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Calculating Minimum Grazing Lease Rates for Hawai'i

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Pasture lease rates for grazing cattle in Hawai'i vary widely, from a low of $10.00 to a high of $50.00 per acre. These lease rates should reflect the returns that ranchers can expect from a livestock operation and the value of the land when it is used for this or other economic opportunities. A rate that is too low overvalues the returns to the livestock operation and undervalues the land resource. Conversely, a rate that is too high overvalues the land and undervalues the livestock grazed on the land. For example, lease rates based on speculative land value rather than grazing value result in rates that are too high. All resource owners, whether they own land or livestock, benefit from market prices that accurately reflect the value of their resources to the community. To make sound resource management decisions for private, state, or federal lands, all decision makers must understand what the land contributes to the well being of the community.

Because lease rates are included in an operator's cost of production, ranchers generally expect to pay an amount that is consistent with the quality of the grazing offered by the land. For most unused agricultural land in Hawai'i, livestock grazing is an important and inexpensive management tool. Properly managed grazing can be effectively used to attain a number of land management objectives including reduction of wildfire fuels, weed and shrub control, wildlife habitat management, range or pasture improvement, and native and endangered species or ecosystem protection. Land managers are more likely to choose grazing as an option if the fee and the grazing services they receive provides a greater benefit than any other alternative means of management.

Identifying a minimum grazing lease rate (MGLR) provides ranchers and land managers the ability to objectively determine the value of the land unit to the lessee for grazing and the value of grazing to the lessor for that land. It is a critical step in developing an effective lease agreement for grazing. The purpose of this publication is to provide information lessees and lessors can use to calculate a minimum lease rate for grazing and to present important concepts about developing lease agreements.

Federal grazing fees

In 1991, the United States Department of Agriculture (USDA) reviewed the formula for setting the fees charged to livestock operators that graze domestic livestock on federal lands and set forth various alternatives in the 1986 Grazing Fee Review and Evaluation Report.* Numerous studies on grazing fees conducted by USDA and the Department of the Interior, universities throughout the West, and various interest groups were examined. The formula was devised by economists knowledgeable about ranching economics, state and federal agency officials, livestock industry representatives, and representatives of environmental groups. An agricultural economist was also consulted in the overall analysis of the existing formula's technical merits and alternative formula designs.

The current formula was established in the Public Rangelands Improvement Act of 1978 (PRIA). PRIA prescribed that the formula would be in place for a 7-year trial period, and in 1986 it was extended indefinitely. The formula is applicable to those public lands managed by the Bureau of Land Management (BLM) and the Forest

*Rangeland Management, Briefing Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives, U.S. General Accounting Office, June 1991.

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Service in the 16 Western states. Together, these agencies manage grazing on about 268 million acres, divided into about 31,000 grazing allotments. Grazing privileges on these allotments are assigned to livestock operators by permit or lease.

Each operator pays a fee for each head of livestock grazing on the public lands. The fee is established in terms of an animal unit month (AUM) of forage. An animal unit month is defined as the amount of forage required to sustain one animal unit (AU) for 1 month. Generally, one AU is equivalent to one 1000-pound cow with calf, and an AUM corresponds to 780 pounds of air-dry forage. A rancher grazing 100 head of 1000-lb cows with calves for three months would use 300 AUMs.

The PRIA formula adjusts a $1.23 base value by an index designed to reflect changes in the forage prices paid by livestock operators on private lands and the overall profitability of public lands grazing. The formula is:

$$\text{Grazing fee} = \frac{\$1.23\ (\text{FVI} + \text{BCPI} - \text{PPI})}{100}$$

where FVI = forage value index, BCPI = beef cattle price index, and PPI = prices paid index.

The forage value index (FVI) is used in the PRIA formula to update the fee according to changes in the prices paid for leases on private lands, and it is based on an 11-state average (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming). Each year the annual average private lease rate is calculated for these 11 states and is divided by $3.65, the private lease rate during the base period 1964 to 1968. Then, it is multiplied by 100 to give a number for the index.

Because the price received for cattle is the major determinant of a rancher's profits, the beef cattle price index (BCPI) is included in the calculation of grazing fees. In the PRIA formula, the BCPI is an average annual price received for beef cattle by ranchers in each of the 11 western states. This value is divided by the 1964–1968 average beef cattle price of $22.04 per hundredweight and then multiplied by 100 to give a number for the index.

The prices paid index (PPI) adjusts the grazing fee to account for the rancher's costs and is based on several components of the national index of prices paid by farmers in 16 western states (those listed above, plus Kansas, Nebraska, North Dakota, South Dakota, and Oklahoma) as compiled by USDA. The components of this index include production commodities such as fuels and energy, farm supplies, tractors and other machinery, building and fencing supplies, farm services, interest rates, and farm wage rates. The index does not include costs such as taxes paid, feed and feed production, or prices paid for livestock, because these values are included in other indices.

Calculating a minimum grazing lease rate for Hawai'i

Grazing lease rates in Hawai'i vary widely between $10.00 and $50.00 per acre, but they average $30.00. Stocking rates per acre in Hawai'i also vary widely, from more than 24 AUMs in highly productive lands to a low of 0.48 AUMs in dry leeward rangelands. Given this variability, the average stocking rate in Hawai'i, weighted by the total number of animals grazed in the different rangeland types in the state, is estimated to be one animal unit per acre per year, or 12 AUMs per acre. Thus, on an AUM basis, the average lease rate in Hawai'i of $30.00 is equivalent to $2.50/AUM ($30.00 ÷ 12 months). Using this information, the FVI is calculated as follows:

$$\text{FVI} = \frac{\text{current average lease rate}}{\text{lease rate in base year [1968 = \$3.65]}} \times 100$$

$$= \frac{\$2.50}{\$3.65} \times 100$$

$$= 68.49$$

The average annual price for beef cattle in 2006 was $87.35/cwt (USDA Livestock Outlook Report 1/23/2007; this includes all animals for slaughter). Hawai'i ranchers can be docked as much as 15 percent of the sale price at the point of sale. Thus, the average price received by Hawai'i ranchers in 2006 was approximately $74.25/cwt.

$$\text{BCPI} = \frac{\$74.25}{\$22.04} \times 100$$

$$= 336.89$$

The PPI for 2006 (USDA Agricultural Prices Report 1/31/2007) was 150. Using these values, the current estimated MGLR for Hawaii is calculated as follows:

$$\text{MGLR} = \frac{\$1.23 \times (68.49 + 336.89 - 150)}{100}$$
$$= \$3.14 \text{ per AUM}$$

The MGLR changes annually, and the current rate can be found on the Hawai'i Rangelands West website [rangelands.manoa.hawaii.edu]. Land managers can adjust their lease rates relative to the MGLR depending on the quality of the grazing provided, or the amount of services provided with the lease. Land with high-quality forages, for example, can be leased at higher rates than those with poor forages (Figure 1). Leases that include a range of services, including maintenance of fence lines, roads, water infrastructure, animal care, and other services, can demand a higher lease rate than those units that do not offer such services. Land managers must therefore weigh the value of the grazing as a management tool for the land against the value of the services provided and the quality of the forages.

Considerations for writing lease agreements

While a lease agreement can take many different forms, several factors should be considered to ensure that both parties' needs are met. Often these factors are ignored, and the lease agreement either encourages overgrazing or is too costly for the grazer. The discussion below outlines several issues that should be covered in any grazing lease agreement.

The main goal of an effective grazing lease is to ensure that proper grazing and management of the land resource occurs. As mentioned previously, grazing can be used as a tool to attain a number of land management objectives. The goal is to draft a grazing lease that will meet both parties' objectives without compromising the long-term stability of the land resource.

The first issue of concern is the length of the lease. *Grazing leases should be long-term agreements.* While month-to-month leases are common in Hawai'i, long-term agreements create value and stability for both the grazer and the landowner. Short-term leases do not provide incentives for sound grazing management decisions by the grazer because the lease can be terminated at any time. In addition, short-term leases limit the level of commitment by the landowner. All leases should provide for continuation of the agreement or a means to terminate the agreement should the need arise.

The second issue concerns the amount of the lease rent. *Lease rates must be equal to the grazing value of the land unit and the services provided.* As discussed earlier, land that supports more animals demands a higher lease rate. In addition, the type of services provided by the landowner also helps determine the lease rate. The quality of the land being grazed determines the base value of the lease rate. The landowner can then adjust the rate according to the services they provide for the grazer. The appendix (p. 7) provides a worksheet to assist in adjusting the Hawai'i MGLR value for forage quality and services provided.

A third consideration is the carrying capacity of the land for grazing. *Grazing lease rates must be tied to the number of animal units grazed over a specified length of time.* Landowners in Hawai'i often base their lease rate calculations on a land unit, typically on a per acre basis; for example, $20 per acre per month. Other landowners may charge by the head; for example, $10/head. Neither of these approaches encourages sound grazing management decisions. Lease rates calculated on a per-land-unit basis impose no control on the number of head grazed. The grazer is free to graze as many head as desired, and all too often more animals are grazed than the land can support. On the other hand, basing the lease rate on the number of head alone does not control the amount of time the land is grazed. The lease rate should be based on the number of animal unit months (AUMs) grazed.

Using AUMs as the basis for lease rates requires estimation of the carrying capacity of the land unit. Carrying capacity refers to the total number of AUMs available to the grazing animals. Knowing the acreage, herd size, and the carrying capacity of the land unit to be grazed, the landowner and grazer can work together to allocate the AUMs appropriately and prevent overgrazing. For example, if a 10-acre pasture supports 5 AUMs, that pasture could be grazed by five mature, lactating cows for 1 month or one cow for 5 months without compromising the stability of the land resource. The landowner typically assigns a value to the AUM, such as $3.00/AUM. Thus, 5 AUMs would be worth $15.00 regardless if the AUMs were used in 1 month or in 5 months.

The final point to be considered when drafting an agreement is the overall long-term goal for the land. *Grazing lease agreements should include a grazing management plan.* Many landowners in Hawai'i do not do this, and the result is severely overgrazed pastures. The development of a grazing management plan is essential to the lease agreement. The landowner should determine the desired grazing management program

Figure 1. High-quality range or pasture lands (A) should command a higher lease rate than low-quality rangelands (B). Likewise, range or pasture leases that provide more services and/or resources, such as maintenance of roads, fences, water, and other infrastructure, and animal care (C), should receive a higher rate than lands where the lessee maintains these activities.

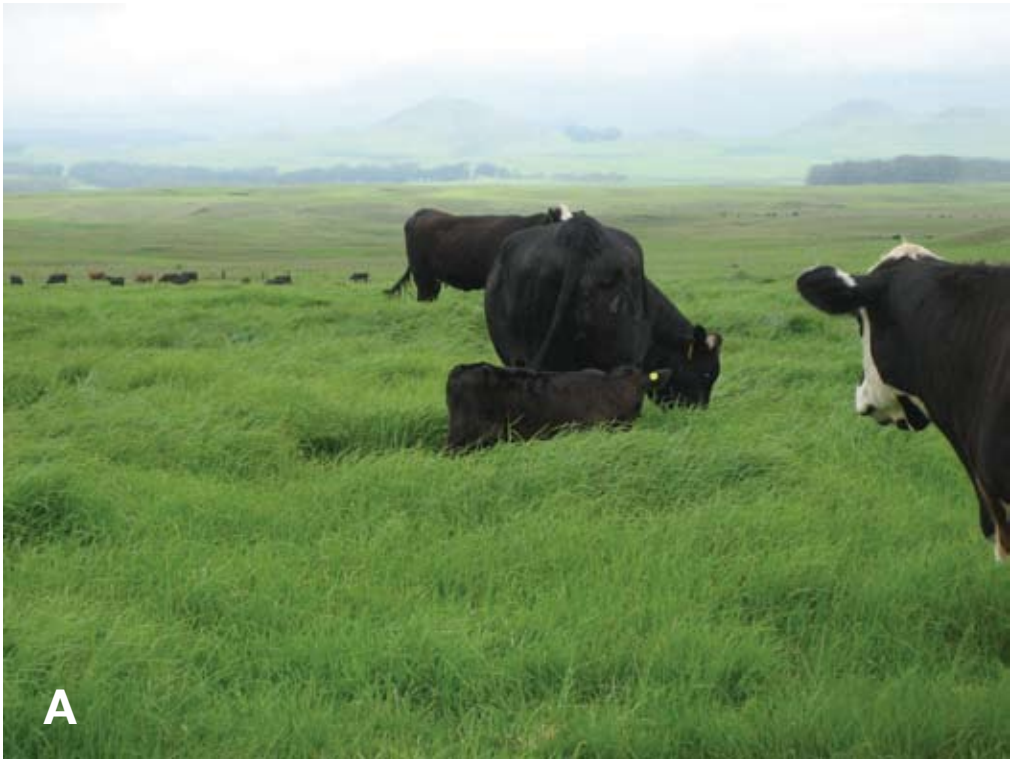
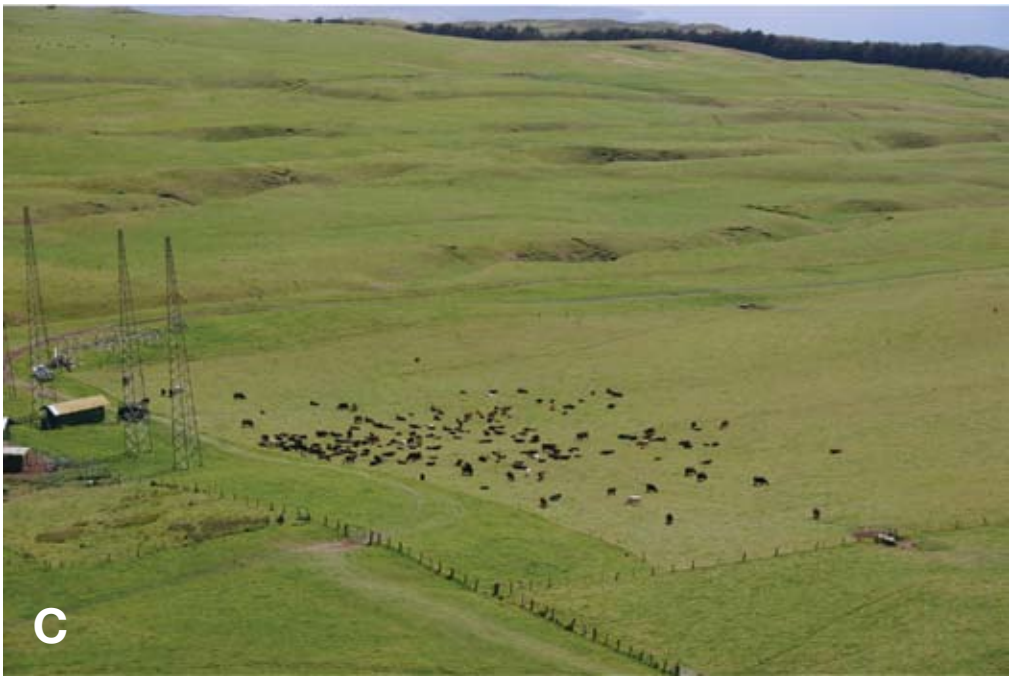


Figure 1, continued.



before grazing begins, or it should be designed through consultation with a grazing management professional. In either case, the lease agreement should provide details of the grazing management plan, including turn-in and turn-out dates, pasture rotations, stocking rates, etc. Also, the lease agreement should stipulate what constitutes a violation of the grazing management plan and the consequence of the violation, such as termination of the lease agreement.

Adjusting the minimum grazing lease rate

Adjustments to the MGLR should accurately reflect changes in the agricultural value of leased land and, as mentioned earlier, land that is of higher quality, or where services are provided, should command a higher lease rate. Table 1 provides a range of values relating finished beef cattle prices to the percent total digestible nutrients (TDN) in the forage resource based on the cost of gain per pound of forage. The appropriate forage quality adjustment (FQA) is determined by the TDN of the forage, which can be provided with a simple forage analysis through an accredited laboratory, and the current market price of finished beef cattle (contact your Cooperative Extension Service livestock agent for advice on accredited laboratories and current market values). The appropriate value, in dollars per AUM, is selected from the table and added to the MGLR.

The annual services adjustment (ASA) is based on service provided by the landowner and should include all activities that support grazing activities (see Appendix). These could include maintenance of infrastructure such as buildings, roads, fences, and water developments. Other services that should be considered in the ASA may include activites such as providing supplementation, moving cattle, and processing fees. The appendix provides a description and a means to calculate an ASA per AUM. The ASA value is then added to the MGLR value.

Conclusion

The establishment of a minimum grazing lease rate in Hawai'i is important for several reasons. First, it provides a means to adjust lease rate values according to fluctuations in livestock markets, or the rancher's ability to pay, and agricultural land use values. Second, it provides a statewide standard that can easily be applied by state, federal, and private land management entities, and this will help to eliminate the large discrepancies that currently exist in statewide lease rates. Thirdly, a minimum grazing lease rate provides a means for ranchers and land management entities to objectively determine the value of the land unit for grazing and the value of grazing for that land unit. Ranchers have a greater incentive to pay a higher lease rate if more services are provided or if the quality of the grazing unit is higher. On the other hand, land management entities must make decisions about the overall management of the land unit. They are more likely to choose grazing as a land management practice if the price or the services they receive provides a greater benefit than other alternative means of management.

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Table 1. Forage quality adjustment values ($/AUM) based on the price per pound of a finished beef animal and the percent total digestable nutrients of the forage resource.

Price	% TDN					
($/lb)	55	60	65	70	75	85
1.25	0.35	0.64	0.89	1.11	1.28	1.32
1.20	0.33	0.62	0.86	1.07	1.22	1.27
1.15	0.32	0.59	0.82	1.02	1.17	1.22
1.10	0.31	0.56	0.79	0.98	1.12	1.16
1.00	0.28	0.51	0.71	0.89	1.02	1.06
0.95	0.26	0.49	0.68	0.84	0.97	1.01
0.90	0.25	0.46	0.64	0.80	0.92	0.95
0.85	0.24	0.44	0.61	0.76	0.87	0.90
0.80	0.22	0.41	0.57	0.71	0.82	0.85
0.75	0.21	0.38	0.54	0.67	0.77	0.79
0.70	0.19	0.36	0.50	0.62	0.71	0.74
0.65	0.18	0.33	0.46	0.58	0.66	0.69
0.60	0.17	0.31	0.43	0.53	0.61	0.64
0.55	0.15	0.28	0.39	0.49	0.56	0.58
0.50	0.14	0.26	0.36	0.44	0.51	0.53

Adjusted Grazing Lease Rate Worksheet

Resources

A. Estimated carrying capacity: _____ AUM/acre

B. Total acres leased: _____ acres

C. Total AUMs (line A × line B): _____ AUMs

Forage quality adjustment

D. Total digestible nutrients (from forage analysis): _____ %

E. Current price per pound for a finished beef animal: $ _____

F. Forage quality adjustment value (selected from Table 1) $ _____ /AUM
(Round current price ($/lb) and laboratory percent TDN to nearest table value to find the appropriate FQA.)

Annual services adjustment

G. Fence maintenance: $ _____

H. Water infrastructure maintenance: $ _____

I. Water fees: $ _____

J. Road maintenance: $ _____

K. Maintenance of buildings, corrals, and other infrastructure: $ _____

L. Other services provided (supplementation, herding, etc.): $ _____

M. Total annual services (sum lines G through L): $ _____

N. Annual service adjustment (line M ÷ line C) = $ _____ /AUM

Adjusted grazing lease rate

O. MGLR = $ _____ /AUM (The MGLR changes annually, and the current rate can be found on the Hawai‘i Rangelands West website [rangelands.manoa.hawaii.edu]).

P. Forage quality adjustment (line F) = $ _____ /AUM

Q. Annual services adjustment (line N) = $ _____ /AUM

R. Adjusted grazing lease rate (sum lines O through Q) = $ _____ /AUM