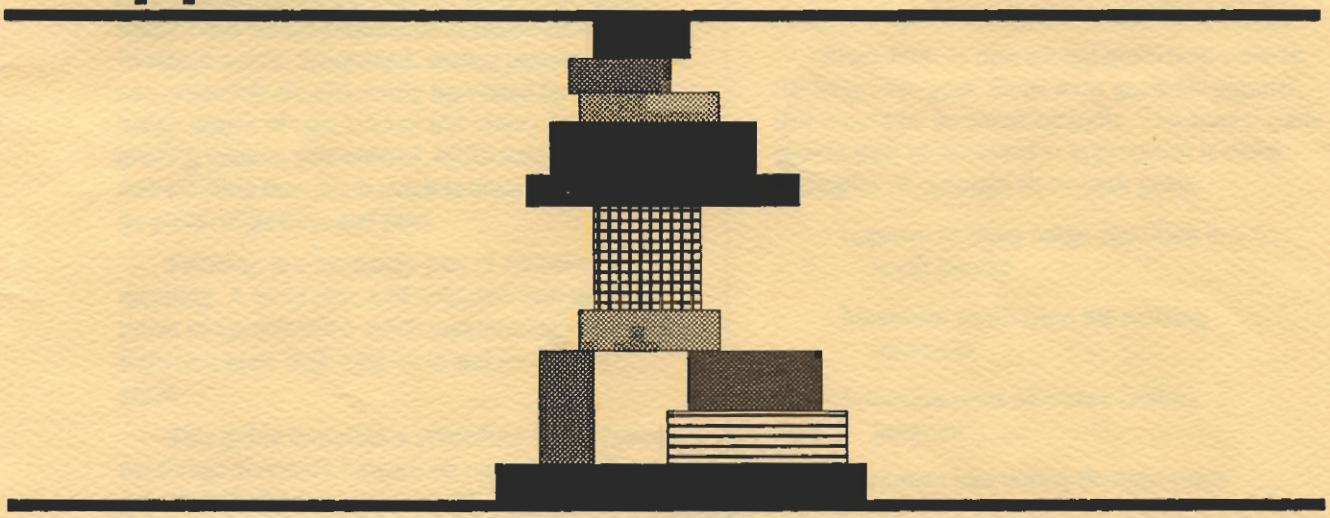
A Guide for Planning, Analyzing and Balancing

Forage Supplies with Livestock Demand



MONTANA STATE UNIVERSITY
1893•CENTENNIAL•1993
Extension Service

EB101
Issued
September 1991

A Guide for Planning, Analyzing, and Balancing Forage Supplies with Livestock Demand

By John Lacey, Ellis Williams, Jim Rolleri and Clayton Marlow*

Range management is the practice of manipulating the biological and physical components of the range to obtain a variety of products. These products include forage for livestock and wildlife, habitat for wildlife, watersheds, and recreational and aesthetic benefits. Successful range management requires proper range planning.

Successful stockmen and wildlife managers have definite goals and objectives for their operations. Their forage production is balanced with livestock needs. Rangeland, seeded pastures, hay and aftermath are efficiently harvested by manipulating season of use, kind and/or class of livestock, grazing system, pest control, fertilization practices, and stocking rate. Each ranch is unique in terms of its goals, objectives and plan.

Planning is a necessary part of successful ranching. A good plan will help maintain or improve range condition while maximizing profits. Ranchers need both long-term and short-term goals.

This guide describes a procedure for analyzing the forage-livestock balance on ranches. The approach includes five major steps:

1. Setting goals
2. Inventory of rangeland resource
3. Inventory of livestock and wildlife
4. Balancing forage resource with livestock demand
5. Planning

Setting Goals

Long-term goals provide a ranch with direction. When establishing these goals, the relative merits of various enterprises — cow-calf, yearling, sheep, and game ranching — should be considered.

Short-term or operational goals help achieve the long-term goal. Short-term goals are specific, and should be prepared annually. The annual goals should then be allocated to appropriate months. Examples of common short-term goals:

- Improve existing range condition in the north pasture
- Maximize profit from the existing operation
- Minimize costs of winter feeding program
- Minimize loss during drought years
- Increase weaning weights of steer calves by 25 pounds

The goals defined should reflect the rancher's experience, personal aspirations, and biological and market realities. The means for achieving the goals

---

* *Montana State University Extension Range Mangement Specialist; County Extension Officers in Carter-Fallon and Sweetgrass counties, respectively, and Associate Dean, College of Agriculture, Montana State University.* *The authors acknowledge that the methodologies and approaches described in this publication were developed by J. Workman, Range Economist at Utah State University and by S. S. Waller, L. E. Moser, and B. Anderson at the University of Nebraska.*

cannot be decided until you have collected and analyzed historical and current livestock use records, economic information, climatic data, and ecological data on soils and vegetation.

Inventory of Rangeland Resource

Proper range management planning requires a thorough understanding of all range, pasture, and other forage resources. You need inventory information to set initial stocking rates, develop grazing management programs, evaluate the need for range improvements, and implement grazing systems. Although soil maps, aerial photographs and knowledge of plants and animals are useful, a satisfactory inventory can be completed by using the simplified procedure described below.

Native Range Sites

Range is land that produces grass, forbs, and shrubs that can be harvested by grazing animals. Depending on depth of soil and its parent material, slope and other surface features, depth of water table, soil texture and salinity, each rangeland has the potential to produce a distinct plant community. The plant community that develops and matures under natural conditions is called the "climax" vegetation.

Different kinds of rangeland are called range sites. Sites are often grouped according to availability of soil moisture (Fig. 1). "Normal" range sites allow vegetation to make a normal response to climate and are not affected by soil or moisture-limiting factors. "Normal" sites include the sandy, silty and clayey range sites.

Coulees and bottomlands often are designated as "run-in" sites because they have superior soil moisture and produce more vegetation than "normal" sites. Overflow and subirrigated sites are included in the "run-in" group.

"Run-off" sites have topographic features or characteristics that limit soil moisture availability and produce less vegetation than "normal" sites. Shallow, very shallow, thin hilly, dense clay and badland sites are included in the "run-off" group.

The first phase of an inventory requires mapping the sites onto an aerial photograph (Figure 2). The number of acres of each major group (normal, run-in, and run-off) should also be estimated.

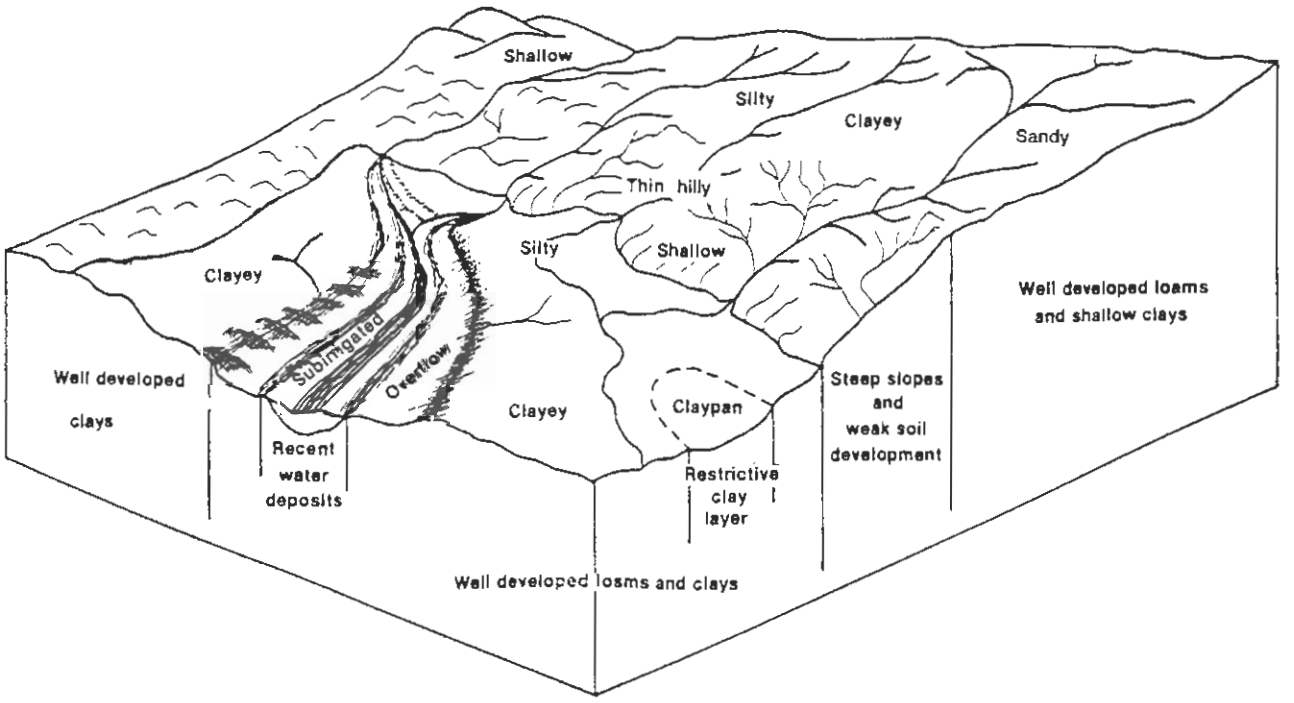


Figure 1. Range sites as they typically occur on the landscape. The subirrigated and overflow area are "run-in" sites. The clayey, silty and sandy areas are "normal" sites. The shallow, thin hilly and claypan areas are "run-off" sites.

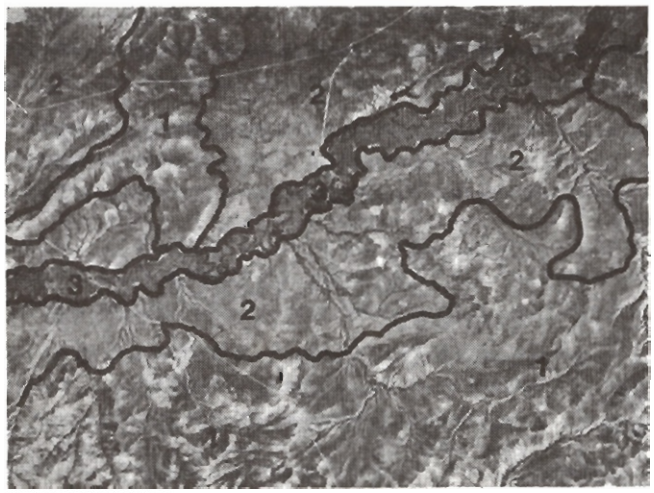


Figure 2. Each range site produces a different kind and/or amount of vegetation and requires a unique management strategy. The "thin hilly (1)," "silty (2)" and "overflow (3)" range sites would be mapped in the "run-off," "normal," and "run-in" groups of range sites, respectively. *Aerial photograph supplied by Dr. J. E. Taylor.*

Range Condition

Plant Response to Cattle Grazing

Range condition or range health is the present state of the vegetation compared to the kind and amount of native vegetation the range site is capable of producing. To assist in determining the range condition class for a range site, we classify plant species as "decreasers," "increasers" or "invaders," based primarily on the response to grazing pressure.

Decreasers are high producing, palatable plants that grow in the original climax community. These plants decrease in relative abundance under continued heavy use.

Increasers are lower producing, less palatable plants that also grow in the original climax community. They tend to increase and take the place of decreasers that weaken or die due to heavy grazing, drought or other range disturbances. If overgrazing is continued over a period of years, the increasers will also lose vigor and decline in abundance.

Invaders are introduced plants or short-lived (annual or biennial) native plants. An introduced plant was brought to the North American continent by man. Invaders become established and take over a site as decreasers and increasers are reduced by grazing or other disturbances.

The relationship between decreasers, increasers, and invaders is shown in Figure 3. Range condition is divided into four classes:

1) *excellent range condition* with original vegetation contributing more than 75 percent of the total yield;

2) *good range condition* with original vegetation comprising between 50 and 75 percent of the total yield;

3) *fair range condition* with original vegetation contributing between 25 and 50 percent of the total yield; and

4) *poor range condition* where original vegetation represents less than 25 percent of the total yield.

The total decreasers, increasers and invaders always is 100 percent, and is based upon air-dry weight of the current growth.

Determining Range Condition

The first step in estimating range condition is to select locations within the range sites and estimate species composition by weight. Composition by weight means the proportions of the different species present on a weight basis, not number of plants, vigor, or erosion. The estimator must consider what the plants would look like had they not been grazed but had reached their total growth potential for that grazing season.

In some situations, a simplified system for evaluating range condition is useful. For example,

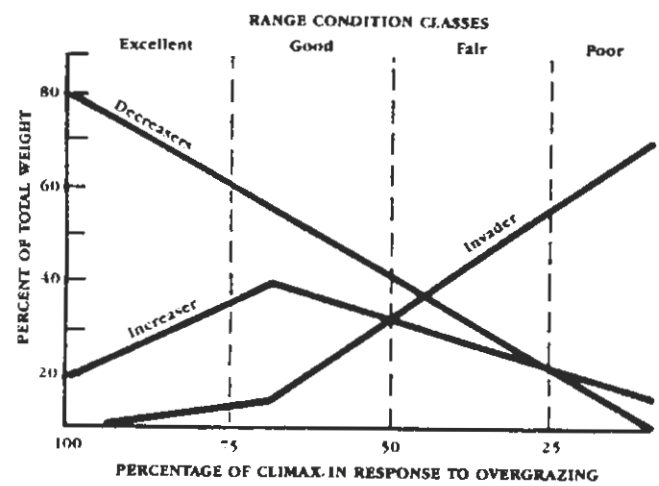


Figure 3. Relationship between decreasers, increasers and invaders.

Table 1. Suggested initial stocking rates for native range in good condition.

Group of Sites	Precipitation			
	10-14 inches		15-19 inches	
	AUM/Ac	Ac/AUM	AUM/Ac	Ac/AUM
Run-in	.82	1.2	.90	1.1
Normal	.3	3.3	.45	2.2
Run-off	.17	5.9	.29	3.4

For a range in fair condition, where most of vegetation consists of less-desirable plants, initial suggested stocking rates would be about one-third less.

a normal site is in "good" condition if the desirable native grasses (western wheatgrass, bluebunch wheatgrass, green needlegrass, needleandthread, thickspike wheatgrass, and prairie sandreed grass) contribute more than 50 percent of the total yield, and there is no sign of accelerated erosion. The site would be in fair-poor condition if blue grama, woody plants, clubmoss and total forbs contributed more than 50 percent of the total yield and there were signs of soil erosion.

Initial suggested stocking rates for the three groups of range sites when they are in "good" condition are summarized in Table 1. These values assume season-long, continuous grazing. About 50 percent of the vegetation is left to retain plant vigor, 25 percent is harvested by livestock, and 25 percent of the total yield is lost to wastage, trampling, and other herbivores (Figure 4)

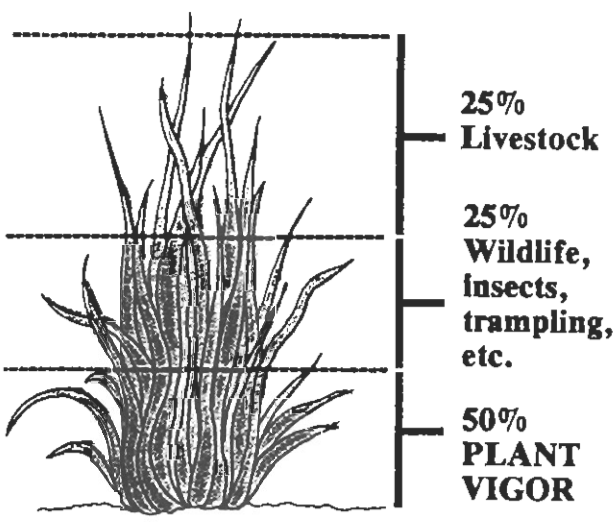


Figure 4. Plant utilization by weight assuming continuous, season-long grazing (i.e. take half and leave half).

Use your experience and knowledge of the vegetation, soils, and climate to analyze forage resources. If the initial suggested stocking rates appear unrealistic, check them by measuring the amount of forage available. Annual forage yield is usually measured on ungrazed plants in July, when above-ground forage growth reaches its peak. To estimate production, mark off circular plots with a 21-inch wire tied to a spike (Figure 5). Clip all of the current year's forage growth within the circle at ground level. Clip several plots in each pasture to get a reliable estimate. Place the herbage in a cloth or paper bag and let it dry for one or two weeks. Weigh the samples in grams (453.6 grams per pound) and multiply the air-dried weight by 0.88 to obtain an approximate dry matter weight. Multiply the dry matter weight in grams by 10 to get pounds per acre. For example, if 95 grams of forage (dry matter weight) were clipped from a circle, there are 950 pounds of forage per acre (95 x 10 = 950).

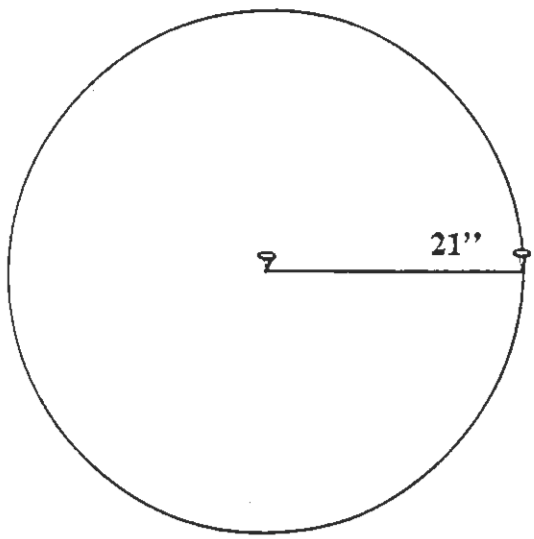


Figure 5. How yield of forage can be determined.

Sometimes it is useful to think of the range as a hay field and imagine harvesting it for hay. In this situation, about 1/2 ton per acre would be harvested. Knowing that an AUM (animal unit month) equals 670 pounds of forage, and

Forage Supplies with Livestock Demand

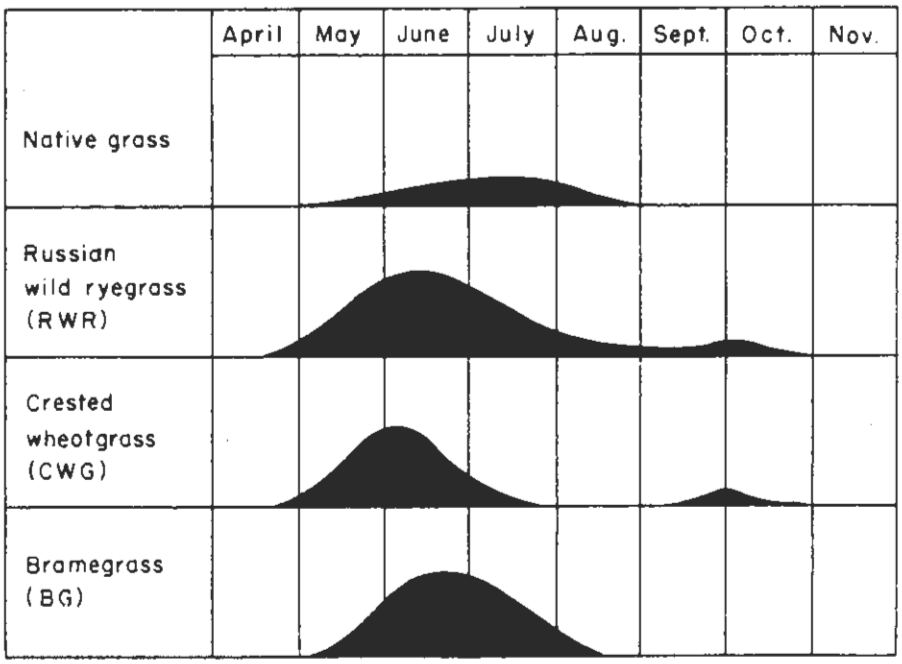


Fig. 6. Relative yield and period of growth of native grass and seeded pastures.

Table 2. Carrying capacity estimate of several seeded pastures and of crop aftermath.

Pasture	Precipitation zone (Inches)	AUM per acre	Acre per AUM
Crested wheatgrass	10-14	0.67	1.5
	14-18	1.00	1.0
Russian wildrye	10-14	0.50	2.0
	14-18	1.00	1.0
Pubescent wheatgrass	10-14	0.75	1.3
	14-18	1.25	0.8
Intermediate wheatgrass	14-18	1.25	0.8
	18-22	1.80	0.6
Bromegrass	14-18	1.25	0.8
	18-22	2.00	0.6
Timothy	14-18	1.50	0.7
	18-22	2.00	0.5
Orchardgrass	18-22	2.00	0.5
Grain aftermath	10-14	0.20	5.0*
	15-19	0.30	3.3*
Hay aftermath	10-14	0.40	2.5
	15-19	0.50	2.0

**Do not graze if it results in insufficient stubble to protect the soil from wind erosion.*

assuming that livestock harvest about 25 percent of the total vegetation, the clipped plot data can be used to validate initial suggested stocking rates.

Seeded Pasture

Pastures contain improved grass or legume varieties that are usually intensively managed. Depending on fertilization, weed control, periodic renovation, and the grazing system, they can usually be stocked at a higher rate than can native range. There are usually fewer management concerns about selectivity and succession on seeded pastures than on native range.

Crested wheatgrass and Russian wild ryegrass are excellent pasture grasses for early spring. (Russian wildrye is also good for fall grazing.) They initiate growth earlier in the spring and maximum growth is reached four to five weeks earlier than native range (Figure 6).

Table 2 summarizes initial suggested stocking rates for several seeded grasses and aftermath. A high level of management is assumed.

Hay and AUMs from Other Sources

Hay is converted to an AUM basis assuming approximately 2.5 and 3.0 AUM per ton of grass and alfalfa, respectively. Table 3 lists total digestible nutrients (TDN) and protein content of several common feeds.

Table 3. Average total digestible nutrients (TDN), metabolizable energy (ME) and protein contents of six feeds.

Feed	TDN (%)	ME (Mcal)	Protein (%)
Alfalfa hay	56	0.95	18
Bromegrass hay	56	0.92	14
Barley grain	84	1.38	13
Oats grain	77	1.26	13
Wheat grain (hard)	88	1.45	14

Inventory of Livestock and Wildlife

A common unit of measurement has been devised to estimate both the amount of forage demanded by livestock (stocking rate) and the amount of forage available (grazing capacity) in a pasture. This measurement defines a "standard animal" to adjust for differences in forage demand between kinds and classes of livestock, size of animal, and age of offspring.

The **animal unit** (AU) defines forage intake on the basis of a standard animal. The most practical "standard animal" is the cow-calf pair. We define the **animal unit** as a 1000-pound cow of average milking ability with a calf less than four months old. The **animal unit month** (AUM) is the amount of forage needed by an "animal unit" (AU) grazing for one month. Since daily forage requirements (on dry weight basis) of cattle average about 2.2 percent of their weight, a 1000-pound lactating cow will consume 22 pounds of forage (dry weight) per day.

Traditional British breeds of cattle were common a generation ago. Cows weighed about 900 pounds and weaned a 350 pound calf. Crossbreeding programs have increased cow size to an average of 1100 to 1300 pounds. Larger cows require more energy for maintenance and for greater milk production. In addition, modern calves are bigger and require more forage. Therefore, the old approach of regarding all cows, with or without calf as an AU is no longer recommended.

Animal size should be considered when matching livestock needs with available forage. The most widely recommended procedure uses the metabolic requirement ratio $(W)^{0.75}/(1000\ Pounds)^{0.75}$, where W is the weight (in pounds) of the animal, and a 1000-pound cow is defined as the basic AU. A rule of thumb is to adjust for changes in size on an animal unit equivalent by adding 0.1 AU for every 100 pound increase in live weight above the standard AU (Table 4). Figure 7 shows how the number of cows grazing a pasture should be adjusted to size.

Consumption, combined with a factor for trampling and waste of 25 percent results in an estimate of 839 pounds of forage to supply one AUM. The estimate of wastage varies with range and pasture condition and with level of grazing management. Efficiency of forage harvest increases and wastage decreases with higher levels of grazing management.

Animals consuming more or less forage than the standard animal due to differences in size, type, production level, etc. are assigned AU values based on their intake relative to the standard animal. For example, daily forage requirement of sheep (on a dry weight basis) average three percent

Table 4. Calculating AUM requirements of a beef cow with calf under Four months of age

Weight of Cow	Daily Forage Dry Matter Intake (lbs)	Waste (25%)	Total Daily Requirement	Total Monthly Requirement
1000	22.0	5.5	27.5	839
1100	24.2	6.1	30.3	924
1200	26.4	6.6	33.0	1007
1300	28.6	7.1	35.7	1089
1400	30.8	7.6	38.4	1171

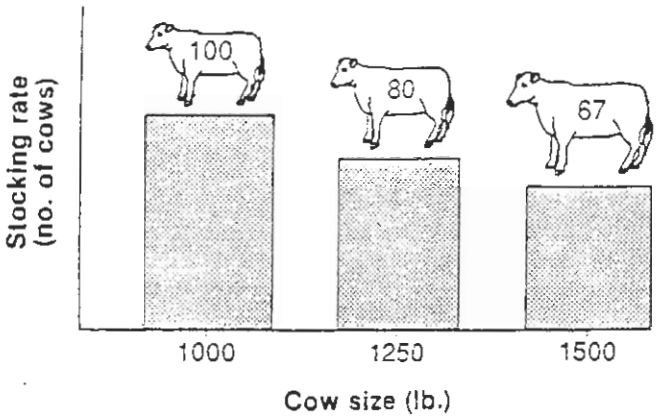


Figure 7. The number of animal units (1000-pound cow with calf less than four months of age) that can graze a field with a carrying capacity of 100 AUMs for one month declines as cow size increases. (Taken from Range Notes, No. 8, Prepared by Alberta Public Lands Range Management Program, Dec. 1989).

of their body weight. Thus, five ewes (average weight 150 pounds) are one animal unit (Table 5). Larger ewes require more forage. Lambs also require forage from two months of age (average weight 15 pounds) through weaning (average weight 80 pounds). By considering each lamb at the age of two months to consume about one-third as much as a ewe, each lamb averages 0.3 x 0.2 AU, or 0.06 AU. Thus, 100 ewes with 100 lambs that are more than two months of age would represent: (100 ewes x 0.2 AU) + (100 lambs x 0.06 AU) = 26 AU. In contrast, if the ewes had a 170% lamb crop, the same flock would represent: (100 ewes x 0.2 AU) + (170 lambs x 0.06 AU) = 30 AU.

AUM values for other kinds and classes of livestock are listed in Table 6. For example, yearling cattle (12-17 months) vary in weight from 600 to 900 pounds during the grazing season. As a rule of thumb, they are assigned 0.75 AU; thus, they consume 503 pound or [(30.5 days per month) x (22 pounds x 0.75)] of forage per month. The .75 rating should be adjusted accordingly for "light" and "heavy" yearlings. Mature bulls require more feed than a cow-calf pair and are considered to be 1.5 AU. As calves approach four months of age, forage intake increases and eventually becomes more important nutritionally than milk. Thus, from four months until weaning, calves require an average of 0.3 AU of forage monthly. For example, a 1200 pound cow with a 450 pound calf in October would be regarded as 1.5 AU or [(1200 pound cow = 1.2 AU + (calf = 0.3 AU)]. Each calf is assumed to be about 0.5 AU from weaning until they reach 12 months of age.

Game and non-game animals also consume forage. Accurate determinations are complicated by incomplete knowledge of quantitative forage requirements, their dietary habits compared with domestic stock, the efficiency of animals in making use of feeds and the extent to which they utilize the same areas as domestic stock. Therefore, the estimated comparative feed requirements of game and domestic stock should be used with caution (Table 6).

The big game numbers in Table 6 apply to mature animals. Just as offspring of livestock are considered to exert additional demand for forage when they reach two to four months of age, offspring of wildlife should also be considered. Failure to do so will underestimate grazing use, and could lead to range deterioration.

Balancing livestock numbers with available forage is a basic goal and principle of range management. Forage productivity benefits when livestock are evenly distributed, spring grazing is de-

Table 5. Calculating AUM requirements of a ewe with lamb under two months of age.

Weight of Ewe (lbs)	Daily Forage Dry Matter Intake (lbs)	Waste (25%)	Total Daily Requirement	Total Monthly Requirement	AU Equivalent
150	4.5	1.1	5.6	171	0.20
175	5.3	1.3	6.6	201	0.24
200	6.0	1.5	7.5	229	0.27

Table 6. Animal unit values (AU) for different kinds and classes of livestock and wildlife. The standard for this guide is based on forage intake of a spring calving cow (1000 pound average milking ability) and her calf (less than four months in age).

Kind/Class of Animal	AU	# of Animals Equal to 1 AU
Cow (1000 lb., spring calving, above average milking ability,) and calf (less than 4 months of age)	1.00	1.0
Cow (1000 lb) non-lactating	0.90	1.1
Calf (from 4 months of age to weaning)	0.30	3.3
Replacement heifers (18-24 months)	1.00	1.0
Yearling cattle (Long; 12-17 months)	0.75	1.4
Yearling cattle (Short; 7-12 months)	0.50	2.0
Young bulls (12-24 months)	1.20	0.8
Bulls (24-60 months)	1.50	0.6
Yearling horses	0.75	1.3
Two-year-old horses	1.00	1.0
Mature horses	1.25	0.8
Mature lactating ewe (150 lb) and lamb (less than 2 months in age)	0.20	5.0
Mature non-lactating ewe (150 lb)	0.18	5.5
Lamb (2 months to weaning)	0.06	16.7
Lamb (weaned to yearling)	0.12	8.3
Lamb (yearling)	0.15	6.6
Ram	0.25	4.0
Goat (mature)	0.15	6.6
Kid (yearling)	0.10	10.0
White-tailed deer	0.15	6.6
Mule deer	0.20	5.0
Antelope	0.20	5.0
Bison (lactating cow)	0.90	1.1
Bison (bull)	1.50	0.66
Elk	0.60	1.7
Moose	1.00	1.0
Bighorn	0.20	5.0
Mountain goat	0.15	6.6
Blacktailed jackrabbit	0.016	62
Whitetailed jackrabbit	0.02	48
Columbian ground squirrel	0.003	385
Prairie dogs	0.004	256

layed, and plants are provided periods of rest between grazing periods. Information about stocking rates, range condition, rainfall, and grazing patterns should be collected and evaluated. Grazing management programs should be adjusted when the need arises.

Balancing Forage Resource with Livestock Demand

A map or aerial photograph is useful in analyzing forage resources on a ranch. Here we use a hypothetical southeastern Montana ranch to illustrate how forage resources can be balanced to meet ranch and livestock needs (Figure 8). (Any similarity to an actual operation is coincidental.)

A complete livestock inventory by month was developed for the ranch (Table 7). In this example, the rancher has a 200-cow herd calving in late March with a 90 percent calving rate. Cow weights average 1000 pounds. Cattle are culled at a 15 percent rate, and calves are weaned November 1. Replacement heifers (30 for this example) are raised to calve as two-year-olds and join the cow herd. The herd has a bull:cow ratio of 1:20. The replacement heifers are artificially inseminated. Four of the 10 bulls are young, and six are mature.

We entered the number of livestock for each class on the top line in Table 7. Each kind and class of livestock must be converted to AU by multiplying the number of livestock by the AU value. For example, 170 non-lactating cows equals 153 AUs (170 non-lactating cows x .9 AU = 153 AUs). By calculating these AUs on a monthly basis, the AUM demand for each month is determined (AU x month = AUM). Forage required by livestock is summarized in the bottom row of the Livestock Count/Forage Demand Chart (Table 7). The forage demand by livestock should now be transferred to the next-to-the-bottom row of the "Trial" Forage Availability/Livestock Balance Chart (Table 8).

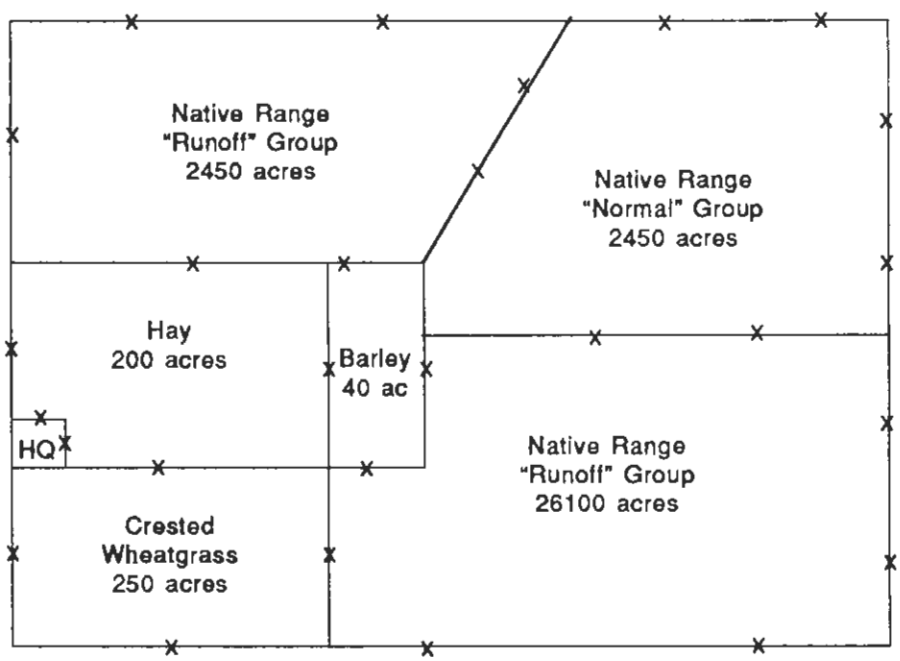


Figure 8. Example ranch in southeastern Montana.

Ranch size: 7,510 acres rangeland
40 acres barley
250 acres crested wheatgrass pasture
200 acres hay (grass alfalfa mix)
which averages 1 Ton/Ac
8,000 acres Total

Cattle operation: 200 commercial cows, calves sold in fall
15% annual replacement
1 bull per 20 cows
annual precipitation averages 12 inches

Table 7. Livestock Count/Forage Demand Chart

Kind/Class of Livestock	Animal Unit Value	# AUs	Month J	F	M	A	M	J	J	A	S	O	N	D
Mature cow (non-lactating)	0.9	#	170	170	170								170	170
		AUs	153	153	153								153	153
Mature cow (lactating)	1.0	#				200	200	200	200	200	200	200		
		AUs				200	200	200	200	200	200	200		
Replacement bred heifers(18-24 months)	0.8	#	30	30	30								30	30
		AUs	24	24	24								24	24
Replacement yearling heifers (12-17 months)	0.7	#				30	30	30	30	30	30	30		
		AUs				21	21	21	21	21	21	21		
Replacement heifer calves (6-12 months)	0.5	#	30	30	30								30	30
		AUs	15	15	15								15	15
Calves (3-4 months through weaning)	0.3	#				180	180	180	180	180	180	180		
		AUs				0	0	0	54	54	54	54		
Weaned steer/heifer calves (6-12 months)	0.5	#												
		AUs												
Yearling steer/heifer calves (6-12 months)	0.7	#												
		AUs												
Young bulls (12-24 months)	1.2	#	4	4	4	4	4	4	4	4	4	4	4	4
		AUs	5	5	5	5	5	5	5	5	5	5	5	5
Bulls (mature, 2-5 years)	1.5	#	6	6	6	6	6	6	6	6	6	6	6	6
		AUs	9	9	9	9	9	9	9	9	9	9	9	9
Horses	1.2	#												
		AUs												
Total		#	240	240	240	420	420	420	420	420	420	420	240	240
		AUs	206	206	206	235	235	235	289	289	289	289	206	206

Define Kind and Amount of Forage

Available forages must be identified and summarized in a "Trial" Forage Available Chart (Table 8). AUMs from range, pasture aftermath, carryover hay, and grain should be included.

The hay will provide 500 AUMs (2.5 AUM/ton x 1 ton/acre x 200 acres = 500 AUMs). Crested wheatgrass can provide 168 AUMs (250 acres x 0.67 AUM/acre = 168 AUMs). The hay aftermath provides 0.4 AUMs/acre, or 80 AUMs. However, fall grazing may impair future yield.

Available AUMs from native range were calculated by multiplying the number of acres in each "range site group" by the suggested stocking rate. For example, 5060 acres of "runoff sites" provides 860 AUMs (5060 acres x 0.17 AUM/acre = 860 AUMs), and 2450 acres of "normal" sites provide 735 AUMs (2450 acres x 0.30 AUM/acre = 735 AUMs).

The 40-acre barley field produces 30 bushels per acre and a bushel weighs 48 pounds. Since it contains 84 percent total digestible nutrients (TDN), the contribution of barley to total ranch feed is:

$$\frac{\text{(total grain production)} \times (\%\ \text{TDN})}{\text{pounds of TDN per AUM}} = \text{AUMs from barley}$$

or:

$$\frac{(40\ \text{acres}) \times (30\ \text{bu/ac}) \times (48\ \text{lbs/bu}) \times (0.84)}{400} = 121\ \text{AUMs}$$

The barley stubble provides 0.2 AUMs/acre, or eight AUMs. However, forage fluctuates with harvest efficiency, volunteer grain, and weeds.

Determine When to Graze or Feed Available Forage

Transfer kind of forage, AUM/acre, number of acres, AUMs, and total AUMs required from Table 8 to the "Final" Forage Availability/Livestock Balance Chart (Table 9). Once the "Total AUMs Required" are listed (on the next-to-last row), the forages should be allocated over the year based on their characteristics, desired use, and the livestock operation. For example, aftermath will normally be used during fall, and hay is fed in winter. Thus, the forage supply is balanced by dividing the total number of AUMs available among those months when the forage is to be used. This process of balancing available forage to match the needs of livestock requires a good understanding of the livestock operation.

We have included examples of the forms (Livestock Count/Forage Demand Chart, Trial Forage Availability/Livestock Balance Chart, Sheep Count/Forage Demand Chart, and Final Forage Availability/Livestock Balance Chart) in the Appendix. We encourage their use in planning, analyzing, and balancing forage supply and livestock demand.

Planning

The Final Forage Availability/Livestock Balance Chart (Table 9) indicates that total feed supplies are adequate from May through January. However, the total yearlong carrying capacity is constrained by the forage available from February through April. Therefore, the ranch is not capable of carrying a 200-head breeding herd yearlong. It is only capable of carrying 206 AU (2472/12 = 206). When replacement heifers and bulls are taken into account, a cow-calf operation with a breeding herd

Table 8. "Trial" Forage Availability/Livestock Balance Chart

Kind of Forage	AUM/ Acre	Acres	AUMs	Month											
				J	F	M	A	M	J	J	A	S	O	N	D
Hay			500	125	125	125	125								
Hay aftermath	.4	200	80									40	40		
Barley			121	20	20	21							20	20	20
Barley aftermath	.2	40	8									8			
Crested wheatgrass	.67	250	168				84	84							
Native range	.17 .3	7510	1595					200	250	300	250	250	250	95	
Total		8000	2472												
Total AUMs allocated				145	145	146	209	284	250	250	300	298	310	115	20
Total AUMs required				206	206	206	235	235	235	289	289	289	289	206	206
Total AUMs excess/ deficiency				-61	-61	-60	-26	+49	+15	-39	+11	+9	+21	-91	-186

Table 9. "Final" Forage Availability/Livestock Balance Chart

Kind of Forage	AUM/ Acre	Acres	AUMs	Month											
				J	F	M	A	M	J	J	A	S	O	N	D
Hay			500	188	103									21	188
Hay aftermath	.4	200	80									40	40		
Barley			121	18	31	10							26	18	18
Barley aftermath	.2	40	8									8			
Crested wheatgrass	.67	250	168				84	84							
Native range	.17 .3	7510	1595					151	235	289	289	241	223	167	
Total		8000	2472												
Total AUMs allocated				206	134	10	84	235	235	289	289	289	289	206	206
Total AUMs required				206	206	206	235	235	235	289	289	289	289	206	206
Total AUMs excess/ deficiency				0	-72	-196	-151	0	0	0	0	0	0	0	0

of 172 cows (206/1.2 AU=172) would represent about 206 AU. The 206 animal units were divided by 1.2 AU to derive 172 cows because the replacement heifers and bulls would represent about 0.2 AU per brood cow.

Use the completed Final Forage Availability/ Livestock Balance Chart as a planning tool. Use economic analyses to compare these alternatives:

1) reducing the herd to 172 brood cows

2) purchasing additional hay

3) increasing production on existing hayland or developing additional hayland

4) improving forage production on either pasture or range land, or

5) implementing a higher level of grazing management (may include additional fencing and water developments, rotational grazing system, etc.).

Every range plan should include a monitoring program. Through monitoring, we find out what is happening over time. Only by systematically making observations, gathering data and keeping records on distribution patterns, grazing use, problem areas, growing conditions, actual use, and other events can stockmen determine how ongoing management practices are affecting rangeland.

Summary

Planning is an important part of range management. Goals and objectives must be defined. Rangeland resource inventories and livestock inventories should be completed to balance forage supply with livestock demand. Forage analyses are useful in evaluating the alternative strategies to meet management goals.

Appendix 1: Livestock Count/Forage Demand Chart

Kind/Class of Livestock	Animal Unit Value		Month											
			J	F	M	A	M	J	J	A	S	O	N	D
Mature cow (non-lactating)	0.9	#												
		AUs												
Mature cow (lactating)	1.0	#												
		AUs												
Replacement bred heifers (18-24 months)	0.8	#												
		AUs												
Replacement yearling heifers (12-17 months)	0.7	#												
		AUs												
Replacement heifer calves (6-12 months)	0.5	#												
		AUs												
Calves (3-4 months through weaning)	0.3	#												
		AUs												
Weaned steer/heifer calves (6-12 months)	0.5	#												
		AUs												
Yearling steers/heifers (12-17 months)	0.7	#												
		AUs												
Young bulls (12-24 months)	1.2	#												
		AUs												
Bulls (mature, 2-5 years)	1.5	#												
		AUs												
Horses	1.2	#												
		AUs												
Total		#												
		AUs												

Appendix 2: Sheep Count/Forage Demand Chart

Kind/Class of Livestock	Animal Unit Value		Month											
			J	F	M	A	M	J	J	A	S	O	N	D
Mature ewe (non-lactating)	.15	#												
		AUs												
Mature ewe (lactating)	.2	#												
		AUs												
Replacement yearling ewes (10-17 months)	.12	#												
		AUs												
Lambs (2 months)	.08	#												
		AUs												
Rams (mature, 2-5 years)	.25	#												
		AUs												
		#												
		AUs												
		#												
		AUs												
		#												
		AUs												
Total		#												
		AUs												

Appendix 3: "Trial" Forage Availability/Livestock Balance Chart

Kind of Forage	AUM/ acre	Acres	AUMs	Month											
				J	F	M	A	M	J	J	A	S	O	N	D
Total															
Total AUMs Allocated															
Total AUMs Required															
Total AUMs Excess/Deficiency															

Appendix 4: Final Forage Availability/Livestock Balance Chart

Total															
Total AUMs Allocated															
Total AUMs Required															
Total AUMs Excess/Deficiency															