K-STATE
Research and Extension

Guide to Body Condition Scoring Beef Cows and Bulls

What is a body condition score?

Body condition scoring (BCS) is a method for determining the relative fatness of beef cattle. The system used by beef producers in the U.S. rates body condition on a scale from 1 to 9, with 1 being severely emaciated and 9 extremely obese. Animals are judged by fat thickness in areas such as the spine (vertebrae), ribs, hooks and pins, tailhead, brisket, and muscling in the round and shoulder (Figure 1). Body condition scoring can be done using visual indicators (Table 1) or a combination of visual and palpation techniques described in Table 8.

Why are body condition scores important?

Body condition scoring is a free tool to help you evaluate nutritional status and sort cattle according to dietary needs. Changes in body condition scores reflect how well nutrients provided match with needs

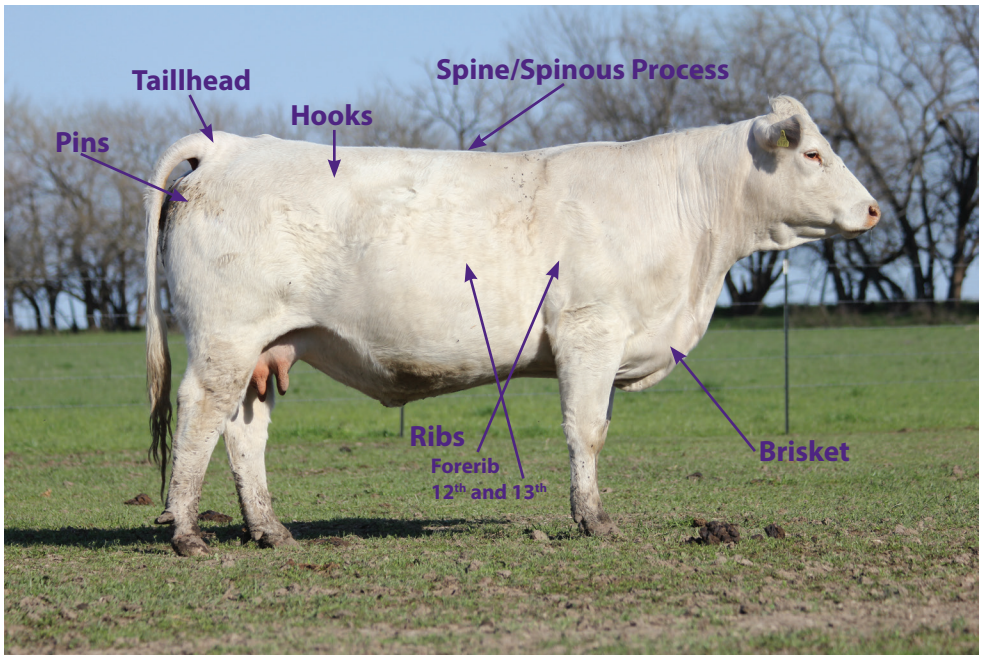

Figure 1. Key places on a live beef animal evaluated to determine body condition.

or energy expenditures. Because body condition is linked to reproductive performance, you can improve success and profitablity with this simple practice.

When and how to BCS cattle

You can evaluate body condition anytime you are around your cattle, but it is recommended 60 to 90 days before calving, at calving, and weaning. An easy way to determine your herd's average body condition is to tally the number of cows that fall into each BCS category while riding, walking, or driving through the cattle or processing (Figure 2). This information helps you determine the average BCS and calculate the percentage of cows in each category. Example body condition scores from visual appraisals are shown on page 3.

Record this information on a handheld device or tablet or use the template shown at right (Figure 2), which can be found at KSUBeef.org. The *Body Condition Record Book* (MF3277) is another tool for recording body condition scores.

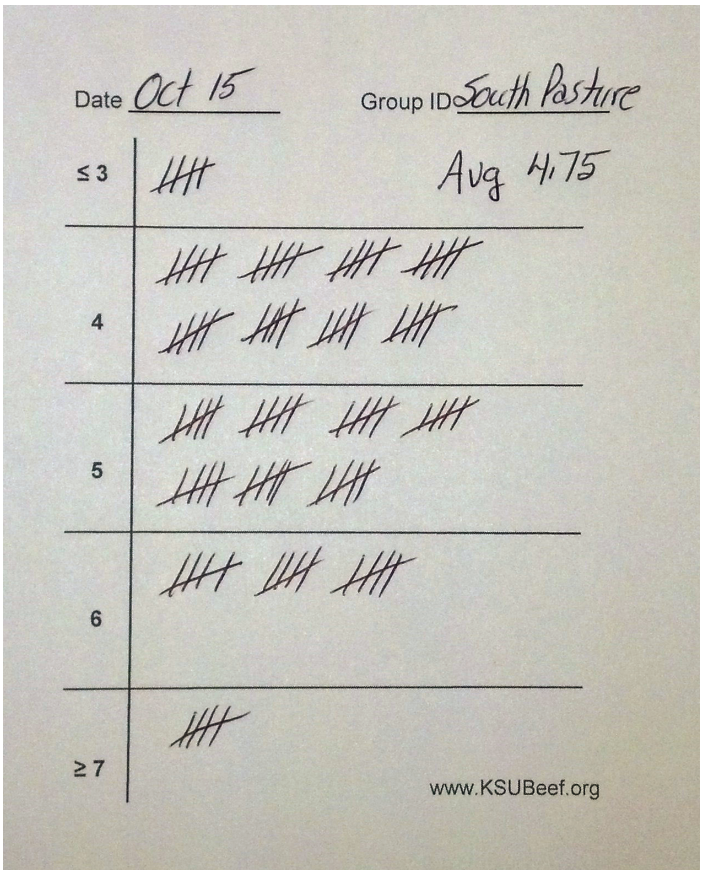

Figure 2. The "tally method" for scoring cows in individual pastures.

Table 1. Visual method for evaluating body condition in cattle

		Physical Attribute					
	BCS	Spine	Ribs	Hooks/Pins	Tailhead	Brisket	Muscling
Thin	1	Visible	Visible	Visible	No fat	No fat	None/atrophy
	2	Visible	Visible	Visible	No fat	No fat	None/atrophy
Borderline	3	Visible	Visible	Visible	No fat	No fat	None
	4	Slightly visible	Foreribs visible	Visible	No fat	No fat	Full
Optimum Condition	5	Not visible	Not visible	Visible	No fat	No fat	Full
	6	Not visible	Not visible	Visible	Some fat	Some fat	Full
Over-Conditioned	7	Not visible	Not visible	Slightly visible	Some fat	Fat	Full
	8	Not visible	Not visible	Not visible	Abundant fat	Abundant fat	Full
	9	Not visible	Not visible	Not visible	Extremely fat	Extremely fat	Full

Adapted from Herd and Sprott, 1986; BCS = body condition score

Body Condition Score Examples

BCS 3

BCS 4

BCS 5

BCS 6

BCS 7

BCS 8

Impact on reproduction and calf performance

The relationships between BCS and reproduction have been investigated for many years. Body condition scores at calving are related to days until cows return to estrus and proportion of cows cycling. Cows with greater BCS at calving resume normal estrous cycles sooner (Figure 3). Subsequently, this can result in shorter calving intervals (Table 2). Cows in better body condition at calving deliver calves that show greater average daily gain, which results in heavier weaning weights (Table 2). Results of a Louisiana study show that regardless of BCS changes before calving (positive or negative), a BCS of 5 ensures a sufficient rebreeding rate the following year (Table 3). Avoid a decrease in BCS during pregnancy. Research shows that the care of the pregnant cow affects fetal programming. Poor nutritional status of the mother may have long-term negative impacts on the calf.

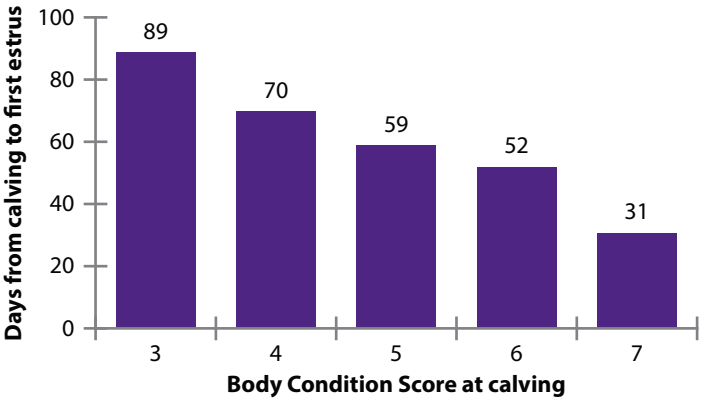

Figure 3. Average days from calving until estrus based on BCS at calving. Adapted from Houghton, 1990.

Table 2. Relationship of body condition score to beef cow performance and calf performance[1]

BCS[2]	Pregnancy rate, %	Calving interval, d	Calf ADG[3], lb/d	Calf WW[4], lb
3	43	414	1.60	374
4	61	381	1.75	450
5	86	364	1.85	514
6	93	364	1.85	514

[1] Kunkle et al., 1994
[2] BCS = body condition score on scale of 1 to 9
[3] ADG = average daily gain in pounds per day
[4] WW = weaning weight in total pounds

Table 3. Pregnancy effects based on cow BCS changes in last trimester*

	Group		
	1[a]	2[b]	3[c]
Pre-calving BCS change	1.4	-0.4	-2.0
% pregnant			
20 days after calving	55	51	64
40 days after calving	76	67	79
60 days after calving	89	82	89
Average days to conception after calving	89	87	85

[a] Group 1 = BCS ≤ 4 in last trimester and fed to increase BCS to 5 or 6 by calving
[b] Group 2 = BCS of 5 or 6 in last trimester and fed to maintain and calve at BCS of 5 or 6
[c] Group 3 = BCS of ≥ 7 in last trimester and fed to lose weight so that calving BCS was 5 or 6
* Morrison et al., 1999

A large-scale study of 5,510 head of cattle was conducted to determine the influence of BCS on estrus expression and artificial insemination (A.I.) pregnancy rate in response to estrus synchronization over a five-year period. The authors concluded a minimum BCS of 5 should be achieved before breeding to ensure acceptable reproductive performance of beef cows managed on forage. Results are shown in Table 4.

Looking specifically at heifers, it is even more important that they are in BCS of 5 to 6 at calving. At a BCS of 4 (Table 5), a much lower proportion of heifers were cycling and pregnant even late in the breeding season. It is also important to note the post-calving interval to first estrus, which allowed heifers with a BCS of 5 or 6 to breed back at an earlier date than those with a lower BCS.

Cows with a greater BCS at calving have more immunoglobulin M in their milk, which means more immunoglobulin circulating in calf-serum and greater health protection for calves. The relationship between BCS and immunoglobulin levels is shown in Figure 4.

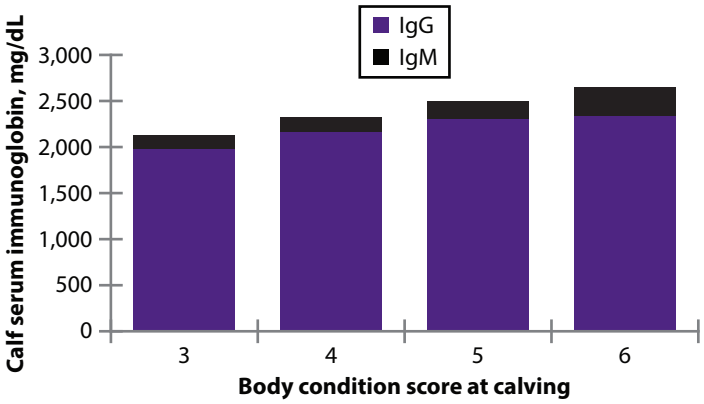

Figure 4. Relationship between body condition and immunoglobulin levels in calf serum. Adapted from Odde, 1997.

Table 4. Effect of body condition at start of synchronization on estrus expression (observed heat), pregnancy rates to A.I., and breeding season pregnancy rate[1]

	Body condition scores at synchronization					
Measures	3	4	5	6	7	8
Estrus after synch (% cycling)	41.8	40.5	50.5	53.0	56.4	40.4
Fixed-time A.I. pregnancy rate (%)	36.7	47.4	51.8	52.9	50.9	44.9
Breeding season pregnancy rate (%)	74.7	78.2	86.4	90.2	89.9	87.9

[1] Kasimanickam et al., 2011

Table 5. Proportion of first-calf heifers exhibiting estrus based on days of breeding season and body condition score at calving

	% in estrus by days of breeding season			% pregnant by days of breeding season		
BCS	20 days	40 days	60 days	20 days	40 days	60 days
4	42	56	74	27	43	56
5	54	80	90	35	65	80
6	63	98	98	47	90	96

Adapted from Spitzer et al., 1995

Don't forget the bulls

Ideally, a bull should have a body condition score of 5.5 to 6.5 on a 9-point scale before the breeding season. Both overconditioned and under-conditioned bulls can be a problem. A bull may lose 100 to 200 pounds during the breeding season. Assessing body condition throughout the breeding season helps you determine if you need to supplement your bull(s) to maintain productivity. Bulls that are too thin during breeding are less active and do not cover as many cows. This may reduce breeding success.

Age and body condition score have a major impact on scrotal circumference. Scrotal circumference is an estimate of reproductive capacity and a component of the breeding soundness exam used to identify potentially satisfactory breeders. Bulls in greater body condition have a larger scrotal circumference than thinner bulls (Table 6). Fat in the scrotum can negatively affect semen quality. Semen quality is reduced for bulls in a body condition of 7 or greater or those with body condition scores less than 4 (Table 7).

Table 6. Effect of body condition on scrotal circumference

BCS	Number of bulls	Scrotal circumference (cm)
4	5	36.9
5	242	37.7
6	80	38.6

Adapted from Rusk et al., 2002.

Table 7. Effect of body condition on semen quality in physically normal beef bulls

BCS	% bulls with satisfactory semen quality	Number of bulls
3	52.6	19
4	60.0	10
5	70.0	290
6	77.8	27
7	47.6	42

Adapted from Barth et al., 2002.

Body condition scoring tips

Keep it simple. Once you are familiar with the general appearances of cows that are thin, borderline, optimum, and overconditioned, you can use these classifiers instead of determining exact numerical BCS values. Grouping cows by these classes will help to determine nutritional management practices.

Be consistent. Body condition scoring is subjective, so your scoring might be slightly different than your neighbor's. However, if you are the one consistently doing the evaluations then relative differences can be determined over a period of time.

Evaluate fat thickness, not other external factors. When evaluating BCS, consider pregnancy, rumen fill, and age of the cow. Look beneath the hair coat and do not be misled by cows that are full, in the last trimester of pregnancy, long-haired, or have recently calved or been limit fed. Producers should become familiar with the normal appearance of the herd during each stage of production to accurately gauge fat thickness.

Use body condition scoring at key times during the production cycle. These include the beginning of the last trimester, calving, and weaning. Assessing BCS at these times allows you to change BCS if necessary before important events such as calving and breeding.

Don't forget to score your bulls. Body condition scoring bulls is important because they are the other half of your breeding equation, and bull fertility is critical. Aim for optimal condition six weeks or more before the start of the season.

Record body condition scores. This allows you to learn from changes over time. Herd average body condition reflects your most recent nutritional program and measures how closely you achieved your management goals. Use individual body condition scores to sort cows with similar nutritional needs into management groups or identify cows that do not fit your environment.

Use BCS to time management decisions. Rather than a set calendar date for weaning, weaning time can be used as a tool to manage cow body condition. Avoid starting the winter with thin cows that require more feed for maintenance and will struggle to regain weight without significant expenditures on feed.

Table 8. Visual and palpation methods for determining body condition in cattle

1.	Bone structure of shoulder, ribs, back, hooks and pins is sharp to the touch and easily visible. Little evidence of fat deposits or muscling.
2.	Little evidence of fat deposition but some muscling in the hindquarters. The spinous processes (vertebrae) feel sharp to the touch and are easily seen with space between them.
3.	Beginning of fat cover over the loin, back, and foreribs. The backbone is still highly visible. Processes of the spine can be identified individually by touch and may still be visible. Spaces between are less pronounced.
4.	Foreribs are not noticeable but the 12th and 13th ribs are still noticeable to the eye, particularly cattle with a big spring of rib and width between ribs. The transverse spinous processes can be identified only by palpation (with slight pressure) and feel rounded rather than sharp. Full, but straight muscling in the hindquarters.
5.	The 12th and 13th ribs are not visible to the eye unless the animal has been shrunk. The transverse spinous processes can only be felt with firm pressure and feel rounded but are not noticeable to the eye. Spaces between the processes are not visible and are only distinguishable with firm pressure. Areas on each side of the tailhead are well filled but not mounded.
6.	Ribs are fully covered and are not noticeable to the eye. Hindquarters are plump and full. Noticeable sponginess over the foreribs and on each side of the tail head. Firm pressure is required to feel the transverse processes.
7.	Ends of the spinous processes can only be felt with firm pressure. Spaces between processes can barely be distinguished. Abundant fat cover on either side of the tail head with evident patchiness.
8.	Animal takes on a smooth, blocky appearance. Bone structure disappears from sight. Fat cover is thick and spongy and patchiness is likely.
9.	Bone structure is not seen or easily felt. The tailhead is buried in fat. The animal's mobility may actually be impaired by excessive fat.

Adapted from Pruitt and Momont, South Dakota State University, 1988.

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MF3274 December 2016