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# Animal Unit Month (AUM) Lease Rates

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Livestock producers and landowners alike are frequently interested in simple ways to determine rental rates for grazing lands, including rangelands, forest lands, and dryland and irrigated seeded pastures. One common metric for grazing land leases is the Animal Unit Month (AUM). The MSU Extension Ag Lease website (<http://aglease.msuextension.org>) provides information that lessors and lessees can use to establish equitable leases on both grazing lands and cropland. This document provides an overview and examples of how livestock producers and landowners can compute AUM rental rates for Montana grazing lands.

**TO DETERMINE THE TOTAL ANNUAL PAYMENT,** a lessee or landlord needs to know the number of acres being leased for grazing, the lease rate per AUM, and the stocking rate. To calculate the rate per month, it is also necessary to know the duration of the grazing period (the number of months that livestock will be allowed to graze on the leased land).

## What is an AUM?

An AUM is a unit of measure used to quantify forage allowance for grazing animals. In the same way that one ton is a unit of measure comprised of 2,000 pounds, one AUM is a unit of measure comprised of 790 pounds of oven-dried forage. This amount equals the weight of the forage consumed (consumed = ingested + trampled, see sidebar) monthly by a grazing ruminant weighing 1,000 pounds, with or without its calf (or equivalent) up to 6 months of age (Society for Range Management Glossary): 1 AUM = 26 pounds of forage consumed/day × 30.4 days/month = 790 pounds of forage consumed/month. More conservative or more liberal values are sometimes used by landowners or government agencies, so it is important to be clear on specifics. One way to clarify the definition of AUM is to specify it in a written lease.

## Stocking Rates

A stocking rate expresses the amount of grazing pressure applied to the land. Stocking rates can be described as either AUMs per acre, or acres per AUM ( $1 \div \text{AUMs/acre} = \text{acres/AUM}$ ). Guidelines

## How Much Forage Does a Grazing Ruminant Consume?

As long as forage availability is adequate, forage intake is constrained by the maximum amount of time that grazing ruminants (e.g., cattle, sheep, goats, deer, elk, pronghorns, etc.) will graze each day (about 10-12 hours/day). Next, forage intake by grazing ruminants is controlled largely by the animals' rumen capacity and the rate that forage passes through their digestive system. Larger animals generally have larger rumens, and the forage passage rate is greater when forage is more digestible. For example, grazing ruminants ingest as much as 2.5 to 3% of their body weight per day when forage is highly digestible (e.g., irrigated pasture in early summer) or as low as 1 to 1.5% of their body weight per day when forage digestibility is very low (e.g., straw). Overall, when forage availability is not limiting, the oven-dry weight of forage ingested by a grazing ruminant averages 2% of body weight per day. The oven-dry weight of forage ingested by grazing horses, mules, burros, and donkeys averages about 50% more than that for grazing ruminants (i.e., about 3% of body weight per day) due to differences in the digestive anatomy of equine animals versus ruminants. Finally, in addition to the amount of forage ingested by grazing animals, some forage also is consumed by trampling. The oven-dry weight of forage consumed by trampling each day averages 0.6% of a grazing animal's body weight (calculated from Quinn and Hervey 1970). Taken together, the oven-dry weight of forage consumed per day (forage ingested + trampled) averages 2.6% of body weight for a grazing ruminant (e.g., 26 lbs/day for a 1,000-lb cow) or 3.6% of body weight for a grazing equine (e.g., 36 lbs/day for a 1,000-lb horse).

for stocking rates that optimize livestock production without harming soil, plant and water resources in Montana are available from the USDA Natural Resources Conservation Service (See the Soil Survey Estimated AUM at [https://www.nrcs.usda.gov/wps/portal/nrcs/mt/technical/landuse/pasture/NRCS144P2\\_056939/](https://www.nrcs.usda.gov/wps/portal/nrcs/mt/technical/landuse/pasture/NRCS144P2_056939/)). Similar suggestions for

long-term, sustainable livestock stocking rates in Montana are available from MSU Extension (See the *Grazing Leases* MontGuide at <https://store.msuextension.org/publications/AgandNaturalResources/MT201601AG.pdf>). The example calculations below use stocking rate expressed in AUMs/acre.

## Lease Rates

Lease rates per AUM can be determined by the landlord and tenant, by checking with neighbors or local resources to estimate the “going rate,” or by checking averages (such as those listed at <http://aglease.msuextension.org>). The USDA National Agricultural Statistics Service surveys livestock producers every year to estimate the average lease rates paid in Montana for non-irrigated, privately-owned grazing land. Average lease rates from each year’s survey are reported per AUM, per cow-calf pair, and per head. In addition, USDA Agricultural Marketing Service reports current year lease rates for several nearby states. Both of these sets of rates are available at <http://aglease.msuextension.org>. The example calculation below uses lease rate expressed in \$/AUM.

## Grazing Land Lease Rate Example Calculation

### Example Lease Details

- Lease rate = \$27/AUM
- Stocking Rate = 0.3 AUM/acre (3.33 acres/AUM)
- Acres = 320
- Months grazed = 3

### To calculate:

- **Rental rate per acre, multiply the lease rate by the stocking rate:**  
Rental rate per acre =  
 $\$27/\text{AUM} * 0.3 \text{ AUM/acre} = \$8.10 \text{ per acre}$
- **Rental rate on a per acre and per month basis, take the rental rate per acre and divide by the total number of months used for grazing:**  
Rental rate per acre, per month =  
 $\$8.10 \text{ per acre}/3 \text{ months of grazing} = \$2.70/\text{acre/month}$

- **Total AUMs for the season, multiply the total number of acres by the stocking rate:**

Total AUMs for the season =  
 $320 \text{ acres} * 0.3 \text{ AUM/acre} = 96 \text{ AUMs for the season}$

### The total annual payment is found by either:

- a) **Multiplying the rental rate per acre by the total number of acres:**

Total annual payment =  
 $\$8.10/\text{acre} * 320 \text{ acres} = \$2,592, \text{ in total}$

### OR

- b) **Multiplying the lease rate per AUM by the total number of AUMs:**

Total annual payment =  
 $\$27/\text{AUM} * 96 \text{ AUMs} = \$2,592, \text{ in total}$

## Additional Resources

- Fuller, K.B. 2019. *A Contributions Approach to Pasture Leasing*. Montana State University Extension MontGuide MT201815AG.
- Fuller, K.B., and R. Endecott. 2016. *Beef Cattle Share Leases*. Montana State University Extension MontGuide MT201607AG.
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- Holechek, J.L. 1988. *An Approach for Setting the Stocking Rate*. *Rangelands* 10:10-14.
- Johnson, D.E., M.M. Borman, and L.R. Rittenhouse. 1982. *Intake, Apparent Utilization and Rate of Digestion in Mares and Cows*. *Proceedings of the Western Section of the American Society of Animal Science* 33:294-296.
- Quinn, J.A., and D.F. Hervey. 1970. *Trampling Losses and Travel by Cattle on Sandhill Range*. *Journal of Range Management* 23:50-55.
- Society for Range Management. 1989. *A Glossary of Terms Used in Range Management, 3rd Edition*. Denver, CO, USA: Society for Range Management.



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