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Body Condition: Implications for Managing Beef Cows

Body condition, or the amount of body fat an animal is carrying, is one management indicator that can be used to predict herd fertility and determine feeding programs. This factsheet is intended to make producers aware of the condition scoring system, what effects various condition scores will have on herd fertility, and to offer some management strategies regarding feeding and when to condition score to optimize both fertility and economics. The information is presented in four parts:

- how to condition score
- the relationship between body condition score and post-calving fertility
- feeding strategies in relationship to condition score
- practical application of condition scoring.

Condition scoring beef cattle

Body condition scoring is a subjective or "hands on" method of determining the amount of fat an animal is carrying. Condition scoring is a better predictor of body energy content than visual "eyeballing," weight-to-height ratio, heart girth or live weight. The advantage of a condition score measurement is that it is easy to learn, fast, simple, cheap, does not require specialized equipment and is sufficiently accurate for many research and management situations.

In our high technology environment, the simple condition score has many management implications. Perhaps most importantly, it allows individuals to speak the same language when describing body condition. That is, rather than using ambiguous rating terms such as "fat," "moderate" or "thin" based on visual appraisal, condition scoring assigns a numerical rating based on the feel of your cows.

Condition scoring is a better predictor of body energy content than visual "eyeballing"

What is body condition scoring?

The East of Scotland College of Agriculture was the forerunner in establishing a scoring system. Body condition is scored from 1 (very thin) to 5 (grossly fat). The fat cover over the loin area between the hip (hook) bone and the last rib is the major location on the animal's body used for condition scoring, especially in thin animals. The area is measured by placing your hand on the loin area, fingers pointing to the opposite hip bone. With your thumb, feel that fat cover over the ends of the short ribs (Figure 1). In some reports, the short ribs are also termed spinous processes.

Since there is no muscle between the end of the short ribs and the skin, any padding felt by the thumb will be fat. In cows that score above 3, the short ribs can no longer be felt, even with firm pressure; therefore, in fatter cattle, the fat cover around the tail head and over the ribs is also used to assess the animal's condition score.

The condition scoring system

The Scottish system uses the following descriptions to define each score:

Score 1: The individual short ribs are fairly sharp to the touch, and there is no fat around the tail head. The hip bones, tail head and ribs are visually prominent.

Score 2: The short ribs can be identified individually when touched, but feel rounded rather than sharp. There is some tissue cover around the tail head, over the hip bones and the flank. Individual ribs are no longer obvious.

Score 3: The short ribs can only be felt with firm pressure. The areas on either side of the tail head now have a degree of fat cover that can be felt easily.

Score 4: Fat cover around the tail head is evident as slight "rounds," soft to the touch. The short ribs cannot be felt even with firm pressure. Folds of fat are beginning to develop over the ribs and thighs of the animal.

Score 5: The bone structure is no longer noticeable, and the animal presents a "blocky" appearance. The tail head and hip bones are almost completely buried in fat, and folds of fat are apparent over the ribs and thighs. The short ribs are completely covered by fat, and the animal's mobility is impaired by the large amounts of fat carried.

In practice, an animal's condition may fall between the above values, in which case intermediate numbers (halves) can be used. For example, a 2.5 score indicates the animal is intermediate between a 2 and a 3 for body condition.

Figure 2 shows typical fat cover over the short ribs in cows with various body condition scores. It is important to remember that a condition score cannot be measured visually, as a full hair coat can hide a very poor condition. Condition score must be measured by feeling for fat cover.

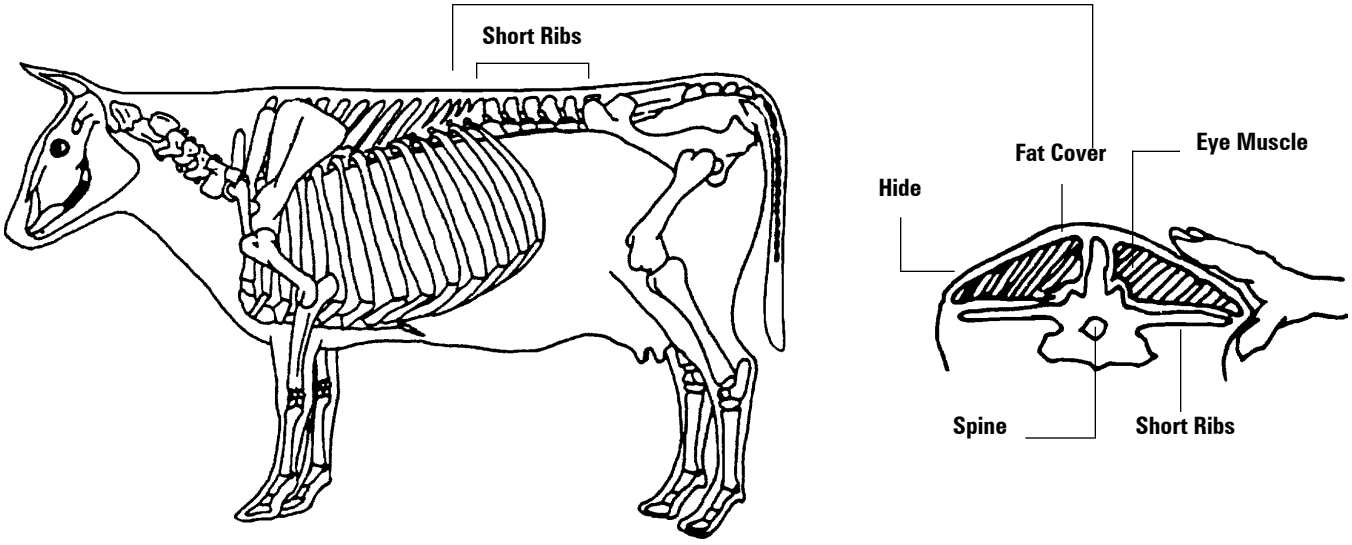

Figure 1. Where to condition score

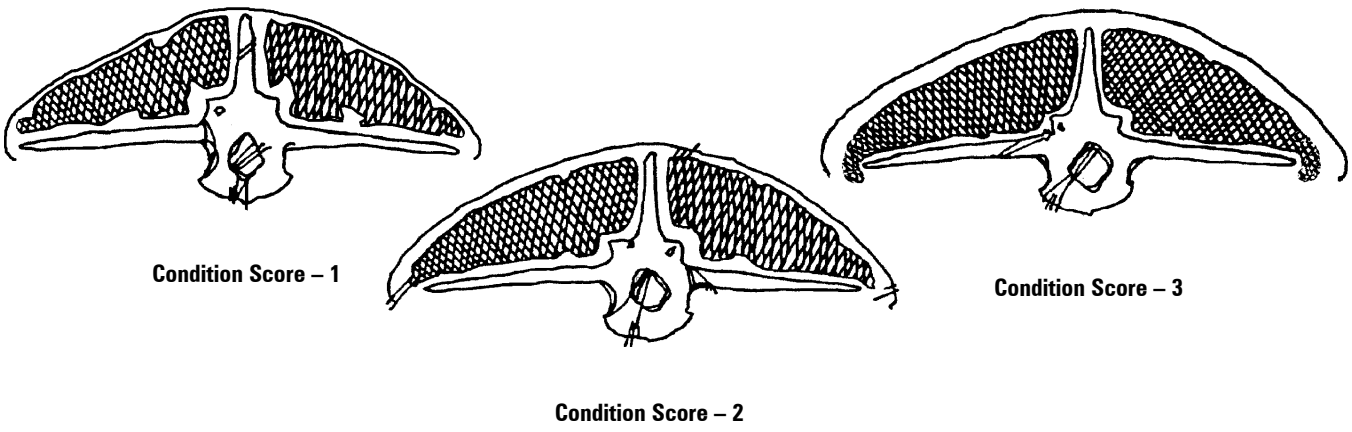

Figure 2. Typical fat cover over the short ribs in cows with various body condition scores

When to condition score

Cows should be condition scored three times each production year as follows:

- Fall pregnancy check or start of winter feeding program – optimum score is 3.0.
- At calving – optimum score for mature cows is 2.5; optimum score for first-calf heifers is 3.0.
- Thirty days before the start of the breeding season – optimum score is 2.5.

Relationship between condition score and post-calving fertility

Numerous studies have shown that adequate nutrition before and after calving is essential for optimum reproductive performance. Feeding programs that result in thin cows at calving and/or in a loss of body condition after calving will increase the interval from calving to estrus (standing heat) and decrease first service conception rates. Both an increase in number of days to estrus and a decrease in conception rate will result in a decrease in the number of cows becoming pregnant in the first three weeks of the breeding season.

In one study (Table 1), cows calving with body condition scores ranging from 2.0 to 3.5 were fed to either gain (high diet) or lose (low diet) 1.0 to 1.5 pounds per day from calving through the breeding season. Cows in the moderate group were fed to maintain body condition after calving. Cows in the low + flushing group were fed the low diet until two weeks before the start of the breeding season. They were then fed a flushing ration of 8.8 to 13.2 pounds of ground corn per day and corn silage free choice. Flushing was continued throughout the first 30 days of breeding.

The information presented in Table 1 shows that cows with a score of 2.0 or less took longer to return to normal estrus than did cows with a score of 2.5 or greater. Cows with a score of 2.0 or less at calving had a lower pregnancy rate in the first part of the breeding season regardless of the feeding program after calving. In addition, this study also indicated that post-calving feeding programs did not appear to affect potential fertility in cows scoring 2.5 or better at calving. Flushing cows just before and during the breeding season appeared to increase the number of thin cows (scoring 2.0 or less at calving) becoming pregnant in the first three weeks of the breeding season.

Table 1. Effect of body condition at calving on subsequent reproduction [a]

Cow condition score at calving	Postpartum nutrition	Days to show heat	Pregnant in first 20 days of breeding (%)
2.0	Low	56	30 [c]
or			
less	Low + flushing	67	45
	Moderate or high	60	43
MEAN		**59** [b]	**41** [b]
2.5	Low	50	55
or			
greater	Low + flushing	49	55
	Moderate or high	48	50
MEAN		**49**	**52**

a Adapted from Richards et al., 1986. J. Anim. Sci. 62:300

b Significantly different from cows calving in a body condition score of 2.5 or greater.

c Significantly lower than any other group.

It is important to realize that not all cows in a group offered the same ration will be able to maintain their body condition. Because of competition at the feed bunk, social rank, and the efficiency with which the animal utilizes nutrients for body maintenance and milk production, a cow may lose body condition after calving even when offered a high plane of nutrition. Conversely, other cows that may not be producing as much milk, or that are more aggressive at the feed bunk, may be able to maintain body condition even when the group is offered less than maintenance requirements.

The information presented in Table 2 shows that under group feeding conditions, only about 64 per cent of the cows fed below maintenance requirements actually lost body condition. In contrast, 40 per cent of the cows fed to maintain body condition were unable to do so, and 33 per cent of the cows fed at a high plane of nutrition were unable to maintain body condition. Overall, there was a modest decrease in the number of days from calving to estrus when cows were fed at or above maintenance requirements. However, the marked decrease in the number of days to estrus was observed only in cows that were able to maintain body condition, regardless of the calculated level of nutrition.

Table 2. Effect of loss or maintenance of body condition in cows fed different diets [a]

Dietary group [b]	Lost condition after calving	Days to estrus
Fed 90% of requirement	63.6%	58
Fed 100% of requirement	40.0%	40
Fed 110% of requirement	33.3%	35
All cows that lost condition		60
All cows that maintained condition		32

a Adapted from Rutter and Randel, 1984. J. Anim. Sci. 58:265

b Percentage of calculated NRC requirements for metabolizable energy; all diets were equal in crude protein, mineral and vitamin supplementation. Dietary groups contained 11, 10 and 9 animals for the 90%, 100% and 110% treatments, respectively.

Therefore, to obtain optimum post-calving fertility, mature cows should calve with a body condition score of 2.5 to 3.0 and be able to maintain that condition through the breeding season.

Flushing, the practice of feeding a very high level of nutrition for a couple of weeks before the start of the breeding season, only works in cows that are below optimum condition and can gain condition to reach optimum (2.5) during flushing. Flushing will NOT enhance reproduction in cows (typically scoring 1.5 or less) that are unable to gain enough condition during flushing.

Cows with a body condition score of 2.0 about 30 days before the start of the breeding season may be helped to re-breed by the use of flushing and by the use of a controlled suckling treatment. Controlled suckling involves removing a calf for 48 hours or limiting nursing to once daily until the cow is observed to be in heat.

Another adverse effect of inadequate cow nutrition is the reduction in pounds of calf weaned. Reports indicate a 5 per cent to 25 per cent reduction in adjusted 205-day weaning weight of calves from dams with a body condition of less than 2.0 at calving or from suckled cows losing condition after calving.

The amount of loss in the current year depends on breed type and severity of underfeeding before cows go to good pasture. In areas where cows typically calve later in the spring (April, May) and are able to go to good pasture shortly after calving, very little is lost in the current year's calf weaning weight.

The major loss in pounds of calf weaned occurs in the following year. Calf weaning weight is markedly affected by age of the calf at weaning. If one assumes that an average calf will gain about 2 pounds per day from birth to weaning, then for every estrous cycle that a cow remains open, the calf is 20 days younger and about 40 pounds lighter at weaning.

The information presented in Table 3 shows next year's estimated relative losses in terms of pounds of calf weaned based on various management decisions made before and after calving this year.

If a cow is fed to lose one-half of a body condition score over the winter, there will be a savings in winter feed costs. In contrast, feed costs will be 20 to 30 per cent higher for cows fed to gain one-half of a body condition score over the winter, compared with those fed to maintain body condition.

Table 3. Effect of body condition on this year's feed cost and next year's calf weaning weight

Pre-calving management	Winter feed costs [a] (% of maintenance)	Cow condition at calving	After calving management	Weeks delay in conception (80 day exposure)	Loss in next year's calf weaning weight
Lose condition (from 2.5 to 2.0)	85 - 90%	2.0	Lose condition (from 2.0 to 1.5 or less)	10	up to 70% loss
Maintain condition (at 2.0)	100%	2.0	Maintain condition (at 2.0)	8	up to 40% loss
Gain condition (from 1.5 to 2.0)	120 - 130%	2.0	Gain condition (from 2.0 to 2.5)	5	up to 15% loss
Lose condition (from 3.0 to 2.5)	85%	2.5	Lose condition (from 2.5 to 2.0)	2	5% loss
Maintain condition	100%	2.5	Maintain condition	0*	0% loss
Gain condition (from 2.0 to 2.5)	120 - 130%	2.5	Gain condition (from 2.5 to 3.0)	0*	0% loss

a Winter feed cost relative to maintenance can only be calculated if the amount of condition gained or lost is known. Losing 0.5 lb/head/day of body tissue would result in a loss of 0.5 units of condition score in 200 days and would reduce feed cost by 10 - 15 per cent. To gain 0.5 units requires twice as much energy. Note: These figures do not include weight change caused by fetal growth.

* Conceived in the first 21 days of breeding.

Cows that calve with a body condition score of 2.0 or less will usually show a decreased weight at weaning the next year, regardless of the nutritional level offered after calving. This loss is the result of cows failing to become pregnant or conceiving later in the breeding season. When cows calve with a body condition score of 2.5 and lose condition after calving, there will be a reduction in next year's calf weaning weight. The reduction is caused by an average two to five-week delay in return to estrus after calving.

Cows with a 2.5 condition score when they calve and that are able to at least maintain that condition after calving are the most successful both in re-breeding on time and optimizing pounds of calf weaned.

Condition scoring and feeding strategies

From a nutritional point of view, fat represents storage of energy in the body. Cows can accumulate body fat during periods of surplus or inexpensive energy intake to build up a reserve of energy that can be drawn on in times of need. The term "feeding off her back" refers to the mobilization of previously accumulated body fat.

The accumulation of fat in beef cattle is not an efficient process. The efficiency of retaining digestible energy (DE) in the form of body tissue varies from about 30 per cent for dry cows fed low quality diets to about 60 per cent for suckled cows fed high quality diets.

To improve one unit of body condition score requires about 1,900 Mcal of DE. This is the equivalent of over 1,200 pounds of barley grain or almost 1 ton of average quality hay. Each unit loss of body condition score will supply the equivalent of 900 Mcal of DE. This figure is equal to 600 pounds of barley or 900 pounds of hay.

How can body condition be manipulated to reduce feeding costs? It is common practice to put lactating cows on good quality feed, usually pasture, for 6 to 8 months after calving. In addition to stimulating milk production, considerable weight gain is usually achieved, especially in late lactation. Many mature cows gain over 200 pounds (the equivalent of one unit of body condition score) during the pasture season.

A reasonable target for body condition at fall weaning is 3.0. If this condition has not been achieved by the end of the summer grazing season, producers should consider weaning calves early so that the cows have at least one month of good fall grazing in which to gain condition before winter feeding begins.

Cows entering the winter with a condition score of 3.0 have several advantages over cows scoring less than 2.0. The extra fat tissue provides some internal insulation against heat loss. It also provides an energy reserve that can be called on when the amount of daily feed is insufficient to meet the cow's needs. In other words, the daily feed allowance offered to cows in good condition can be limited to reduce wintering costs of the cow herd.

An 1,100 pound cow scoring 2.5 needs to maintain her body weight and condition over the winter as well as provide for the nutrition of the growing fetus. She requires about 20 to 22 pounds of hay per day to do this. A 1,200 pound cow scoring 3.0 can afford to contribute about one-half pound of body tissue "off her back" each day, reducing the amount of feed required. She needs about 18 to 20 pounds of hay per day, a saving of 10 per cent. The pounds of hay specified here represent actual intake.

The feed waste factor, present in all feeding systems, will increase the amount of hay that must be offered to achieve these levels of intake.

Sometimes, cows enter the winter in thin condition (score less than 2.0) and need to gain considerable weight before calving. A cow that has to improve one unit in condition (gain approximately 200 pounds) has to be fed about 7 pounds of barley or 11 pounds of hay above what she requires for maintenance. This amount represents an increase in the feed cost of wintering the cow of approximately 50 per cent.

Cows that calve with a condition score of less than 2.5 need to gain weight rapidly. If an improvement of one-half unit of condition score (100 pounds) is required in the first 60 days after calving, a high quality ration must be fed. Approximately 10 pounds of barley per day is required above what the cow already needs for normal maintenance and milk production. This period often coincides with the "mud season," which makes grain feeding difficult for many cow-calf producers. Under most conditions, it is impossible to feed cows that score less than 2.0 well enough between calving and breeding to have a positive effect on fertility.

Condition scoring can be used to sort a cow herd into groups that have similar nutritional needs. Both bred heifers and thin cows need more energy than mature cows that score 2.5 to 3.0 and will benefit from reduced competition for feed as well.

The ideal feeding program is one that recognizes the ability of the beef cow to safely and economically gain and lose body condition. Managers should be aware that it costs over twice as much to improve body condition as it does to use excess body condition to supplement the daily energy intake.

Improve body condition when dietary energy is least expensive (usually the summer). Let the cow lose condition when dietary energy is expensive (usually the winter). Managers should recognize that a rapid loss in condition is not safe and that a rapid increase in condition is not always possible. Also, while condition scoring is a useful tool for evaluating the energy status of a cow, it is not useful in determining if she has received an adequate amount of the other important nutrients such as protein, vitamins and minerals.

Practical application of condition scoring to cow/calf production

Learn how to condition score

- The producer need not remember all five condition scores. The most useful score to remember and to shoot for is the score of 2.5.
- Condition scoring is more accurate than "eyeballing." Keep records of condition scores.
- Cows should be scored in the fall, at calving and 30 days before the start of the breeding season.
- If condition scoring the cow herd at calving and before the start of the breeding season is not feasible, a producer could use an alternative twice per year strategy: once in the fall and once after calving (30 to 45 days before the start of the breeding season).
- Although condition scoring the cow herd between calving and the start of the breeding season may be inconvenient, breeding problems caused by inadequate nutrition are most likely to be detected during this critical time.
- A record can be kept of an individual animal's condition score. Alternatively, a representative group of cows from very large herds can be scored to give an estimation of average herd condition score.

Use condition scores as management indicators

Thin cows (cow scoring 2.0 or less):

- Look for causative factors
  - lack of sufficient feed
  - excessive competition at the feed bunk
  - internal /external parasites
  - disease or injury
- Problems that may be encountered
  - increased calving difficulty (scores of 1.5 or less)
  - increased calf death loss
  - delayed breeding or open cows
  - fewer pounds of calf weaned
- Make corrective management decisions
  - feed young and thin cows separately from mature cows in adequate condition
  - improve winter diet (**NOTE:** Do not rely on "flushing" thin cows to increase reproductive rates)
  - control parasites
  - vaccinate against common diseases
  - wean calves about one month earlier in the fall

Fat cows (score 3.5 or greater):

- Look for causative factors
  - did not wean a calf
  - produced very little milk
  - overfeeding or overabundant feed
- Problems that may be encountered
  - increased calving difficulties (scores of 4.0 or greater)
  - decreased calf vigor and (or) survival
  - lower fertility
  - low weaning weights
  - feed costs too high
- Make corrective management decisions
  - cull non-fertile or sub-fertile cows and cows that do not produce a growthy calf
  - do not overfeed cows already in adequate body condition (score of 2.5); feed separately if necessary
  - let cows coming off pasture in a body condition score of 3.0 or better lose some condition over the winter.

It is important to realize that inadequate cow nutrition not only affects current calf weaning weight as a result of poor milk production, but also affects next year's calf weaning weight owing to a delay in number of days to conception. The full effect of a breeding problem in the current year is not realized until about one and one-half years later.

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