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Body Condition Scoring of Beef Cattle

Body condition scoring (BCS) of cattle allows producers to assess the fat reserves of cows during various production phases. When evaluated at key production time points, this information can be used in management and feeding decisions. The aim of BCS is to obtain a simple and reliable measure of the level of body fat reserves in live animals. Though live weight gives an indication of body size, it can be markedly affected by gut fill and stage of pregnancy. Careful training of scorers and periodic standardization have shown BCS to be accurate and useful on a within-herd basis.

Cow-calf producers can use BCS so feeding and management can be regulated in order to ensure that breeding cattle are in appropriate condition at different stages of their production cycle. Action can then be taken to alter the condition of those cows that are not in the correct condition at critical stages. Scoring can be carried out easily in circumstances where weighing may be impossible or impractical. The technique is easily learned and is most useful when practiced regularly by the same person in the same herd over several years.

Practical importance

Variation in the BCS of beef cows has a number of practical implications. The condition of cows at calving is associated with length of postpartum anestrus, subsequent lactation performance, as well as health and vigor of the newborn calf.

Incidence of calving difficulty is increased in extremely fat heifers, although condition is often overrated as a cause of dystocia in older cows. However, the condition of cows at breeding affects their reproductive performance in terms of the number of services required per conception, calving interval, and the percentage of cows failing to become pregnant during the breeding season.

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Body condition scoring system

The BCS system uses numbers to describe the relative fatness or body composition of the cow. The scoring system for beef cattle has a range of 1 to 9, with 1 representing very thin cows and 9 representing very fat cows. A cow with a BCS of 5 is said to be in average condition; however, perception of an "average" conditioned cow can vary from producer to producer. For BCS to be most helpful, producers need to calibrate to the 1 to 9 system. The system is relatively simple: thinner cows looks very sharp, angular and skinny, while fatter cows look smooth and boxy with bone structures increasingly hidden from sight or touch.

A BCS can be assigned to a cow either by visual appraisal, by palpation or by combining sight and touch. Research suggests cattle can be scored equally well by palpation of fat cover or by visual appraisal. Accurate visual appraisal may be hampered by hair coat. For cattle with long hair, handling is of value, but when hair is short, handling probably is not necessary. Remember that gut fill and animals in late pregnancy may make animals appear fatter than they actually are. Figures 1–9 give guidelines for determining BCS by palpation of fat cover.

Effect on reproductive performance

Management of cow body condition at key time points in the cow-calf production cycle is a major opportunity to influence reproductive efficiency in cow-calf operations.

Calving interval and profitability

Calving interval is defined as the period from the birth of one calf to the next. To have a 12-month calving interval, a cow must conceive within 80 days of the birth of her calf. Such cows produce a pound of weaned calf cheaper than cows that take longer than 80 days, making them more profitable.

Calving intervals in excess of 12 months are often caused by nutritional stress at some point, either before the calving season or during the subsequent breeding season, which results in thin body condition and poor reproductive performance.

BCS 1
Emaciated

The cow is severely emaciated and physically weak. Bone structure of shoulder, ribs, back, hooks, and pins are sharp to the touch and easily visible. No evidence of fat deposits or muscling. This body condition score is rarely observed in the field.

BCS 2
Very Thin

The cow appears emaciated but not weak. No evidence of fat deposition. Muscle atrophy is significant in the shoulder, over the loin and rump, and through the hindquarters. The spinous and transverse processes, hooks, and pins feel sharp to the touch and are easily seen.

BCS 3
Thin

Very little fat cover over the shoulder, loin, and rump. The foreribs have slight evidence of fat deposition, but the last three or more ribs can be seen. The backbone is still highly visible. Processes of the spine can be identified individually by touch and may still be visible. Spaces between the processes are less pronounced. There is evidence of muscle loss in the hindquarters.

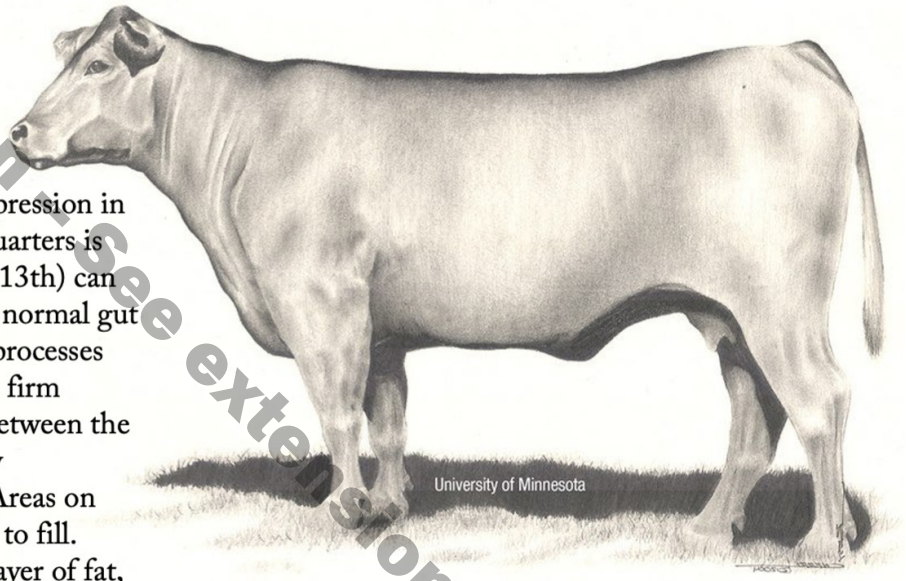
Figures 1–3. Body condition scores (BCS) 1-3 and their descriptions. Artist depictions courtesy University of Minnesota.

BCS 4
Borderline

Foreribs are slightly noticeable and the 12th and 13th ribs are still easily visible. Muscle atrophy is still noticeable over shoulders, loin, and hindquarters, but is approaching normal. The transverse and spinous processes can be identified only by palpation (with slight pressure) and feel rounded rather than sharp. The hooks and pins are covered in minimal fat and easily identified.

BCS 5
Moderate

There is slight evidence of fat deposition in the brisket. Muscle expression in the shoulder, loin, rump, and hindquarters is normal. The last two ribs (12th and 13th) can only be seen if the cow has less than normal gut fill. Individual spine and transverse processes cannot be seen, can only be felt with firm pressure, and feel rounded. Spaces between the processes are not visible and are only distinguishable with firm pressure. Areas on each side of the tailhead are starting to fill. Hooks and pins are covered with a layer of fat, but still distinguishable.



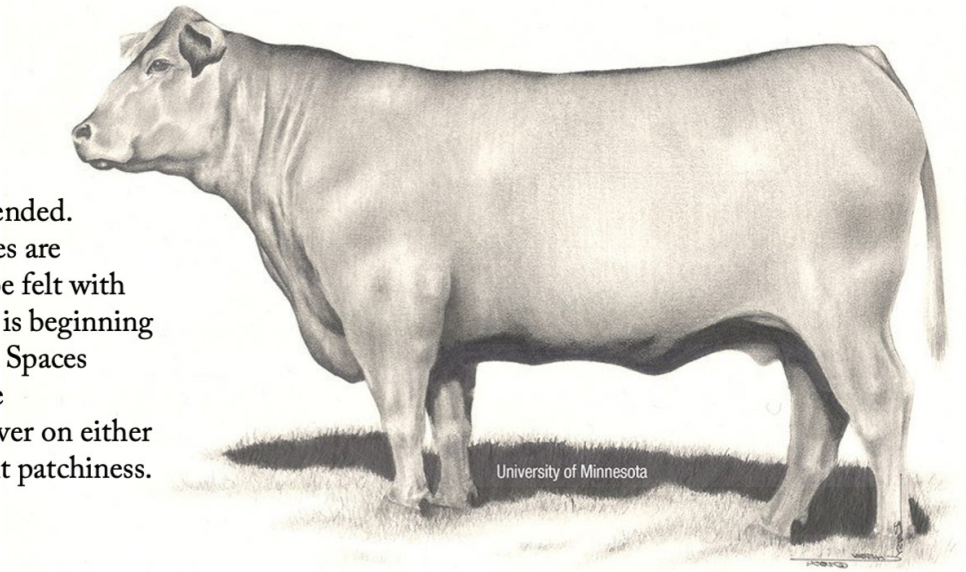
BCS 6
Good

The cow exhibits a smooth appearance throughout. Ribs are fully covered and are not noticeable to the eye. Hindquarters are plump and full. Noticeable springiness over the foreribs and on each side of the tailhead. Firm pressure is now required to feel the transverse processes. Fat deposition in the brisket is evident.

Figures 4–6. Body condition scores (BCS) 4-6 and their descriptions. Artist depictions courtesy University of Minnesota.

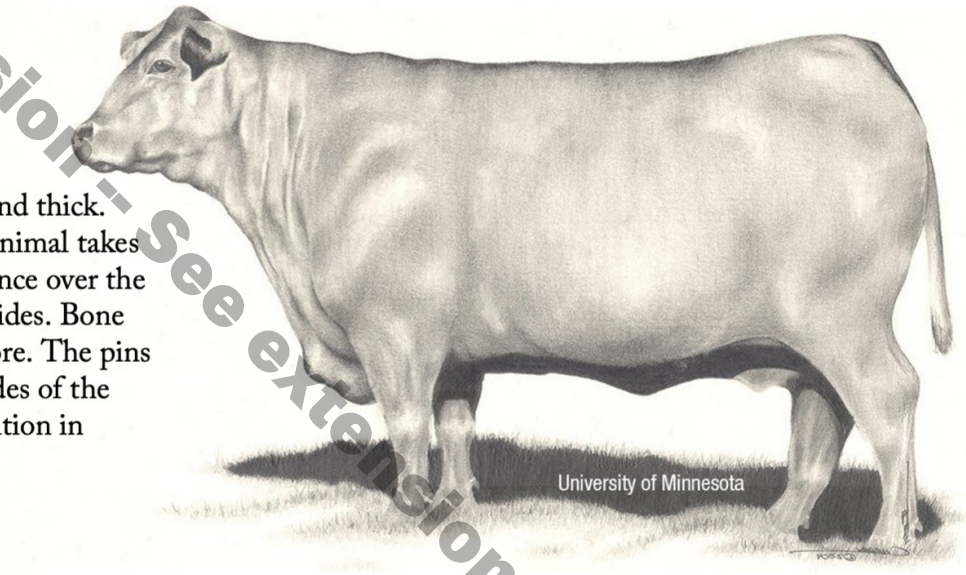
BCS 7
Fleshy

The brisket is full, but not distended. Spinous and transverse processes are embedded in fat and can only be felt with very firm pressure. The topline is beginning to take on a square appearance. Spaces between processes can barely be distinguished. Abundant fat cover on either side of the tailhead with evident patchiness.



BCS 8
Obese

The cow's neck appears short and thick. Brisket is distended with fat. Animal takes on a square and blocky appearance over the topline and smooth along the sides. Bone structure cannot be seen anymore. The pins are embedded in fat on both sides of the tailhead. Evidence of fat deposition in udder.



BCS 9
Very Obese

Rarely seen. Bone structures are not easy to identify. The tailhead is buried in fat. The cow appears short-necked with a full, and distended, brisket. Significant fat deposition in the udder. The animal's mobility may be impaired by excessive fat.

Figures 7–9. Body condition scores (BCS) 7-9 and their descriptions. Artist depictions courtesy University of Minnesota.

The relationship of body condition to calving intervals is shown in Figure 10. The thinnest cows have the longest calving intervals, while fatter cows have shorter calving intervals. Producers should evaluate their cows for condition and consider supplemental feed to correct nutritional deficiencies, which are indicated when cows become thin. Additionally, considering culling cows that cannot maintain body condition when provided an economical level of supplementation.

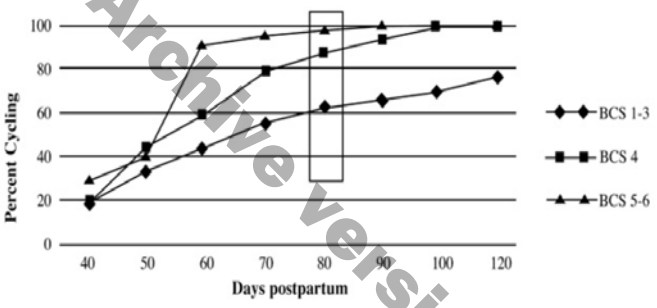


Figure 10. Body condition score and length of postpartum anestrus. Cows calving in BCS 1-3 or 4 take a greater number of days to initiate cycling after calving than cows in BCS 5-6. Day 80 is highlighted, as cows would need to conceive by 80 days postpartum to maintain a 365-day calving interval. Note that this is not be possible for cows calving in thin BCS, as a portion of these cows are not even cycling by this time. Adapted from JN Wiltbank. 1983. Vet Clin North Am Large Anim Pract 5(1):41-57.

Body condition at calving

The influence of nutrition before calving is a major factor that controls the length of time between calving and the return to estrus. Cows with a BCS of 4 or less at calving, as a result of low levels of pre-calving nutrition, will have longer intervals from calving to first estrus than cows in BCS of 5 or higher. Young cows require about one BCS higher to achieve the same reproductive performance as mature cows, since they have the added requirement of growth.

It is much easier to increase condition in cows before rather than after they calve. High nutrition after calving is directed first toward milk production. Feeding cows to gain condition early in lactation therefore leads to increased milk production but has little effect on body condition.

The target BCS for cows immediately prior to calving is 6. Anything higher than 7 may not be helpful, and scores at less than 5 prior to calving will result in reduced reproductive performance in the subsequent breeding season.

Body condition at breeding

The influence of nutrition after calving is a major factor that controls the fertility of a cow's estrous cycle during the breeding season. A lower conception rate has been shown among cows losing condition from calving through breeding compared with cows that maintain or gain condition during this time.

Cows should be in a condition score of 6 or better at calving and should maintain good body condition (BCS 5) during the breeding period. Table 1 shows results of a trial involving more than 1,000 cows where the effect of body condition during the breeding season on pregnancy rates was studied. That trial supports the statement that condition scores of less than 5 during breeding result in extremely low pregnancy rates, even when using an extremely long breeding period of 150 days! Note that adequate nutrition prior to and through the breeding season is necessary for acceptable reproduction, even when cows are in good body condition.

Table 1. Body condition score (BCS) during the breeding season and end-of-season pregnancy rate.

	BCS ≤4	BCS 5	BCS ≥ 6
Percent pregnant after 150 days	58%	85%	95%
Number of cows	122	300	619

Adapted from DB Herd and LR Sprott. 1985. Texas Agricultural Extension Service Bulletin B-1526.

Application in beef cattle

Scoring the body condition of cows 100 days before calving, then sorting them to various management groups for feeding according to need will improve reproductive performance and allow more timely use of supplemental feeding. As a general reference for an industry average sized cow, Table 2 describes the approximate weight change needed to reach optimum condition from 100 days before calving until calving.

Feed availability is often overlooked on pasture during periods of reduced or no forage growth. A stark drop in BCS in a small window (30–45 days) is likely due to inadequate feed availability. In general, animal intake is limited when tall fescue-based pastures are grazed below 4" forage height. Be aware of the average forage height across pastures and have a plan to intervene by rotating to a new pasture or giving access to stored forages.

Beef cattle have requirements for energy, protein, minerals, vitamins, and water. Many producers are quick to blame mineral and vitamin deficiencies for poor reproductive performance, yet the more common cause is often inadequate energy in the diet. Protein is rarely

Table 2. Weight change needed to reach optimal condition before calving.

Body condition score	Description of condition	Weight change needed
1	Emaciated	Gain 350 pounds
2	Very thin	Gain 300 to 350 pounds
3	Thin	Gain 200 to 300 pounds
4	Borderline	Gain 150 to 200 pounds
5	Moderate	Gain weight of fetus only (100 pounds)
6	Good	Gain weight of fetus only (100 pounds)
7	Fleshy	No weight gain needed
8	Fat	Can probably lose 100 pounds
9	Extremely fat	Can probably lose 150 pounds

deficient in forage systems that are based around cool-season perennial forages (e.g., tall fescue). So long as forage availability is not lacking, energy supplementation should be the focus when attempting to reverse a decline in BCS or improve BCS prior to calving.

Begin troubleshooting BCS deficiencies with a forage test. Local MU Extension specialists can help interpret the results and develop a feeding plan to raise BCS. In general, forages with <55% total digestible nutrients (TDN) will not meet the energy requirements of a beef cow, regardless of stage of production. Too many producers harvest stored forages when convenient or late in order to maximize yield. An abundance of <50% TDN hay does no good for the cow herd, because supplemental feed is required to meet energy requirements. Cows will reach satiety well before enough low-quality hay is consumed to meet energy requirements.

Supplementation strategies can be simplified by considering feeding as a percentage of the cow's body weight. In general, a cow will eat 1.5 to 1.8% of body weight per day if fed low-quality forage alone. Providing 0.25 to 0.50% of body weight per day in supplement can go a long way toward meeting energy requirements, as common supplements in Missouri are often >80% TDN. This strategy is recommended if you have a long period of time to raise cow BCS by 1 score. If cows need to gain 1 BCS in less than 60 days or need to gain more than 1 BCS, consider a supplementation rate of between 0.75 and 1.00% of body weight per day. While >10 lbs of supplement per cow per day may seem extreme, weigh the cost of supplement versus the lost revenue associated with cows failing to breed next year.

Supplementation calculations such as these are based on an assumption that cows are consuming low-quality forages as the base of the diet. A switch to higher quality forages may reduce or eliminate the need for supplementation. Feeding corn silage or grazing high-quality annual forages (e.g., cover crops) may be a viable option if cows are in the vicinity of croplands. Ultimately, supplementation decisions are economic decisions, so carefully calculate the total cost and ensure supplementation can be offered profitably.

Target body condition scores

Management recommendations related to body condition vary based on the system and the timing of forage availability. For example, in Missouri cow-calf systems, optimal management of body condition will differ greatly between spring-calving and fall-calving herds.

Spring-calving herds

Cows calving in the true spring (e.g., April) should be in BCS of 5 or higher when they calve, as forage quality around the time of calving can meet demands associated with lactation. However, "spring-calving" cows that are actually calving in the winter months (e.g., January–March) are still consuming harvested forages and will generally lose BCS following calving. This loss is not detrimental if cows are in moderate to fleshy condition (BCS 6) at calving, but thin to borderline-conditioned cows will show decreased reproduction if they lose further condition during this period. Spring-calving cows in BCS of 5 at breeding should be able to maintain their condition until weaning. They will need to gain BCS after weaning so that they can reach the desired BCS prior to calving. Figure 11 illustrates changes in BCS occurring during the year in well-managed spring-calving herds.

Fall-calving herds

Cow BCS will fluctuate more in fall-calving herds due to the demands associated with lactation during the winter months when nutritional management is expensive due to lack of active forage growth. In hay-based winter-feeding models, cattle are often eating lower-quality harvested forages for much of this time. Therefore, body condition may be low (e.g. BCS 4) in fall-calving cows at the end of the winter until active grass growth begins ("turnout"). Cow BCS should increase when cows are transitioned to high quality

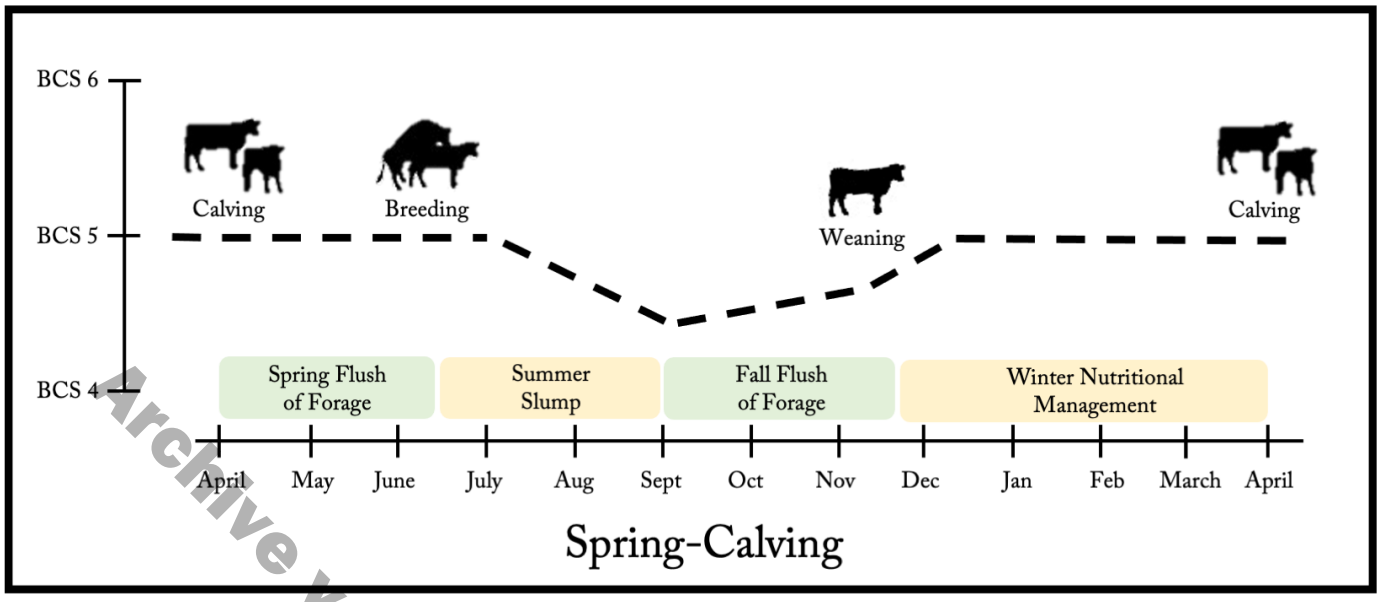


Figure 11. Body condition scores (BCS) changes anticipated in spring-calving herds due to forage quality and stage of production.

forage in the spring, with a significant opportunity to rebuild body condition after the calf is weaned.

Considering the demands of winter lactation, it is recommended that fall-calving cows be managed to reach a BCS of 6 at calving to begin another yearly cycle. In general, if pastures are adequate during the summer, this is achievable. Management of timing of weaning is a major opportunity to influence the amount of body condition cows rebuild prior to their next calving. Additionally, good winter grazing and/or supplementation programs for fall-calving cows can be worthwhile investments to mitigate the amount of condition lost over the winter.

Because cows are lactating between calving and breeding and pasture quality may be declining in the fall, some loss of BCS prior to breeding could occur without good forage management. Fall-calving cows in BCS of 6 at calving can afford to lose some body condition prior to breeding without adversely affecting reproduction, provided that a quality diet is provided during the breeding season. The lower portion of Figure 12 illustrates changes in BCS occurring during the year in well-managed fall-calving herds.

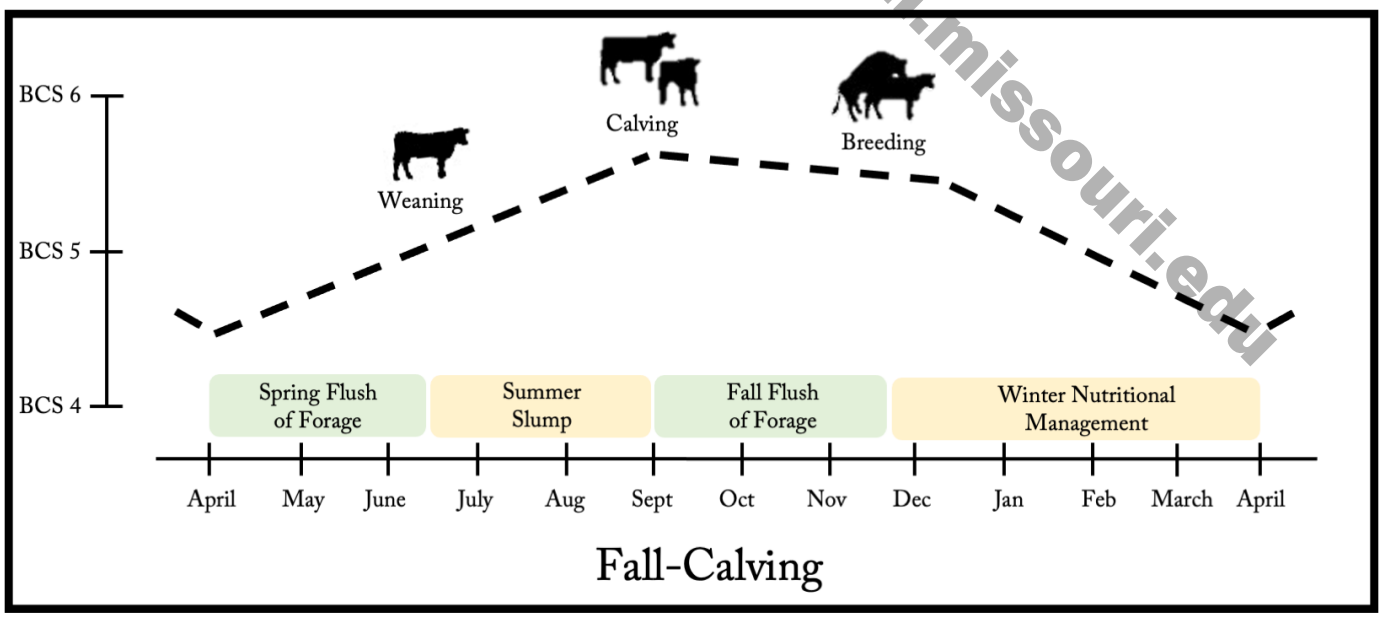


Figure 12. Body condition scores (BCS) changes anticipated in fall-calving herds due to forage quality and stage of production.

Conclusions

Body condition, particularly body condition at calving, has a major influence on pregnancy outcomes in cow-calf operations. Taking a yearlong approach by body conditioning scoring the cow herd or a representative portion of the herd) seasonally periodically. This will inform decisions related to weaning, supplementation, forage and other management that can affect body condition. Proactive management can help keep cows in seasonally appropriate body condition economically, allowing the operation to achieve optimal reproductive performance.

Portions of this guide were adapted from Texas Agricultural Extension Service Bulletin B-1526, "Body Condition, Nutrition and Reproduction of Beef Cows" by Dennis B. Herd and L.R. Sprott and from University of Missouri Extension publication G2230, "Body Condition Scoring of Beef and Dairy Animals" by Jack C. Whittier and Barry Steevens.

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