

Getting a grip on grazing

How to feed your livestock while maintaining the health and value of your land



Many folks move to rural acreages to enjoy the open space, to potentially own livestock for hobby or pleasure, or to provide space for their children to raise animals. Improperly managed animals grazing on rural acreages can create a large number of resource problems that people may not be aware of. These problems include a shortage of grass cover resulting in soil erosion, reduced soil and water quality, reduced livestock health, and an increased number of weeds. Proper grazing can invigorate plants and make use of a renewable natural resource. This section is designed to provide information that will help you avoid negative results while optimizing the forage resources your land offers. Among the questions to answer include:

- How much do my animals need to eat to be healthy?

- How much forage can my land provide while remaining healthy?
- What are some specific grazing strategies that will allow me to best take advantage of the available forage while keeping forage plants healthy and producing to their full potential?

How much our livestock need to eat (forage demand)

So, we all love our animals, but how much forage do they need to be healthy critters? Depending on the type and stage of growth of our animals, they have varying nutritional requirements. Below are considerations and a conversion table outlining such differences.

How much does your livestock eat every day?

Forage required by an animal is commonly measured in “animal

units” or an AU (one AU equivalent is about 25 pounds of feed per day). It is a way to compare different animals and their feed requirements. See Table 1.

- One mature 1,200-pound pleasure horse will eat approximately 32 pounds of grass or hay per day (1.25 AU).
- A 1,000-pound cow not lactating will require approximately 25 pounds of grass or hay per day (1.00 AU).
- A mature ewe or doe goat will eat 4 to 5 pounds of grass or hay per day (0.2 AU).

It is important to note that most forages quickly lose nutritional value as they flower and move into dormancy (dry up and turn brown). Because of this factor during winter months or whenever forage quality is decreased, supplemental feed is generally required. This may be

The U.S. Department of Agriculture's Natural Resources Conservation Service has developed ecological site descriptions (ESDs) for Wyoming that can help guide you in estimating various ecological aspects of land, including estimating forage production for your area. For more information and a more detailed explanation of how to find ESDs for your area, see pages 3-5 at: <http://www.wyomingextension.org/agpubs/pubs/B1204.pdf>

in the form of a complete feed, a grain, and/or a protein supplement. Replacement feed in the form of hay may also be required if there is insufficient forage available due to previous harvesting or snow cover.

As forage amount is discussed, you may hear the term "animal unit month," or AUM, being used. This is simply the forage required for one animal weighing 1,000 pounds for one month. For example, based on the numbers above, one 1,000-pound cow will consume one AUM, which equals approximately 800 pounds of forage for one month. A 1,200-pound saddle horse will consume 1.2 AUMs (960 pounds) in one month.

Once we have determined how much forage your animals need to eat, we can start to think about the

Table 1. Average annual pasture and hay production values (values may vary depending on area and management).

	Fertile Soils		Poor Soils	
	Hay Tons/Acre	Forage AUMs (lbs)/Acre	Hay Tons/Acre	Forage AUMs (lbs)/Acre
Irrigated hay pasture	2 – 4	3 – 4 (2,400-3,600)	<2	1 – 2 (800-1,600)
Non-irrigated hay pasture	1 – 2	1 – 2 (800-1,600)	0 – 0.5	0.5 (400)
Rangeland/ woodland	0 – 1	0 – 0.5 (400)	0 – 0.5	0.25 (200)

amount of forage our land or pastures can provide. This is the second part of the equation in determining how many animals can use the property for how long while maintaining healthy pastures.

So, how productive are our landscapes (also known as forage supply)?

Now that we know how much feed our animals require, the next question is: can the forage from our property keep them full and healthy? What can we realistically expect from our pasture(s)? Very general guidelines (these figures are averages and can vary to a greater or lesser degree, depending on management strategies and land conditions) regarding estimates of annual pasture and hay production are in Table 2 (figuring

approximately 800 pounds = 1 AUM). Also understand that pastures are unique and your conditions may vary significantly from the figures listed.

To get a more accurate estimate of the amount of forage on your property, follow a few simple steps to calculate pounds of forage per acre.

1. Using PVC pipe or another durable material, construct a square with inner dimensions of 25 by 25 centimeters. This is a quarter meter square and will help with calculations.
2. Randomly place the square on the ground in several representative areas of the pasture.
3. Clip all of the grasses and forbs (not shrubs because you are trying to quantify plants likely consumed by livestock) inside the square to a height of 1", and place the clippings in a paper bag (brown lunch bags work well).
4. Let the contents dry in the bags for 2 days.
5. Zero the scale with the weight of an empty bag (to subtract the weight of the bag from the final weight you will record).
6. Weigh each bag with the plants in them, and record the weights (in grams) on a piece of paper.
7. When done weighing all the bags, calculate the average weight for a bag, then convert it to pounds per acre by multiplying by 35.7.

Table 2. Animal Unit Equivalents based on animal weights and pounds of forage consumed on average each day.

Animal	Weight	AU Equivalent	# Animals per AU	Pounds of forage per day
Cow	1,000	1	1	25
Cow	1,500	1.5	0.66	37.5
Yearling Cow	700	0.85	1.25	21.25
Mature Bull	1,700	1.5	0.67	37.5
Milking Cow		1.5	0.67	37.5
Working Horse		2	0.5	50
Saddle Horse		1.25	0.8	31.25
Colt < 2 yrs.		0.5	2	12.5
Sheep	120	0.2	5	5
Goat		0.17	5.9	4.25
Elk	600	0.66	1.5	16.5
Mule Deer	125	0.22	4.5	5.5
Pronghorn	90	0.17	5.9	4.25

Calculate your stocking rate

Once you know your animals' requirements and your land's production, it is easy to estimate how much forage you have available for your livestock.

You will need the following numbers:

Pasture Size _____ acres

Pasture Production _____ pounds/acre

Animal Requirements _____ pounds/day

Example

Assumptions:

30 acres "High Plains Southeast" native range

10-14 inch precipitation zone

Sandy soil range site

Needle and thread/Rhizomatous Wheatgrass

Plant Community

Predicted plant production:

Favorable precip year = 1,500 lbs/acre

Average precip year = 1,200 lbs/acre

Poor precip year = 700 lbs/acre

1,200 lb horse will eat around 32 lbs of dry matter/day

In an average year, this pasture will produce 36,000 lbs of forage. (1,200 lbs/acre x 30 acres)

Half of this must be left in place to keep the plants healthy, and 15 percent will be lost to other grazers (deer, antelope, rabbits, mice, etc.). **So only 35 percent of this is available to domestic animals.**

This pasture has **12,600 lbs of available forage** (36,000 lbs x .35) and can support **one 1,200 lb horse for 394 days** (12,600 lbs / 32 lbs/day) or **three 1,200 lb horses for 131 days** (12,600 lbs / 108lbs/day).



Now that we know how much our animals need to eat and the productivity (in pounds/acre or AUMs/acre) of our pastures, we can calculate our stocking rate (see sidebar). Our stocking rate calculation will tell us how many animals we can put on our property without causing damage to the plants that keep our animals healthy.

Healthy grasses make happy horses ☺

The more knowledge a landowner or manager has regarding how grass grows, the better he or she will be able to keep grasses healthy and the most productive. Healthy grasses are not only more nutritionally valuable, but they often produce more forage.

Is grazing necessary?

Many of Wyoming's landscapes have evolved with grazing, beginning with bison roaming the plains. This has allowed our native grass species to adapt and flourish with grazing. There is a catch: now that we have fences everywhere, it is our responsibility as landowners to control grazing, due to our animals being unable to migrate naturally. As much as we need to control grazing so as to not overgraze plants, it can also be detrimental to have no grazing. This is because of the lack of stimulation to the grasses. In the absence of grazing, plants often become less healthy and productive. A heavy layer of litter (dead plant material) can prevent or block new emerging vegetation from getting needed sunlight and the nutrients to grow.



Litter (or dead plant tissue) that has accumulated due to a lack of grazing or other disturbances.

Unhappy grasses keep everyone unsatisfied ☹

You may find yourself in a situation where your animals need more than your pasture can supply; this is very common in Wyoming because of our semiarid conditions. Continually grazing plants during the growing season numerous years in a row (when the supply doesn't meet the demand) can damage the plants, not allowing them to recuperate once grazing has occurred. This keeps the grasses from producing enough food from sunlight to keep themselves healthy. As a result, they will be reduced in size and often die. This type of mismanagement will create a reduction of your forage supply in future years. On the next page are two pictures illustrating sustainable grazing management and the unfortunate outcome of mismanagement.

Fortunately, as you can see in picture 2, mismanagement can be avoided, leaving your pastures productive and healthy. As land managers, we can properly manage our pastures to avoid a situation like picture 1.

Other consumers

Although we often do not see more than our livestock grazing our pastures on a regular basis, we cannot assume that livestock are the only ones consuming forage. There are numerous other consumers taking advantage of the growing plants in our pastures. Large wildlife like deer, antelope, and elk and much smaller creatures such as gophers and grasshoppers all consume forage. Research has shown that, on a majority of pastures, 15 to 25 percent



1. Continuous grazing allows weeds to grow where healthy desirable plants grew before but have been weakened and outcompeted.



2. Good grazing management promotes more forage, fewer weeds, and less bare ground.

of forage is eaten by these types of consumers. In most season-long grazing situations, harvest by domestic livestock is only about 25 to 35 percent. Therefore, when we are developing our grazing management plan, losses by other animals need to be accounted for to maintain plant health and vigor.

So, grazing by livestock and wildlife can benefit grasses by stimulating

growth of individual stems, but too much grazing can remove important plant tissue for further growth. So, how can we reach a happy medium?

A happy medium...

There is a happy medium that can be found between the complete absence of grazing and overgrazing. Here are some guidelines to help you reach that balance and responsibly

Options for rehabilitating degraded pastures

Preventing mismanagement of our property is always the best and often easiest plan to follow, but what if you purchase a property that has already been overused and the plants have been mismanaged?

How do you know if your property is degraded?

Does your property have large patches of bare ground?	Yes	No
Do the plants consist of mostly weedy or annual species?	Yes	No
Is soil being lost due to wind or water erosion?	Yes	No
Is there browsing damage on your trees, shrubs, fences, or barns?	Yes	No

If you answered yes to any of these questions, your pasture may be a candidate for rehabilitation.

Depending on your goals and the status of your native seedbank (native grass seeds lying dormant in the soil), you have several options. If there are adequate desirable species still living, you may be able to rest the pasture and allow the existing grass species to recolonize the bare ground by their production of seed and the increase in plant width. However, if the plants are mostly weedy or annual and there is a lot of bare ground, you may have to consider more drastic measures such as seeding. Seeding can be expensive and requires proper planning, and the landowner must be patient and allow at least two years of rest following seeding. When seeding dryland sites (no irrigation), success is highly dependent on the amount of precipitation the site receives.

Some essentials for successful seeding include:

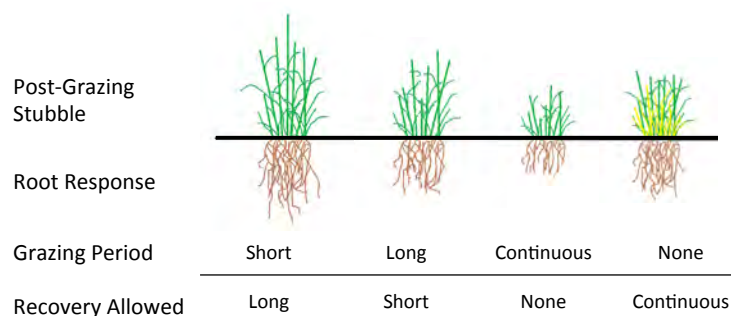
- designing the proper seed mix
- preparing a firm seedbed
- using the best planting methods
- properly timing the seeding so there is adequate moisture

A seeding plan can be made with the help of your local conservation district or University of Wyoming Extension office. With a successful seeding, desirable plants will fill the gaps, hold the soil, and produce good quality forage.

Prevent overgrazing... ...leave a **STUBBLE**

- ✧ Leaving 2-6 inches (dry vs. irrigated) protects both soil and plant health
- ✧ Plant leaves must remain for rapid regrowth to occur (by photosynthesis) after grazing
- ✧ Exposed soil allows wind and water erosion along with the high chance of weed invasion
- ✧ Allow plants to recover (re-grow without animals grazing) before grazing again

Grass Health with Grazing Periods



manage your pasture for years to come.

- Don't allow livestock time to remove too much of the plant at one time
- Allow the plants time to re-grow their leaves and store some food before grazing again
- Don't allow year-round continuous grazing of smaller pastures
- If using rotational grazing, don't have the livestock graze the same pasture at the same time each year

Take half, leave half

Plants produce food through the process known as photosynthesis (utilizing sunlight and other resources) to supply themselves with needed nutrients. Plants require a certain amount of carbohydrates, fats, proteins, and minerals just the same as animals do. Healthy growing plants produce a surplus of nutrients, which can be safely harvested by plant-eating animals. However, to maintain the health of our plants, their needs must be adequately supplied. So allow your plants to feed themselves.

Research suggests that, in a normal year, plants need to keep about 50 percent of their tissue (mainly leaves) to stay healthy and conduct photosynthesis. It is true that with available moisture in the soil and adequate time to rest and recover from

grazing, grasses can recover from more severe defoliation; however, the generalization holds for most pasture situations – take half for the animal (which may also mean wildlife as outlined in the above stocking rate calculation) and leave half for the plant. If the plant is continually grazed with no time to grow or regrow during the growing season, too much leaf material is removed and the root system is depleted. This makes the grass less competitive for limited soil moisture and less able to regrow leaves or tolerate drought. When plants are overgrazed, they also become more susceptible to being outcompeted by less desirable plants (weeds) and the chance of erosion increases.

It can be difficult to determine a 50-percent harvest level, so stubble height may be an easier measurement. As stated above, leaving around 4 inches of plant stubble left is a good rule of thumb to maintain the health of most grasses.

Grazing at the right time (time and timing of grazing)

Grazing intensity (the amount of plant material removed) and frequency (the number of times a plant is grazed) are influenced by the number of animals and length of time they graze an area. Generally, plants withstand grazing best when plants are grazed lightly or at a moderate

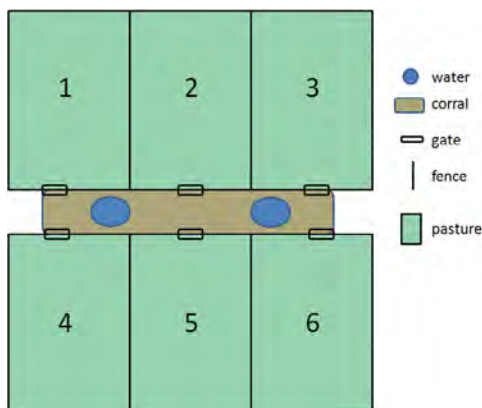
intensity and are then allowed to regrow. Herbivores rarely take all of the leaf tissue the first time they graze a plant; they often take one or two bites and then go to the next plant. Therefore, moving animals quickly through a pasture prevents repeated grazing of regrowth and is less stressful on actively growing plants.

Seasonality, or the time of year when grazing occurs, also affects how well plants withstand grazing. In arid or semiarid areas, grazing early in the growing season (as plants are in the vegetative stage) is relatively harmless if there is ample soil moisture available for plants to regrow. However, when the plants are in the early reproductive (or boot stage) of growth, grazing removes growing points that are responsible for the continuation of plant growth. In areas where moisture and nutrients are limited, plants may be safely grazed for short periods early in the growing season, when moisture levels are highest, or after plants have matured fully and are less vulnerable to grazing (dormant season). In places with adequate available moisture for plants to regrow, timing of grazing is less critical for plant health. In irrigated pastures or wet areas, the main management concern is rapid plant growth where there is too much forage that becomes mature very

Strategies you can use to keep grasses happy while keeping forage production high

quickly and the nutritional quality decreases.

There are a few tools that can help maintain healthy pastures; one strategy is by altering a season-long *Example rotational grazing system.*



grazing system.

Pasture Design / Grazing Strategy

- Rotational Grazing – this strategy makes use of numerous paddocks where animals are rotated from paddock to paddock, so each area undergoes a short grazing period, followed by a longer rest period. Deciding on the number and size of paddocks to be grazed are important aspects of this grazing strategy. Paddock layout will vary from acreage to acreage due to topography, watering areas, animal traffic, and other logistical management concerns. When considering adopting a rotational grazing strategy for your own property, first consult with someone who is familiar with rotational grazing, such as resource professionals at your local University of Wyoming Extension, conservation district, or Natural Resources Conservation Service office.
- Upside-Down Grazing – If your forage quantity is not adequate to sustain your animals

year-round, consider “upside-down grazing.” This strategy involves letting your animals graze in the winter (if there isn’t deep snow) when the damage to the plants is the least and confining and feeding your animals in the summer. This strategy is great for the plants, and your animals will require less hay in the summer. Supplementation may be required in the winter.

Proper facility setup, including fencing and building materials, can enhance your property. You can use a combination of corralling and cross-fencing to create paddocks, which can be easily managed for the needs of your livestock. If you do not plan to corral animals, develop a rotation system to ensure adequate resting of each pasture before regrazing the same area. Poor producing pastures that have been degraded may require rest, renovation, or reseeding to bring them back to their original production levels. Different fence types and installation methods suit a number of management and aesthetic goals. A wildlife friendly fence (see “Wildlife” section of this guide) will enhance the movement of wildlife across your property.



Food, Water, and Animal Health

- Feed year round (buy hay) – as mentioned earlier, feeding hay

all year may be necessary for many Wyoming landowners to maintain grass cover throughout the property.

- Stock water – in most cases, animals like to be near a water source. With that in mind, if there is only one water source for the entire property, the property may be overgrazed around the water source and undergrazed in other areas. Placement of properly spaced watering facilities (or mineral supplements) can encourage more uniform grazing of a property by livestock.

Determining a grazing strategy that works best for your situation and maintains vegetative cover will ensure healthy plants, which leads to happy and healthy livestock.

Mismanagement of grazing can lead to problems with pastures, but properly managed grazing can benefit the entire ecosystem. To achieve this, land managers must have an idea of the amount of forage animals will consume (forage demand) as well as production values within pastures (forage supply) before developing a grazing plan. In developing a grazing management plan, try to devise grazing strategies that account for the nutritional needs of plants and animals while working within individual situations.

The UW Extension, your local conservation district, or Natural Resources Conservation Service are available to assist with natural resource and land management planning, questions, and concerns.

Resources

Go to the *Barnyards & Backyards*’ website’s “Forage/Pasture/Grazing” page, where you will find great articles, videos and other resources on grazing.

Keys to Successful Grazing

- Check your animals frequently to limit the amount of plant material being grazed.
- Avoid continuous season-long grazing; instead, develop flexible grazing strategies that allow plants to recover after grazing.
- Grazing plans must be flexible; consider differences in growing conditions across years as a result of wet or drought cycles, grazing by wildlife or insects, and other changing environmental conditions.
- Continue year-round rotation to distribute manure, food wastes, and trampling across pastures, or hold animals in a corral.
- Have a water source available for each pasture.
- Horses and other livestock do not necessarily need 24-hour access to feed or forage. Corral animals and feed if needed to prevent over-grazing of pastures.
- On a limited acreage, you may have only enough pasture to exercise your animals and will need to feed throughout the year.
- Grazing capacity varies from area to area. Make sure you are stocking pastures according to the amount of forage they can provide.
- Base your decision to move animals on how much grasses are used and the amount of green leaf material remaining, not on a calendar date.

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WATER, not

Introduction

Because water is in scarce supply in Wyoming and highly regulated, knowing the basics of the legal, social, geological, and other practical issues related to its use may contribute directly to your happiness as a landowner.

In Wyoming, water links our lives to those of our family, neighbors, communities, and region. We cannot emphasize enough the importance of understanding the laws and customs pertaining to water and of communication with neighbors and regulators to ensure that there is enough of this precious resource to go around and to avoid getting into hot water.