative contribution of genomic data to overall EPD accuracy is reduced.

The EPD prediction of genetic merit for a trait is the best indicator of expected performance of future progeny. Recognizing that base values may be different among breeds is important; some breeds use an average within a specific year, whereas other breeds use a nonspecific historical point.

Effective Use Of EPDs

What is Percentile (%) Score?

Percentile rankings are a powerful tool to see how the actual EPD for a bull ranks within the breed. Percentile scores are an easy reference and tells how a bull ranks for each individual trait against other sires in the breed. The Lower the percentile ranking the better for an individual animal.



Effective Use Of EPDs

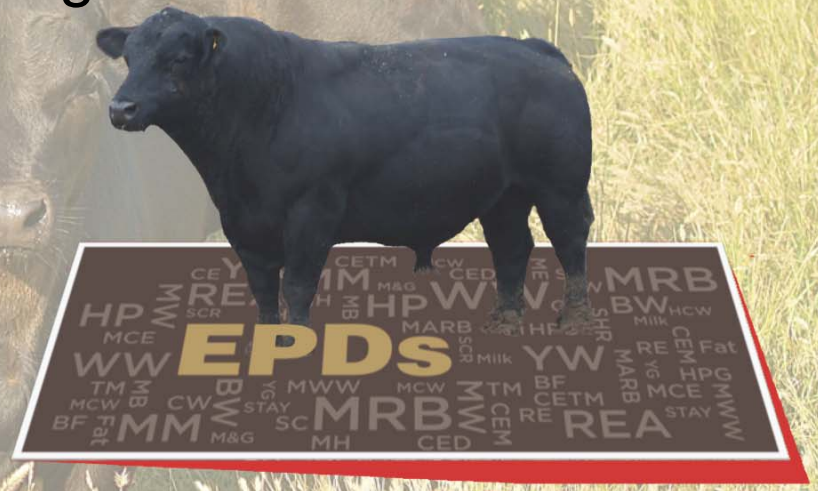
Which EPD Values Should I Use?

The answer depends on the goals and current production status of your herd!

Effective Use Of EPDs

Define Your Management Goals

- ❑ Sell calves off cow
- ❑ Background calves
- ❑ Run calves on grass as yearlings
- ❑ Retain ownership to the rail
- ❑ Raise replacement females
- ❑ Sell cow-calf pairs
- ❑ Other



Effective Use Of EPDs

Factors to evaluate when selecting genetics

Critical evaluation of recent management decisions

- ❑Calf crops
- ❑Calving events
- ❑Subsequent calf production areas impacted by the selection of breeding bulls
- ❑Areas for improvement.

Other considerations:

- ❑Feed resources
- ❑Environmental conditions (weather, terrain, average moisture, etc.)
- ❑Labor availability

Effective Use Of EPDs

How Do I Use EPDs In Bull Selection?

Bull	CED	BW	WW	YW	CEM	Milk	HP	CW	REA	FAT	MARB	$B
A	4	-1.2	45	112	9	27	20	78	1.05	0.034	0.17	131.25
B	-2	5	57	138	17	17	15	88	0.67	0.05	0.42	147.56

Using EPDs to compare bulls of the same breed is a simple mathematical equation. Subtract the EPD values and look at the difference.

If Bull A has a weaning weight EPD of plus 45 and Bull B has a weaning weight EPD of plus 57, calves from Bull B should average 12 pounds heavier at weaning than those calves sired by bull A (57 – 46 = 12).

If Bull A has a yearling weight EPD of plus 112 and Bull B has a yearling weight EPD of plus 138, calves from Bull B should average 26 pounds heavier at a year of lage than those calves sired by Bull A (138 – 112 = 26).

Check these numbers by weighing the calves. The results may not be exact, but through time, the genetic trend will express the desired selection and the calves will perform as expected.

Other traits are the same. Use this method to calculate difference in all traits wanted to evaluate.

Effective Use Of EPDs

BW = birth weight: This is the expected difference in birth weight of a bull's progeny expressed as pounds of calf. The greater the number, the heavier the calf will be at birth.

CE or CED = calving ease or calving ease direct: This is the expected difference in percentage of unassisted births from a bull when mated to 2-year-old heifers. A higher value indicates greater calving ease in first-calf heifers.

WW = weaning weight: This is the expected difference in adjusted weaning weights of a bull's progeny in pounds. The greater the number, the heavier the calves at weaning.

YW = yearling weight: This is the expected difference in adjusted yearling weights of a bull's progeny in pounds. The greater the number, the heavier the calves as yearlings.

Effective Use Of EPDs

CETM, CEM or MCE = calving ease total maternal, calving ease maternal or maternal calving ease: This is the expected difference in the percentage of unassisted births of that bull's daughters. A higher value indicates greater calving ease in first-calf daughters.

Milk or MM = milk or maternal milk: This is the expected difference in the amount of pre-weaning body weight gained by calves that can be attributed to the milking ability of a bull's daughters. The greater the number, the more pounds due to milk production from that bull's daughter.

Effective Use Of EPDs

TM, MWW, M&G = total maternal, maternal weaning weight or maternal milk and growth: Each of these terms measures a sire's ability to transmit milk production and growth rate to weaning through his daughters. It is the expected difference in the weaning weight of the sire's daughters' calves, in pounds, calculated as the milk EPD plus half of the WW EPD of that bull.

MW, MCW = mature weight or mature cow weight: These are a predictor of the difference in mature weight of daughters of a sire, expressed in pounds. The greater the number, the heavier you can expect the progeny to be at maturity.

Effective Use Of EPDs

ME = maintenance energy: This indicates differences in mature cow maintenance energy requirements, expressed in megacalories/month. Greater numbers indicate more feed inputs required to maintain body condition in progeny.

HP, HPG = heifer pregnancy: This is the expected difference in the probability of female progeny for a bull conceiving as 2-year-olds. Greater numbers are desired if the goal is to have daughters from a bull with a greater probability of being pregnant and calving as 2-year-old heifers.

STAY = stayability: This represents differences in the percent of the probability of a bull's daughters staying productive past age 6. The greater the number, the longer you could expect female progeny of a bull to remain in the herd.

Effective Use Of EPDs

MH = mature height: This is a predictor of the difference in mature height of a sire's daughters, expressed in inches. The greater the number, the taller/larger framed the progeny will get.

SC or SCR = scrotal circumference: This is the expected difference in adjusted yearling scrotal circumferences of a bull's progeny, in centimeters.

Effective Use Of EPDs

Fat, BF = fat or back fat: This is the expected difference in adjusted fat thickness at the 12th rib of a sire's progeny, expressed in inches. Lower numbers indicate leaner carcasses. Greater number indicates a greater fleshing ability of progeny, compared with a lower number.

MB, MRB, MARB = marbling: This is the expected difference in adjusted marbling score of a sire's progeny, expressed in percent. A greater number indicates a greater potential quality grade.

YG = yield grade: It is expressed as the expected difference in the deviation of yield grade units for a bull's progeny. A lower number would move progeny, on average, toward lower numerical yield grades than the population average. Yield Grade 1 equates to more red meat yield, and Yield Grade 5 equates to less red meat yield.

Effective Use Of EPDs

SHR = shear force: This is the expected difference in pounds of force required to shear a steak from a bull's progeny. Lower values indicate less force to cut through a steak, and, therefore, more tender meat.

REA or RE = rib-eye area: This is the expected difference in adjusted rib-eye area of a sire's progeny, measured in square inches. Selecting for larger REA EPD will emphasize heavier muscled progeny.

Effective Use Of EPDs

Selection indices are designed to match production goals for a set of traits identified to have production importance in the industry. Once identified, extensive research investigates individual traits that should be included by collecting and analyzing performance records to determine economic weights for traits involved.

These economic weights are used to create a specific selection index. These are reported as dollar values to indicate the amount of profit or savings the producer could expect when utilizing that index.

Comparing two bulls using a selection index or selection indices is very similar to using EPD comparisons, but it allows a producer to evaluate a single number that combines several traits to meet a focused goal.

Effective Use Of EPDs

Indices have specific goals. Some are meant for specific breed or type of crossing. Some are for producers selling calves at weaning or retaining ownership through the feedlot phase. Some are holistic in nature for producers with long-term herd goals that manage cattle from conception to harvest. To demonstrate the variety of indices available, here are several examples from selected breeds:

American Angus Association

Cow Energy Value ($EN)

An index value expressed in dollar savings per cow per year, assesses differences in cow energy requirements as an expected dollar savings difference in daughters of sires. A larger value is more favorable when comparing two animals (more dollars saved on feed energy expenses). Components for computing the cow $EN savings difference include lactation energy requirements and energy costs associated with differences in mature cow size.

Effective Use Of EPDs

American Angus Association

Weaned Calf Value ($W)

An index value expressed in dollars per head, is the expected average difference in future progeny performance for pre-weaning merit. $W includes revenue and cost adjustments associated with differences in birth weight, weaning direct growth, maternal milk and mature cow size.

Beef Value ($B)

An index value expressed in dollars per head, is the expected average difference in future progeny performance for post-weaning and carcass value, compared with progeny of other sires.

Effective Use Of EPDs

American Angus Association

Feedlot Value ($F)

An index value expressed in dollars per head, is the expected average difference in future progeny performance for post-weaning merit compared to progeny of other sires.

Grid Value ($G)

An index value expressed in dollars per head, is the expected average difference in future progeny performance for carcass grid merit compared to progeny of other sires.

Effective Use Of EPDs

American Angus Association

Quality Grade ($QG)

$QG represents the quality grade segment of the economic advantage found in $G. $QG is intended for the specialized user wanting to place more emphasis on improving quality grade. The carcass marbling (Marb) EPD contributes to $QG.

Yield Grade ($YG)

$YG represents the yield grade segment of the economic advantage found in $G. $YG is intended for the specialized user wanting to place more emphasis on red meat yield. It provides a multi-trait approach to encompass ribeye, fat thickness and weight into an economic value for red meat yield.

American Red Angus Association

HerdBuilder Index (HB)

An index using Red Angus bulls mated to cows and heifers, with replacement heifers retained from within the herd and all remaining progeny sold on a quality-based carcass grid. By using the HerdBuilder Index, producers can increase the sustainability of the cowherd and, ultimately, their operation.

GridMaster Index (GM)

An index built using the Red Angus bulls mated to cows and all progeny sold on a quality-based carcass grid. The GridMaster Index is for producers whose primary goal is to maximize profitability of feeders in the feedyard and on the rail.

Effective Use Of EPDs

American Simmental Association

All-Purpose Index (API)

An index that evaluates sires for use on the entire cow herd (bred to Angus first-calf heifers and mature cows), with the portion of their daughters required to maintain herd size retained and the remaining heifers and steers put on feed and sold on grade and yield.

Terminal Index (TI)

An index that evaluates sires for use on mature Angus cows, with all offspring put on feed and sold on grade and yield.

Effective Use Of EPDs

American Hereford Association

Baldy Maternal Index (BMI$)

An index to maximize profit for commercial cow-calf producers who use Hereford bulls in rotational crossbreeding programs on Angus-based cows. Retained ownership of calves through the feedlot phase of production is maintained and the cattle are to be marketed on a certified Hereford beef (CHB) pricing grid.

Certified Hereford Beef Index (CHB$)

A terminal sire index in which Hereford bulls are used on British-cross cows and all offspring are sold as fed cattle on a CHB pricing grid. This index places no emphasis on milk or fertility because all cattle will be terminal. This index promotes growth and carcass.

Effective Use Of EPDs

American Gelbvieh Association

Cow ($Cow)

An index of value expressed in dollars for a replacement female relative to other animals in the herd. $Cow includes stayability, reproductive efficiency, milk, calving ease, moderate mature weight, calf gain feedlot feed efficiency and carcass value.

Feeder Profit Index (FPI)

An economic selection index designed to aid producers in selecting sires whose progeny will perform in the feedlot and are sold on grade and yield. Well-ranking sires for FPI have higher marbling and carcass weight than their contemporaries.

Effective Use Of EPDs

American Shorthorn Association

Calving Ease ($CEZ)

An index of value expressed in dollars relative to calving ease among heifers.

British Maternal Index ($BMI)

An index that considers calving ease direct, weaning weight, yearling weight, milk and marbling as it relates to cow performance.

Feedlot Index ($FI)

An index that considers calving ease direct, yearling weight, marbling and ribeye as it relates to animal performance.

Effective Use Of EPDs

North American Limousin Foundation

Mainstream Terminal Index (MTI)

An multiple-trait selection index of value expressed in dollars per head, designed to assist beef producers by adding simplicity to genetic selection decisions. It measures differences in expected profit per carcass produced on a main- stream grid (yield grade 1 or 2, Select to low-Choice quality grade, and no over- or underweights or dark cutters).

Effective Use Of EPDs

American International Charolais Association

Terminal Sire Index (TSI)

The AICA Terminal Sire Index (TSI) is a formal method of combing Expected Progeny Differences (EPD) – BWT, WWT, YWT, REA, HCW, MARB and FAT – into one single value on which to base selection decisions. The TSI uses estimates of the genetic relationships between traits with an economic default value based on three year rolling USDA data. The TSI represents a dollar index per terminal progeny produced for a bull in the AICA database, ranking them for profit potential. This dollar index is to be interpreted much like single trait EPD.

Effective Use Of EPDs

Which Bull Would You Use?

Bull	CE	BW	WW	YW	MCE	Milk	TM	SC	HCW	REA	Fat	Marb
A	10.5	-5.4	13	27	4.1	19	26	0.6	4	.19	-.009	.04
B	9.0	-2.3	36	62	5.9	6	24	1.4	47	.53	.034	.11
Breed average	3.1	0.7	24.4	43.8	4.0	7.9	20.1	0.6	14.7	0.26	0.002	0.04

Need: **A bull for mature black baldy cows which have had at least two calves.**

Desired Outcome: Keep calving ease on terminal cross calves that will sell at weaning or after a backgrounding period and have the benefit of enhanced weight sale day.

Both bulls are above average in CE and BW but not a concern because the cows are mature baldy females. The emphasis in selecting would be put on WW EPD alone.

Bull B calves should be 25 pounds heavier at weaning. This is a large difference and important to consider. This is a terminal crossand no heifers will be retained, so maternal calving ease can be ignored.

DOES IT MAKE SENSE TO SELECT "BULL B?"

Effective Use Of EPDs

Which Bull Would You Use?

Bull	CE	BW	WW	YW	MCE	Milk	MWW	Stay	CWT	REA	BF	Marb
A	18.1	-3.7	56.5	70.8	13.9	35.3	63.4	26.8	5.5	0.8	-0.036	0.08
B	1.1	7	97.4	147.4	6.5	14.7	63.3	15.9	66.9	0.81	-0.047	-0.15
Breed average	8.7	1.9	62.8	91.7	9.4	21.5	52.8	20.5	26.9	0.77	-0.057	0.13

Need: **A Simmental influence herd, cows and heifers are managed as one in breeding season.**

Desired Outcome: Expand herd through heifer retention, hoping to produce females that calve easily and have the longevity to grow old in the herd.

Emphasis would be put on CE, BW and MCE. Bull A should have 17 percent more unassisted births and calves that are 10.7 pounds lighter in 2-year-old heifers and 7.4 percent more unassisted births in his daughters as 2-year-old heifers.

Bull A staybility EPD is 10.9 percent better, benefiting longevity goals. Bull A steers may be lighter but his daughters should perform because of Milk and MWW EPDs.

DOES IT MAKE SENSE TO SELECT "BULL A?"

Effective Use Of EPDs

Which Bull Would You Use?

Bull	CED	BW	WW	YW	CEM	Milk	HP	CW	REA	Fat	MARB	$B
A	1	3.2	71	117	12	24	19	85	0.79	0.051	0.25	112.90
B	-11	4.2	62	111	1	32	17	58	0.99	0.085	0.45	112.93
Breed average	5	1.5	50	89	8	24	10.4	31	0.49	0.015	0.51	104.67

Need: . A bull for a straight-bred Angus herd where the producer retains ownership through a finishing phase.

Desired Outcome: Calves are placed on high-concentrate diets and the goal is to develop calves that provide the greatest carcass value.

The $B index is nearly identical for the two bulls. Goals need to be more clearly defined. A comparison of BW, WW and YW traits shows differences. Bull A is stronger here. If cow herd is strong in marbling and ribeye area traits, then Bull A may be the better candidate. Bull B is stronger in CW, MARB, REA and FAT EPDs. If the base cow herd is strong in calving and growth characteristics, then Bull B likely may be the better choice.

"BULL A" or "BULL B" will work. Base your decision on EPD study!

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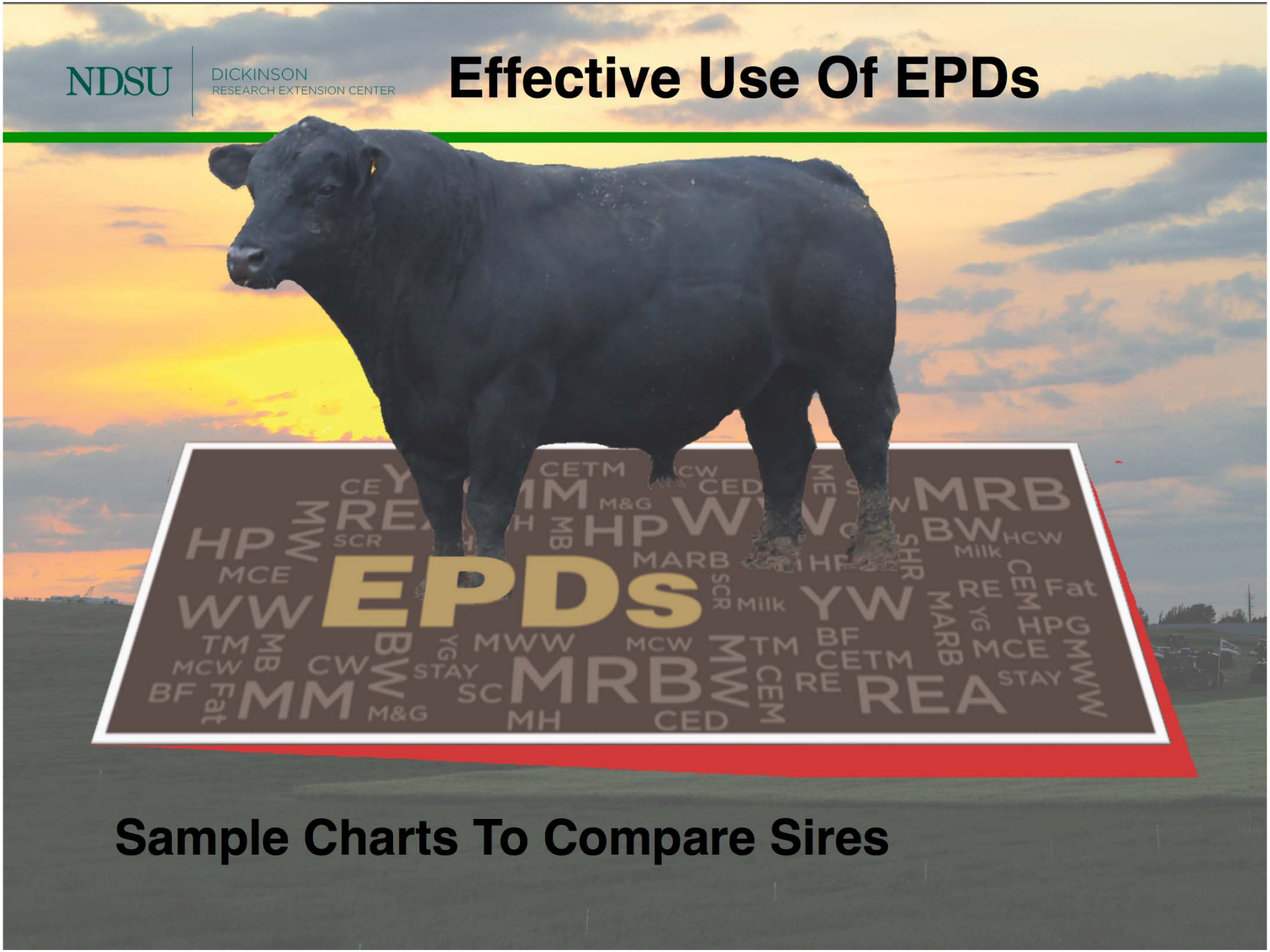
Effective Use Of EPDs



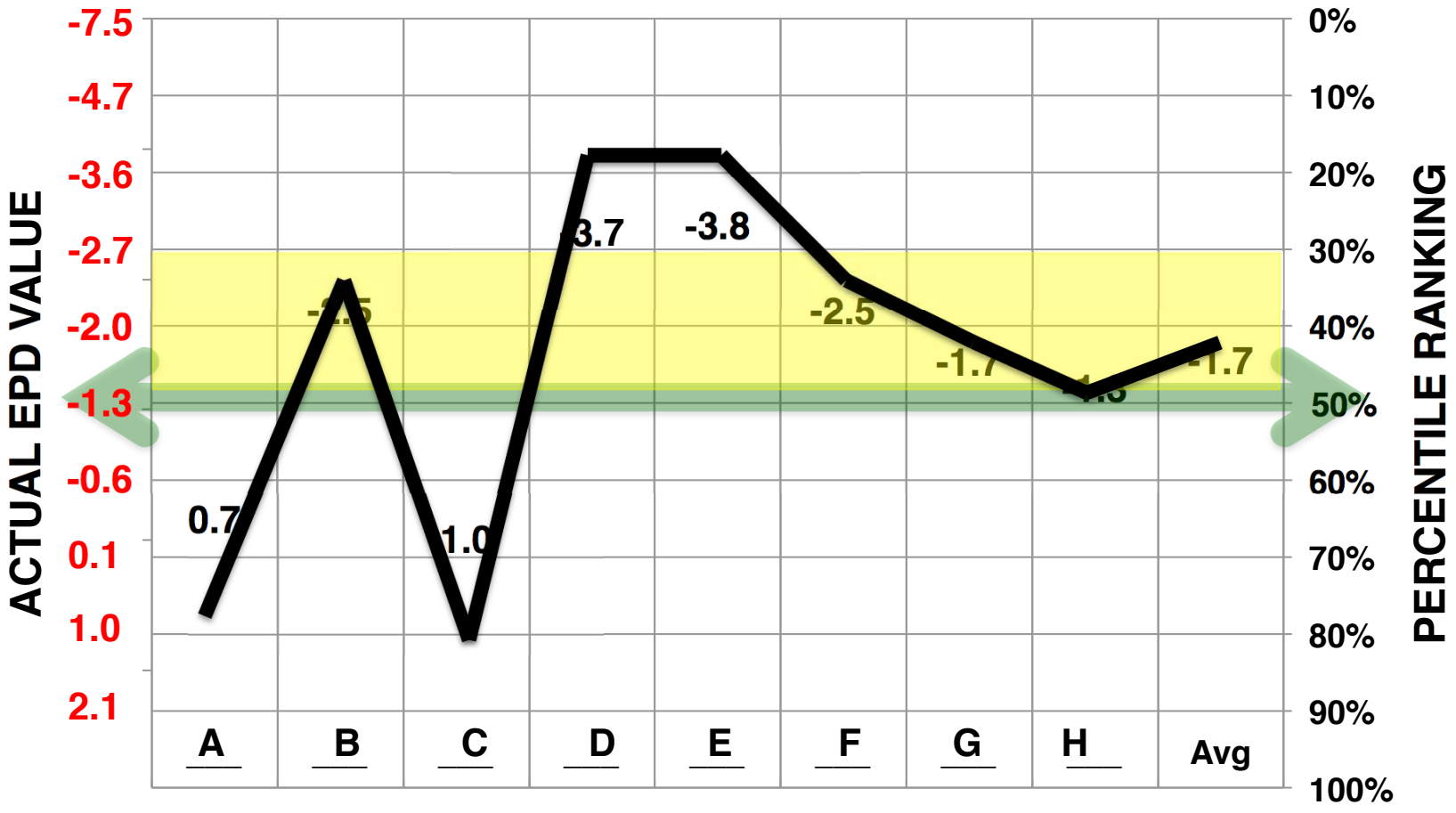
Sample Charts To Compare Sires

Effective Use Of EPDs

BREED	DREC 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		
1724745	B069	-1.7	52	71	21	0.05	0.15	69	47		
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	-1.6	60	95	22	0.52	0.27	127	50	######	######
Percentile Scores For Actual EPD											
Breed 10%		-1.1	63	111	30	0.84	0.8	13.48	67.31		
Breed 30%		0.4	55	98	26	0.61	0.58	-0.35	54.32		
Breed 50%		1.3	50	90	24	0.47	0.42	-8.21	46.16		
Breed 70%		2.2	44	80	21	0.34	0.26	-15.25	37.78		

Effective Use Of EPDs

Birthweight



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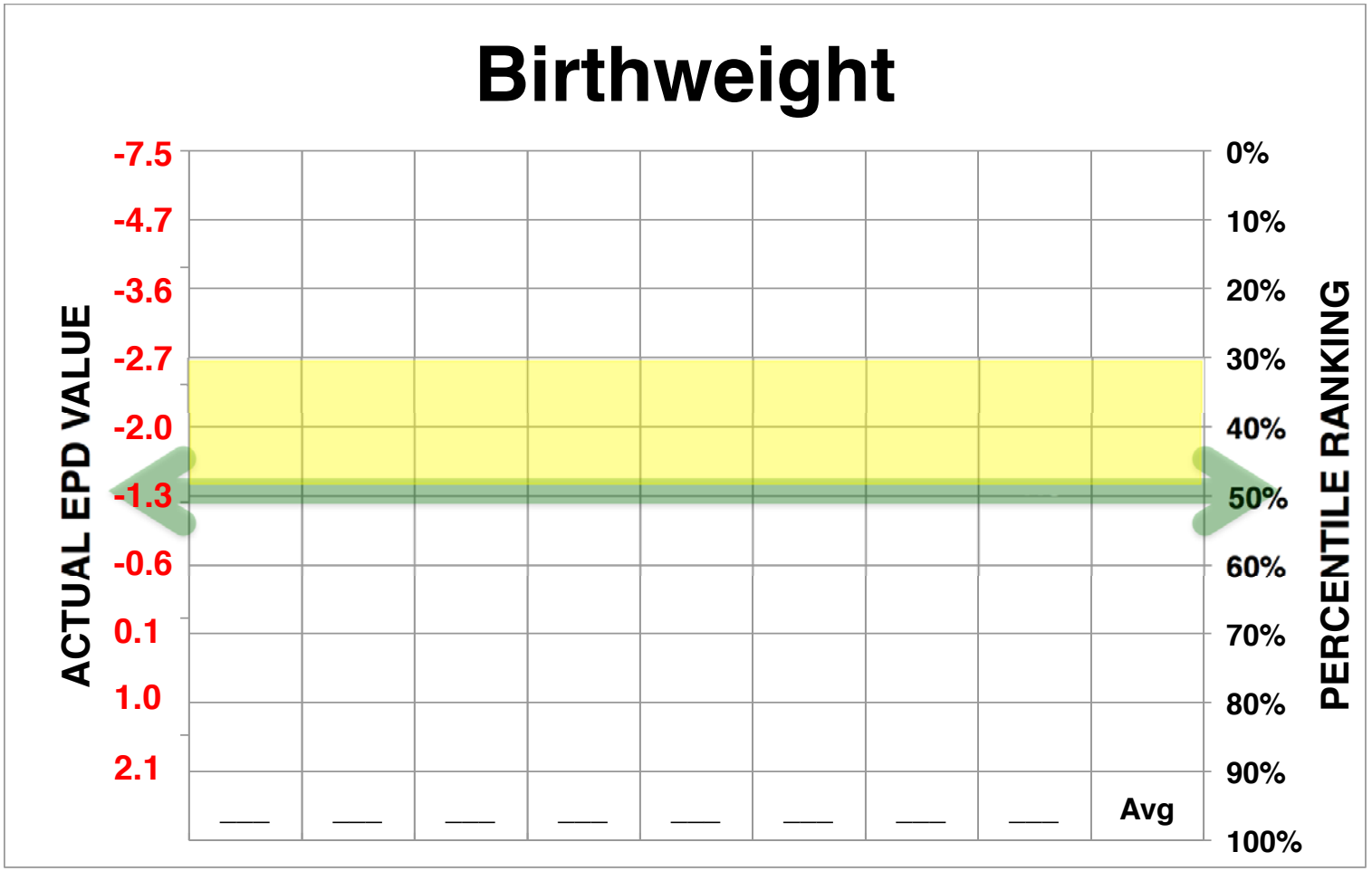
RED ANGUS BULL EVALUATION FORM



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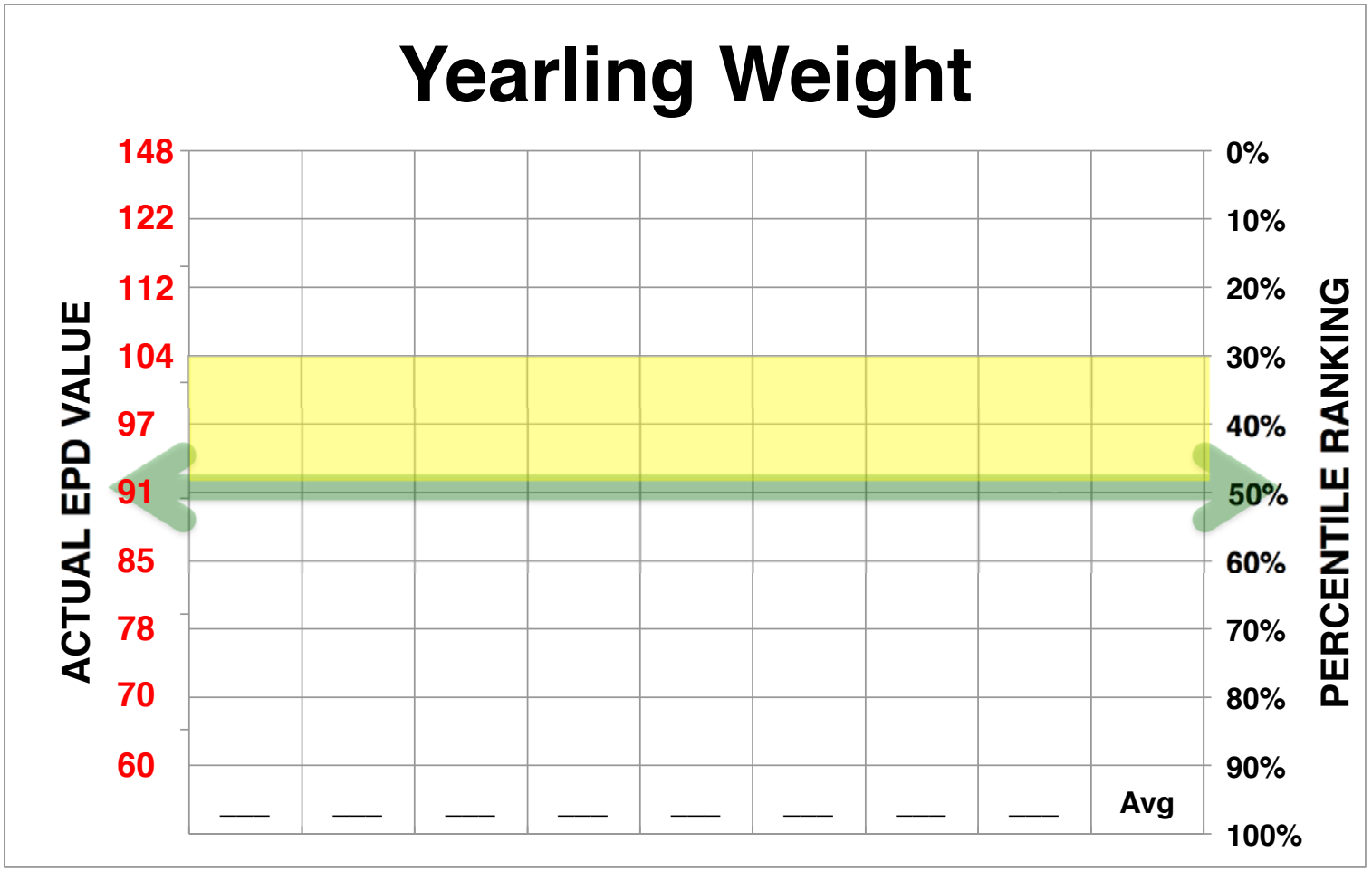

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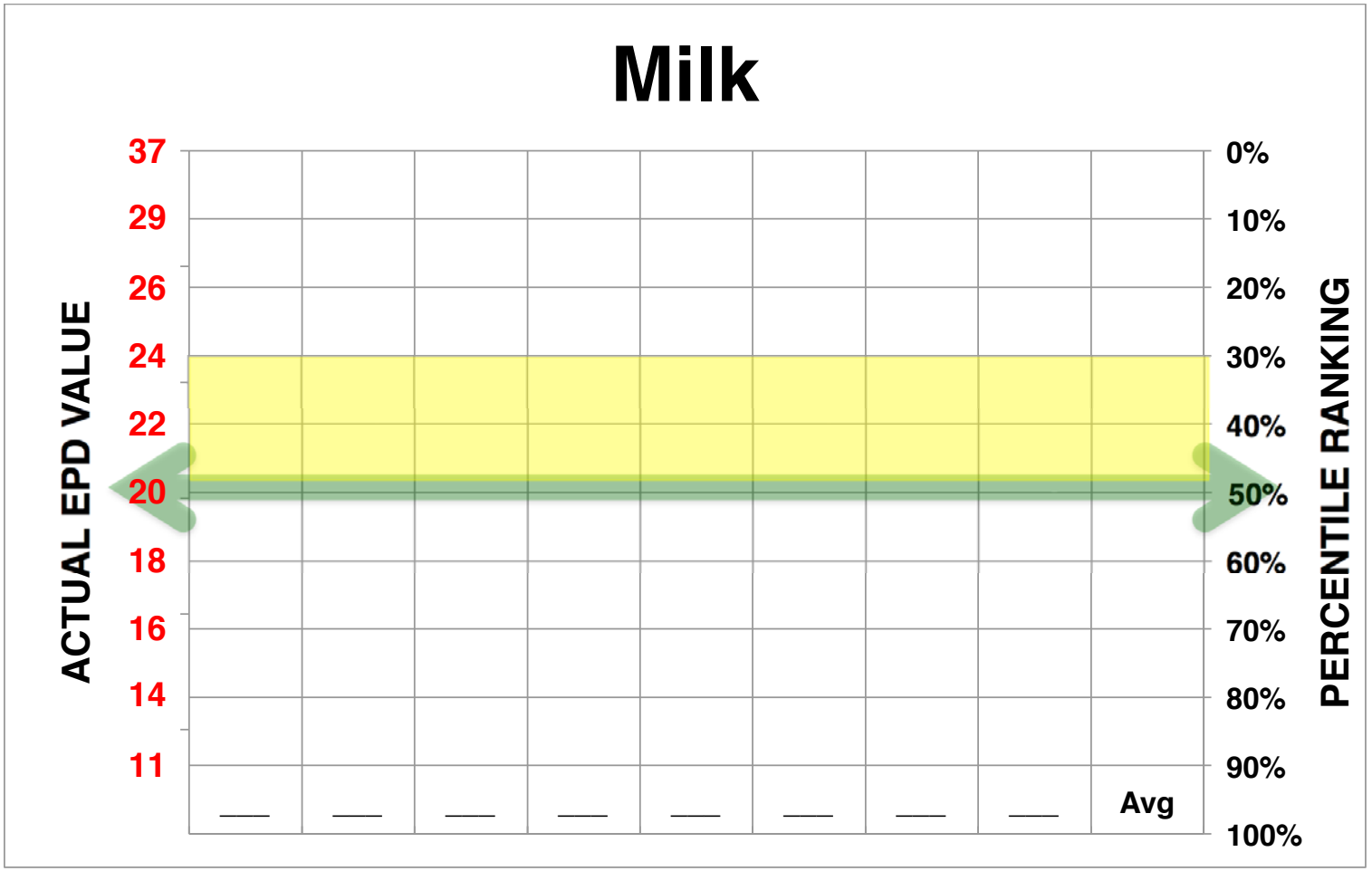

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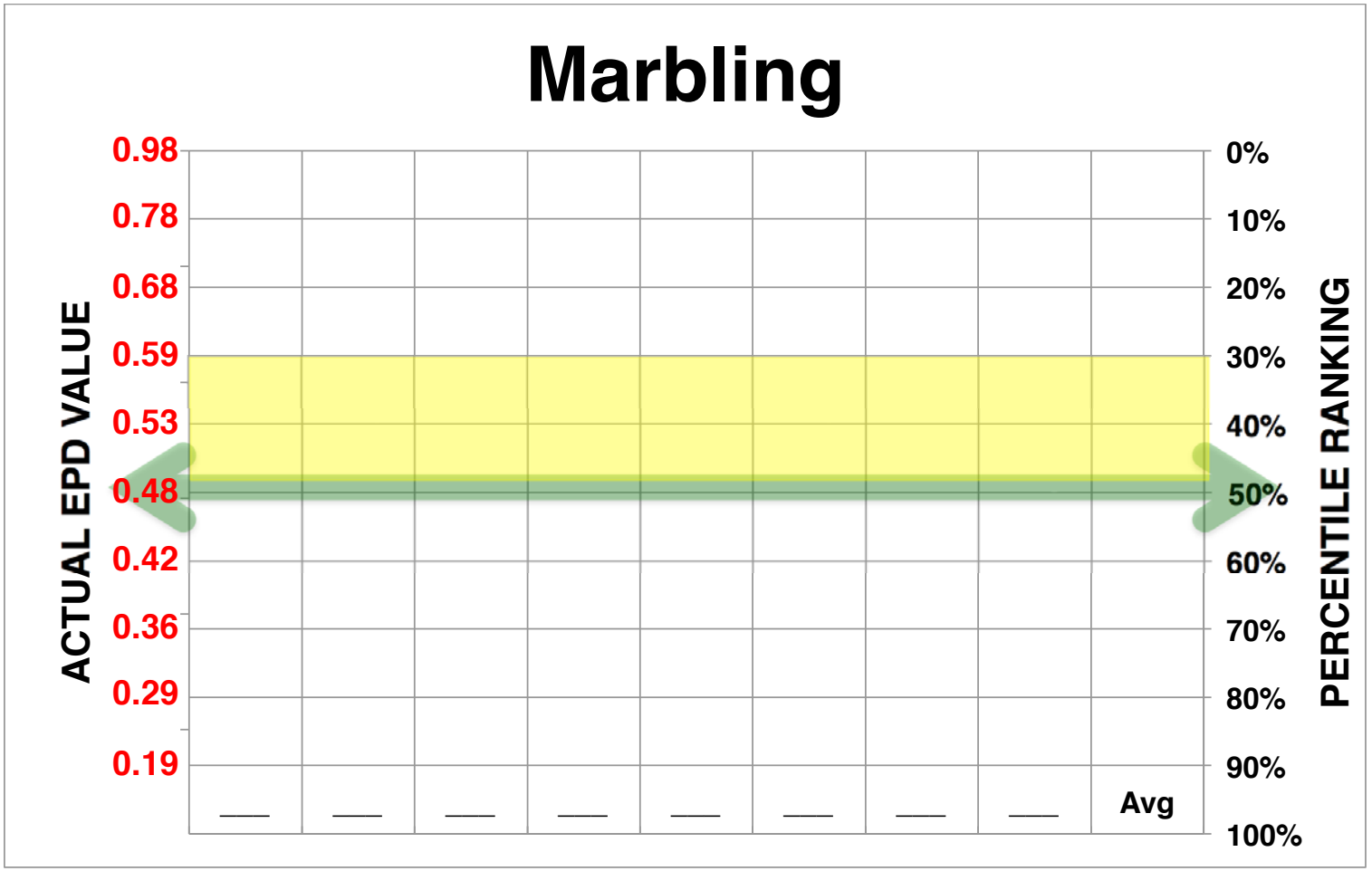

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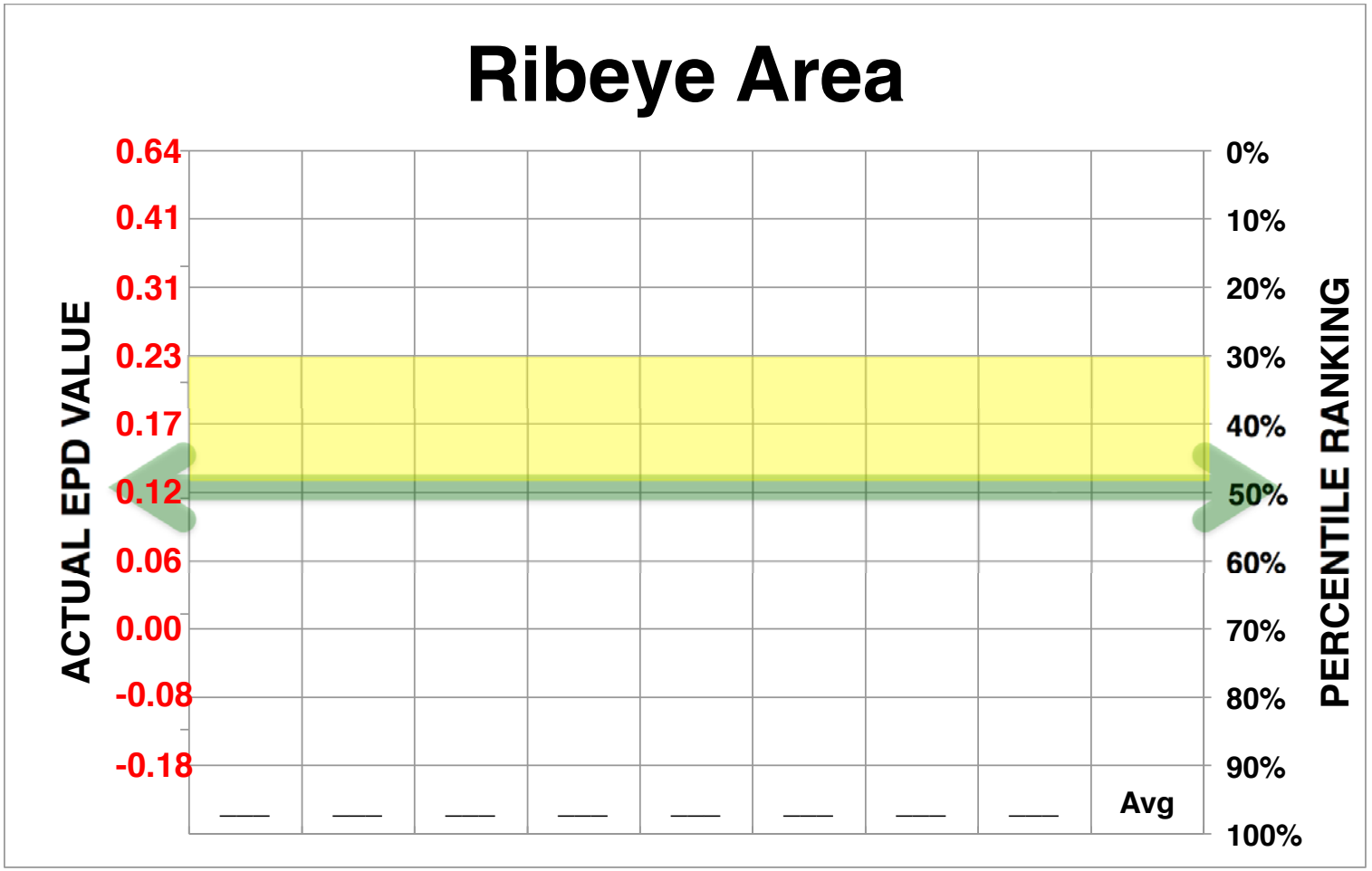

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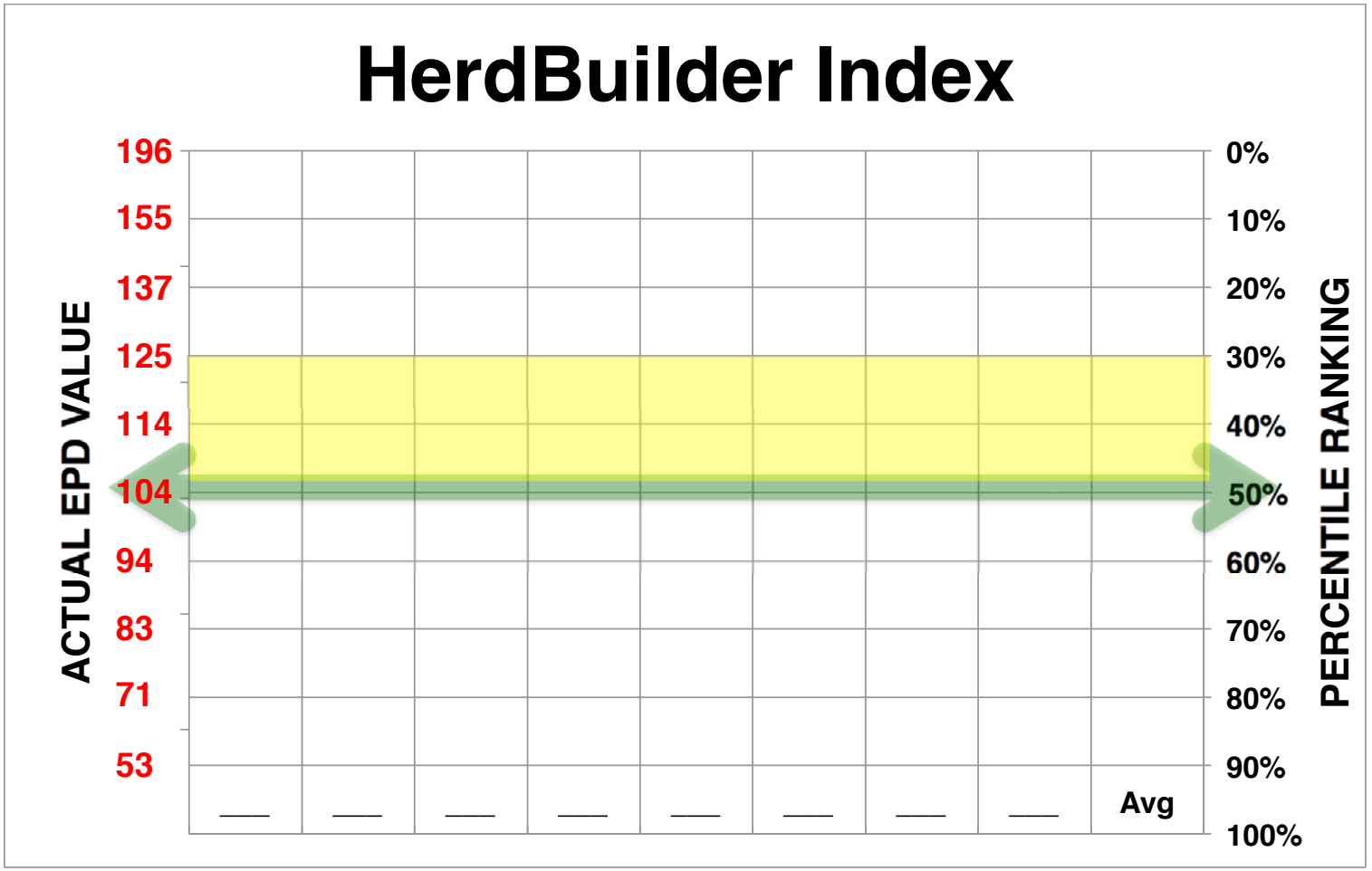

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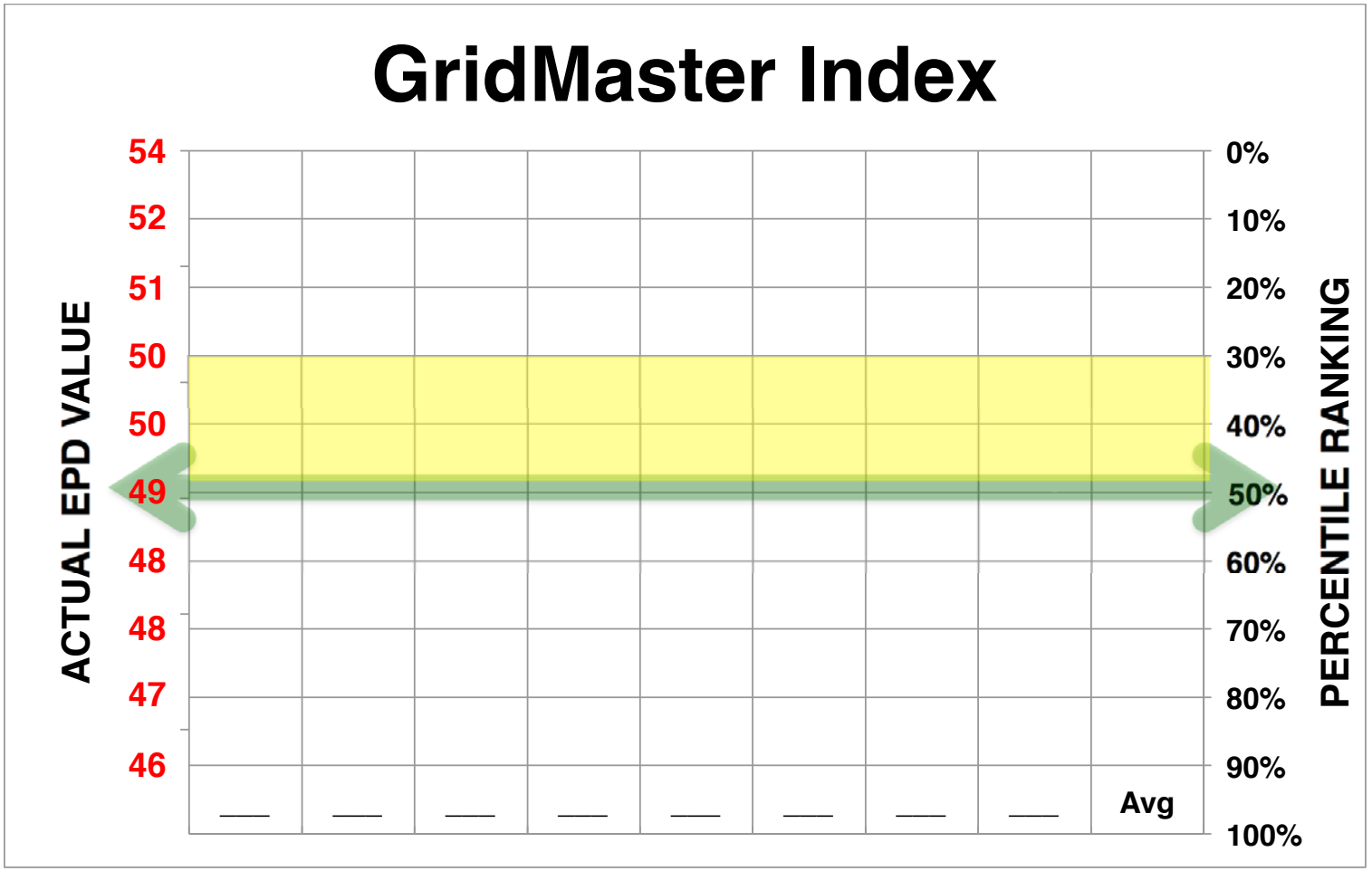

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Thank You For Your Attention

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