

Beef Cattle Nutrition Series

Part 3: Nutrient Requirement Tables



UfA UNIVERSITY OF ARKANSAS
DIVISION OF AGRICULTURE
Cooperative Extension Service

Acknowledgment is given to **DR. GEORGE DAVIS**, former Extension livestock specialist, who was the original author of this publication.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director, Cooperative Extension Service, University of Arkansas. The Arkansas Cooperative Extension Service offers its programs to all eligible persons regardless of race, color, national origin, religion, gender, age, disability, marital or veteran status, or any other legally protected status, and is an Equal Opportunity Employer.

Contents

Mineral Requirements	1
Vitamin Requirements	2
Energy and Protein Requirements	3
Explanation of Nutrient Requirement Tables	
Mature Cows	3
Two-Year-Old Heifers	3
Bred Heifers	3
Growing Steer, Heifer and Bull Calves	4
Growing Yearling Cattle	4
Yearling and Breeding Bulls	4

Tables

Table 1. Mineral Requirements and Maximum Tolerable Concentrations	2
Table 2. Maximum Tolerable Concentrations of Mineral Elements Toxic to Cattle	2
Table 3. Predicting Peak Milk in Beef Cows	3
Table 4. Nutrient Requirements of Mature Beef Cows to Maintain Moderate Body Condition	5-7
Table 5. Nutrient Requirements to Increase Body Condition Score of Mature Cows from 4 to 5 During the Last 90 Days of Pregnancy	8
Table 6. Nutrient Requirements to Increase Body Condition Score of Open Mature Cows	8
Table 7. Nutrient Requirements of Two-Year-Old Heifers (20 pounds peak milk)	9
Table 8. Nutrient Requirements of Pregnant Replacement Heifers	10
Table 9. Nutrient Requirements of Growing Steer and Heifer Calves	11
Table 10. Nutrient Requirements of Bull Calves (less than 12 months of age, 2000 lb mature weight)	12
Table 11. Nutrient Requirements of Growing Yearlings – Bulls, Steers and Heifers	13-15
Table 12. Nutrient Requirements of Yearling and Breeding Bulls	15-16

Beef Cattle Nutrition Series

Part 3: Nutrient Requirement Tables

Shane Gadberry, Ph.D.

Extension Beef Cattle Specialist

University of Arkansas Cooperative Extension Service

This report was prepared from information contained in Nutrient Requirements of Beef Cattle, Seventh Revised Edition, issued in 1996 (1996 NRC) under the direction of the Subcommittee on Beef Cattle Nutrition, Committee on Animal Nutrition, Board on Agriculture and National Research Council (NRC).

Since the publication of Nutrient Requirements of Beef Cattle, Sixth Revised Edition (1984), research efforts have been directed towards defining the impact of beef cattle's biological, production and environmental diversities and variations on nutrient utilization and requirements. The 1996 NRC edition utilized these results to evaluate mathematical modeling in concert with experimental data to more clearly define factors that relate to nutrient requirements of beef cattle. Some of these factors are: breed effects, sex, body weight, body condition, milk composition and yield, compensatory growth, environmental variation, ionophores and implants, forage availability and microbial yield.

Software is included with the 1996 NRC publication to generate nutrient requirement tables and evaluate rations based on factors that influence nutrient requirements. Simple tables of dietary requirements cannot do as good a job of accounting for animal, feed, and environmental variations as the NRC's model. In many situations, however, the dietary nutrient requirement tables in this publication should be sufficient. Tables 4 to 12 were compiled from (1) requirement tables in the 1996 NRC report, (2) data generated with the 1996 NRC software and (3) additional calculations. The tables were designed to give guidelines for formulating cattle diets and for simple diagnostic or teaching purposes for the most common classes of beef cattle.

In the 1996 NRC report, metabolizable protein (MP) replaces crude protein (1984 NRC). MP is defined as the true protein absorbed by the intestine, supplied by microbial protein and undegraded intake protein. Daily crude protein requirements per animal reported in Tables 4 through 12 were computed as pounds of MP required daily divided by 0.67. **Animal weights in the tables are shrunk body weights. Shrunk body weight is 96 percent of full body weight.**

▼Mineral Requirements

At least 17 minerals are required by beef cattle. Macrominerals required include calcium, magnesium, phosphorus, potassium, sodium and chlorine, and sulfur. The microminerals required are chromium, cobalt, copper, iodine, iron, manganese, molybdenum, nickel, selenium and zinc. Other minerals including arsenic, boron, lead, silicon and vanadium have been shown to be essential for one or more animal species, but there is no evidence that these minerals are of practical importance in beef cattle.

Calcium and phosphorus requirements are shown in Tables 4 to 12. Calcium requirements are similar to those in the 1984 NRC report because new information is not sufficient to justify a change. Calcium requirements are adjusted to 50 percent true absorption. Phosphorus requirements for maintenance are lower in the 1996 NRC report, and the phosphorus requirements have been adjusted to 68 percent true absorption.

The requirements and maximum tolerable concentrations for other minerals are shown in Table 1. For certain minerals, requirements are not listed because research data are inadequate to determine requirements.

Table 1. Mineral Requirements and Maximum Tolerable Concentrations (in Percentage or PPM of Diet Dry Matter)

Mineral	Unit	Requirement			Maximum Tolerable Concentration	
		Growing and Finishing Cattle	Cows			
			Gestating	Early Lactation		
Chlorine	%	---	---	---	---	
Chromium	ppm	---	---	---	1,000	
Cobalt	ppm	0.10	0.10	0.10	10	
Copper	ppm	10.00	10.00	10.00	100	
Iodine	ppm	0.50	0.50	0.50	50	
Iron	ppm	50.00	50.00	50.00	1,000	
Magnesium	%	0.10	0.12	0.20	0.40	
Manganese	ppm	20.00	40.00	40.00	1,000	
Molybdenum	ppm	---	---	---	5	
Nickel	ppm	---	---	---	50	
Potassium	%	0.60	0.60	0.70	3	
Selenium	ppm	0.10	0.10	0.10	2	
Sodium	%	0.06-0.08	0.06-0.08	0.10	---	
Sulfur	%	0.15	0.15	0.15	0.40	
Zinc	ppm	30.00	30.00	30.00	500	

Source: Adapted from Table 5-1 in Nutrient Requirements of Beef Cattle, National Research Council, 1996. Washington, D.C.: National Academy of Sciences.

A number of elements that are not required (or at least required only in very small amounts) can cause toxicity in beef cattle. Maximum tolerable concentrations of several elements known to be toxic to cattle are given in Table 2. The maximum

tolerable concentration for a mineral has been defined as "that dietary level that, when fed for a limited period, will not impair animal performance and should not produce unsafe residues in human food derived from the animal" (1980 NRC: p. 3).

Table 2. Maximum Tolerable Concentrations of Mineral Elements Toxic to Cattle (in PPM of Diet Dry Matter)

Element	ppm
Aluminum	1,000
Arsenic	50 (100 for organic forms)
Bromine	200
Cadmium	0.5
Fluorine	40 to 100
Lead	30
Mercury	2
Strontium	2,000

Source: Adapted from Table 1 in National Research Council, 1980. Mineral Tolerance of Domestic Animals. Washington, D.C.: National Academy of Sciences.

▼Vitamin Requirements

The vitamin most likely to be deficient in beef cattle diets is vitamin A. Vitamin A can be stored in the liver to prevent vitamin A deficiency. No more than 2 to 4 months of protection from stored vitamin A can be expected.

Beef cattle requirements for vitamin A are 1,000 IU/lb dry feed for beef feedlot cattle; 1,270 IU/lb dry feed for pregnant beef heifers and cows; and 1,770 IU/lb dry feed for lactating cows and breeding bulls. These requirements are the same as those given in the 1984 NRC report.

Vitamin D is synthesized by beef cattle exposed to sunlight or fed sun-cured forages. Therefore, animals rarely require vitamin D supplementation. The vitamin D requirement of beef cattle is 125 IU/lb dry diet.

Determining vitamin E requirements of ruminants is difficult because of its inter-relationships with other dietary components. Vitamin E requirements depend on concentrations of antioxidants, sulfur-containing amino acids, and selenium in the diet. Vitamin E is not stored in the body in large concentrations. The vitamin E requirement for beef cattle has not been established but is estimated to be between 7 and 27 IU/lb dry diet for young calves.

▼Energy and Protein Requirements

In most beef production situations, cattle are fed to appetite with either high forage (stocker, backgrounding, cow-calf) or high-grain diets (growing and finishing cattle) and are supplemented to support the energy allowable production, based on group averages. The requirement tables were designed with that in mind.

Tables 4 to 12 show energy, protein, calcium, phosphorus and vitamin A requirements as 1) nutrient density of the diet on a dry-matter basis and 2) daily nutrient requirements per animal in pounds, Mcal's or IU's.

Diet NE_m (net energy for maintenance) was used to predict DMI. All diet density requirements reflect these predicted DMI and tabular feed NE values. In situations where the predicted DMI is overestimated, the diet density requirement is underestimated and adjustments should be made in the diet.

Explanation of Nutrient Requirement Tables

▼Mature Cows

Table 4 for mature cows includes the nutrient requirements of cows for months 1 to 12 since calving. Requirements are shown for mature cow weights (one month after calving) of 900, 1,000, 1,100, 1,200, 1,300 and 1,400 pounds and three levels of peak milk production (10, 20 and 30 pounds) during a 29-week lactation for each weight

class. The milk production levels cover the range of expected peak milk given for 28 breeds of beef cattle. Table 3 provides information for predicting peak milk production of beef cows.

Table 3. Predicting Peak Milk in Beef Cows^a

Mature Wt. (lb)	Peak Milk (lb/day)				
	10	15	20	25	30
Avg. expected 7 month male calf weight (lb)					
900	440	465	495	----	----
1000	460	485	515	545	570
1100	480	510	540	565	590
1200	500	530	560	585	615
1300	520	550	580	605	635
1400	540	570	600	625	655

^aAdapted from Appendix Table 12 in National Research Council, 1996. Nutrient Requirements of Beef Cattle.

Calves born from 1,200 pound cows were assumed to weigh 80 pounds. A similar ratio of calf:cow birth weights was used for the other cow weight classes. Requirements are generated for each of the 12 months of the reproductive cycle. Month 1 of the reproductive cycle is the first month after calving. Within each weight class, nutrient requirements are the same for all cows during months 7 through 12 regardless of peak milk level. Expected milk yield is shown for months 1 through 6 since calving.

Table 5 includes the nutrient requirements to increase the body condition score (BCS) of beef cows from a BCS 4 to a BCS 5 during the last 90 days of pregnancy.

Table 6 provides the nutrient requirements to increase the BCS of thin, open, mature cows. The nutrient requirements are based on increasing body condition by one score over a 30- or 60-day period.

If the desired body condition change is greater than 1, multiply the amount of body condition score change desired by either 30 or 60 days, depending on the selected plane of nutrition. For example, if increasing BCS from 3 to 6 and using the 30-day nutrient requirements, it will take 90 days (3 BCS's x 30 days) to achieve a BCS 6 at this level of nutrients in the diet.

▼Two-Year-Old Heifers

Table 7 for two-year-old heifers includes the requirements for animals with mature weights of 900 to 1,400 pounds. The table was generated for heifers with 20 pounds of peak milk production.

Actual body weights are shown for months 1 through 12 for all weight classes. Calf:cow birth weight ratios are the same as mature cows.

▼ Bred Heifers

Table 8 for bred heifers includes the requirements for animals with mature weights of 900 to 1,400 pounds. Nutrient requirements are shown for 9 months. Month 1 is the first month of pregnancy. Target ADG and body weights are shown for each month from breeding to calving. The target ADG for growth was computed as target calving weight minus target breeding weight divided by 280 days of gestation. Target calving weight is 80 percent of mature weight and target puberty weight is 60 percent of mature weight (65 percent for *Bos indicus*).

▼ Growing Steer, Heifer and Bull Calves

Table 9 shows nutrient requirements for growing steer and heifer calves (less than 12 months of age, implanted with a growth stimulant). Requirements are shown for calves with expected finishing weights of 1,100 and 1,200 lb (28 percent body fat) or maturity (replacement heifers).

Table 10 shows nutrient requirements of growing bull calves (less than 12 months of age) with a mature weight of 2,000 pounds.

▼ Growing Yearling Cattle

Table 11 shows nutrient requirements for growing and finishing yearling steers and heifers (1000-1400 lbs at finishing – 28% body fat) or

maturity (replacement yearling heifers). Within each final weight, the weight ranges given are 55 to 80 percent of final weight to reflect typical feeding group averages. Diet density requirements are given for the diet energy allowable ADG rather than a specific ADG. It is assumed that cattle are fed a particular diet free-choice and that only replacement heifers are fed for a target ADG. The user can estimate the requirements for a particular ADG by finding the nearest value in the table.

▼ Yearling and Breeding Bulls

Tables 11 and 12 show nutrient requirements of bulls. Table 11 shows requirements for yearling bulls in early stages of development that weigh less than 50 percent of their expected mature weight. To use Table 11, multiply the bull's mature weight by 0.60 to determine the animals' weight class at finishing. Nutrient requirements for bulls that weigh more than 50 percent of their mature weight are shown in Table 12.

▼ Beef Cattle Nutrition Series Publications

Part 1. Nutrient Basics (FSA3078)

Part 2. Establishing Nutritional Requirements (FSA3079)

Part 3. Nutrient Requirement Tables (MP391)

Part 4. Formulating Rations (FSA3080)

Some of the information in this publication was taken from *Nutrient Requirements of Beef Cattle, Seventh Revised Edition* (1996 NRC). Tabular values were compiled from the 1996 NRC report, software provided with the 1996 NRC publication and additional calculations.

Table 4. Nutrient Requirements of Mature Beef Cows to Maintain Moderate Body Condition

Months Since Calving			Diet Nutrient Density						Daily Nutrients per Animal						
			Milk (lb/day)	DMI (lb/day)	TDN (%DM)	ME (Mcal/lb)	NE _m (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	ME (Mcal)	NE _m (Mcal)	CP (lb)	Ca (lb)
900 lb Mature Weight															
10 lb Peak Milk															
1	8.3	20.2	56.2	0.94	0.55	8.9	0.24	0.17	11.4	19.0	11.1	1.79	.049	.033	36
2	10.0	20.6	57.0	0.95	0.56	9.3	0.25	0.17	11.7	19.6	11.7	1.92	.053	.035	36
3	9.0	21.4	54.8	0.92	0.53	8.6	0.23	0.16	11.7	19.7	11.3	1.84	.051	.035	38
4	7.2	21.0	53.8	0.90	0.51	8.1	0.22	0.15	11.3	18.9	10.8	1.70	.046	.031	37
5	5.4	20.5	52.8	0.88	0.50	7.7	0.20	0.14	10.8	18.0	10.2	1.57	.042	.029	36
6	3.9	20.2	52.0	0.87	0.49	7.2	0.18	0.13	10.5	17.6	9.8	1.45	.037	.026	36
20 lb Peak Milk															
1	16.7	22.6	60.2	1.01	0.61	10.8	0.30	0.20	13.6	22.8	13.8	2.44	.068	.044	40
2	20.0	23.5	61.6	1.03	0.64	11.5	0.33	0.21	14.5	24.2	14.9	2.70	.077	.051	42
3	18.0	23.8	59.2	0.99	0.60	10.7	0.30	0.20	14.1	23.6	14.3	2.54	.073	.046	42
4	14.4	22.9	57.6	0.96	0.57	9.9	0.28	0.18	13.2	22.0	13.1	2.26	.064	.042	41
5	10.8	21.9	55.8	0.93	0.55	9.1	0.25	0.17	12.2	20.4	12.0	1.99	.055	.037	39
6	7.8	21.1	54.3	0.91	0.52	8.3	0.22	0.15	11.5	19.2	11.0	1.76	.046	.033	37
30 lb Peak Milk															
1	25.0	24.9	63.6	1.06	0.67	12.4	0.36	0.23	15.8	26.4	16.5	3.09	.088	.057	44
2	30.0	26.3	65.4	1.09	0.69	13.2	0.39	0.24	17.2	28.7	18.2	3.48	.101	.064	47
3	27.0	26.3	62.9	1.05	0.65	12.3	0.36	0.23	16.5	27.6	17.2	3.24	.095	.060	47
4	21.6	24.8	60.8	1.02	0.62	11.4	0.33	0.21	15.1	25.3	15.5	2.83	.082	.053	44
5	16.2	23.4	58.5	0.98	0.59	10.3	0.29	0.19	13.7	22.9	13.7	2.41	.068	.044	41
6	11.7	22.2	56.4	0.94	0.56	9.3	0.25	0.17	12.5	20.9	12.3	2.06	.057	.037	39
10, 20, 30 lb Peak Milk															
7	0.0	18.0	46.8	0.78	0.40	6.5	0.15	0.12	8.4	14.0	7.2	1.17	.028	.022	23
8	0.0	18.3	47.2	0.79	0.41	6.6	0.15	0.12	8.6	14.5	7.5	1.20	.028	.022	23
9	0.0	18.7	47.8	0.80	0.42	6.7	0.15	0.12	8.9	15.0	7.9	1.25	.028	.022	24
10	0.0	19.4	48.8	0.82	0.43	6.9	0.24	0.15	9.5	15.9	8.3	1.34	.046	.029	25
11	0.0	19.4	51.8	0.87	0.48	7.6	0.24	0.15	10.0	16.9	9.3	1.47	.046	.029	25
12	0.0	19.7	55.5	0.93	0.54	8.6	0.24	0.15	10.9	18.3	10.6	1.70	.046	.029	25
1,000 lb Mature Weight															
10 lb Peak Milk															
1	8.3	21.6	55.8	0.93	0.55	8.7	0.24	0.17	12.1	20.1	11.8	1.88	.051	.035	38
2	10.0	22.1	56.6	0.95	0.56	9.1	0.25	0.17	12.5	21.0	12.3	2.01	.055	.037	39
3	9.0	23.0	54.3	0.91	0.52	8.4	0.23	0.16	12.5	20.9	12.0	1.93	.053	.037	41
4	7.2	22.5	53.4	0.89	0.51	8.0	0.22	0.15	12.0	20.0	11.5	1.80	.049	.033	40
5	5.4	22.1	52.5	0.88	0.49	7.5	0.20	0.14	11.6	19.4	10.9	1.66	.044	.031	39
6	3.9	21.7	51.8	0.86	0.48	7.1	0.19	0.14	11.2	18.7	10.5	1.55	.040	.029	38
20 lb Peak Milk															
1	16.7	24.0	59.6	1.00	0.60	10.5	0.30	0.20	14.3	24.0	14.5	2.53	.073	.049	42
2	20.0	25.0	60.9	1.02	0.62	11.2	0.32	0.21	15.2	25.5	15.6	2.79	.079	.053	44
3	18.0	25.4	58.6	0.98	0.59	10.4	0.30	0.19	14.9	24.9	15.0	2.64	.075	.049	45
4	14.4	24.4	57.0	0.95	0.56	9.7	0.27	0.18	13.9	23.2	13.8	2.36	.066	.044	43
5	10.8	23.5	55.4	0.92	0.54	8.9	0.24	0.17	13.0	21.6	12.7	2.08	.057	.040	42
6	7.8	22.7	54.0	0.90	0.52	8.2	0.22	0.15	12.3	20.4	11.7	1.85	.051	.035	40
30 lb Peak Milk															
1	25.0	26.4	62.8	1.05	0.65	12.1	0.35	0.22	16.6	27.7	17.2	3.18	.093	.060	47
2	30.0	27.8	64.5	1.08	0.68	12.9	0.38	0.24	17.9	30.0	18.9	3.57	.104	.066	49
3	27.0	27.8	62.1	1.04	0.64	12.0	0.35	0.22	17.3	28.9	17.9	3.34	.097	.062	49
4	21.6	26.4	60.1	1.00	0.61	11.1	0.32	0.21	15.9	26.4	16.1	2.92	.084	.055	47
5	16.2	24.9	57.9	0.97	0.58	10.0	0.28	0.19	14.4	24.2	14.4	2.50	.071	.046	44
6	11.7	23.7	55.9	0.93	0.55	9.1	0.25	0.17	13.2	22.0	13.0	2.16	.060	.040	42
10, 20, 30 lb Peak Milk															
7	0.0	19.5	46.8	0.78	0.40	6.5	0.16	0.12	9.1	15.2	7.8	1.26	.031	.024	25
8	0.0	19.8	47.2	0.79	0.41	6.6	0.16	0.12	9.3	15.6	8.1	1.30	.031	.024	25
9	0.0	20.3	47.9	0.80	0.42	6.7	0.16	0.12	9.7	16.2	8.5	1.35	.031	.024	26
10	0.0	21.1	48.9	0.82	0.44	6.9	0.24	0.15	10.3	17.3	9.3	1.45	.051	.032	27
11	0.0	21.0	52.1	0.87	0.49	7.7	0.24	0.15	10.9	18.3	10.3	1.61	.051	.032	27
12	0.0	21.4	55.9	0.93	0.55	8.7	0.24	0.15	12.0	19.9	11.8	1.86	.051	.032	27

Table 4 (Continued). Nutrient Requirements of Mature Beef Cows to Maintain Moderate Body Condition

Months Since Calving	Milk (lb/day)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients per Animal								
			TDN (%DM)	ME (Mcal/lb)	NE _m (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	ME (Mcal)	NE _m (Mcal)	CP (lb)	Ca (lb)	P (lb)	Vit. A (1000's IU)		
1,100 lb Mature Weight																	
10 lb Peak Milk																	
1	8.3	23.1	55.6	0.93	0.54	8.5	0.24	0.17	12.8	21.5	12.5	1.97	.055	.037	41		
2	10.0	23.5	56.3	0.94	0.55	8.9	0.25	0.17	13.2	22.1	13.0	2.10	.060	.040	42		
3	9.0	24.5	54.1	0.90	0.52	8.2	0.23	0.16	13.3	22.1	12.7	2.02	.055	.040	43		
4	7.2	24.1	53.2	0.89	0.50	7.8	0.21	0.15	12.8	21.4	12.1	1.89	.051	.037	43		
5	5.4	23.6	52.3	0.87	0.49	7.4	0.20	0.14	12.3	20.5	11.6	1.75	.046	.033	42		
6	3.9	23.3	51.6	0.86	0.48	7.0	0.19	0.14	12.0	20.0	11.2	1.64	.044	.031	41		
20 lb Peak Milk																	
1	16.7	25.4	59.1	0.99	0.60	10.3	0.29	0.20	15.0	25.1	15.2	2.62	.075	.051	45		
2	20.0	26.4	60.4	1.01	0.62	10.9	0.31	0.21	15.9	26.7	16.3	2.88	.084	.055	47		
3	18.0	26.9	58.1	0.97	0.58	10.2	0.29	0.19	15.6	26.1	15.6	2.73	.077	.051	48		
4	14.4	26.0	56.6	0.95	0.56	9.4	0.27	0.18	14.7	24.7	14.5	2.45	.068	.046	46		
5	10.8	25.0	55.0	0.92	0.53	8.7	0.24	0.17	13.8	23.0	13.3	2.17	.060	.042	44		
6	7.8	24.2	53.7	0.90	0.51	8.1	0.22	0.15	13.0	21.8	12.4	1.95	.053	.037	43		
30 lb Peak Milk																	
1	25.0	27.8	62.2	1.04	0.64	11.8	0.34	0.22	17.3	28.9	17.9	3.27	.095	.062	49		
2	30.0	29.2	63.9	1.07	0.67	12.5	0.37	0.24	18.7	31.2	19.5	3.66	.108	.068	52		
3	27.0	29.4	61.5	1.03	0.63	11.7	0.34	0.22	18.1	30.3	18.6	3.43	.099	.064	52		
4	21.6	27.9	59.5	0.99	0.60	10.8	0.31	0.20	16.6	27.6	16.8	3.01	.086	.057	49		
5	16.2	26.4	57.4	0.96	0.57	9.8	0.28	0.19	15.2	25.3	15.1	2.59	.073	.049	47		
6	11.7	25.3	55.6	0.93	0.54	8.9	0.25	0.17	14.1	23.5	13.7	2.25	.062	.042	45		
10, 20, 30 lb Peak Milk																	
7	0.0	20.9	46.8	0.78	0.40	6.5	0.16	0.12	9.8	16.3	8.4	1.36	.033	.026	27		
8	0.0	21.2	47.2	0.79	0.41	6.6	0.16	0.12	10.0	16.7	8.7	1.40	.033	.026	27		
9	0.0	21.8	47.9	0.80	0.42	6.7	0.16	0.12	10.4	17.4	9.2	1.45	.033	.026	28		
10	0.0	22.6	48.9	0.82	0.44	7.0	0.25	0.16	11.1	18.5	9.9	1.56	.057	.036	29		
11	0.0	22.5	52.1	0.87	0.49	7.7	0.25	0.16	11.7	19.6	11.0	1.73	.057	.036	29		
12	0.0	23.0	56.0	0.94	0.55	8.7	0.25	0.16	12.9	21.6	12.7	2.00	.057	.036	29		
1,200 lb Mature Weight																	
10 lb Peak Milk																	
1	8.3	24.4	55.3	0.92	0.54	8.4	0.24	0.17	13.5	22.4	13.1	2.06	.057	.040	43		
2	10.0	24.9	56.0	0.94	0.55	8.8	0.25	0.17	13.9	23.4	13.7	2.19	.062	.042	44		
3	9.0	26.0	53.7	0.90	0.51	8.1	0.23	0.16	14.0	23.4	13.4	2.12	.060	.042	46		
4	7.2	25.6	52.9	0.88	0.50	7.7	0.21	0.15	13.5	22.5	12.8	1.98	.055	.040	45		
5	5.4	25.1	52.1	0.87	0.49	7.3	0.20	0.14	13.1	21.8	12.2	1.84	.051	.035	44		
6	3.9	24.8	51.5	0.86	0.48	7.0	0.19	0.14	12.8	21.3	11.8	1.73	.046	.035	44		
20 lb Peak Milk																	
1	16.7	26.8	58.7	0.98	0.59	10.1	0.29	0.19	15.7	26.3	15.8	2.71	.077	.053	47		
2	20.0	27.8	59.9	1.00	0.61	10.7	0.31	0.21	16.7	27.8	16.9	2.97	.086	.057	49		
3	18.0	28.4	57.6	0.96	0.57	9.9	0.29	0.19	16.4	27.3	16.3	2.82	.082	.055	50		
4	14.4	27.4	56.2	0.94	0.55	9.3	0.26	0.18	15.4	25.8	15.1	2.54	.073	.049	48		
5	10.8	26.5	54.7	0.91	0.53	8.5	0.24	0.17	14.5	24.1	14.0	2.26	.064	.044	47		
6	7.8	25.7	53.4	0.89	0.51	7.9	0.22	0.15	13.7	22.9	13.1	2.04	.055	.040	45		
30 lb Peak Milk																	
1	25.0	29.2	61.6	1.03	0.64	11.5	0.34	0.22	18.0	30.1	18.6	3.36	.099	.064	52		
2	30.0	30.6	63.2	1.06	0.66	12.3	0.36	0.23	19.3	32.4	20.2	3.75	.110	.071	54		
3	27.0	30.8	60.8	1.02	0.62	11.4	0.34	0.22	18.7	31.4	19.2	3.52	.104	.066	54		
4	21.6	29.4	59.0	0.99	0.59	10.6	0.31	0.20	17.3	29.1	17.5	3.10	.090	.060	52		
5	16.2	27.9	57.0	0.95	0.56	9.6	0.27	0.18	15.9	26.5	15.8	2.68	.077	.051	49		
6	11.7	26.7	55.2	0.92	0.54	8.8	0.25	0.17	14.7	24.6	14.4	2.34	.066	.046	47		
10, 20, 30 lb Peak Milk																	
7	0.0	22.4	46.9	0.78	0.40	6.5	0.16	0.13	10.5	17.5	9.0	1.45	.037	.029	28		
8	0.0	22.8	47.3	0.79	0.41	6.5	0.16	0.13	10.8	18.0	9.3	1.49	.037	.029	29		
9	0.0	23.3	47.9	0.80	0.42	6.7	0.16	0.13	11.2	18.6	9.8	1.56	.037	.029	30		
10	0.0	24.3	49.0	0.82	0.44	6.9	0.25	0.16	11.9	19.9	10.7	1.67	.062	.040	31		
11	0.0	24.1	52.3	0.87	0.49	7.7	0.25	0.16	12.6	21.0	11.8	1.86	.062	.040	31		
12	0.0	24.6	56.2	0.94	0.55	8.8	0.25	0.16	13.8	23.1	13.5	2.16	.062	.040	31		

Table 4 (Continued). Nutrient Requirements of Mature Beef Cows to Maintain Moderate Body Condition

Months Since Calving	Milk (lb/day)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients per Animal								
			TDN (%DM)	ME (Mcal/lb)	NE _m (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	ME (Mcal)	NE _m (Mcal)	CP (lb)	Ca (lb)	P (lb)	Vit. A (1000's IU)		
1,300 lb Mature Weight																	
10 lb Peak Milk																	
1	8.3	25.8	55.1	0.92	0.53	8.3	0.23	0.17	14.2	23.7	13.8	2.15	.060	.042	46		
2	10.0	26.3	55.8	0.93	0.55	8.7	0.25	0.17	14.7	24.5	14.3	2.28	.064	.046	47		
3	9.0	27.5	53.5	0.89	0.51	8.0	0.23	0.16	14.7	24.5	14.0	2.20	.062	.044	49		
4	7.2	27.0	52.7	0.88	0.50	7.6	0.21	0.15	14.2	23.8	13.4	2.06	.057	.042	48		
5	5.4	26.6	52.0	0.87	0.49	7.3	0.20	0.15	13.8	23.1	12.9	1.93	.053	.040	47		
6	3.9	26.3	51.4	0.86	0.48	6.9	0.19	0.14	13.5	22.6	12.5	1.82	.051	.037	47		
20 lb Peak Milk																	
1	16.7	28.2	58.4	0.98	0.59	9.9	0.29	0.19	16.5	27.6	16.5	2.80	.082	.055	50		
2	20.0	29.1	59.5	0.99	0.60	10.5	0.31	0.21	17.3	28.8	17.6	3.06	.088	.060	51		
3	18.0	29.9	57.2	0.96	0.57	9.7	0.28	0.19	17.1	28.7	16.9	2.91	.084	.057	53		
4	14.4	28.9	55.9	0.93	0.55	9.1	0.26	0.18	16.2	26.9	15.8	2.63	.075	.051	51		
5	10.8	28.0	54.4	0.91	0.52	8.4	0.24	0.17	15.2	25.5	14.6	2.35	.066	.046	50		
6	7.8	27.2	53.3	0.89	0.51	7.8	0.22	0.15	14.5	24.2	13.7	2.13	.060	.042	48		
30 lb Peak Milk																	
1	25.0	30.6	61.2	1.02	0.63	11.3	0.33	0.22	18.7	31.2	19.2	3.45	.101	.066	54		
2	30.0	32.0	62.7	1.05	0.65	12.0	0.36	0.23	20.1	33.6	20.8	3.84	.115	.073	57		
3	27.0	32.3	60.3	1.01	0.62	11.2	0.33	0.21	19.5	32.6	19.9	3.61	.106	.068	57		
4	21.6	30.8	58.5	0.98	0.59	10.4	0.30	0.20	18.1	30.3	18.1	3.19	.093	.062	55		
5	16.2	29.4	56.6	0.95	0.56	9.4	0.27	0.18	16.6	27.9	16.4	2.77	.079	.055	52		
6	11.7	28.2	55.0	0.92	0.53	8.6	0.24	0.17	15.5	25.9	15.0	2.43	.068	.049	50		
10, 20, 30 lb Peak Milk																	
7	0.0	23.8	46.9	0.78	0.40	6.5	0.17	0.13	11.2	18.6	9.5	1.54	.040	.031	30		
8	0.0	24.2	47.3	0.79	0.41	6.5	0.17	0.13	11.4	19.1	9.9	1.58	.040	.031	31		
9	0.0	24.8	48.0	0.80	0.42	6.7	0.17	0.13	11.9	19.8	10.4	1.66	.040	.031	31		
10	0.0	25.8	49.0	0.82	0.44	6.9	0.26	0.16	12.6	21.2	11.4	1.78	.066	.042	32		
11	0.0	25.6	52.5	0.88	0.49	7.8	0.26	0.16	13.4	22.5	12.5	1.99	.066	.042	33		
12	0.0	26.1	56.5	0.94	0.56	8.9	0.26	0.16	14.7	24.5	14.6	2.31	.066	.042	33		
1,400 lb Mature Weight																	
10 lb Peak Milk																	
1	8.3	27.1	54.9	0.92	0.53	8.2	0.23	0.17	14.9	24.9	14.4	2.23	.064	.046	48		
2	10.0	27.6	55.5	0.93	0.54	8.6	0.25	0.17	15.3	25.7	15.0	2.36	.068	.049	49		
3	9.0	28.9	53.3	0.89	0.51	7.9	0.23	0.16	15.4	25.7	14.6	2.29	.066	.046	51		
4	7.2	28.5	52.5	0.88	0.49	7.6	0.21	0.15	15.0	25.1	14.1	2.15	.062	.044	50		
5	5.4	28.0	51.8	0.86	0.48	7.2	0.20	0.15	14.5	24.1	13.5	2.02	.057	.042	50		
6	3.9	27.7	51.2	0.86	0.47	6.9	0.19	0.14	14.2	23.8	13.1	1.91	.053	.040	49		
20 lb Peak Milk																	
1	16.7	29.5	58.0	0.97	0.58	9.8	0.28	0.19	17.1	28.6	17.1	2.88	.084	.057	52		
2	20.0	30.5	59.1	0.99	0.60	10.3	0.30	0.20	18.0	30.2	18.2	3.14	.093	.062	54		
3	18.0	31.3	56.8	0.95	0.56	9.6	0.28	0.19	17.8	29.7	17.6	2.99	.088	.060	55		
4	14.4	30.3	55.5	0.93	0.54	8.9	0.26	0.18	16.8	28.2	16.4	2.70	.079	.053	54		
5	10.8	29.4	54.1	0.90	0.52	8.3	0.24	0.17	15.9	26.5	15.3	2.44	.071	.049	52		
6	7.8	28.6	53.0	0.89	0.50	7.7	0.22	0.16	15.2	25.5	14.4	2.21	.062	.044	51		
30 lb Peak Milk																	
1	25.0	31.9	60.7	1.01	0.62	11.1	0.33	0.22	19.4	32.2	19.8	3.53	.104	.068	56		
2	30.0	33.3	62.2	1.04	0.64	11.8	0.35	0.23	20.7	34.6	21.5	3.93	.117	.075	59		
3	27.0	33.7	59.8	1.00	0.61	11.0	0.32	0.21	20.2	33.7	20.5	3.69	.110	.073	60		
4	21.6	32.3	58.1	0.97	0.58	10.2	0.30	0.20	18.8	31.3	18.8	3.27	.097	.064	57		
5	16.2	30.8	56.2	0.94	0.55	9.3	0.27	0.18	17.3	29.0	17.0	2.86	.084	.057	54		
6	11.7	29.6	54.7	0.91	0.53	8.5	0.24	0.17	16.2	26.9	15.7	2.52	.073	.051	52		
10, 20, 30 lb Peak Milk																	
7	0.0	25.2	46.9	0.78	0.40	6.5	0.17	0.13	11.8	19.7	10.1	1.63	.044	.033	32		
8	0.0	25.6	47.3	0.79	0.41	6.5	0.17	0.13	12.1	20.2	10.5	1.67	.044	.033	33		
9	0.0	26.2	48.0	0.80	0.42	6.7	0.17	0.13	12.6	21.0	11.0	1.75	.044	.033	33		
10	0.0	27.3	49.1	0.82	0.44	6.9	0.26	0.16	13.4	22.4	12.0	1.89	.071	.044	35		
11	0.0	27.0	52.6	0.88	0.50	7.8	0.26	0.16	14.2	23.8	13.5	2.11	.071	.044	34		
12	0.0	27.6	56.6	0.95	0.56	8.9	0.26	0.16	15.6	26.2	15.5	2.45	.071	.044	35		

Table 5. Nutrient Requirements to Increase Body Condition Score of Mature Cows from 4 to 5 During the Last 90 Days of Pregnancy

Mature Weight (@BCS 5)	DMI (lb/day)	Diet Nutrient Density					Daily Nutrients per Animal					
		TDN (% DM)	NE _m (Mcal/lb)	CP (% DM)	Ca (% DM)	P (% DM)	TDN (lb)	NE _m (Mcal)	CP (lb)	Ca (lb)	P (lb)	Vit. A (1,000's IU)
1,000	20.5	60	0.59	7.7	0.36	0.2	12.3	12.1	1.57	0.074	0.040	26
1,100	22	60	0.58	7.5	0.35	0.2	13.2	12.8	1.65	0.078	0.043	28
1,200	23.5	59	0.58	7.4	0.34	0.19	13.9	13.6	1.74	0.081	0.045	30

Table 6. Nutrient Requirements to Increase Body Condition Score of Open Mature Cows

Mature Weight (@BCS 5)	Current BCS	Days to Gain 1 BCS	DMI (lb/day)	Diet Nutrient Density					Daily Nutrients per Animal					
				TDN (% DM)	NE _m (Mcal/lb)	CP (% DM)	Ca (% DM)	P (% DM)	TDN (lb)	NE _m (Mcal)	CP (lb)	Ca (lb)	P (lb)	Vit. A (1,000's IU)
1,000	3	30	18.8	64	0.65	6.1	0.28	0.16	12.0	12.2	1.14	0.053	0.031	24
		60	17.7	57	0.55	6.4	0.23	0.15	10.1	9.8	1.14	0.041	0.026	28
	4	30	20.5	66	0.67	5.9	0.27	0.16	13.5	13.8	1.21	0.056	0.033	26
		60	19.0	58	0.56	6.4	0.23	0.15	11.0	10.7	1.21	0.044	0.028	24
1,100	3	30	20.3	65	0.66	6.0	0.29	0.17	13.2	13.4	1.22	0.058	0.034	26
		60	19.0	58	0.56	6.4	0.24	0.15	11.0	10.6	1.22	0.045	0.029	24
	4	30	22.2	67	0.69	5.9	0.28	0.16	14.9	15.3	1.30	0.062	0.036	28
		60	20.4	58	0.57	6.4	0.24	0.15	11.8	11.6	1.30	0.048	0.030	26
1,200	3	30	21.0	65	0.69	6.2	0.30	0.18	13.7	14.5	1.30	0.063	0.037	27
		60	20.3	58	0.56	6.4	0.24	0.15	11.8	11.3	1.30	0.048	0.031	26
	4	30	23.5	67	0.68	5.9	0.28	0.16	15.7	16.0	1.38	0.065	0.038	30
		60	21.8	58	0.56	6.3	0.23	0.15	12.6	12.3	1.38	0.051	0.033	28

Table 7. Nutrient Requirements of Two-Year-Old Heifers (20 pounds peak milk)

Months Since Calving	Body Wt. (lb)	Milk (lb/day)	DMI (lb/day)	Diet Nutrient Density					Daily Nutrients per Animal							
				TDN (%DM)	ME (Mcal/lb)	NE _m (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	ME (Mcal)	NE _m (Mcal)	CP (lb)	Ca (lb)	P (lb)	
900 lb Mature Weight																
1	729	12.3	19.1	61.4	1.03	0.63	10.8	0.31	0.20	11.7	19.7	12.0	2.07	.059	.038	34
2	738	14.8	19.9	62.6	1.05	0.65	11.4	0.33	0.21	12.5	20.9	12.9	2.27	.066	.042	35
3	748	13.3	20.4	60.3	1.01	0.62	10.6	0.30	0.19	12.3	20.6	12.6	2.16	.061	.039	36
4	758	10.7	19.8	58.8	0.98	0.59	9.9	0.28	0.18	11.6	19.4	11.7	1.96	.055	.036	35
5	769	8.0	19.3	57.4	0.96	0.57	9.2	0.26	0.17	11.1	18.5	11.0	1.77	.050	.033	34
6	781	5.8	18.8	56.2	0.94	0.55	8.6	0.23	0.15	10.6	17.7	10.3	1.61	.043	.028	33
7	794	0.0	17.4	48.5	0.81	0.43	6.8	0.17	0.12	8.4	14.1	7.5	1.18	.030	.021	22
8	810	0.0	17.5	49.2	0.82	0.44	7.0	0.17	0.12	8.6	14.4	7.7	1.22	.030	.021	22
9	830	0.0	17.7	50.5	0.84	0.46	7.2	0.17	0.12	8.9	14.9	8.1	1.28	.030	.021	22
10	854	0.0	17.9	52.4	0.88	0.49	7.7	0.27	0.16	9.4	15.8	8.8	1.38	.048	.029	23
11	885	0.0	18.3	55.2	0.92	0.54	8.3	0.27	0.16	10.1	16.8	9.9	1.52	.049	.029	23
12	925	0.0	18.9	58.7	0.98	0.59	9.3	0.26	0.16	11.1	18.5	11.2	1.75	.049	.030	24
1,000 lb Mature Weight																
1	810	12.3	20.4	61.0	1.02	0.63	10.6	0.31	0.19	12.4	20.8	12.9	2.16	.063	.039	36
2	820	14.8	21.2	62.1	1.04	0.64	11.1	0.32	0.20	13.2	22.0	13.6	2.36	.068	.042	38
3	831	13.3	21.8	59.8	1.00	0.61	10.4	0.30	0.19	13.0	21.8	13.3	2.26	.065	.041	39
4	843	10.7	21.2	58.5	0.98	0.59	9.7	0.28	0.18	12.4	20.8	12.5	2.06	.059	.038	38
5	854	8.0	20.7	57.1	0.95	0.57	9.0	0.25	0.17	11.8	19.7	11.8	1.87	.052	.035	37
6	868	5.8	20.3	56.0	0.94	0.55	8.4	0.23	0.16	11.4	19.1	11.2	1.71	.047	.032	36
7	883	0.0	18.8	48.6	0.81	0.43	6.9	0.18	0.13	9.1	15.2	8.1	1.29	.034	.024	24
8	900	0.0	18.9	49.4	0.83	0.44	7.0	0.18	0.13	9.3	15.7	8.3	1.33	.034	.025	24
9	922	0.0	19.1	50.7	0.85	0.46	7.3	0.18	0.13	9.7	16.2	8.8	1.39	.034	.025	24
10	949	0.0	19.4	52.7	0.88	0.50	7.7	0.28	0.17	10.2	17.1	9.7	1.50	.054	.033	25
11	984	0.0	19.9	55.5	0.93	0.54	8.3	0.28	0.16	11.0	18.5	10.7	1.66	.056	.033	25
12	1028	0.0	20.6	59.1	0.99	0.60	9.3	0.27	0.16	12.2	20.4	12.4	1.92	.056	.033	26
1,100 lb Mature Weight																
1	891	12.3	21.6	60.7	1.01	0.62	10.4	0.30	0.19	13.1	21.8	13.4	2.25	.065	.041	38
2	902	14.8	22.5	61.7	1.03	0.64	10.9	0.32	0.20	13.9	23.2	14.4	2.45	.072	.045	40
3	915	13.3	23.2	59.5	0.99	0.60	10.1	0.30	0.19	13.8	23.0	13.9	2.35	.070	.044	41
4	927	10.7	22.6	58.2	0.97	0.58	9.6	0.27	0.18	13.2	21.9	13.1	2.16	.061	.041	40
5	940	8.0	22.1	56.9	0.95	0.56	8.9	0.25	0.17	12.6	21.0	12.4	1.96	.055	.038	39
6	954	5.8	21.7	55.9	0.93	0.55	8.3	0.23	0.16	12.1	20.2	11.9	1.81	.050	.035	38
7	971	0.0	20.2	48.8	0.82	0.43	6.9	0.18	0.13	9.9	16.6	8.7	1.39	.036	.026	26
8	990	0.0	20.4	49.5	0.83	0.45	7.0	0.18	0.13	10.1	16.9	9.2	1.43	.037	.027	26
9	1014	0.0	20.6	50.8	0.85	0.47	7.3	0.18	0.13	10.5	17.5	9.7	1.50	.037	.027	26
10	1044	0.0	20.9	52.8	0.88	0.50	7.7	0.29	0.17	11.0	18.4	10.5	1.61	.060	.036	27
11	1082	0.0	21.4	55.7	0.93	0.54	8.4	0.28	0.17	11.9	19.9	11.6	1.79	.060	.036	27
12	1130	0.0	22.1	59.4	0.99	0.60	9.4	0.27	0.16	13.1	21.9	13.3	2.07	.060	.036	28
1,200 lb Mature Weight																
1	972	12.3	22.9	60.4	1.01	0.62	10.2	0.30	0.19	13.8	23.1	14.2	2.34	.069	.044	41
2	984	14.8	23.8	61.4	1.03	0.63	10.7	0.32	0.20	14.6	24.5	15.0	2.55	.076	.048	42
3	998	13.3	24.5	59.2	0.99	0.60	10.0	0.29	0.19	14.5	24.3	14.7	2.44	.071	.047	43
4	1011	10.7	24.0	58.0	0.97	0.58	9.4	0.27	0.18	13.9	23.3	13.9	2.25	.065	.043	42
5	1025	8.0	23.4	56.8	0.95	0.56	8.8	0.25	0.17	13.3	22.2	13.1	2.05	.059	.040	41
6	1041	5.8	23.0	55.8	0.93	0.55	8.3	0.23	0.16	12.8	21.4	12.7	1.90	.053	.037	41
7	1059	0.0	21.5	48.9	0.82	0.44	6.9	0.19	0.13	10.5	17.6	9.5	1.48	.041	.028	27
8	1080	0.0	21.7	49.7	0.83	0.45	7.1	0.19	0.13	10.8	18.0	9.8	1.53	.041	.028	28
9	1106	0.0	22.0	51.0	0.85	0.47	7.3	0.19	0.13	11.2	18.7	10.3	1.61	.042	.029	28
10	1139	0.0	22.3	53.1	0.89	0.50	7.8	0.29	0.17	11.8	19.8	11.2	1.73	.065	.038	28
11	1180	0.0	22.8	55.9	0.93	0.55	8.5	0.29	0.17	12.7	21.2	12.5	1.93	.066	.039	29
12	1233	0.0	23.7	59.7	1.00	0.61	9.4	0.28	0.17	14.1	23.7	14.5	2.23	.066	.040	30
1,300 lb Mature Weight																
1	1053	12.3	24.1	60.2	1.01	0.61	10.1	0.30	0.19	14.5	24.3	14.7	2.43	.072	.046	43
2	1066	14.8	25.0	61.1	1.02	0.63	10.5	0.31	0.20	15.3	25.5	15.8	2.63	.078	.050	44
3	1081	13.3	25.8	58.9	0.98	0.59	9.8	0.29	0.19	15.2	25.3	15.2	2.53	.075	.049	46
4	1095	10.7	25.3	57.8	0.97	0.58	9.2	0.27	0.18	14.6	24.5	14.7	2.34	.068	.046	45
5	1111	8.0	24.8	56.6	0.95	0.56	8.7	0.25	0.17	14.0	23.6	13.9	2.15	.062	.042	44
6	1128	5.8	24.4	55.7	0.93	0.54	8.2	0.23	0.16	13.6	22.7	13.2	1.99	.056	.039	43
7	1147	0.0	22.9	49.0	0.82	0.44	6.9	0.19	0.13	11.2	18.8	10.1	1.58	.044	.030	29
8	1170	0.0	23.1	49.8	0.83	0.45	7.1	0.19	0.13	11.5	19.2	10.4	1.63	.044	.030	29
9	1199	0.0	23.3	51.2	0.86	0.47	7.3	0.19	0.13	11.9	20.0	11.0	1.71	.044	.030	30
10	1234	0.0	23.7	53.3	0.89	0.51	7.8	0.30	0.18	12.6	21.1	12.1	1.85	.071	.043	30
11	1279	0.0	24.3	56.2	0.94	0.55	8.5	0.29	0.17	13.7	22.8	13.4	2.06	.071	.043	31
12	1336	0.0	25.2	60.0	1.00	0.61	9.5	0.28	0.17	15.1	25.2	15.4	2.40	.071	.043	32
1,400 lb Mature Weight																
1	1134	12.3	25.3	60.0	1.00	0.61	10.0	0.30	0.19	15.2	25.3	15.4	2.52	.076	.048	45
2	1148	14.8	26.2	60.9	1.02	0.62	10.4	0.31	0.20	16.0	26.7	16.2	2.72	.081	.052	46
3	1164	13.3	27.1	58.7	0.98	0.59	9.7	0.29	0.19	15.9	26.6	16.0	2.62	.079	.051	48
4	1179	10.7	26.6	57.6	0.96	0.57	9.1	0.27	0.18	15.3	25.5	15.2	2.43	.072	.048	47
5	1196	8.0	26.1	56.5	0.94	0.56	8.5	0.25	0.17	14.7	24.5	14.6	2.23	.065	.044	46
6	1214	5.8	25.7	55.												

Table 8. Nutrient Requirements of Pregnant Replacement Heifers

Months Since Conception	Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density					Daily Nutrients per Animal						
				TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	CP (lb)	Ca (lb)	P (lb)	
900 lb Mature Weight															
1	563	0.72	15.5	50.2	0.46	0.21	7.2	0.22	0.16	7.8	7.1	1.11	.034	.025	20
2	585	0.76	15.9	50.3	0.46	0.21	7.1	0.21	0.16	8.0	7.3	1.13	.034	.025	20
3	609	0.82	16.3	50.4	0.46	0.21	7.1	0.21	0.16	8.2	7.5	1.16	.034	.026	21
4	636	0.91	16.8	50.7	0.46	0.21	7.2	0.21	0.16	8.5	7.7	1.21	.035	.027	21
5	665	1.05	17.3	51.3	0.47	0.22	7.3	0.20	0.16	8.9	8.1	1.27	.035	.028	22
6	700	1.24	17.8	52.3	0.49	0.24	7.6	0.20	0.16	9.3	8.7	1.36	.036	.028	23
7	741	1.50	18.4	54.1	0.51	0.26	8.1	0.31	0.23	10.0	9.4	1.49	.057	.042	23
8	792	1.84	19.1	57.1	0.56	0.30	8.9	0.31	0.22	10.9	10.7	1.70	.059	.042	24
9	854	2.26	19.7	62.0	0.63	0.37	10.3	0.30	0.22	12.2	12.4	2.02	.059	.043	25
1,000 lb Mature Weight															
1	625	0.79	16.7	50.1	0.46	0.21	7.2	0.22	0.17	8.4	7.7	1.20	.037	.028	21
2	650	0.83	17.2	50.2	0.46	0.21	7.2	0.22	0.17	8.6	7.9	1.23	.038	.029	22
3	676	0.89	17.7	50.4	0.46	0.21	7.2	0.22	0.17	8.9	8.1	1.27	.038	.030	22
4	704	0.98	18.2	50.7	0.46	0.21	7.2	0.21	0.17	9.2	8.4	1.31	.038	.031	23
5	735	1.11	18.7	51.3	0.47	0.22	7.3	0.21	0.17	9.6	8.8	1.37	.039	.032	24
6	772	1.29	19.4	52.3	0.49	0.24	7.6	0.20	0.16	10.1	9.5	1.47	.039	.032	25
7	815	1.54	20.0	54.0	0.52	0.26	8.0	0.32	0.23	10.8	10.4	1.60	.064	.046	25
8	866	1.87	20.7	56.8	0.56	0.30	8.7	0.31	0.23	11.8	11.6	1.81	.064	.048	26
9	929	2.28	21.3	61.3	0.63	0.37	10.0	0.31	0.22	13.1	13.4	2.13	.066	.048	27
1,100 lb Mature Weight															
1	687	0.86	18.0	50.3	0.46	0.21	7.2	0.23	0.18	9.1	8.3	1.30	.041	.032	23
2	714	0.90	18.5	50.4	0.46	0.21	7.2	0.22	0.17	9.3	8.5	1.33	.041	.032	23
3	742	0.96	19.0	50.5	0.46	0.21	7.2	0.22	0.17	9.6	8.7	1.36	.042	.032	24
4	773	1.05	19.5	50.8	0.47	0.22	7.2	0.22	0.17	9.9	9.2	1.41	.043	.033	25
5	806	1.18	20.1	51.3	0.48	0.22	7.3	0.21	0.17	10.3	9.6	1.47	.043	.034	26
6	845	1.36	20.8	52.3	0.49	0.24	7.5	0.21	0.17	10.9	10.2	1.57	.044	.035	26
7	890	1.61	21.5	53.9	0.52	0.26	7.9	0.32	0.23	11.6	11.2	1.70	.069	.049	27
8	944	1.94	22.3	56.5	0.56	0.30	8.6	0.31	0.22	12.6	12.5	1.92	.069	.049	28
9	1009	2.35	22.9	60.6	0.62	0.36	9.8	0.30	0.22	13.9	14.2	2.24	.069	.050	29
1,200 lb Mature Weight															
1	750	0.93	19.3	50.5	0.46	0.21	7.2	0.23	0.18	9.7	8.9	1.39	.044	.035	25
2	779	0.97	19.8	50.5	0.46	0.21	7.2	0.23	0.18	10.0	9.1	1.42	.046	.036	25
3	809	1.03	20.3	50.7	0.46	0.21	7.2	0.22	0.18	10.3	9.3	1.46	.046	.036	26
4	842	1.12	20.9	50.9	0.47	0.22	7.2	0.22	0.17	10.6	9.8	1.51	.046	.036	27
5	878	1.25	21.5	51.4	0.48	0.23	7.3	0.22	0.17	11.1	10.3	1.57	.047	.037	27
6	918	1.44	22.2	52.3	0.49	0.24	7.5	0.21	0.17	11.6	10.9	1.67	.047	.038	28
7	966	1.69	23.0	53.8	0.51	0.26	7.9	0.31	0.23	12.4	11.7	1.81	.071	.053	29
8	1022	2.01	23.7	56.2	0.55	0.30	8.5	0.31	0.22	13.3	13.0	2.02	.073	.053	30
9	1089	2.42	24.4	59.9	0.61	0.35	9.6	0.30	0.22	14.6	14.9	2.35	.073	.054	31
1,300 lb Mature Weight															
1	812	1.01	20.5	50.6	0.46	0.21	7.2	0.24	0.18	10.4	9.4	1.48	.049	.037	26
2	843	1.05	21.0	50.7	0.46	0.21	7.2	0.23	0.18	10.6	9.7	1.51	.049	.038	27
3	876	1.10	21.6	50.8	0.47	0.22	7.2	0.23	0.18	11.0	10.2	1.56	.050	.039	27
4	911	1.19	22.2	51.0	0.47	0.22	7.2	0.22	0.18	11.3	10.4	1.61	.050	.040	28
5	949	1.33	22.9	51.5	0.48	0.23	7.3	0.22	0.18	11.8	11.0	1.67	.050	.041	29
6	992	1.51	23.6	52.4	0.49	0.24	7.5	0.22	0.17	12.4	11.6	1.77	.052	.041	30
7	1041	1.76	24.4	53.7	0.51	0.26	7.9	0.31	0.23	13.1	12.4	1.92	.076	.056	31
8	1099	2.09	25.2	56.0	0.55	0.29	8.5	0.30	0.22	14.1	13.9	2.13	.076	.056	32
9	1169	2.49	25.9	59.5	0.60	0.34	9.5	0.30	0.22	15.4	15.5	2.45	.078	.057	33
1,400 lb Mature Weight															
1	874	1.08	21.7	50.7	0.47	0.22	7.3	0.24	0.18	11.0	10.2	1.57	.052	.039	28
2	907	1.12	22.3	50.8	0.47	0.22	7.2	0.24	0.18	11.3	10.5	1.61	.054	.040	28
3	942	1.18	22.9	50.9	0.47	0.22	7.2	0.23	0.18	11.7	10.8	1.65	.054	.041	29
4	979	1.27	23.5	51.2	0.47	0.22	7.2	0.23	0.18	12.0	11.0	1.70	.054	.042	30
5	1020	1.40	24.2	51.6	0.48	0.23	7.3	0.22	0.18	12.5	11.6	1.77	.054	.044	31
6	1065	1.58	24.9	52.4	0.49	0.24	7.5	0.22	0.18	13.0	12.2	1.86	.055	.045	32
7	1117	1.83	25.8	53.7	0.51	0.26	7.8	0.31	0.23	13.9	13.2	2.01	.080	.059	33
8	1177	2.16	26.6	55.8	0.55	0.29	8.4	0.30	0.22	14.8	14.6	2.23	.080	.059	34
9	1249	2.57	27.4	59.0	0.60	0.34	9.3	0.30	0.22	16.2	16.4	2.56	.082	.060	35

Table 9. Nutrient Requirements of Growing Steer and Heifer Calves^a

Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients per Animal						
			TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	NE _g (Mcal)	CP (lb)	Ca (lb)	P (lb)	
1,100 lb @ Finishing															
300	0.5	7.9	54	0.50	0.24	9.2	0.30	0.16	4.3	3.07	0.42	0.73	.024	.013	8
	1.0	8.4	59	0.57	0.31	11.4	0.46	0.23	5.0	3.07	0.90	0.95	.039	.019	8
	1.5	8.6	64	0.64	0.37	13.6	0.62	0.29	5.5	3.07	1.40	1.17	.053	.025	9
	2.0	8.6	69	0.72	0.44	16.2	0.79	0.36	5.9	3.07	1.92	1.39	.068	.031	9
	2.5	8.5	75	0.81	0.52	18.9	0.96	0.40	6.4	3.07	2.46	1.61	.082	.034	9
400	3.0	8.2	83	0.92	0.62	22.2	1.17	0.51	6.8	3.07	3.00	1.83	.096	.042	8
	0.5	9.8	54	0.50	0.24	8.7	0.27	0.15	5.3	3.81	0.52	0.85	.026	.015	10
	1.0	10.4	59	0.57	0.31	10.4	0.39	0.20	6.1	3.81	1.12	1.08	.040	.021	10
	1.5	10.7	64	0.64	0.37	12.1	0.50	0.24	6.8	3.81	1.74	1.30	.053	.026	11
	2.0	10.7	69	0.72	0.44	14.1	0.62	0.29	7.4	3.81	2.39	1.51	.066	.031	11
500	2.5	10.6	75	0.81	0.52	16.3	0.75	0.34	8.0	3.81	3.05	1.72	.079	.036	11
	3.0	10.2	83	0.92	0.62	19.0	0.90	0.41	8.5	3.81	3.72	1.94	.092	.042	10
	0.5	11.6	54	0.50	0.24	8.4	0.25	0.15	6.3	4.50	0.62	0.97	.029	.017	12
	1.0	12.2	59	0.57	0.31	9.8	0.34	0.18	7.2	4.50	1.32	1.19	.041	.022	12
	1.5	12.6	64	0.64	0.37	11.2	0.42	0.22	8.1	4.50	2.06	1.41	.054	.027	13
600	2.0	12.7	69	0.72	0.44	12.8	0.52	0.25	8.8	4.50	2.82	1.63	.066	.032	13
	2.5	12.5	75	0.81	0.52	14.7	0.62	0.30	9.4	4.50	3.60	1.84	.077	.037	13
	3.0	12.1	83	0.92	0.62	16.9	0.74	0.35	10.0	4.50	4.40	2.05	.089	.042	12
	0.5	13.2	54	0.50	0.24	8.2	0.23	0.14	7.1	5.16	0.71	1.08	.031	.019	13
	1.0	14.0	59	0.57	0.31	9.4	0.30	0.17	8.3	5.16	1.51	1.31	.043	.024	14
700	1.5	14.4	64	0.64	0.37	10.6	0.38	0.20	9.2	5.16	2.36	1.53	.054	.028	14
	2.0	14.6	69	0.72	0.44	11.9	0.44	0.22	10.1	5.16	3.23	1.74	.065	.033	15
	2.5	14.4	75	0.81	0.52	13.6	0.52	0.26	10.8	5.16	4.13	1.95	.075	.037	14
	3.0	13.8	83	0.92	0.62	15.7	0.62	0.30	11.5	5.16	5.04	2.17	.086	.041	14
	0.5	14.9	54	0.50	0.24	8.0	0.22	0.14	8.0	5.79	0.79	1.19	.033	.021	15
800	1.0	15.8	59	0.57	0.31	9.0	0.28	0.16	9.3	5.79	1.70	1.42	.044	.026	16
	1.5	16.2	64	0.64	0.37	10.1	0.33	0.19	10.4	5.79	2.65	1.64	.054	.030	16
	2.0	16.3	69	0.72	0.44	11.4	0.39	0.21	11.2	5.79	3.63	1.85	.064	.034	16
	2.5	16.1	75	0.81	0.52	12.8	0.46	0.24	12.1	5.79	4.64	2.06	.074	.038	16
	3.0	15.5	83	0.92	0.62	14.6	0.54	0.27	12.9	5.79	5.66	2.27	.084	.042	16
1,200 lb @ Finishing															
300	0.5	7.8	54	0.49	0.24	9.4	0.31	0.17	4.2	3.07	0.39	0.73	.025	.013	8
	1.0	8.3	58	0.56	0.30	11.5	0.48	0.23	4.8	3.07	0.84	0.95	.040	.019	8
	1.5	8.6	63	0.63	0.36	13.7	0.63	0.29	5.4	3.07	1.31	1.17	.054	.025	9
	2.0	8.6	68	0.70	0.42	16.2	0.80	0.36	5.8	3.07	1.80	1.40	.069	.031	9
	2.5	8.6	73	0.78	0.50	18.7	0.96	0.43	6.3	3.07	2.30	1.61	.083	.037	9
400	3.0	8.3	80	0.88	0.58	22.0	1.18	0.52	6.6	3.07	2.81	1.83	.098	.043	8
	0.5	9.7	54	0.49	0.24	8.8	0.28	0.16	5.2	3.81	0.49	0.85	.027	.015	10
	1.0	10.3	58	0.56	0.30	10.4	0.39	0.20	6.0	3.81	1.04	1.07	.041	.021	10
	1.5	10.6	63	0.63	0.36	12.2	0.51	0.25	6.7	3.81	1.63	1.30	.054	.026	11
	2.0	10.7	68	0.70	0.42	14.1	0.63	0.30	7.3	3.81	2.23	1.51	.068	.032	11
500	2.5	10.7	73	0.78	0.50	16.1	0.76	0.35	7.8	3.81	2.85	1.72	.081	.037	11
	3.0	10.4	80	0.88	0.58	18.7	0.90	0.41	8.3	3.81	3.49	1.94	.094	.043	10
	0.5	11.5	54	0.49	0.24	8.4	0.25	0.15	6.2	4.50	0.58	0.97	.029	.017	12
	1.0	12.2	58	0.56	0.30	9.8	0.34	0.18	7.1	4.50	1.23	1.19	.042	.022	12
	1.5	12.6	63	0.63	0.36	11.2	0.43	0.22	7.9	4.50	1.93	1.41	.055	.028	13
600	2.0	12.6	68	0.70	0.42	12.9	0.53	0.26	8.6	4.50	2.64	1.63	.067	.033	13
	2.5	12.6	73	0.78	0.50	14.6	0.63	0.30	9.2	4.50	3.37	1.84	.079	.038	13
	3.0	12.2	80	0.88	0.58	16.8	0.75	0.35	9.8	4.50	4.12	2.05	.092	.043	12
	0.5	13.2	54	0.49	0.24	8.2	0.24	0.15	7.1	5.16	0.66	1.08	.031	.019	13
	1.0	14.0	58	0.56	0.30	9.3	0.31	0.17	8.1	5.16	1.42	1.31	.043	.024	14
700	1.5	14.4	63	0.63	0.36	10.6	0.38	0.20	9.1	5.16	2.21	1.52	.055	.029	14
	2.0	14.4	68	0.70	0.42	12.1	0.46	0.23	9.8	5.16	3.03	1.74	.067	.034	14
	2.5	14.4	73	0.78	0.50	13.5	0.54	0.26	10.5	5.16	3.87	1.95	.078	.038	14
	3.0	14.0	80	0.88	0.58	15.4	0.64	0.31	11.2	5.16	4.73	2.16	.089	.043	14
	0.5	14.8	54	0.49	0.24	8.0	0.23	0.14	8.0	5.79	0.74	1.18	.034	.021	15
800	1.0	15.7	58	0.56	0.30	9.0	0.29	0.17	9.1	5.79	1.59	1.42	.045	.026	16
	1.5	16.2	63	0.63	0.36	10.1	0.34	0.19	10.2	5.79	2.48	1.64	.056	.030	16
	2.0	16.3	68	0.70	0.42	11.3	0.41	0.21	11.1	5.79	3.40	1.85	.067	.035	16
	2.5	16.2	73	0.78	0.50	12.7	0.47	0.24	11.8	5.79	4.34	2.05	.077	.039	16
	3.0	15.8	80	0.88	0.58	14.4	0.55	0.27	12.6	5.79	5.30	2.27	.087	.043	16

^a1,100 or 1,200 lb @ finishing (28 percent body fat) or maturity (replacement heifers).

Table 10. Nutrient Requirements of Bull Calves (less than 12 months of age, 2,000 lb mature weight)

Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients per Animal						
			TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	NE _g (Mcal)	CP (lb)	Ca (lb)	P (lb)	
300	0.5	8.0	55	0.51	0.25	9.1	0.31	0.16	4.4	3.53	0.39	0.73	.025	.013	8
	1.0	8.3	58	0.56	0.30	11.4	0.48	0.23	4.8	3.53	0.84	0.95	.040	.019	8
	1.5	8.5	61	0.60	0.34	13.8	0.64	0.29	5.2	3.53	1.31	1.17	.054	.025	9
	2.0	8.6	65	0.65	0.38	16.3	0.80	0.36	5.6	3.53	1.80	1.40	.069	.031	9
	2.5	8.7	68	0.71	0.43	18.5	0.95	0.43	5.9	3.53	2.30	1.61	.083	.037	9
	3.0	8.6	72	0.76	0.48	21.3	1.14	0.50	6.2	3.53	2.81	1.83	.098	.043	9
400	0.5	9.9	55	0.51	0.25	8.6	0.27	0.15	5.4	4.38	0.49	0.85	.027	.015	10
	1.0	10.3	58	0.56	0.30	10.5	0.40	0.20	6.0	4.38	1.04	1.08	.041	.021	10
	1.5	10.5	61	0.60	0.34	12.4	0.51	0.25	6.4	4.38	1.63	1.30	.054	.026	11
	2.0	10.7	65	0.65	0.38	14.1	0.64	0.30	7.0	4.38	2.23	1.51	.068	.032	11
	2.5	10.7	68	0.71	0.43	16.2	0.76	0.35	7.3	4.38	2.85	1.73	.081	.037	11
	3.0	10.7	72	0.76	0.48	18.1	0.88	0.40	7.7	4.38	3.49	1.94	.094	.043	11
500	0.5	11.7	55	0.51	0.25	8.3	0.25	0.15	6.4	5.18	0.58	0.97	.029	.017	12
	1.0	12.2	58	0.56	0.30	9.8	0.34	0.18	7.1	5.18	1.23	1.19	.042	.022	12
	1.5	12.5	61	0.60	0.34	11.3	0.44	0.22	7.6	5.18	1.93	1.41	.055	.028	13
	2.0	12.6	65	0.65	0.38	12.9	0.53	0.26	8.2	5.18	2.64	1.63	.067	.033	13
	2.5	12.7	68	0.71	0.43	14.5	0.63	0.29	8.6	5.18	3.37	1.84	.080	.037	13
	3.0	12.6	72	0.76	0.48	16.3	0.73	0.34	9.1	5.18	4.12	2.05	.092	.043	13
600	0.5	13.4	55	0.51	0.25	8.1	0.24	0.14	7.4	5.93	0.66	1.08	.032	.019	13
	1.0	13.9	58	0.56	0.30	9.4	0.32	0.17	8.1	5.93	1.42	1.31	.044	.024	14
	1.5	14.3	61	0.60	0.34	10.7	0.38	0.20	8.7	5.93	2.21	1.53	.055	.029	14
	2.0	14.5	65	0.65	0.38	12.0	0.46	0.23	9.4	5.93	3.03	1.74	.067	.034	15
	2.5	14.5	68	0.71	0.43	13.4	0.54	0.26	9.9	5.93	3.87	1.95	.078	.038	15
	3.0	14.5	72	0.76	0.48	14.9	0.61	0.30	10.4	5.93	4.73	2.16	.089	.043	15
700	0.5	15.1	55	0.51	0.25	7.9	0.23	0.14	8.3	6.66	0.74	1.19	.034	.021	15
	1.0	15.6	58	0.56	0.30	9.1	0.29	0.17	9.0	6.66	1.59	1.42	.045	.026	16
	1.5	16.0	61	0.60	0.34	10.3	0.35	0.19	9.8	6.66	2.48	1.64	.056	.030	16
	2.0	16.3	65	0.65	0.38	11.4	0.40	0.21	10.6	6.66	3.40	1.86	.066	.035	16
	2.5	16.3	68	0.71	0.43	12.7	0.47	0.24	11.1	6.66	4.34	2.07	.077	.039	16
	3.0	16.3	72	0.76	0.48	13.9	0.53	0.26	11.7	6.66	5.30	2.27	.087	.043	16
800	0.5	16.7	55	0.51	0.25	7.7	0.22	0.14	9.2	7.36	0.82	1.28	.036	.023	17
	1.0	17.3	58	0.56	0.30	8.7	0.27	0.16	10.0	7.36	1.76	1.51	.047	.028	17
	1.5	17.7	61	0.60	0.34	9.7	0.32	0.18	10.8	7.36	2.74	1.72	.057	.032	18
	2.0	18.0	65	0.65	0.38	10.7	0.37	0.19	11.7	7.36	3.76	1.93	.066	.035	18
	2.5	18.1	68	0.71	0.43	11.8	0.42	0.22	12.3	7.36	4.80	2.13	.076	.039	18
	3.0	18.0	72	0.76	0.48	12.9	0.47	0.24	13.0	7.36	5.86	2.33	.085	.043	18
900	0.5	18.2	55	0.51	0.25	7.5	0.21	0.14	10.0	8.04	0.90	1.37	.039	.026	18
	1.0	18.9	58	0.56	0.30	8.3	0.25	0.15	11.0	8.04	1.92	1.57	.048	.029	19
	1.5	19.4	61	0.60	0.34	9.1	0.29	0.17	11.8	8.04	2.99	1.77	.057	.033	19
	2.0	19.6	65	0.65	0.38	9.9	0.34	0.19	12.7	8.04	4.11	1.95	.066	.037	20
	2.5	19.7	68	0.71	0.43	10.9	0.38	0.20	13.4	8.04	5.24	2.14	.075	.040	20
	3.0	19.6	72	0.76	0.48	11.9	0.42	0.22	14.1	8.04	6.40	2.33	.083	.043	20

Table 11. Nutrient Requirements of Growing Yearlings – Bulls^a, Steers^b and Heifers^b

Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients per Animal						
			TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	NE _g (Mcal)	CP (lb)	Ca (lb)	P (lb)	
1,000 lb @ Finishing															
550	0.64	15.2	50	0.45	0.20	7.1	0.21	0.13	7.6	4.83	0.93	1.08	.032	.020	15
	1.77	16.1	60	0.61	0.35	9.8	0.36	0.19	9.7	4.83	2.85	1.58	.058	.031	16
	2.68	15.7	70	0.76	0.48	12.4	0.49	0.24	11.0	4.83	4.48	1.95	.077	.038	16
	3.34	14.8	80	0.90	0.61	14.9	0.61	0.29	11.8	4.83	5.71	2.21	.090	.043	15
	3.75	13.7	90	1.04	0.72	17.3	0.73	0.34	12.3	4.83	6.48	2.37	.100	.047	14
600	0.64	16.2	50	0.45	0.20	7.0	0.21	0.13	8.1	5.16	0.99	1.13	.034	.021	16
	1.77	17.2	60	0.61	0.35	9.5	0.34	0.18	10.3	5.16	3.04	1.63	.058	.031	17
	2.68	16.8	70	0.76	0.48	11.9	0.45	0.23	11.8	5.16	4.79	2.00	.076	.039	17
	3.34	15.8	80	0.90	0.61	14.3	0.56	0.27	12.6	5.16	6.10	2.26	.088	.043	16
	3.75	14.6	90	1.04	0.72	16.5	0.66	0.32	13.1	5.16	6.92	2.41	.096	.047	15
650	0.64	17.3	50	0.45	0.20	6.9	0.20	0.12	8.7	5.48	1.06	1.19	.035	.021	17
	1.77	18.2	60	0.61	0.35	9.2	0.32	0.17	10.9	5.48	3.22	1.67	.058	.031	18
	2.68	17.8	70	0.76	0.48	11.5	0.42	0.21	12.5	5.48	5.08	2.05	.075	.037	18
	3.34	16.8	80	0.90	0.61	13.7	0.52	0.26	13.4	5.48	6.47	2.30	.087	.044	17
	3.75	15.5	90	1.04	0.72	15.9	0.61	0.30	14.0	5.48	7.35	2.46	.095	.047	16
700	0.64	18.2	50	0.45	0.20	6.8	0.19	0.12	9.1	5.79	1.12	1.24	.035	.022	18
	1.77	19.3	60	0.61	0.35	8.8	0.30	0.16	11.6	5.79	3.41	1.70	.058	.031	19
	2.68	18.8	70	0.76	0.48	10.9	0.39	0.20	13.2	5.79	5.37	2.05	.073	.038	19
	3.34	17.8	80	0.90	0.61	13.0	0.48	0.24	14.2	5.79	6.84	2.31	.085	.043	18
	3.75	16.4	90	1.04	0.72	15.0	0.56	0.28	14.8	5.79	7.77	2.46	.092	.046	16
750	0.64	19.2	50	0.45	0.20	6.7	0.19	0.12	9.6	6.10	1.18	1.29	.036	.023	19
	1.77	20.3	60	0.61	0.35	8.5	0.28	0.16	12.2	6.10	3.59	1.73	.057	.032	20
	2.68	19.8	70	0.76	0.48	10.3	0.37	0.19	13.9	6.10	5.66	2.04	.073	.038	20
	3.34	18.7	80	0.90	0.61	12.2	0.45	0.23	15.0	6.10	7.21	2.28	.084	.043	19
	3.75	17.3	90	1.04	0.72	14.0	0.52	0.26	15.6	6.10	8.18	2.42	.090	.045	17
800	0.64	20.2	50	0.45	0.20	6.5	0.19	0.12	10.1	6.40	1.23	1.31	.038	.024	20
	1.77	21.3	60	0.61	0.35	8.1	0.27	0.15	12.8	6.40	3.77	1.73	.058	.032	21
	2.68	20.8	70	0.76	0.48	9.8	0.34	0.18	14.6	6.40	5.94	2.04	.071	.037	21
	3.34	19.6	80	0.90	0.61	11.5	0.42	0.22	15.7	6.40	7.56	2.25	.082	.043	20
	3.75	18.1	90	1.04	0.72	13.2	0.48	0.25	16.3	6.40	8.59	2.39	.087	.045	18
1,100 lb @ Finishing															
605	0.68	16.3	50	0.45	0.20	7.2	0.22	0.13	8.2	5.19	1.00	1.17	.036	.021	16
	1.88	17.3	60	0.61	0.35	10.0	0.36	0.19	10.4	5.19	3.04	1.73	.062	.033	17
	2.86	16.9	70	0.76	0.48	12.7	0.49	0.24	11.8	5.19	4.82	2.15	.083	.041	17
	3.56	15.9	80	0.90	0.61	15.3	0.61	0.29	12.7	5.19	6.12	2.43	.097	.046	16
	4.00	14.7	90	1.04	0.72	17.8	0.72	0.34	13.2	5.19	6.96	2.62	.106	.050	15
660	0.68	17.5	50	0.45	0.20	7.1	0.21	0.13	8.8	5.54	1.06	1.24	.037	.023	18
	1.88	18.4	60	0.61	0.35	9.7	0.34	0.18	11.0	5.54	3.24	1.78	.063	.033	18
	2.86	18.0	70	0.76	0.48	12.3	0.45	0.23	12.6	5.54	5.14	2.21	.081	.041	18
	3.56	17.0	80	0.90	0.61	14.7	0.56	0.27	13.6	5.54	6.54	2.50	.095	.046	17
	4.00	15.7	90	1.04	0.72	17.1	0.66	0.32	14.1	5.54	7.43	2.68	.104	.050	16
715	0.68	18.5	50	0.45	0.20	6.9	0.20	0.13	9.3	5.89	1.13	1.28	.037	.024	19
	1.88	19.6	60	0.61	0.35	9.2	0.32	0.17	11.8	5.89	3.45	1.80	.063	.033	20
	2.86	19.1	70	0.76	0.48	11.5	0.42	0.21	13.4	5.89	5.46	2.20	.080	.040	19
	3.56	18.1	80	0.90	0.61	13.7	0.52	0.26	14.5	5.89	6.94	2.48	.094	.047	18
	4.00	16.7	90	1.04	0.72	15.9	0.61	0.30	15.0	5.89	7.89	2.66	.102	.050	17
770	0.68	19.6	50	0.45	0.20	6.8	0.20	0.12	9.8	6.22	1.19	1.33	.039	.024	20
	1.88	20.7	60	0.61	0.35	8.8	0.30	0.16	12.4	6.22	3.64	1.82	.062	.033	21
	2.86	20.2	70	0.76	0.48	10.9	0.39	0.20	14.1	6.22	5.77	2.20	.079	.040	20
	3.56	19.1	80	0.90	0.61	12.9	0.48	0.24	15.3	6.22	7.34	2.46	.092	.046	19
	4.00	17.6	90	1.04	0.72	14.8	0.56	0.28	15.8	6.22	8.34	2.60	.099	.049	18
825	0.68	20.6	50	0.45	0.20	6.6	0.19	0.12	10.3	6.55	1.26	1.36	.039	.025	21
	1.88	21.8	60	0.61	0.35	8.4	0.28	0.16	13.1	6.55	3.84	1.83	.061	.035	22
	2.86	21.3	70	0.76	0.48	10.3	0.37	0.19	14.9	6.55	6.08	2.19	.079	.040	21
	3.56	20.1	80	0.90	0.61	12.1	0.44	0.23	16.1	6.55	7.73	2.43	.088	.046	20
	4.00	18.6	90	1.04	0.72	13.9	0.52	0.26	16.7	6.55	8.78	2.59	.097	.048	19
880	0.68	21.7	50	0.45	0.20	6.5	0.19	0.12	10.9	6.88	1.32	1.41	.041	.026	22
	1.88	22.9	60	0.61	0.35	8.1	0.27	0.15	13.7	6.88	4.03	1.85	.062	.034	23
	2.86	22.4	70	0.76	0.48	9.8	0.34	0.18	15.7	6.88	6.38	2.20	.076	.040	22
	3.56	21.1	80	0.90	0.61	11.4	0.42	0.22	16.9	6.88	8.11	2.41	.089	.046	21
	4.00	19.5	90	1.04	0.72	13.1	0.48	0.25	17.6	6.88	9.22	2.55	.094	.049	20

^aUse expected mature weight of bull times 0.60 to choose weight to use for growing yearling bulls.^b1,000 to 1,400 lb @ finishing (28 percent body fat) or maturity (replacement heifers).

Table 11 (Continued). Nutrient Requirements of Growing Yearlings – Bulls^a, Steers^b and Heifers^b

Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients per Animal						
			TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	NE _g (Mcal)	CP (lb)	Ca (lb)	P (lb)	
1,200 lb @ Finishing															
660	0.72	17.5	50	0.45	0.20	7.3	0.22	0.13	8.8	5.54	1.06	1.28	.039	.023	18
	2.00	18.4	60	0.61	0.35	10.2	0.36	0.19	11.0	5.54	3.25	1.88	.066	.035	18
	3.04	18.0	70	0.76	0.48	13.0	0.49	0.24	12.6	5.54	5.15	2.34	.088	.043	18
	3.78	17.0	80	0.90	0.61	15.8	0.61	0.29	13.6	5.54	6.54	2.69	.104	.049	17
	4.25	15.7	90	1.04	0.72	18.4	0.72	0.34	14.1	5.54	7.44	2.89	.113	.053	16
720	0.72	18.6	50	0.45	0.20	7.1	0.21	0.13	9.3	5.92	1.13	1.32	.039	.024	19
	2.00	19.7	60	0.61	0.35	9.7	0.34	0.18	11.8	5.92	3.47	1.91	.067	.035	20
	3.04	19.2	70	0.76	0.48	12.2	0.45	0.23	13.4	5.92	5.50	2.34	.086	.044	19
	3.78	18.2	80	0.90	0.61	14.6	0.56	0.27	14.6	5.92	6.98	2.66	.102	.049	18
	4.25	16.8	90	1.04	0.72	17.0	0.66	0.32	15.1	5.92	7.94	2.86	.111	.054	17
780	0.72	19.8	50	0.45	0.20	6.9	0.20	0.13	9.9	6.28	1.20	1.37	.040	.026	20
	2.00	20.9	60	0.61	0.35	9.2	0.32	0.17	12.5	6.28	3.69	1.92	.067	.036	21
	3.04	20.4	70	0.76	0.48	11.4	0.42	0.21	14.3	6.28	5.84	2.33	.086	.043	20
	3.78	19.3	80	0.90	0.61	13.6	0.52	0.26	15.4	6.28	7.41	2.62	.100	.050	19
	4.25	17.8	90	1.04	0.72	15.8	0.61	0.30	16.0	6.28	8.43	2.81	.109	.053	18
840	0.72	20.9	50	0.45	0.20	6.8	0.20	0.13	10.5	6.64	1.27	1.42	.042	.027	21
	2.00	22.1	60	0.61	0.35	8.8	0.30	0.16	13.3	6.64	3.90	1.94	.071	.035	22
	3.04	21.6	70	0.76	0.48	10.8	0.39	0.20	15.1	6.64	6.17	2.33	.091	.043	22
	3.78	20.4	80	0.90	0.61	12.8	0.48	0.24	16.3	6.64	7.84	2.61	.106	.049	20
	4.25	18.8	90	1.04	0.72	14.7	0.56	0.28	16.9	6.64	8.91	2.76	.115	.053	19
900	0.72	22.0	50	0.45	0.20	6.6	0.19	0.12	11.0	6.99	1.34	1.45	.042	.026	22
	2.00	23.3	60	0.61	0.35	8.4	0.28	0.16	14.0	6.99	4.11	1.96	.065	.037	23
	3.04	22.7	70	0.76	0.48	10.2	0.37	0.19	15.9	6.99	6.50	2.32	.084	.043	23
	3.78	21.5	80	0.90	0.61	12.0	0.44	0.23	17.2	6.99	8.25	2.58	.095	.049	22
	4.25	19.8	90	1.04	0.72	13.8	0.52	0.26	17.8	6.99	9.39	2.73	.103	.051	20
960	0.72	23.1	50	0.45	0.20	6.5	0.19	0.12	11.6	7.34	1.40	1.50	.044	.028	23
	2.00	24.4	60	0.61	0.35	8.1	0.27	0.15	14.6	7.34	4.31	1.98	.066	.037	24
	3.04	23.9	70	0.76	0.48	9.7	0.34	0.19	16.7	7.34	6.82	2.32	.081	.045	24
	3.78	22.5	80	0.90	0.61	11.3	0.41	0.22	18.0	7.34	8.66	2.54	.092	.050	23
	4.25	20.8	90	1.04	0.72	13.0	0.48	0.25	18.7	7.34	9.85	2.70	.100	.052	21
1,300 Lb @ Finishing															
715	0.76	18.5	50	0.45	0.20	7.3	0.22	0.13	9.3	5.89	1.13	1.35	.041	.024	19
	2.11	19.6	60	0.61	0.35	10.2	0.36	0.19	11.8	5.89	3.45	2.00	.071	.037	20
	3.21	19.1	70	0.76	0.48	13.0	0.49	0.24	13.4	5.89	5.47	2.48	.094	.046	19
	3.99	18.1	80	0.90	0.61	15.7	0.61	0.29	14.5	5.89	6.94	2.84	.110	.052	18
	4.48	16.7	90	1.04	0.72	18.3	0.72	0.34	15.0	5.89	7.88	3.06	.120	.057	17
780	0.76	19.8	50	0.45	0.20	7.1	0.21	0.13	9.9	6.28	1.20	1.41	.042	.026	20
	2.11	20.9	60	0.61	0.35	9.6	0.34	0.18	12.5	6.28	3.68	2.01	.071	.038	21
	3.21	20.4	70	0.76	0.48	12.1	0.45	0.23	14.3	6.28	5.84	2.47	.092	.047	20
	3.99	19.3	80	0.90	0.61	14.5	0.56	0.27	15.4	6.28	7.41	2.80	.108	.052	19
	4.48	17.8	90	1.04	0.72	16.9	0.66	0.32	16.0	6.28	8.41	3.01	.117	.057	18
845	0.76	21.0	50	0.45	0.20	6.9	0.21	0.13	10.5	6.67	1.28	1.45	.044	.027	21
	2.11	22.2	60	0.61	0.35	9.1	0.32	0.17	13.3	6.67	3.91	2.02	.071	.038	22
	3.21	21.7	70	0.76	0.48	11.4	0.42	0.22	15.2	6.67	6.20	2.47	.091	.048	22
	3.99	20.5	80	0.90	0.61	13.6	0.51	0.26	16.4	6.67	7.87	2.79	.105	.053	21
	4.48	18.9	90	1.04	0.72	15.7	0.60	0.30	17.0	6.67	8.93	2.97	.113	.057	19
910	0.76	22.2	50	0.45	0.20	6.7	0.20	0.13	11.1	7.05	1.35	1.49	.044	.029	22
	2.11	23.5	60	0.61	0.35	8.7	0.30	0.17	14.1	7.05	4.13	2.04	.071	.040	24
	3.21	22.9	70	0.76	0.48	10.7	0.39	0.20	16.0	7.05	6.55	2.45	.089	.046	23
	3.99	21.6	80	0.90	0.61	12.7	0.48	0.24	17.3	7.05	8.32	2.74	.104	.052	22
	4.48	20.0	90	1.04	0.72	14.6	0.56	0.28	18.0	7.05	9.44	2.92	.112	.056	20
975	0.76	23.4	50	0.45	0.20	6.6	0.20	0.13	11.7	7.43	1.42	1.54	.047	.030	23
	2.11	24.7	60	0.61	0.35	8.3	0.28	0.16	14.8	7.43	4.35	2.05	.069	.040	25
	3.21	24.1	70	0.76	0.48	10.2	0.37	0.19	16.9	7.43	6.90	2.46	.089	.046	24
	3.99	22.8	80	0.90	0.61	11.9	0.44	0.23	18.2	7.43	8.76	2.71	.100	.052	23
	4.48	21.0	90	1.04	0.72	13.7	0.52	0.26	18.9	7.43	9.94	2.88	.109	.055	21
1040	0.76	24.5	50	0.45	0.20	6.5	0.19	0.13	12.3	7.80	1.49	1.59	.047	.032	25
	2.11	25.9	60	0.61	0.35	8.0	0.27	0.15	15.5	7.80	4.57	2.07	.070	.039	26
	3.21	25.3	70	0.76	0.48	9.6	0.34	0.19	17.7	7.80	7.24	2.43	.086	.048	25
	3.99	23.9	80	0.90	0.61	11.3	0.41	0.22	19.1	7.80	9.19	2.70	.098	.053	24
	4.48	22.1	90	1.04	0.72	12.9	0.48	0.25	19.9	7.80	10.44	2.85	.106	.055	22

^aUse expected mature weight of bull times 0.60 to choose weight to use for growing bull calves.^b1,000 to 1,400 lb @ finishing (28 percent body fat) or maturity (replacement heifers).

Table 11 (Continued). Nutrient Requirements of Growing Yearlings – Bulls^a, Steers^b and Heifers^b

Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients per Animal					
			TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	NE _g (Mcal)	CP (lb)	Ca (lb)	P (lb)
1,400 lb @ Finishing														
770	0.80	19.6	50	0.45	0.20	7.3	0.22	0.13	9.8	6.22	1.19	1.43	.043	.025
	2.22	20.7	60	0.61	0.35	10.1	0.36	0.19	12.4	6.22	3.65	2.09	.075	.039
	3.38	20.2	70	0.76	0.48	12.9	0.49	0.24	14.1	6.22	5.79	2.61	.099	.048
	4.20	19.1	80	0.90	0.61	15.6	0.61	0.29	15.3	6.22	7.34	2.98	.117	.055
840	4.72	17.6	90	1.04	0.72	18.1	0.72	0.34	15.8	6.22	8.34	3.19	.127	.060
	0.80	20.9	50	0.45	0.20	7.1	0.21	0.13	10.5	6.64	1.27	1.48	.044	.027
	2.22	22.1	60	0.61	0.35	9.6	0.34	0.18	13.3	6.64	3.89	2.12	.075	.040
	3.38	21.6	70	0.76	0.48	12.1	0.45	0.23	15.1	6.64	6.18	2.61	.097	.050
910	4.20	20.4	80	0.90	0.61	14.5	0.56	0.27	16.3	6.64	7.84	2.96	.114	.055
	4.72	18.8	90	1.04	0.72	16.8	0.65	0.32	16.9	6.64	8.91	3.16	.122	.060
	0.80	22.2	50	0.45	0.20	6.9	0.21	0.13	11.1	7.05	1.35	1.53	.047	.029
	2.22	23.5	60	0.61	0.35	9.1	0.32	0.17	14.1	7.05	4.13	2.14	.075	.040
980	3.38	22.9	70	0.76	0.48	11.3	0.42	0.22	16.0	7.05	6.56	2.59	.096	.050
	4.20	21.6	80	0.90	0.61	13.5	0.51	0.26	17.3	7.05	8.32	2.92	.110	.056
	4.72	20.0	90	1.04	0.72	15.6	0.60	0.30	18.0	7.05	9.46	3.12	.120	.060
	0.80	23.5	50	0.45	0.20	6.7	0.20	0.13	11.8	7.46	1.43	1.57	.047	.031
1050	2.22	24.8	60	0.61	0.35	8.7	0.30	0.17	14.9	7.46	4.37	2.16	.074	.042
	3.38	24.2	70	0.76	0.48	10.7	0.39	0.20	16.9	7.46	6.93	2.59	.094	.048
	4.20	22.9	80	0.90	0.61	12.6	0.47	0.24	18.3	7.46	8.80	2.89	.108	.055
	4.72	21.1	90	1.04	0.72	14.5	0.56	0.28	19.0	7.46	10.00	3.06	.118	.059
1120	0.80	24.7	50	0.45	0.20	6.6	0.20	0.13	12.4	7.85	1.50	1.63	.049	.032
	2.22	26.1	60	0.61	0.35	8.3	0.28	0.16	15.7	7.85	4.60	2.17	.073	.042
	3.38	25.5	70	0.76	0.48	10.1	0.37	0.20	17.9	7.85	7.30	2.58	.094	.051
	4.20	24.1	80	0.90	0.61	11.9	0.44	0.23	19.3	7.85	9.26	2.87	.106	.055
1120	4.72	22.2	90	1.04	0.72	13.6	0.51	0.26	20.0	7.85	10.53	3.02	.113	.058
	0.80	25.9	50	0.45	0.20	6.5	0.19	0.13	13.0	8.24	1.58	1.68	.049	.034
	2.22	27.4	60	0.61	0.35	8.0	0.27	0.16	16.4	8.24	4.83	2.19	.074	.044
	3.38	26.8	70	0.76	0.48	9.6	0.34	0.19	18.8	8.24	7.66	2.57	.091	.051
1,400	4.20	25.3	80	0.90	0.61	11.2	0.41	0.22	20.2	8.24	9.72	2.83	.104	.056
	4.72	23.3	90	1.04	0.72	12.8	0.48	0.25	21.0	8.24	11.05	2.98	.112	.058

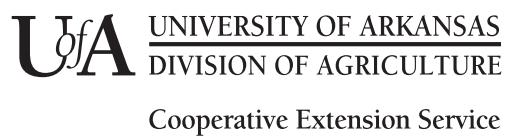
^aUse expected mature weight of bull times 0.60 to choose weight to use for growing yearling bulls.^b1,000 to 1,400 lb @ finishing (28 percent body fat) or maturity (replacement heifers).**Table 12. Nutrient Requirements of Yearling and Breeding Bulls^a, b**

Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients Per Animal					
			TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	NE _g (Mcal)	CP (lb)	Ca (lb)	P (lb)
1,700 lb Mature Weight														
900	0.44	22.0	50	0.45	0.20	6.0	0.16	0.11	11.0	8.04	0.88	1.32	.036	.025
	1.55	23.3	60	0.61	0.35	7.3	0.23	0.14	14.0	8.04	3.51	1.71	.054	.032
	2.46	22.7	70	0.76	0.48	8.8	0.30	0.16	15.9	8.04	5.82	1.99	.068	.037
	3.12	21.5	80	0.90	0.61	10.2	0.36	0.19	17.2	8.04	7.55	2.19	.077	.041
1,000	0.44	23.8	50	0.45	0.20	5.9	0.16	0.11	11.9	8.71	0.95	1.40	.039	.027
	1.55	25.2	60	0.61	0.35	6.9	0.22	0.13	15.1	8.71	3.79	1.74	.055	.033
	2.46	24.6	70	0.76	0.48	8.1	0.27	0.15	17.2	8.71	6.30	1.99	.067	.038
	3.12	23.2	80	0.90	0.61	9.3	0.32	0.18	18.6	8.71	8.17	2.16	.074	.041
1,100	0.44	25.6	50	0.45	0.20	5.8	0.16	0.11	12.8	9.35	1.02	1.48	.041	.029
	1.55	27.0	60	0.61	0.35	6.6	0.20	0.13	16.2	9.35	4.08	1.78	.055	.034
	2.46	26.4	70	0.76	0.48	7.5	0.25	0.14	18.5	9.35	6.76	1.99	.065	.038
	3.12	24.9	80	0.90	0.61	8.6	0.29	0.16	19.9	9.35	8.78	2.13	.072	.041
1,200	0.44	27.3	50	0.45	0.20	5.7	0.16	0.11	13.7	9.98	1.09	1.55	.044	.031
	1.55	28.9	60	0.61	0.35	6.3	0.19	0.12	17.3	9.98	4.35	1.81	.056	.036
	2.46	28.2	70	0.76	0.48	7.1	0.23	0.14	19.7	9.98	7.22	1.99	.064	.039
	3.12	26.6	80	0.90	0.61	7.9	0.26	0.15	21.3	9.98	9.37	2.10	.069	.041
1,300	0.44	29.0	50	0.45	0.20	5.6	0.16	0.11	14.5	10.60	1.16	1.63	.046	.033
	1.55	30.7	60	0.61	0.35	6.0	0.19	0.12	18.4	10.60	4.62	1.85	.057	.037
1,400	0.44	30.7	50	0.45	0.20	5.5	0.16	0.11	15.4	11.20	1.23	1.70	.049	.035
	1.55	32.4	60	0.61	0.35	5.8	0.18	0.12	19.4	11.20	4.88	1.88	.057	.039
1,500	0.44	32.3	50	0.45	0.20	5.5	0.16	0.11	16.2	11.80	1.29	1.77	.051	.037
	1.55	34.1	60	0.61	0.35	5.6	0.17	0.12	20.5	11.80	5.14	1.92	.058	.040
1,600	0.44	33.9	50	0.45	0.20	5.4	0.16	0.12	17.0	12.38	1.36	1.84	.054	.039
	1.55	35.8	60	0.61	0.35	5.4	0.16	0.11	21.5	12.38	5.40	1.95	.059	.041
1,700	0.00	32.9	46	0.39	0.00	5.6	0.16	0.12	15.1	12.96	0.00	1.83	.052	.040
	0.44	35.5	50	0.45	0.20	5.4	0.16	0.12	17.8	12.96	1.42	1.91	.056	.041

Table 12 (Continued). Nutrient Requirements of Yearling and Breeding Bulls^{a, b}

Body Wt. (lb)	ADG (lb)	DMI (lb/day)	Diet Nutrient Density						Daily Nutrients Per Animal					
			TDN (%DM)	NE _m (Mcal/lb)	NE _g (Mcal/lb)	CP (%DM)	Ca (%DM)	P (%DM)	TDN (lb)	NE _m (Mcal)	NE _g (Mcal)	CP (lb)	Ca (lb)	P (lb)
2,000 lb Mature Weight														
1,000	0.49	23.8	50	0.45	0.20	6.1	0.17	0.12	11.9	8.71	0.95	1.44	.041	.028
	1.73	25.2	60	0.61	0.35	7.5	0.25	0.14	15.1	8.71	3.79	1.89	.062	.036
	2.75	24.6	70	0.76	0.48	9.1	0.32	0.17	17.2	8.71	6.30	2.23	.078	.043
	3.49	23.2	80	0.90	0.61	10.5	0.38	0.20	18.6	8.71	8.18	2.46	.088	.047
1,100	0.49	25.6	50	0.45	0.20	5.9	0.17	0.12	12.8	9.35	1.02	1.52	.043	.030
	1.73	27.0	60	0.61	0.35	7.1	0.23	0.14	16.2	9.35	4.07	1.92	.062	.037
	2.75	26.4	70	0.76	0.48	8.4	0.29	0.16	18.5	9.35	6.77	2.22	.076	.043
	3.49	24.9	80	0.90	0.61	9.8	0.35	0.19	19.9	9.35	8.79	2.43	.086	.047
1,200	0.49	27.3	50	0.45	0.20	5.8	0.17	0.12	13.7	9.98	1.09	1.59	.046	.032
	1.73	28.9	60	0.61	0.35	6.8	0.22	0.13	17.3	9.98	4.34	1.96	.063	.039
	2.75	28.2	70	0.76	0.48	7.9	0.27	0.16	19.7	9.98	7.22	2.22	.075	.044
	3.49	26.6	80	0.90	0.61	9.0	0.32	0.18	21.3	9.98	9.38	2.40	.084	.047
1,300	0.49	29.0	50	0.45	0.20	5.8	0.17	0.12	14.5	10.60	1.16	1.67	.048	.034
	1.73	30.7	60	0.61	0.35	6.5	0.21	0.13	18.4	10.60	4.61	2.00	.063	.040
	2.75	30.0	70	0.76	0.48	7.4	0.25	0.15	21.0	10.60	7.67	2.22	.074	.044
	3.49	28.3	80	0.90	0.61	8.4	0.29	0.17	22.6	10.60	9.96	2.38	.081	.047
1,400	0.49	30.7	50	0.45	0.20	5.7	0.16	0.12	15.4	11.20	1.22	1.74	.051	.036
	1.73	32.4	60	0.61	0.35	6.3	0.20	0.13	19.4	11.20	4.88	2.03	.064	.041
1,500	0.49	32.3	50	0.45	0.20	5.6	0.16	0.12	16.2	11.80	1.29	1.81	.053	.038
	1.73	34.1	60	0.61	0.35	6.0	0.19	0.13	20.5	11.80	5.14	2.06	.065	.043
1,600	0.49	33.9	50	0.45	0.20	5.5	0.17	0.12	17.0	12.38	1.35	1.88	.056	.040
	1.73	35.8	60	0.61	0.35	5.8	0.18	0.12	21.5	12.38	5.39	2.09	.066	.044
1,700	0.49	35.5	50	0.45	0.20	5.5	0.16	0.12	17.8	12.96	1.41	1.95	.058	.042
	1.73	37.5	60	0.61	0.35	5.7	0.18	0.12	22.5	12.96	5.64	2.13	.066	.046
1,800	0.49	37.0	50	0.45	0.20	5.5	0.16	0.12	18.5	13.53	1.48	2.02	.061	.044
	1.73	39.1	60	0.61	0.35	5.5	0.17	0.12	23.5	13.53	5.89	2.16	.067	.047
1,900	0.49	38.6	50	0.45	0.20	5.4	0.16	0.12	19.3	14.09	1.54	2.09	.063	.047
	1.73	40.8	60	0.61	0.35	5.4	0.17	0.12	24.5	14.09	6.13	2.19	.068	.049
2,000	0.00	37.2	46	0.39	0.00	5.6	0.17	0.13	17.1	14.64	0.00	2.07	.062	.047
	0.49	40.1	50	0.45	0.20	5.2	0.16	0.12	20.1	14.64	1.60	2.15	.065	.049
2,300 lb Mature Weight														
1,200	0.54	27.3	50	0.45	0.20	6.0	0.18	0.12	13.7	9.98	1.09	1.63	.048	.032
	1.91	28.9	60	0.61	0.35	7.3	0.24	0.14	17.3	9.98	4.36	2.10	.070	.041
	3.03	28.2	70	0.76	0.48	8.7	0.30	0.17	19.7	9.98	7.23	2.45	.086	.048
	3.84	26.6	80	0.90	0.61	10.1	0.36	0.20	21.3	9.98	9.38	2.68	.097	.052
1,300	0.54	29.0	50	0.45	0.20	5.9	0.17	0.12	14.5	10.60	1.16	1.71	.050	.035
	1.91	30.7	60	0.61	0.35	7.0	0.23	0.14	18.4	10.60	4.63	2.14	.070	.043
	3.03	30.0	70	0.76	0.48	8.2	0.28	0.16	21.0	10.60	7.68	2.45	.085	.049
	3.84	28.3	80	0.90	0.61	9.4	0.34	0.19	22.6	10.60	9.96	2.66	.095	.053
1,400	0.54	30.7	50	0.45	0.20	5.8	0.17	0.12	15.4	11.20	1.22	1.78	.052	.037
	1.91	32.4	60	0.61	0.35	6.7	0.22	0.14	19.4	11.20	4.90	2.17	.071	.044
	3.03	31.7	70	0.76	0.48	7.7	0.26	0.15	22.2	11.20	8.12	2.45	.084	.049
	3.84	29.9	80	0.90	0.61	8.8	0.31	0.18	23.9	11.20	10.53	2.64	.092	.053
1,500	0.54	32.3	50	0.45	0.20	5.7	0.17	0.12	16.2	11.80	1.29	1.85	.055	.039
	1.91	34.1	60	0.61	0.35	6.5	0.21	0.13	20.5	11.80	5.16	2.20	.072	.045
1,600	0.54	33.9	50	0.45	0.20	5.7	0.17	0.12	17.0	12.38	1.35	1.92	.058	.041
	1.91	35.8	60	0.61	0.35	6.3	0.20	0.13	21.5	12.38	5.41	2.24	.072	.047
1,700	0.54	35.5	50	0.45	0.20	5.6	0.17	0.12	17.8	12.96	1.42	1.99	.060	.043
	1.91	37.5	60	0.61	0.35	6.1	0.19	0.13	22.5	12.96	5.66	2.27	.073	.048
1,800	0.54	37.0	50	0.45	0.20	5.6	0.17	0.12	18.5	13.53	1.48	2.06	.063	.045
	1.91	39.1	60	0.61	0.35	5.9	0.19	0.13	23.5	13.53	5.91	2.30	.074	.050
1,900	0.54	38.6	50	0.45	0.20	5.5	0.17	0.12	19.3	14.09	1.54	2.13	.065	.047
	1.91	40.8	60	0.61	0.35	5.7	0.18	0.13	24.5	14.09	6.16	2.33	.075	.051
2,000	0.54	40.1	50	0.45	0.20	5.5	0.17	0.12	20.1	14.64	1.60	2.19	.067	.050
	1.91	42.3	60	0.61	0.35	5.6	0.18	0.13	25.4	14.64	6.40	2.36	.075	.053
2,100	0.54	41.6	50	0.45	0.20	5.4	0.17	0.13	20.8	15.19	1.66	2.26	.070	.052
	1.91	43.9	60	0.61	0.35	5.5	0.17	0.12	26.3	15.19	6.64	2.40	.076	.054
2,200	0.54	43.1	50	0.45	0.20	5.4	0.17	0.13	21.6	15.73	1.72	2.32	.072	.054
	1.91	45.5	60	0.61	0.35	5.3	0.17	0.12	27.3	15.73	6.87	2.42	.077	.056
2,300	0.00	44.5	46	0.39	0.00	5.2	0.16	0.12	20.5	16.26	0.00	2.30	.071	.054
	0.54	47.0	50	0.45	0.20	5.1	0.16	0.12	23.5	16.26	1.78	2.39	.075	.056

^aFor bulls that are at least 12 months of age and weigh more than 50 percent of their mature weight.^bVitamin A requirements per pound of dry feed are 1,000 IU's for growing bulls and 1770 IU's for breeding bulls.



Printed by University of Arkansas Cooperative Extension Service Printing Services.

University of Arkansas, United States Department of Agriculture, and County Governments Cooperating

The Arkansas Cooperative Extension Service offers its programs to all eligible persons regardless of race, color, national origin, religion, gender, age, disability, marital or veteran status, or any other legally protected status, and is an Equal Opportunity Employer.