The Ranchers' Guide to EPDs

Profitable. Simple. Sustainable.

With the goal of simplifying ranchers' profit equation, Red Angus continues blazing new trails in the pursuit of providing commercial producers with concise genetic predictions.

Based on the concept of Economically Relevant Traits (ERTs), producers are equipped with tools that allow for selection on traits that directly impact profitability. These tools simplify the selection process, and arm producers with the ability to better identify range bulls whose genetics will more positively impact profitability.

Red Angus delivers technology in a producer-friendly package. Red Angus' inclusion of genomic data into EPDs provides genetic predictions with unsurpassed dependability. Expressing these EPDs on a multi-breed base allows for simplified selection decisions regardless of desired breed composition.

EPDs are the most reliable predictors of an animal's true genetic merit. As the only major beef breed to mandate Total Herd Reporting (THR), Red Angus EPDs have the built-in advantage of being calculated from 20 years of complete contemporary group data. EPDs have "fast-tracked" beef cattle improvement and removed much of the guesswork associated with selecting range bulls.

EPDs: What, Why & How?

EPDs predict differences in progeny performance, and are calculated from comparisons within Contemporary Groups. (A group of calves that were born in the same year, calving season, herd, and are of the same sex and were fed and managed alike.)

EPDs have a clear advantage over less sophisticated predictors such as actual weights or within-herd ratios. Actual and adjusted weights are affected by environment, nutrition and management. Contemporary group ratios are an improvement, as they account for these environmental variables. However, they do not incorporate comparative performance data on related individuals in countless herds throughout the country. Red Angus EPDs account for these sources of variation in performance as well as mating bias (which cows were bred to which bulls). The power of these genetic predictions is multiplied by including every contemporary group from herds in the entire Red Angus breed.

Compare EPDs across breeds.
All animals in Red Angus and Simmental's multi-breed database are described using the same language. That is, their EPDs are published on the same multi-breed base and scale. Selection for Growth (BW, WW, YW, Milk) and Carcass (MARB, YG, CW, REA, FAT) EPDs will be greatly simplified as commercial customers will be able to directly compare these EPDs across breeds, as well as registered hybrids/composite seedstock.

Absolute performance is not predictable... Relative performance is. For Example: Suppose your old herd bull has a yearling weight EPD of 50. You buy a new bull with a yearling weight EPD of 70. How much will the new bull boost your calves' yearling weights?

The Answer...
We cannot predict how much performance will change from one year to the next because of varying environmental conditions (rainfall, temperature, available feedstuffs, etc). However, we do know this: the calves raised in the same contemporary group sired by your new bull will have the genetics to weigh an average of 20 pounds more at 365 days of age as compared to calves sired by the old bull.

Understanding ACCURACY

Red Angus EPDs are often presented with a corresponding accuracy value, which measures the strength of the relationship between the genetic prediction (EPD) and true genetic value. Accuracies are reported as a decimal number from zero to one. As accuracy value approaches 1.0, the EPD is "accurately" or closely estimating the true genetic merit of an animal for a given trait. Although low-accuracy EPDs are less reliable when compared to those of proven sires, independent research demonstrates **EPDs to be the most meaningful indicator of animals' true genetic merit. While "perfect" accuracies of 1.0, are never achieved, many heavily used Red Angus sires have accuracies greater than 0.9 (some as high as .99).**

Multi-Breed Data.
Rancher-Trusted EPDs.

EPDs are only as good as the data used to calculate them. This fact led Red Angus to implement Total Herd Reporting (THR) over two decades ago, and Red Angus continues to be the only breed association to mandate THR for the collective Red Angus cowherd. In a nutshell, THR requires the annual production of every Red Angus cow and the performance of every calf raised through weaning to be reported.

Only THR allows for the accurate calculation of fertility and longevity traits, which are the largest drivers in cowherd profitability. With THR, we know which daughters that were exposed to breeding delivered a calf. With THR, we can better predict which bulls' daughters are able to bring a calf to the weaning pen year after year. Ranchers make more accurate selection decisions and ultimately more profit when they buy bulls whose EPDs are backed by THR.

Jump Starting Accuracy

Red Angus' strong foundation of THR data combines with genomic data from 50K tests to provide EPDs with unsurpassed reliability. The information gained from genomic data can be as informative as a bull's first calf crop, or a cow's lifetime production record. There's nothing new to learn - this powerful combination of information will simply be delivered to producers in the form of higher accuracy EPDs.

Recognizing the importance of heterosis to the success of the beef industry, Red Angus partnered with the American Simmental Association in forming International Genetic Solutions (IGS). Through IGS, Red Angus stakeholders who utilize crossbreeding are provided with true multi-breed EPDs that are calculated using the merged databases of Red Angus, Simmental, Gelbvieh and Limousin. This collaboration allows for the precise determination of heritable genetics and delivers that information to producers in the form of EPDs that can be directly compared, regardless of breed composition.

Cowherd - Building

Profit starts at Reproduction!

Placing selection pressure on traits that will have a direct impact on your marketed product (weaned calves, yearlings, carcasses sold in the meat) can certainly increase your revenue on a per-calf basis. However, in order to achieve the higher goal of increased revenue per cow exposed, selection pressure must be placed on cowherd-building traits.

Red Angus' commitment to Total Herd Reporting allows for the measurement of each female's lifetime production history; from being exposed to breeding as a yearling, to measuring females' productive lifespan. Implementing these tools into your selection decisions will have a long-term impact on your operation's profitability.


CED EPDs

	Top 50%	Top 25%	Top 10%
	5	8	10
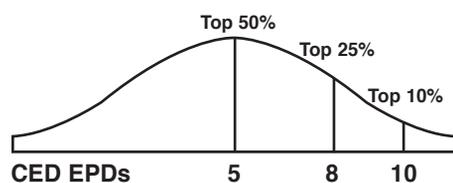
Calving Ease Direct (CED) - **predicts the probability of calves being born unassisted out of 2-year-old heifers.** Producers want live calves - born unassisted. Selecting on actual birth weight is flawed; it is influenced by non-genetic factors such as nutrition and weather (ambient temperature). While BW EPD removes these non-genetic factors, Red Angus' CED EPD is the best predictor of calving ease. The CED EPD includes variation in BW plus other influential genetic factors such as gestation length, calf shape, etc.

HPG EPDs

	Top 50%	Top 25%	Top 10%
	10	11	13
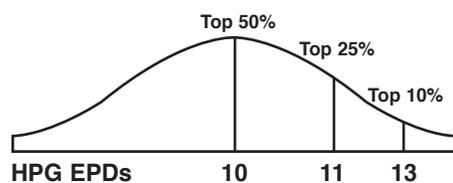
Heifer Pregnancy (HPG) - **predicts the probability of heifers conceiving to calve at two years of age.** Many breeds offer genetic predictions of yearling bull scrotal circumference as an indicator of age of puberty. While puberty is a prerequisite, many factors influence pregnancy rate. Red Angus' HPG EPD offers a tool which selects for what is economically relevant to ranchers - pregnant heifers.

CEM EPDs

	Top 50%	Top 25%	Top 10%
	4	6	8
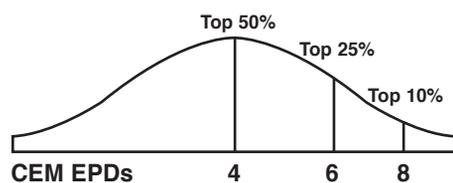
Calving Ease Maternal (CEM) - **predicts the probability of a given animal's daughters calving unassisted at two years of age.** Replacement heifers should be able to calve on their own. Red Angus' CEM EPD offers the industry's most reliable prediction to address that concern. It includes not only the predisposition for a female to calve unassisted, but also her contribution to her calf's traits (birth weight, calf shape, etc.) that make it more likely to be born unassisted.

ME EPDs

	Top 50%	Top 25%	Top 10%
	1	-3	-6
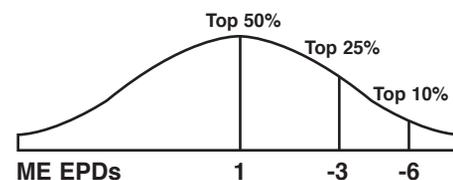
Maintenance Energy (ME) - **predicts differences in daughters' maintenance energy requirements and is expressed in Mcal/Month.** Recognizing that 70% of cowherd feed costs are burned up in maintaining weight and condition, Red Angus' ME EPD allows for the selection of bulls whose daughters will require less feed; thus, reducing cowherd expenses. Include selection pressure for ME EPD to ensure feed costs don't get out of line when selection is made for greater performance and production.

EPD percentiles reflect non-parent animals under two years of age

Traits

## Excel in Stayability...
Excel in Profitability!

Improving Stayability enhances cowherd profitability by increasing the percentage of females that deliver pounds and value to the weaning pen without extra labor or feed – and do it year after year.

Red Angus' Stayability (STAY) EPD is a selection tool to improve overall cowherd efficiency through reducing replacement rate. Cows that stay productive, are problem free and last longer mean a larger percentage of heifers can be cash cropped, instead of developed as replacements.

How is Stayability EPD Calculated?
THR provides the foundation for a reliable Stayability EPD. Once a female enters the productive cowherd she is monitored annually for her productive ability. Only

Stayability (STAY) – predicts the probability of a bull's daughters remaining productive until at least six years of age. Why six? That's how long it takes a female to breakeven given all the expenses of development.

Top 50%
Top 25%
Top 10%

STAY EPDs   10   12   14
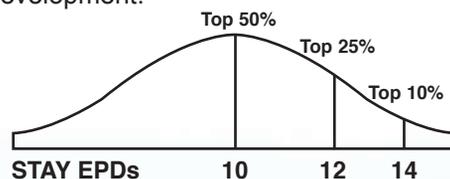
females that produce a calf every year up until at least six years of age are given a positive observation. Females that miss a calf or are culled for any reason including soundness, production, disposition, body condition, etc. are given a negative observation.

Mandatory collection of Stayability observations from all Red Angus herds provides ample data for the prediction of a bull's ability to sire Ranch-Tested – Rancher-Trusted cowherds.

EPD percentiles reflect non-parent animals under two years of age

Traits that add weight to your bank account!

Realizing the vast majority of commercial operations' revenue comes from the sale of pounds, Red Angus strives to provide industry-leading genetic predictions for growth. This can only be achieved through the implementation of Total Herd Reporting. Red Angus further ensures the reliability of performance data through the use of data filters, which eliminates data outside biological norms. The net result of these efforts - no surprises on pay day.


BW EPDs   -1.3   -2.7   -6.2
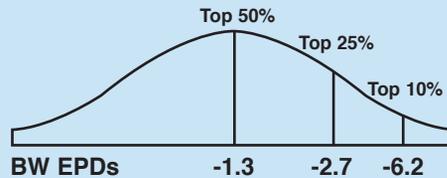
Birth Weight EPD (BW) predicts the difference, in pounds, for birth weight, and is also used in the calculation of Red Angus' Calving Ease Direct (CED) EPD.

WW EPDs   57   64   71
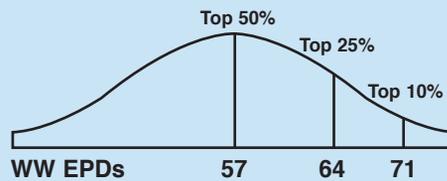
Weaning Weight EPD (WW) predicts the difference, in pounds, for weaning weight (adjusted to age of dam and a standard 205 days of age). This is an indicator of growth from birth to weaning.

YW EPDs   89   101   112
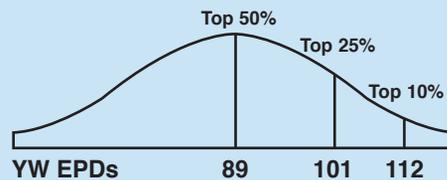
Yearling Weight EPD (YW) predicts the expected difference, in pounds, for yearling weight (adjusted to a standard 365 days of age). This is an indicator of growth from birth to yearling.

MILK EPDs   20   23   26
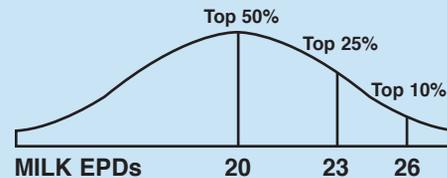
Milk EPD (MILK) predicts the difference in maternal production of an individual animal's daughters as expressed by the weaning weight of their calves.

EPD percentiles reflect non-parent animals under two years of age

Bred-in Carcass Value...

Red Angus is preferred among producers who retain ownership of their calf crop.

This demand is driven from consistent feedyard performance combined with reaping premiums from value-based grids. Furthering the mission of providing genetic predictions that directly impact producer profitability, Red Angus recently added Carcass Weight (CW) and Yield Grade (YG) to its arsenal of ERTs. Incorporation of these selection tools have the power to take your profitability to the next level.
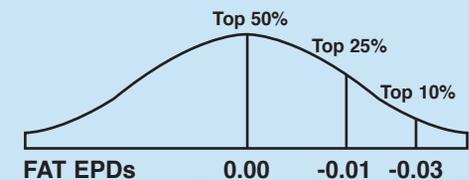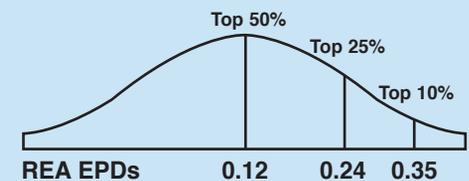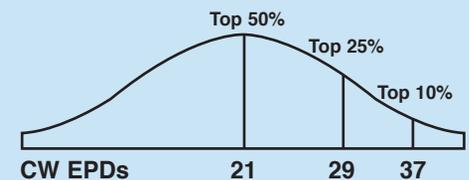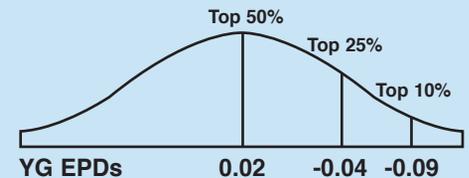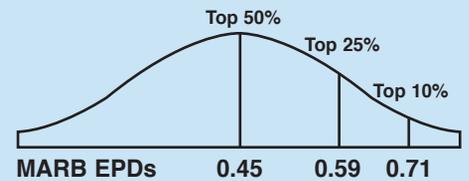
Marbling Score (MARB) - **predicts differences for carcass marbling score as expressed in marbling score units.** Higher marbling scores are positively correlated with higher carcass quality grades.

Yield Grade (YG) - **predicts differences in USDA Yield Grade score and is expressed in USDA Yield Grade units.** YG EPD is calculated using the genetic predictions of CW, REA and FAT EPDs. The reliability of Red Angus' YG EPD is enhanced by using both ultrasound and actual carcass data in the calculation of REA and FAT EPDs.

Carcass Weight (CW) - **predicts differences in hot carcass weight and is expressed in pounds.** Because Red Angus' CW EPD is a multi-trait model which includes birth, weaning and yearling weight data, the prediction is not subject to culling bias. Thus, it provides a more reliable EPD as compared to only using actual carcass weights. This computation allows for the use of weights taken on ~57,000 animals per year as compared to only ~1,500 animals per year with actual carcass weight observations. Increased Carcass Weight tends to detrimentally affect Yield Grade; the calculation of which also includes Rib Eye Area and Fat Thickness.

Rib Eye Area (REA) **predicts differences of carcass Rib Eye Area between the 12th and 13th rib.** Increased Rib Eye Area has a beneficial effect on Yield Grade which also includes Carcass Weight and Fat Thickness.

12th Rib Fat Thickness (FAT) **predicts differences for carcass fat depth over the 12th rib, as expressed in inches.** Increases in fat thickness has a detrimental effect on Yield Grade.

	Top 50%	Top 25%	Top 10%
MARB EPDs	0.45	0.59	0.71
YG EPDs	0.02	-0.04	-0.09
CW EPDs	21	29	37
REA EPDs	0.12	0.24	0.35
FAT EPDs	0.00	-0.01	-0.03

EPD percentiles reflect non-parent animals under two years of age

Bull Selection – Simplified.

Red Angus stakeholders have enjoyed the capability of selecting bulls based on economically relevant traits (ERTs), such as Heifer Pregnancy or Stayability, that truly impact their operations profitability. While these ERTs allow for efficient selection decisions, the growing number of ERTs and EPDs has resulted in confusion as producers attempt to estimate a sire's overall impact. In response, RAAA has developed the HerdBuilder and GridMaster indices, which answer the question:

"What impact will each potential sire have on my operation's profitability?"

HERDBUILDER

Producers selecting bulls to develop profitable replacement females and maximize the value of non-replacement marketed progeny should incorporate the HerdBuilder Index into their selection decisions.

The HerdBuilder Index is built using the following scenario:
- Red Angus bulls mated to cows and heifers
- Replacement heifers retained from within the herd
- All remaining progeny sold on a quality-based carcass grid

Given that replacement heifers are retained, significant influence is placed on the obvious maternal ERTs of Stayability, Heifer Pregnancy and Calving Ease. Additionally, with all remaining progeny sold on a quality-based carcass grid, Marbling, Yield Grade and growth EPDs also impact the HerdBuilder Index.

GRIDMASTER

Use the GridMaster Index if your operation's primary goal is maximizing profitability of feeders in the feedyard and on the rail.

The GridMaster Index is built using the following scenario:
- Red Angus bulls mated to cows
- All progeny sold on a quality-based carcass grid

Marbling, Yield Grade and growth EPDs are the traits of primary importance in the GridMaster Index.

While the process of calculating an index is very complex, the resulting selection tool is very simple to implement.

HerdBuilder and GridMaster are expressed as differences in profitability per exposure.

HerdBuilder Example:
> 30 cows x 5 years breeding = 150 exposures
> Bull A has a HerdBuilder Index of 175: 175 x 150 = $26,250
> Bull B has a HerdBuilder Index of 100: 100 x 150 = $15,000
> **$11,250 Difference in Profitability**

Ranch Tested. Rancher Trusted.

Red Angus

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