

# Managing Body Condition Score to Improve Reproductive Efficiency in Postpartum Beef Cows.

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## Introduction

Over recent years, the economics of the beef cattle industry has forced producers to emphasize production efficiency. The factor that most dramatically influences production efficiency is percent calf crop weaned, a measure of reproductive efficiency. The major constraint in the improvement of reproductive efficiency is the number of days from calving to rebreeding. This interval, known as the postpartum interval (PPI), often determines pregnancy rate which greatly influences percent calf crop weaned. If cows are to maintain a yearly production cycle, they must breed back within 80-85 days after calving. However, research has clearly shown that PPI can range from 30-170 days. Cows with a PPI that exceeds 80 days are usually those cows that are inefficient and are not pregnant at the end of the breeding season.

The duration of the PPI is influenced by many factors including suckling of the calf, nutritional status of the cow, age of the cow and dystocia. Some of these factors are not easily influenced by management, however nutritional status of cows both before and after calving can be controlled and can have dramatic effects on cow rebreeding efficiency. This concept is not new because, historically, livestock producers have based feeding programs on the idea that "the eye of the master influences the size of the feed bucket". Nutritional status can be most easily determined by evaluation of the body condition score (BCS) of the cows. A quantitative body condition scoring system was developed to attempt to quantify changes in cow nutritional status so that economical nutritional programs could logically be implemented. A 9-point (1-9) scale has been successfully used over the past 5-10 years. Incorporation of the body condition scoring system could have many positive returns to a beef cattle operation.

## Body Condition Scoring System

The following gives a description of what to evaluate in cows with differing condition scores.

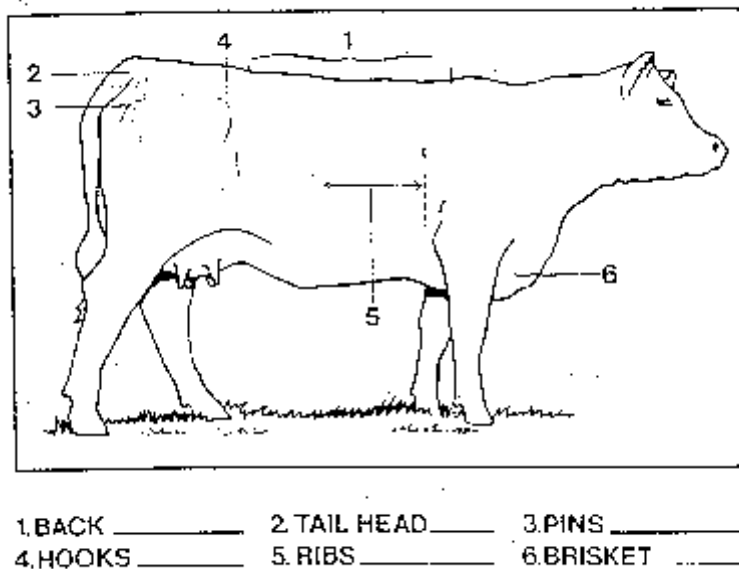
<u>BCS</u>	<u>Cow Description (Figure 1)</u>
1	Bone structure of shoulder, ribs, back, hooks, and pins are sharp to the touch; little evidence of fat deposits or muscling.
2	Little evidence of fat deposition but some muscling in hindquarters.
3	Beginning of fat cover over the loin, back and foreribs. Backbone still highly visible.
4	Foreribs not noticeable; 12 <sup>th</sup> and 13 <sup>th</sup> ribs still noticeable to the eye.

## BCS

### Cow Description (Figure 1)

- 5 12<sup>th</sup> and 13<sup>th</sup> ribs are not visible to the eye unless animal has been shrunk. Areas on each side of the tail head are fairly well filled but not mounded.
- 6 Ribs fully covered, not noticeable to the eye. Hindquarters are plump and full.
- 7 Abundant fat cover on either side of tail head with some patchiness evident.
- 8 Animal taking on a smooth, blocky appearance; bone structure disappearing from site.
- 9 Bone structure not easily seen or felt. Tail head buried in fat. Animal's mobility may actually be impaired.

Figure 1. Anatomical regions used for determining BCS.

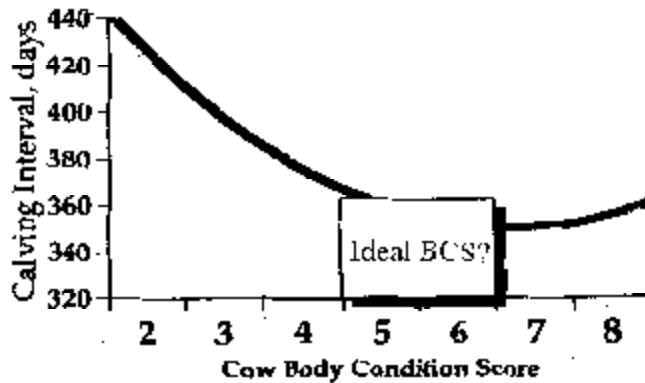


Basically, a cow with a BCS of 1 represents a cow that is emaciated while a cow with a BCS of 9 is extremely obese. It is generally estimated that for each condition score change, the cow must gain between 70 and 100 pounds of body weight. As a cow increases in BCS, total body fat also increases (Figure 2). A cow with a BCS of 6 would have approximately 20 percent body fat compared to a cow with a BCS of 4 which would have approximately 12 percent body fat.

The BCS score of cows both before and after calving can have a dramatic effect on cow reproductive performance

## Body Condition Score Before Calving

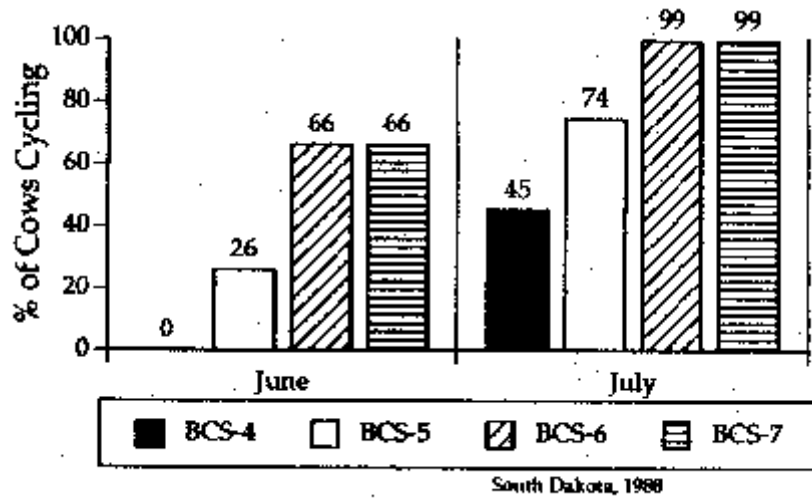
Figure 3. Effect of Cow Body Condition Score on Calving Interval



Precalving BCS has a tremendous influence on reproductive efficiency. As precalving BCS decreases, the number of days from one calving to the next (calving interval) increases in beef cows (Figure 3). Females with a precalving BCS of less than 5 tend to have production cycles greater than 1 year. For example, cows with a precalving BCS of 3 would be expected to have a calving interval of approximately 400 days while a cow with a precalving BCS of 6 would have a calving interval of approximately 360 days.

The reduction in reproductive efficiency from lower precalving BCS results from an increase in the length of the PPI. Research from South Dakota illustrated the influence of precalving BCS on the percentage of cows that initiated estrous cycles after calving (Figure 4). This experiment demonstrated that the percentage of thin cows that were cycling in the first month of the breeding season (June) was considerably lower than for cows that were in more moderate body condition. During the second month of the breeding season, 55% of the cows with a BCS of 4 had still not initiated estrous cycles while over 90% of the cows in more moderate condition had begun to cycle. From a practical standpoint, thin cows may cause a longer breeding season, more open cows in the fall and lighter calves to sell next year because the calves from these thin cows will be born later in the calving season.

Figure 4. Effect of BCS on Percentage of Cows Cyclic During the First (June) and Second (July) Month of the Breeding Season.



Basically, cows that calve in good body condition return to estrus sooner (Table 1) and are more likely to conceive during the breeding season (Table 2) than cows that calve in thinner body conditions.

Table 1. Effect of BCS at Calving on PPI in Beef Cows

Calving B.C.S.	$\leq 4$	$\geq 5$
PPI, days	61	49

from Richards et al., 1986

Table 2. Effect of BCS at Calving on Pregnancy Rates in Beef Cows

Calving BCS	$\leq 4$	5	$\geq 6$
Number of Cows	122	300	619
Pregnancy Rate (%)	58	85	95

from Sprott, 1985

The effect of precalving BCS on pregnancy rates is enhanced in younger cows (Table 3). Only 53% of first-calf heifers with a BCS of 4 conceive during the breeding season compared to 72% of mature cows.

Table 3. Relationship of Parity and BCS to Pregnancy Rate

Parity	BCS			All
	<3	4	>5	
1	20	53	90	84
2	28	50	84	71
3	23	60	90	85
4-7	48	72	92	87
> 8	37	67	89	74
All	31	60	89	82

from Rae et al., 1993

Prepartum BCS of cows affects PPI and pregnancy rate and results in an increase in production efficiency and profitability (Table 4). Thin cows (BCS = 3 or 4) were less likely to conceive and weaned younger calves which were lighter as compared to more moderately conditioned cows (BCS = 5 or 6). Because of the lighter calves, the thin cows generated less income per calf and less yearly income per cow to the producer.

Table 4. Relationship between BCS to Beef Cow Performance and Profitability

BCS	Pregnancy Rate (%)	Calving Interval, days	Calf age at weaning, days	Calf daily gain, lb	Calf weaning weight, lb	Calf price \$/100 lb	Income \$/calf	Yearly income \$/cow
3	43	414	190	1.60	374	96	359	142
4	61	381	223	1.75	460	86	396	222
5	86	364	240	1.85	514	81	416	329
6	93	364	240	1.85	514	81	416	356

from Rae et al. 1993

### Body Condition Score After Calving

Maintaining BCS of cows after calving also affects reproductive efficiency. Cows that calve in moderate body condition need to be fed to maintain their BCS for PPI to remain short (Table 5).

Table 5. Change in BCS after Calving and PPI in Beef Cows

Change in BCS	PPI, days
Lost	60
Maintained	32
All cows	43

from Rutter and Randel, 1984

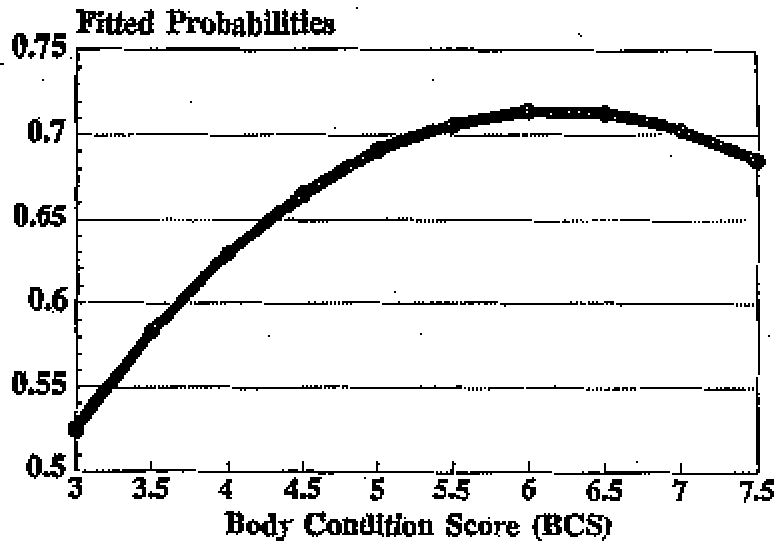
Research from Scotland indicated that cyclic activity can be increased in thin cows by feeding a high energy diet that would increase weight gain and BCS. The percentage of thin cows that had initiated estrous cycles after being fed a diet to increase weight (High) was 34% greater than thin cows that were fed a diet resulting in weight loss (Low). Surprisingly, fat cows that were allowed to lose weight after calving had reduced cyclic activity.

Condition at Calving:	Thin		Fat	
	Low	High	Low	High
Feeding level after Calving:				
Calving Weight, lbs	1027	981	1159	1133
Weight Change after calving	-127	19	-180	-38
Percentage Cyclic	58	92	77	91

from Wright et al., 1992

Although the percentage of the thin cows that initiated estrous cycles after being fed a diet to increase weight was high, little was gained in terms of pregnancy rates. These thin cows were still thin (only gained 19 pounds) at breeding. As BCS at breeding increases, conception rates increases (Figure 5). Therefore, it is not a good strategy to feed all cows to be thin at calving, then attempt to increase their BCS after calving.

Figure 5. Relationship of BCS at Breeding to the Probability of Conception in Beef Cows



### Summary

Body condition score plays a vital role in reproductive efficiency and profitability of a beef cow-calf operation. Most of the data indicates that the optimum BCS prior to calving and breeding is 5 or greater. Cows that are thin (BCS < 5) at calving have much longer PPI than cows that calve in moderate body conditions (BCS > 5). After calving, cows in which BCS is maintained initiate estrous cycles earlier, breed back faster and calve earlier next spring. These earlier calving cows wean heavier calves and are more profitable.