

# NALF's Guide to Ultrasound

## Why Ultrasound?

Rapid growth in the proportion of fed cattle priced on grids and formulas and intense competition from major beef breeds justifies efforts to improve genetics for grade in Limousin cattle. However, improvement in grade will not be possible unless breeders increase their efforts to document thoroughly and accurately the genetic merit of their cattle for carcass traits. Collecting ultrasound data on yearling bulls and replacement heifers can give breeders an overall snapshot of the carcass merit of their herds. Combining it with harvest data in NALF's herdbook can improve the quality and accuracy of the carcass EPDs for the entire breed.

## Managing for Ultrasound

In order to detect genetic differences in muscling, marbling and fat thickness, breeders should manage bulls and heifers so that they can express their full potential for these traits. A bull's propensity for marbling and muscle expression best occurs when the bull is fed to gain at least three pounds per day. Heifers should be managed to have sufficient condition to detect differences in external fat and marbling. The following table gives some general guidelines for managing yearling bulls and replacement heifers.

	<b>Bulls</b>	<b>Replacement Heifers</b>
<b>How to Manage</b>	Put on a high-energy ration after weaning.	Put into a normal heifer development program with a moderate- to high-energy ration.
<b>When to Measure</b>	At or near the end of the post-weaning gain test	Just prior to breeding
<b>Acceptable Age Range</b>	300-450 days	300-450 days

Both bulls and replacement heifers should be measured for rump and rib fat thickness, ribeye area and percent intramuscular fat (marbling) between the ages of 300 to 450 days. NALF will not accept measurements taken before 300 or after 450 days of age.

## Contemporary Groups

It is very important to group the animals appropriately, preferably with their yearling contemporaries. NALF forms ultrasound contemporary groups using an animal's yearling contemporary group (or weaning contemporary group if yearling information has not been recorded) plus:

1. **Scan Lot Date.** Contemporaries must be scanned within three days of each other. Animals scanned more than three days apart will be grouped separately.
2. **Scan Management Code.** Contemporaries must have the same ultrasound management code. Ultrasound management information is recorded on the barnsheet as breeder-defined group code, test type, scan sex and diet code.

*In order for NALF to use an animal's performance data to calculate its EPDs, the animal must be in a contemporary group with at least one other animal.*

## Ultrasound Fees

There are two kinds of fees associated with ultrasound:

1. **Scanning fees** are set individually by ultrasound technicians. The fee structure is established by each individual technician and may vary depending upon the number of head to be scanned and other circumstances. The technician bills the breeder directly for scanning fees.
2. **Processing fees** are assessed by the ultrasound processing lab for about \$4 per head. Payment is required at the time the lab receives the images. Late payment will delay image processing.

## Scan Session Protocol

1. Schedule an appointment with an ultrasound technician at least one month in advance. Ultrasound technicians must be certified by the [Ultrasound Guidelines Council \(UGC\)](#). A list of UGC-certified technicians may be obtained from the UGC website at [www.ultrasoundbeef.com/index\\_files/FindTech.htm](http://www.ultrasoundbeef.com/index_files/FindTech.htm).

Breeders with small herds in close proximity to one another may want to coordinate their scanning sessions. Larger numbers of cattle in a small geographical area may mean lower per head scanning costs.

2. Request a barnsheet from the NALF office. A barnsheet is a preprinted form that lists the tattoo, sex, registration number, sire and dam registration numbers, and birthdate of each animal to be scanned. It is used during the scanning session for recording scan weight and animal management information.

To request a barnsheet, provide NALF with a list of tattoos or registration numbers for all animals to be scanned or, if scanning an entire herd, a member number or herd prefix, birth year letter, and sex. NALF will then process your barnsheet and fax or mail a copy to you.

Also find out from your technician which lab he or she is intending to use so that the NALF office can submit a barnsheet to the lab as well. NALF accepts ultrasound data from any ultrasound processing lab that is a member of the UGC. You can find contact information for UGC member labs on the [UGC website](#).

3. Weigh animals within seven (7) days of scanning session. Restrict animals from food and water overnight and weigh in the morning. Scan weights are used to predict empty body weight so gut fill must be minimized.

4. Prior to the scanning session, clip animals' hair to 0.5 inch in length or less in the areas in which the measurements will be taken. Evidence has shown that clipping greatly improves ultrasound image quality and accuracy of percent intramuscular fat prediction.
5. After the session, the technician will overnight the barnsheet and images to the ultrasound processing lab.
6. The lab will interpret the images and send the results electronically to NALF.
7. NALF will process the ultrasound data, compute adjusted measurements, ratios and interim EPDs and send a summary sheet to the breeder.

*The approximate turnaround time once the lab receives the images is seven business days.*

## Summary Sheets

Ultrasound summary sheets resemble barnsheets, with animals listed by contemporary group. Data printed for each animal include: herd prefix and tattoo; sex; registration number; birth date; sire and dam; scan management code; age and weight at scanning; actual and adjusted measurements and ratios for rump fat, rib fat, ribeye area and percent intramuscular fat (%IMF); and interim EPDs for carcass weight, ribeye area, fat thickness and marbling score.

Animals not in a contemporary group are listed at the end of the summary sheet with an accompanying irregular code. The most common irregular codes are: N = Not on file, U = Under 300 days of age, O = Over 450 days of age and M = Missing data to compute adjusted measurements. Breeders should check the identity of all animals with an irregular code of "N" and report any discrepancies to the NALF office. Breeders are also encouraged to submit weaning and yearling performance data for animals with an irregular code of "M." NALF will reprocess data on these animals free of charge.

## Interpreting Ultrasound Results

NALF's ultrasound data processing system computes adjusted measurements and ratios for each ultrasound trait, plus interim carcass EPDs based on the ultrasound data. Breeders are often uncertain which of these statistics hold the greatest merit. NALF recommends using the results in the following order if they are available:

1. **Carcass EPDs.** EPDs are predictions of genetic differences among animals in a population, not predictions of absolute performance. EPDs are the most accurate predictors of genetic merit that we have in the beef industry. They allow for better overall comparisons of animals within a breed than either ratios or adjusted measurements, which may only be compared within a contemporary group.

Carcass EPDs are computed using the animal's own ultrasound and/or harvest data, as well as ultrasound and harvest data on all the animal's relatives. The performance data is adjusted not only for age, weight and sex but also for the genetic level of the contemporary group with which it is associated. The information is also weighted by the heritability of the trait and by its genetic relationship with other traits.

Remember that the animal with the highest EPD for a trait is not necessarily the most valuable animal. For many traits, the optimum level for an EPD is not the highest or lowest but somewhere in between. For carcass traits, the optimum level depends upon the targeted market for which the cattle are being produced.

2. **Ratios.** If carcass EPDs are not available, ratios are the next best statistic to consider. Ratios provide a way to rank animal performance within a contemporary group after age, weight and sex adjustments have been taken into consideration. The average ratio within a contemporary group is 100, so any ratio above 100 represents higher performance (but not necessarily better, depending on the trait), and any ratio below 100 indicates lower than average performance. Although ratios are a convenient way to depict phenotypic information, they are limited in their ability to indicate an animal's genetic merit because they do not take the animal's pedigree into account. Ratios should never be compared to ratios from different contemporary groups or to ratios from other breeds.
3. **Adjusted Measurements.** Adjusted measurements take an animal's age, weight and sex at scanning into account. Adjusted measurements give an indication of an animal's phenotype for a trait but give no means by which to compare the animal across contemporary groups or breeds. Like ratios, adjusted measurements are limited in their ability to indicate an animal's genetic merit for a given trait.