United Kingdom Beef Shorthorn Selection Indexes: Technical Specifications

The Beef Shorthorn Cattle Society currently reports three different selection indexes. These are the:

- Self-Replacing Index
- Maternal Index
- Terminal Index

All of the selection indexes described above have been derived using BreedObject software. The BreedObject selection index development process involves four major steps. These steps are:

1. A detailed description of the input costs and value generation of the commercial herd and target production system.
2. Once the target production system is described, the BreedObject software evaluates how each trait influences profitability and the economic value of improving each trait.
3. The BreedObject software then assesses what emphasis needs to be applied to each Estimated Breeding Value (EBV) trait to achieve the maximum profitability in the production system and for the market end point for which that index was designed. This step includes evaluating the selection response expected from direct selection on the individual EBVs and the correlated responses expected from selection on related EBVs.
4. The importance placed on each EBV results in the selection index value that is calculated for each animal.

Each selection index describes a different production system/market scenario and relates to a typical commercial herd using Beef Shorthorn bulls. As is the case for EBVs, each selection index can be used to rank and compare animals on their genetic merit. Producers are advised to use the selection index that most closely aligns to their production system. See the Using United Kingdom Beef Shorthorn Selection Indexes tip sheet, available in the Help Centre on the BREEDPLAN website, for further information on the identification and utilisation of the most applicable selection index for your herd.

All selection indexes are reported in units of net profitability per cow mated (£) for the production system/market scenario they describe. Selection indexes account for both sides of the profit equation (costs as well as income), and also reflect the relative short and long term profit associated with possible selection decisions. For example, short term profit can be generated by a bull through the sale of his progeny, and the longer term profit generated by his daughters in a self-replacing cow herd.

Each of the selection indexes are focused on efficient beef production while also targeting the following specifications:

Self-Replacing Index

The Self Replacing Index is designed for a purebred commercial Beef Shorthorn herd that is focusing on breeding both herd replacements and finishing all steers and surplus heifers. It estimates the genetic differences between animals in net profitability per cow joined for an example Beef Shorthorn commercial cow herd targeting the production of finishing steers (average 150 days on feed). Steers are then marketed at an average of 650kg kg live weight (355kg carcase weight) at 20 months of age. Some daughters are retained for breeding.

Maternal Index

The Maternal Index is designed for a commercial Beef Shorthorn cross herd that is focussed on breeding herd replacements and on weaning as many and as heavy calves as possible at 8 months of age. It estimates the genetic differences between animals in net profitability per cow joined for an example Beef Shorthorn Euro cross commercial cow herd targeting the production of pasture grown calves. Steers and heifers are weaned and marketed at an average of 350kg live weight at 8 months of age for further finishing or as replacement heifers.

Terminal Index

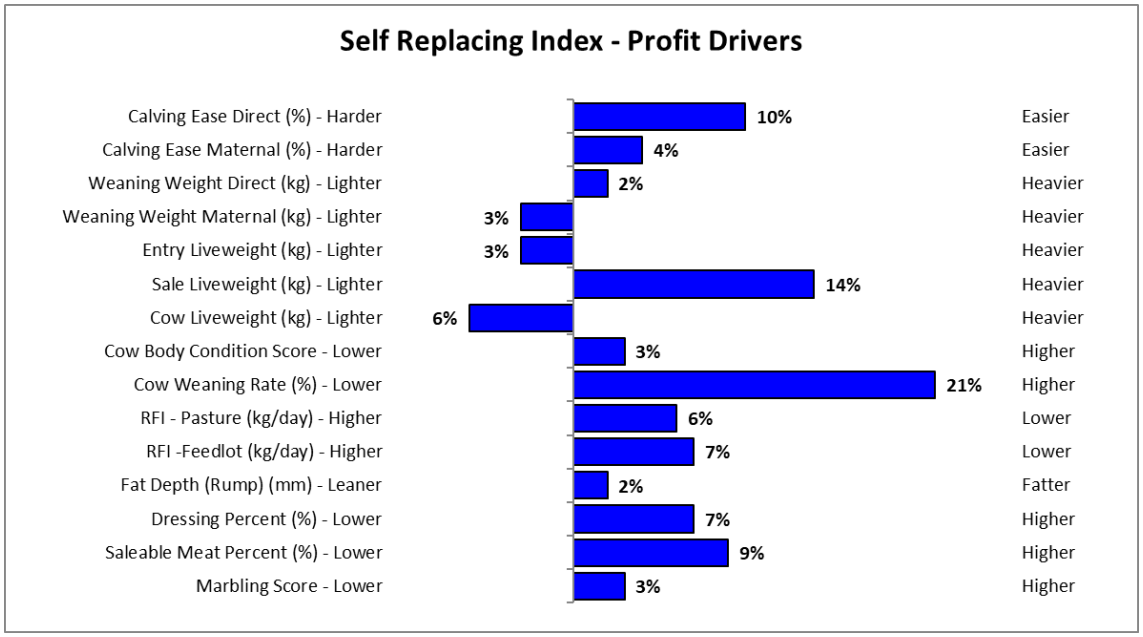
The Terminal Index is designed for a commercial herd using the Beef Shorthorn as a Terminal Sire on Euro cross cows. It estimates the genetic differences between animals in net profitability per cow joined for an example Beef Shorthorn Euro cross commercial cow herd targeting the production of finishing heifers and steers (average 150 days on feed). The heifers and steers are then marketed at an average of 590kg live weight (320 kg carcase weight) at 21 months of age. All progeny are slaughtered.

More detailed information regarding each selection index is provided on the following pages.

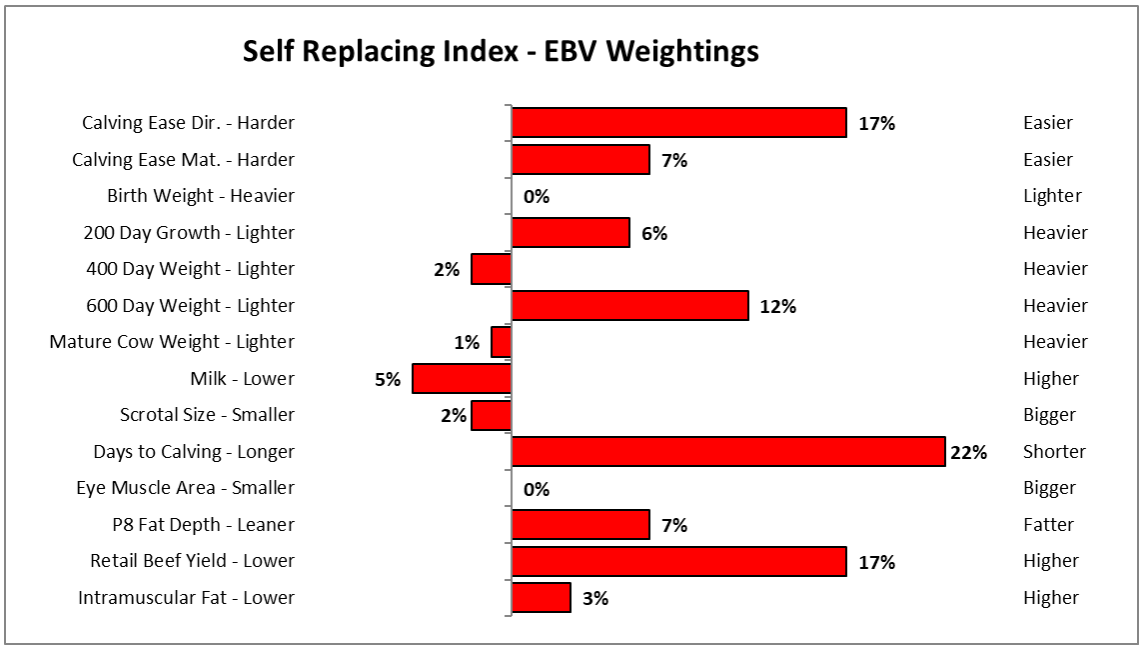
If you have any further queries regarding the Beef Shorthorn Selection Indexes, please do not hesitate to contact staff at your BREEDPLAN processing centre.

Self-Replacing Index

The following bar graph shows the **key economic traits**, as determined by the BreedObject software, that are important in this selection index. The different trait emphases reflect the **underlying profit drivers in a commercial operation** targeting the described production system/market.

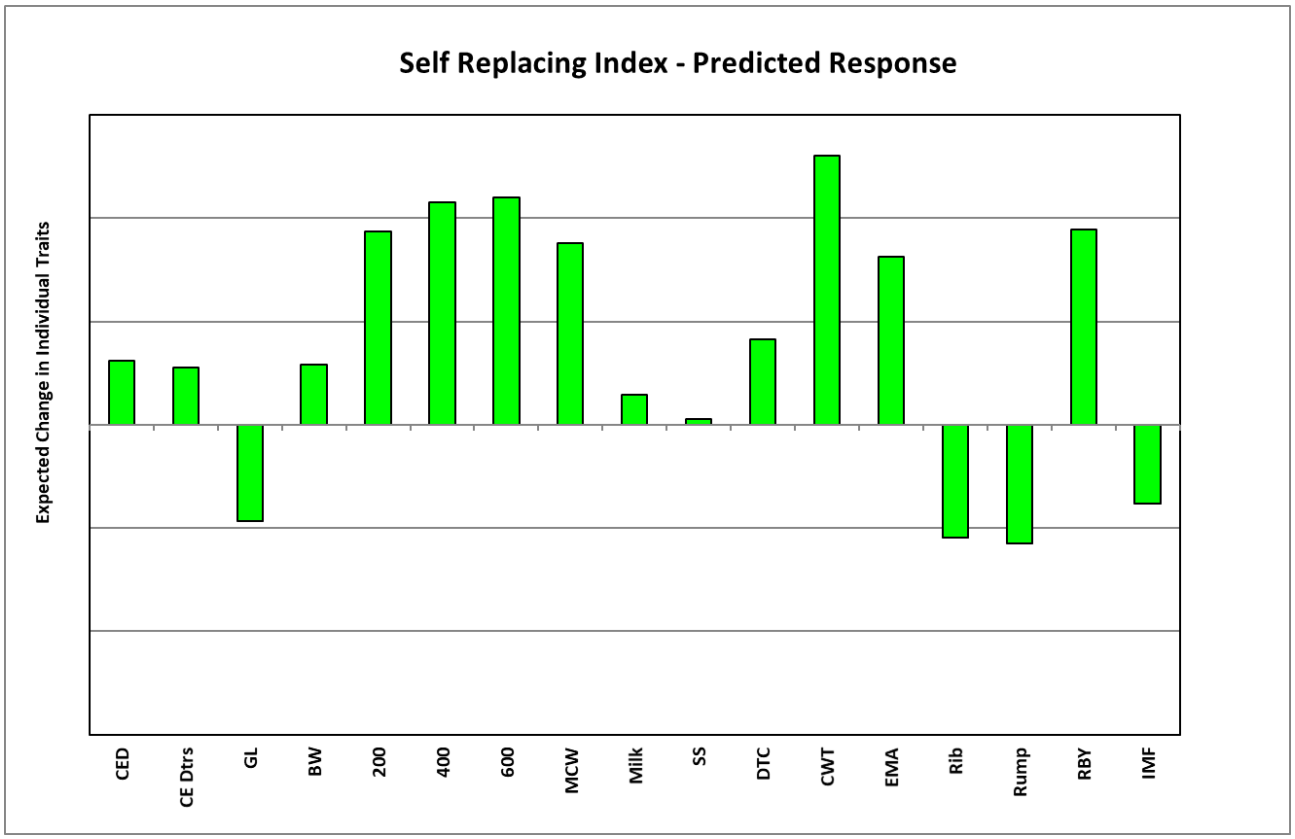


The bar graph below illustrates the magnitude and direction of emphasis that has been placed on each **BREEDPLAN EBV** within this selection index. These weightings represent the **most profitable combination of EBVs**, as determined by the BreedObject software, for the described production system/market.



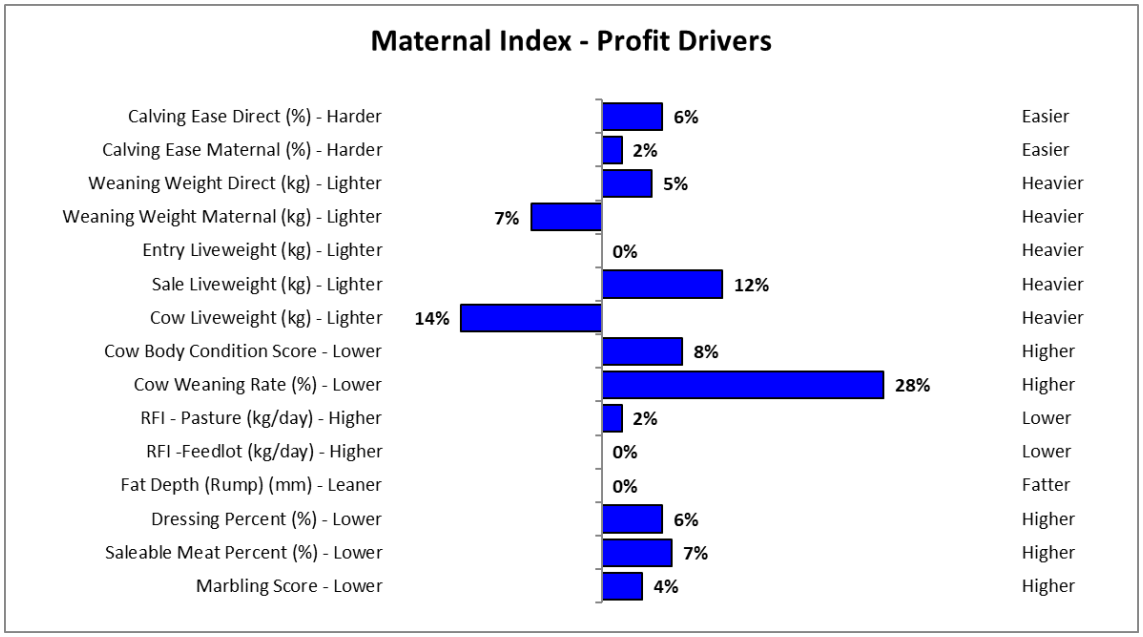
While the graphs on the previous page show the emphasis that has been placed on the production traits and each EBV within the Self-Replacing Index, they do not reflect the expected change that will occur to each individual EBV if producers select animals using this selection index. The selection response will also be influenced by factors such as the genetic relationship between traits and the animals that are available for selection. For example, while there is a slight negative weighting on 400 Day Weight in this selection index, it would be expected that growth to 400 days would typically increase due to the large positive weighting on 600 Day Weight, and the strong genetic correlation between the two traits.

The following bar graph provides an indication of the **relative change** that would be expected in each individual BREEDPLAN EBV if producers select animals using the Self-Replacing Index. The graph reflects the relative change if the Beef Shorthorn Published Sires in 2019 were ranked on this selection index and the Top 10% **selected for use within a breeding program**. The response to selection may differ if a different group of animals were available for selection.

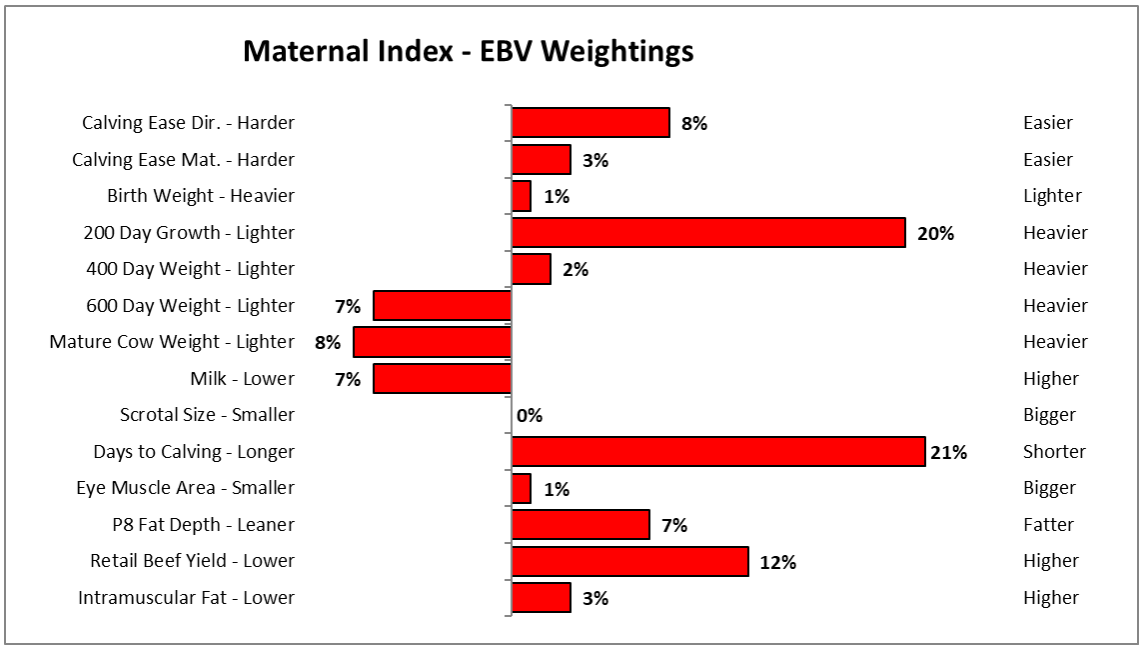


Maternal Index

The following bar graph shows the **key economic traits**, as determined by the BreedObject software, that are important in this selection index. The different trait emphases reflect the **underlying profit drivers in a commercial operation** targeting the described production system/market.

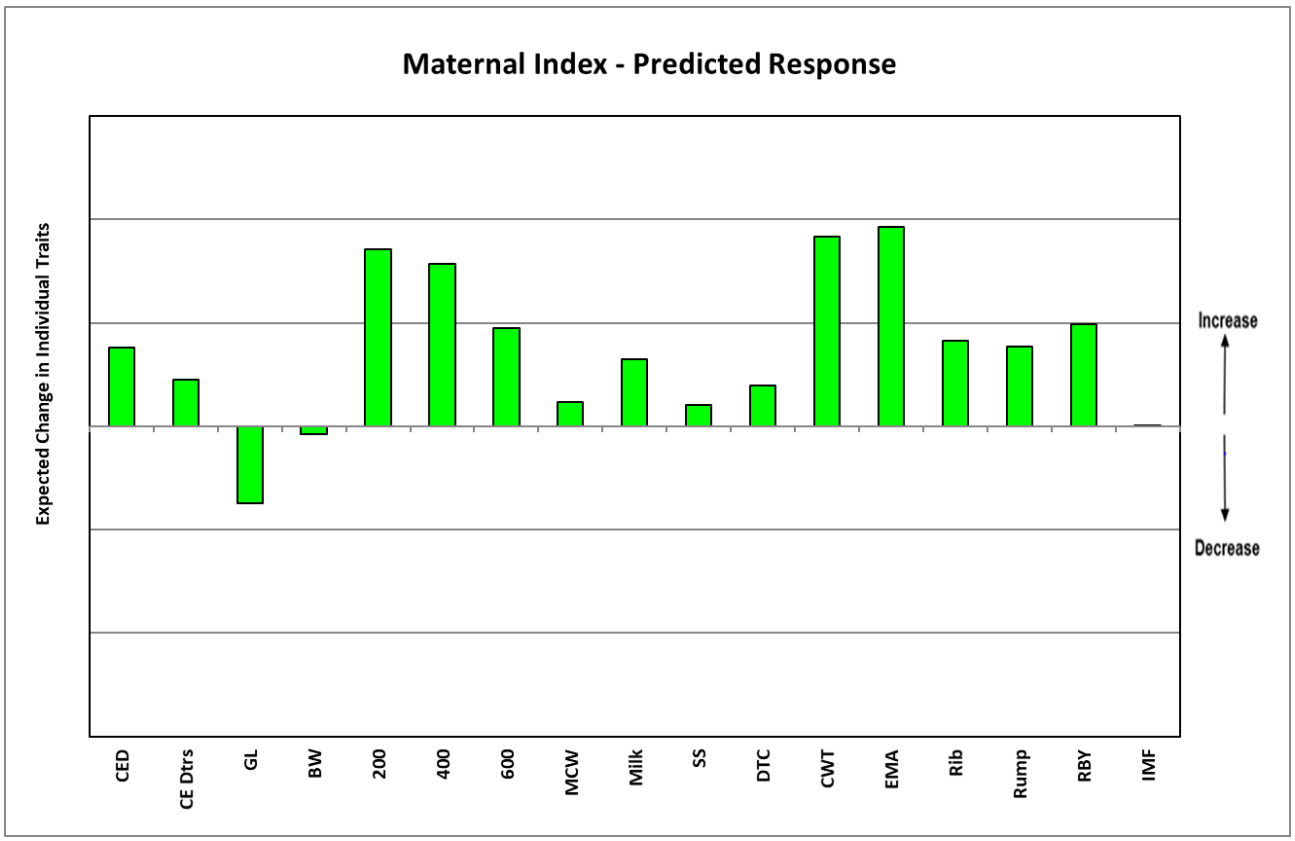


The bar graph below illustrates the magnitude and direction of emphasis that has been placed on each **BREEDPLAN EBV** within this selection index. These weightings represent the **most profitable combination of EBVs**, as determined by the BreedObject software, for the described production system/market.



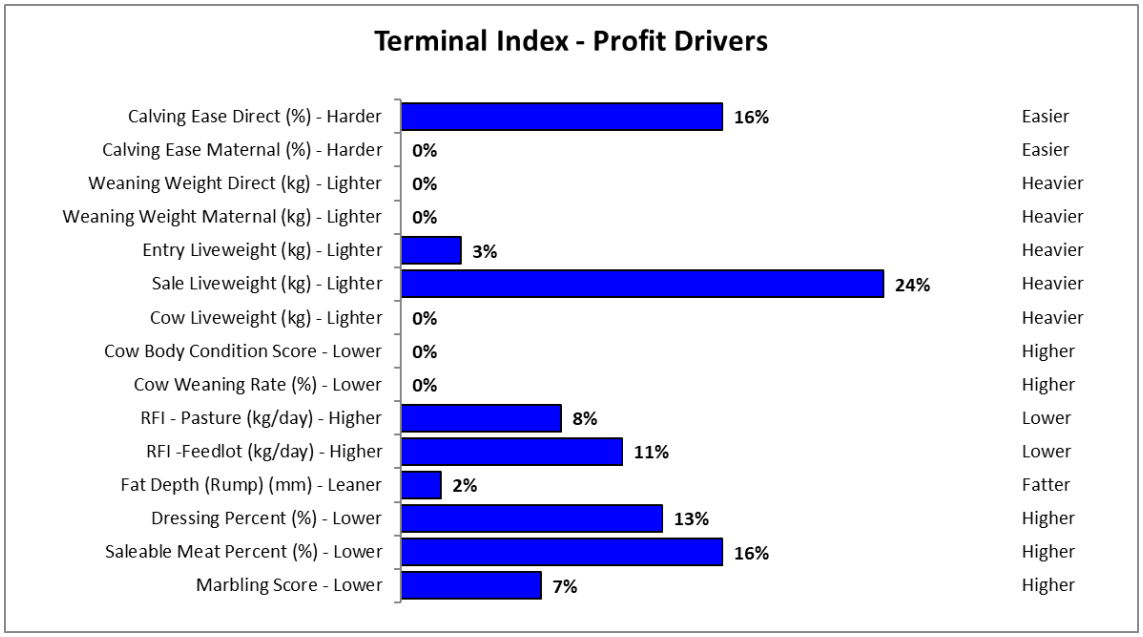
While the graphs on the previous page show the emphasis that has been placed on the production traits and each EBV within the Maternal Index, they do not reflect the expected change that will occur to each individual EBV if producers select animals using this selection index. The selection response will also be influenced by factors such as the genetic relationship between traits and the animals that are available for selection.

The following bar graph provides an indication of the **relative change** that would be expected in each individual BREEDPLAN EBV if producers select animals using the Maternal Index. The graph reflects the relative change if the Beef Shorthorn Published Sires in 2019 were ranked on this selection index and the Top 10% **selected for use within a breeding program**. The response to selection may differ if a different group of animals were available for selection.

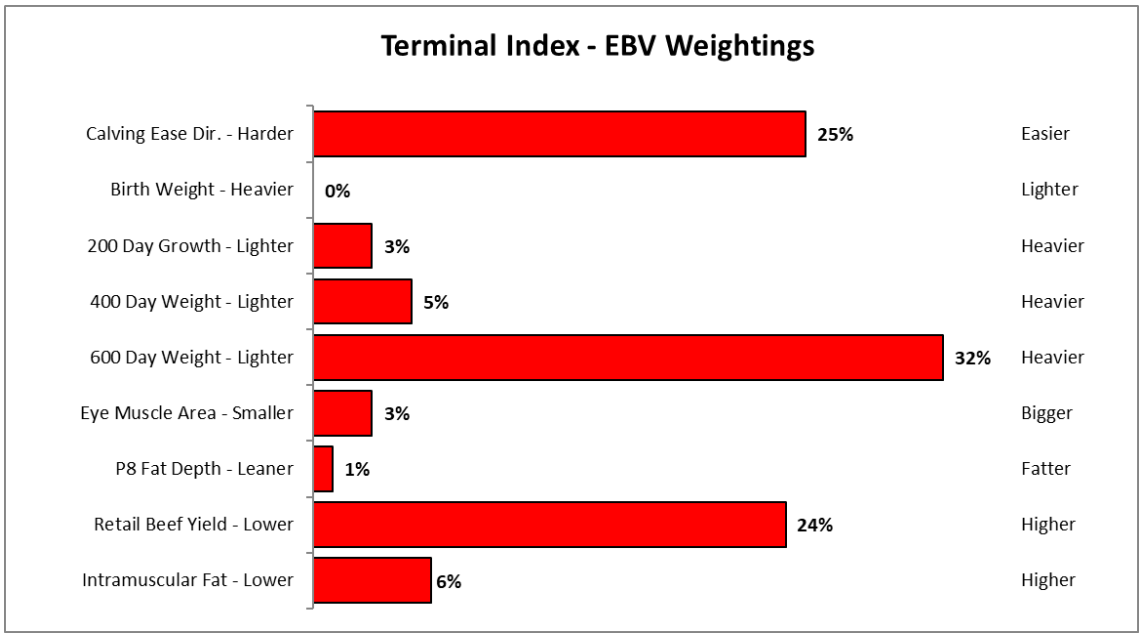


Terminal Index

The following bar graph shows the **key economic traits**, as determined by the BreedObject software, that are important in this selection index. The different trait emphases reflect the **underlying profit drivers in a commercial operation** targeting the described production system/market.



The bar graph below illustrates the magnitude and direction of emphasis that has been placed on each **BREEDPLAN EBV** within this selection index. These weightings represent the **most profitable combination of EBVs**, as determined by the BreedObject software, for the described production system/market.



While the graphs on the previous page show the emphasis that has been placed on the production traits and each EBV within the Terminal Index, they do not reflect the expected change that will occur to each individual EBV if producers select animals using this selection index. The selection response will also be influenced by factors such as the genetic relationship between traits and the animals that are available for selection. The correlations between traits explain how traits that are of no importance to a terminal index (e.g. Milk and Days to Calving) can have a selection response.

The following bar graph provides an indication of the **relative change** that would be expected in each individual BREEDPLAN EBV if producers select animals using the Terminal Index. The graph reflects the relative change if the Beef Shorthorn Published Sires in 2019 were ranked on this selection index and the Top 10% **selected for use within a breeding program**. The response to selection may differ if a different group of animals were available for selection.