

Visual Body Condition Score as a Measure of Range Animal Response

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Several techniques have been developed to monitor range use, to estimate production, and to serve as indicators of proper level of usage. Most of these involve observations and measures of range plant characteristics and changes in the make-up of plant communities. Animal response, the non-crop approach, as pointed out by Dyksterhuis (1988), was first reported from England in 1896 and has been widely adopted by many researchers in the United States of America. Animal response measures indicate the quantity and quality of nutrients harvested by the grazing animals from a given area during a defined grazing period. Variation among years in the degree of expression of animal response characters can serve as a companion source of information, to be used along with vegetation observations and measures, to determine proper stocking rate.

For a cow-calf operation the usual animal response measures are: death loss levels; percentage calf crop, or conception levels and dates; weights of mother cows; weaning weights of calves, or suckling rate of gain. Significant reduction in conception level or percentage calf crop and significant increase in death loss, where nutrition is the causative factor, are associated with extremely low levels of nutrient intake. Little variation occurs in these characters where nutrient intake is moderate to high. Cow weight and suckling rate of gain, on the other hand, tend to give increasing response over nutrient intake levels varying from low to high.

Numerous studies have shown that under heavy use of the range there is a lag, over years, in the appearance of a decreased expression of cow weight and suckling rate of gain. Before these measures show a marked decrease, extensive damage has already been done to the range vegetation. These characters still indicate the amount of nutrients harvested during each year, but they are not sufficiently sensitive to detect the initial stages of vegetation damage.

Recently, visual body condition scoring of cattle has come into common use to indicate the amount of fat in live cattle and thus add refinement to measures of weight changes in cattle that have been subjected to nutritional and/or genetic treatments. Comparison of body condition scores of range cows over years could be an additional, and possibly a more sensitive animal response measure than those presently used.

Visual body condition scoring of cattle is based on the

concept that differences in condition (fatness) are evident to the trained human eye. Several scoring systems have been developed, but the most commonly used system has scores ranging from one through nine. One is the score for a very thin, emaciated animal and nine is for the very obese critter (see Figure 1). It has been firmly established that visual condition scores are highly correlated to the amount of fat in beef animals (Davis 1984, Wagner et al. 1988, Houghton et al. 1990).

Berg and Butterfield (1976) suggested that cattle have defined patterns associated with deposition and depletion of body fat. Differential rates of deposition and depletion of fat among different depots (intermuscular, kidney-pelvic, and subcutaneous) are associated with level of fatness. During weight loss in a fat animal, the fat in the subcutaneous fat depot is more rapidly depleted and during weight gain, the other fat depots are replenished much faster than subcutaneous fat. Subcutaneous fat level differences among animals, and in the same animal over time, are related to total fatness and also, these differences in level are apparent to the human eye.

Data on range cattle had been collected over a period of thirteen years in a Utah Agricultural Experiment Station project designed to compare production and reproduction of different biological types of cows. Body condition scores, body weights, and suckling rate of gain were routinely obtained. Data collected for the years 1981 through 1984 offered the opportunity to compare sensitivity of three animal response measures.

There are two reasons that made the 1981-1984 years suitable for this comparison. First, there were great differences in the amount of precipitation among these years (Table 1). Holechek (1988) concluded, after reviewing several studies, that forage production fluctuates about 30% from the mean in good and poor years. He defined a good year as one having 125%, or more, of average precipitation and a poor year as one having less than 70% of average precipitation. In the 1981-1984 period in our research area there was one year (1983) that would classify as a good year, one year (1984) near the average, and the other two years near the poor category.

The second reason that made the 1981-1984 an opportune period was that within the experimental cows there was a group of mature cows that was present for all four years and in which the cows were bred to the same, or equivalent, bulls each year, thus producing calves of similar genotype each year.

Management of these cows was very constant among years. Cows wintered on Bureau of Land Management

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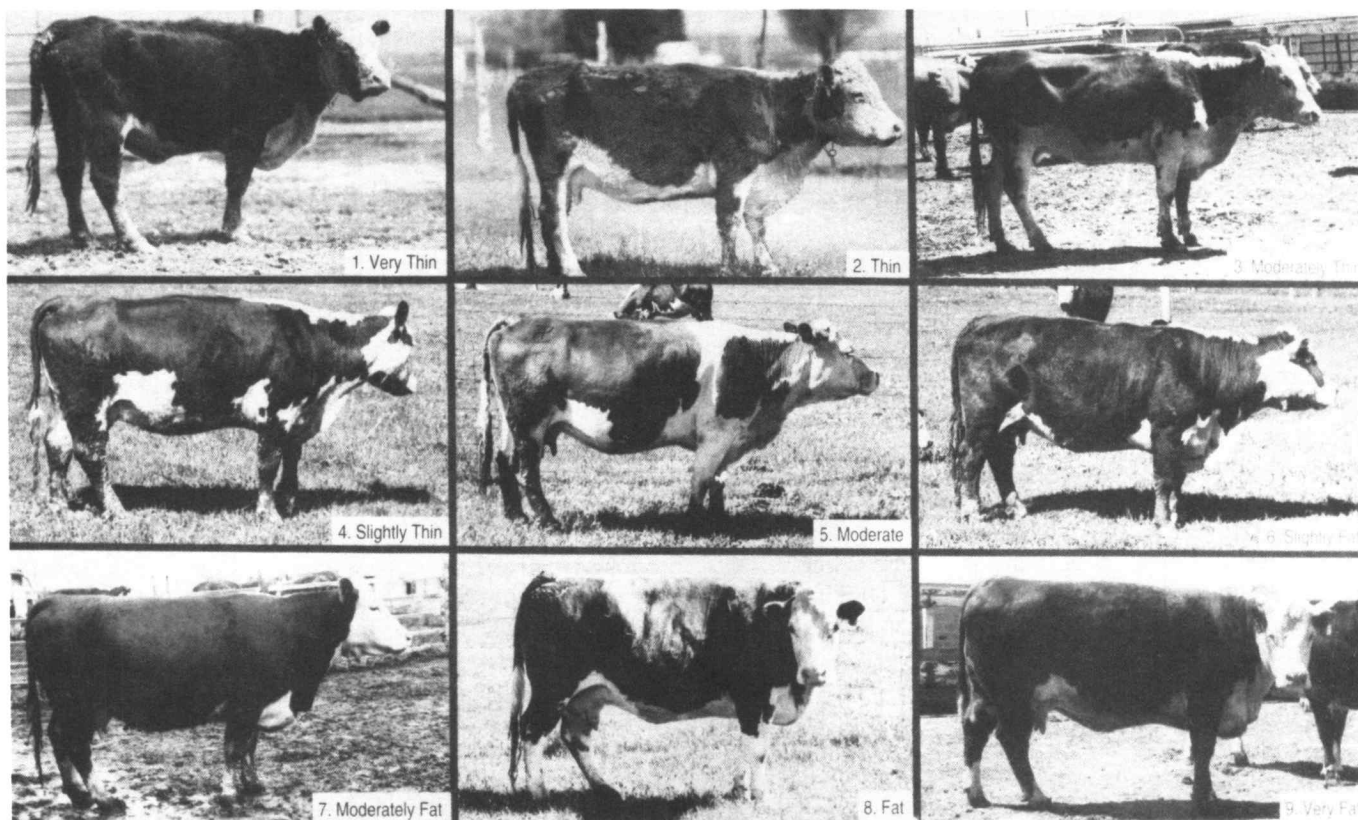


Fig. 1. Body condition scores for beef cattle.

and private range. Hay was fed on private range when snow depth hindered grazing and just prior to, during, and post-calving until range was ready in the spring. Quantity of supplemental feed was regulated so that cows were in moderate condition, as near to condition score 5 as possible (Figure 1) at the start of the calving season. During the spring and summer (approximately April 20 to October 25), cattle grazed on the Benmore Allotment of the Uinta National Forest. Stocking rate was uniform throughout the years at numbers established over the previous 15 years to give moderate use. Under this management program potential variation in quantity of available nutrients would be greatest during the spring-summer grazing period.

Our attempt to determine relative sensitivity of the three animal response characters (cow weight, suckling rate of gain, and body condition score) is based on the following

premise: All these animal response characters, as measured, largely are dependent upon the nutrients ingested and digested by the animals grazing the range plants. If environmental factors, with the exception of feed supply, are relatively constant among years, variation in degree of expression of these animal response characters, within this group of genetically constant cows and their calves, must come about because more nutrients were harvested and digested in some years as compared to other years. Also, if as Holechek (1988) concluded, more forage than average is produced during a good precipitation year, it seems logical to assume that grazing cattle will harvest and digest more nutrients during a good year and less nutrients during a poor year. The increase or decrease in amounts of nutrients digested will augment or decrease the degree of expression of animal response characters among years. Conversely, if degree of expression of

Table 1. Yearly averages and deviations from 1983 levels for precipitation and animal response characteristics.

Year	Precipitation		Body Condition Scores		Body Weight		Suckling Rate of Gain	
	January 1 through August 31	Deviations from 1983 levels	Score	Deviations from 1983 levels	Weight	Deviation from 1983 levels	Daily Gain	Deviations from 1983 levels
	(in)	(%)	Units	(%)	(lbs)	(%)	(lbs)	(%)
1981	6.1	43.0	4.26	22.1	1028	11.1	1.88	8.7
1982	5.2	51.4	4.15	24.1	1118	3.4	2.01	2.4
1983	10.7	—	5.47	—	1157	—	2.06	—
1984	8.7	18.7	4.58	16.3	1142	1.3	1.90	7.8

animal response characters is greater one year than in another, it can be concluded that the animals harvested more digestible nutrients the one year as compared to the other. Then, inasmuch as the amount of nutrients harvested each specific year in our study is the same for each animal response characteristic, the degree to which the response characteristics parallel among the years precipitation variations would compare the response characteristics for sensitivity.

Degree of expression of animal response characteristics in our study varied markedly among years and all characteristics showed maximum response in 1983, the year that had the greatest precipitation (Table 1). As expected, none of the response characteristics varied as much as did precipitation. Suckling rate of gain showed the least variation (measured as deviations from 1983) of the three response measures with the exception of the year 1984. In that year it deviated more from 1983 than did cow weight. The cause of this was not identified.

In general, it would be expected that suckling rate of gain would be the least variable of the measures in crossbred cows such as were used in this study. Modern crossbred range cows have higher milk production ability than range cows of two or more decades ago. Cows with higher milk impetus will strongly strive to maintain milk flow by pulling from body reserves (mostly fat) when nutrient intake is inadequate. Suckling rate of gain is highly related to milk intake. The result of this is that loss of condition and body weight in cows would be more marked under sub-optimum nutrient intake than the decrease in suckling rate of gain in the calf. The calf's gain is somewhat buffered by the cow.

Cow weight and body condition score showed somewhat similar patterns. However, variations in body condition scores more closely paralleled the variation in precipitation than did body weight. This indicates that body condition score may be a more sensitive measure to level of available nutrients than cow weight. The two measures would be expected to vary together because loss or gain in cow weight or in body condition score of range cows, is largely due to changes in amounts of stored body fat. Cow weight is influenced, however, by variation in digestive tract fill at the time of weighing while fill has little influence upon body condition score.

Digestive tract fill can vary widely among cows at time of weighing. Keeping cows off feed and water for approximately 12 hours does not completely standardize fill. Some of our unpublished work shows that weight of rumen contents ranged from 71 to 170 pounds among cows that had been individually fed a sub-maintenance ration and were kept off feed and water for 12 hours prior to being weighed and immediately slaughtered. Keeping cows off feed and water for much longer than 12 hours would subject them to undesirable stress, although it should more nearly equalize fill. The proximity of defecation and and urination to actual weighing could influence cow weight by 22 pounds or more. Time of defecation or

urination has negligible influence upon body condition score.

Body condition score has some additional advantages. Scales are not required. Many ranches do not have suitable scales on site for weighing cows and are reluctant to drive or haul cows appreciable distances to get them weighed. Driving or hauling cows produces shrinkage that may not be standardized among years or periods of time.

Another plus is that body condition scoring can be done without extra handling of the cows while other operations such as pregnancy testing, or grub and lice treatment, etc., are being done. It can even be done without putting cows through a chute. It will be necessary to get near enough to the cows, however, to visually examine each cow and to read the ear tag number or other individual identification.

We concluded that body condition scoring is much more sensitive than suckling rate of gain of calves and somewhat more sensitive than cow weight as a measure of animal response for grazing cattle. Obtaining body condition scores is much easier than is the obtaining of suckling rate of gain or cow weight under most range cattle operating systems. It could be a useful accessory to vegetation measures and observations in determining stocking rate and proper level of range use over both the short and long term. Range managers should seriously consider its adoption. Increasing numbers of animal managers are adopting it because of the demonstrated high correlation between cow condition and reproduction levels. Scoring the cows for condition as they go to the range in the spring and again as they come off the range in the fall could be more useful than just scoring as they come off in the fall.

Note: Photocopies of cows depicting the various body condition scores are available, free of charge. Write to the authors at:

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