By the Numbers

► by **Sally Northcutt,** *director of genetic research, American Angus Association*

Weaned calf value ($W)

Commercial bull buyers are becoming more familiar with Angus dollar value indexes ($Values) as selection tools. The primary $Values are weaned calf value ($W), feedlot value ($F), grid value ($G) and beef value ($B), and many of these indexes appear with expected progeny difference (EPDs) in sale books. In the American Angus Association office, requested sorts on $B are probably the most popular of the $Values at this time, but that does not necessarily mean $B is the most important value for every operation. The $W index represents the preweaning phase, and it is probably underrated in its application by commercial producers.

Contributing factors to $W

The Angus $Values are built upon available interim and National Cattle Evaluation (NCE) EPDs for registered Angus animals. The $W is a preweaning index that relates revenue generated from genetically derived outputs (based on the EPDs) and associated costs (expenses) from required inputs.

For example, the inclusion of calf weight and calf crop percentage to generate revenue, along with the cow maintenance and lactation expenses, create a "net revenue" value in the preweaning portion of a cow-calf operation.

The $W, reported in dollars per head, is geared toward calf preweaning performance and maternal traits of the cow herd. It does not include terminal index components for postweaning growth and carcass merit like $B.

Key EPDs involved in $W include:

- Birth weight EPD (revenue)
- Weaning weight EPD (revenue and expense)
- Milk EPD (revenue and expense)
- Mature cow weight and height EPDs (expense)

1. Birth weight EPD (revenue). Birth weight influences calf death losses as related to dystocia. In Technical Bulletin 1875 (October 1999), the Roman L. Hruska U.S. Meat Animal Research Center (MARC) at Clay Center, Neb., reported that for 2-year-old dams of all breeds, each 1-pound (lb.) increase in birth weight causes a 1.9% linear increase in the need for calving assistance. Increased calving difficulty and the need for assistance was related to greater calf death loss.

Fig. 1: Example $W for a registered animal and accompanying assumptions

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Wean Value ($W) : +28.08

ASSUMPTIONS		
Base Calf Price	$110.00	per cwt
Cow/Heifer Mix	80%/ 20%	
Cow weight	1300	lb
Feed Energy Cost	$0.055	per MCal NEm

Cow Energy ($EN), Savings, $/cow/year	+8.80

In $W, the lower-birth-weight EPDs are associated with additional revenue back to the cow-calf operation. With fewer difficult births, there is greater potential for an improved weaned calf crop percentage and ultimately more revenue to the cow herd.

2. Weaning weight EPD (revenue and expense). Heavier weaning weights result in more pounds of calf sold, positively affecting herd revenue. However, heavier calves sell for a lower price per pound compared to lighter calves, which partially offsets the benefit of heavier sale weights. Slower calf growth produces lighter weights and less revenue at weaning, though lighter calves do bring more per pound.

For $W, weaning direct growth generates revenue in pounds of calf sold. Calf growth is valued on a price slide; so all pounds are not equally weighted in revenue. Also, there are maintenance and gain costs of the calf that are accounted for as expenses.

Calves that gain weight faster than average require more energy to support their extra growth. Conversely, calves that grow more slowly need less total energy. Both energy for growth (net energy for gain, denoted NE_g) and energy for body maintenance (net energy for maintenance, NE_m) must be evaluated, so that all cost factors are accounted for.

A small efficiency adjustment is also made in this portion of $W, since faster-gaining calves tend to be more efficient on the average.

3. Milk EPD (revenue and expense). Milk genetics of the dam provide most of the calf's maternal environment, contributing revenue measured in pounds of calf sold. Consequently, this component of $W is influenced by varying levels of cow milk EPD.

However, increased lactation comes at a price, and the costs (lactation energy requirements, denoted NE_l) are treated as an expense. National Research Council (NRC) data are used as the basis for these adjustments. Cows that produce more milk and wean heavier calves need more energy to support their higher lactation levels. Conversely, lower-milking cows need less total energy.

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4. Mature size EPDs (expense). Mature cow size is handled as an expense. Adjustments are made for maintenance energy requirements for cows of differing mature size. In cases where mature cow size EPDs are absent or of low accuracy, the relationship of mature size with yearling weight and yearling height EPDs is used. As an animal's mature weight EPD increases in accuracy, that EPD becomes the dominant influence affecting the mature size component of $W, while the yearling weight EPD plays a declining role.

Both milk and mature size affect $W according to the lactation and maintenance energy requirements for various levels of each trait, based on nutritional research conducted by the NRC.

One of the advantages of indexes is that strengths can compensate for weaknesses. So, in this case an expense adjustment for milk genetic potential may be offset, to some extent, by moderation in mature size.

Selection indexes use economic assumptions

Economic assumptions are used in the $Value calculations to convert the genetic effect differences into dollars. The assumptions used in the $W are given in Fig. 1 (page 309), using an example registered Angus bull.

Base calf price is calculated using a three-year rolling average of national cattle markets. The average 1,300-lb. mature cow weight is representative of the Association's database. Annual pasture and feed costs were taken from 17 Standardized Performance Analysis (SPA) and university cow-calf budgets representing various geographies across the nation, along with Cattle-Fax data. Central Plains beef cow rations were also used to verify the feed energy cost assumption.

The index was developed with a systems approach, assuming heifers are developed at a 20% replacement rate.

If the EPDs change or the underlying economic assumptions change, then the $Values are sensitive to these component changes and will also change. $Value indexes do not appear with an accuracy value. However, animals with higher accuracies associated with their EPDs will tend to experience smaller fluctuations in their $Values.

If you compared the sire in Fig. 1 ($W of

$28.08) to another sire with a $W of $14.00 by mating the bulls to comparable females and exposing the calves to the same environment through weaning, on the average, we would expect the future progeny difference between the two sets of calves to be $14 per head at weaning.

Just as with EPDs, the $W only has meaning when comparing the relative merit or ranking of two or more animals. To look at the absolute $Value alone is immaterial. It is only useful in comparison with another individual or group of animals.

Breeders should note that $W assumes that enough feed resources are available and the environment is appropriate to provide for the level of production (weaning direct, maternal milk) and cow size. If extremes in milking ability of replacement females and mature cow size are concerns for a particular herd, then the cow energy value ($EN) can provide an additional tool to tailor selection decisions. Details on $EN can be found at *www.angus.org/sireeval/valueindex.html.*

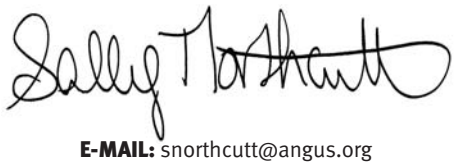
Links to $Values and breed averages

Breed averages and percentiles for EPDs and $Values are available at *www.angus.org/sireeval/.*

The index values are available in the Association's Sire Evaluation Report, which is searchable at *www.angussiresearch.com.*

Individual animals may be viewed at *www.angus.org/performance/beefvalue/* or through EPD/pedigree lookup at *www.angus.org/registeredangus/.*

Members can also access their AAA Login account to view $Values on owned animals as well as to customize $Values using an interactive module.



E-MAIL: snorthcutt@angus.org

Editor's Note: *"By the Numbers" is a column by Association performance programs staff to share insights with Angus members about data collection and interpretation, the NCE, genetic selection, and relevant technology and industry issues. If you have questions or would like to suggest a topic for a future column, contact Sally Northcutt, director of genetic research, or Bill Bowman, director of performance programs, at (816) 383-5100.*