



State entrusted grazing lands : a study of regulation and price
by David Karsten Gaarder

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE
in Applied Economics
Montana State University
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Abstract:

The Montana Department of State Lands manages, as a Trustee, 4,112,302 acres of grazing land. Most of this land was granted through the Enabling Act for the support of common schools. Statutory objectives of the Trust created under this act are: (1) to secure the largest measure of legitimate and reasonable advantage to the trust without impairing long-term productivity; (2) to fully compensate the trust for all interests disposed of; and (3) to secure a sustained income to the trust.

The hypothesis presented is that statutory objectives of the Trust are not effectively being met, that grazing fees on state land are too low, and that the grazing fee formula should be modified. It was the author's intent to examine the current administrative program in light of the objectives set forth, to identify existing barriers to their achievement and to present alternatives. The base grazing fee at the time the study was initiated (1976) was \$1.30 per animal-unit-month and is \$1.48 per AUM for 1977.

Results of the study produced the following factors to be considered in pricing state grazing lands; (1) approximately 85 percent of Montana's leased grazing land supply is made up of public and state land; (2) only 8 percent of state grazing leases are competitive (1976) - the competitive system faces many barriers including the effects of good neighbor relations, preference rights, competitive bid hearings, limited access, and the influence of "big operators" and grazing districts and associations; (3) 1976 AUM prices are significantly higher for competitive state leases (\$3.52 ave.), the private sector (\$7.40), state and federal lands in other western states (\$2.37 ave.) and the value of grazing as determined by the 1969 BLM fee system (\$1.94); (4) significant explanatory variables of competitive bids, as determined by a multiple regression model include the number of potential bidders, the tract size, the previous year's land value index, and the presence of water and fence.

Recommendations made include: (1) Recognize and consider the sales alternative; (2) Complete the remaining in-lieu selections (approximately 22,918 acres); (3) Open information channels concerning land use and lease renewal dates for state leases; (4) Initiate prompt cancellation of leases when warranted; (5) Eliminate charging for "grass crops" on grazing land; (6) Adopt a uniform competitive grazing bid format that gives flexibility, e.g. \$X.XX plus the statutory minimum fee per AUM; (7) Adopt a new grazing fee formula that allows for changes in production costs, and land values as well as beef prices.

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Date 8/4/77

STATE ENTRUSTED GRAZING LANDS: A STUDY OF REGULATION AND PRICE

by

DAVID KARSTEN GAARDER

A thesis submitted in partial fulfillment
of the requirements for the degree

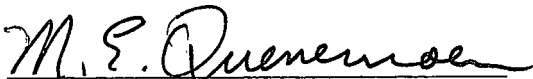
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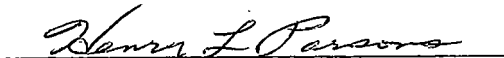
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ABSTRACT

The Montana Department of State Lands manages, as a Trustee, 4,112,302 acres of grazing land. Most of this land was granted through the Enabling Act for the support of common schools. Statutory objectives of the Trust created under this act are: (1) to secure the largest measure of legitimate and reasonable advantage to the trust without impairing long-term productivity; (2) to fully compensate the trust for all interests disposed of; and (3) to secure a sustained income to the trust.

The hypothesis presented is that statutory objectives of the Trust are not effectively being met, that grazing fees on state land are too low, and that the grazing fee formula should be modified. It was the author's intent to examine the current administrative program in light of the objectives set forth, to identify existing barriers to their achievement and to present alternatives. The base grazing fee at the time the study was initiated (1976) was \$1.30 per animal-unit-month and is \$1.48 per AUM for 1977.

Results of the study produced the following factors to be considered in pricing state grazing lands; (1) approximately 85 percent of Montana's leased grazing land supply is made up of public and state land; (2) only 8 percent of state grazing leases are competitive (1976) - the competitive system faces many barriers including the effects of good neighbor relations, preference rights, competitive bid hearings, limited access, and the influence of "big operators" and grazing districts and associations; (3) 1976 AUM prices are significantly higher for competitive state leases (\$3.52 ave.), the private sector (\$7.40), state and federal lands in other western states (\$2.37 ave.) and the value of grazing as determined by the 1969 BLM fee system (\$1.94); (4) significant explanatory variables of competitive bids, as determined by a multiple regression model include the number of potential bidders, the tract size, the previous year's land value index, and the presence of water and fence.

Recommendations made include:

- (1) Recognize and consider the sales alternative;
- (2) Complete the remaining in-lieu selections (approximately 22,918 acres);
- (3) Open information channels concerning land use and lease renewal dates for state leases;
- (4) Initiate prompt cancellation of leases when warranted;
- (5) Eliminate charging for "grass crops" on grazing land;
- (6) Adopt a uniform competitive grazing bid format that gives flexibility, e.g. \$X.XX plus the statutory minimum fee per AUM;
- (7) Adopt a new grazing fee formula that allows for changes in production costs, and land values as well as beef prices.

Chapter 1

INTRODUCTION

General Background

Most of the land owned by the State of Montana came into State ownership through three (3) legislative grants from the federal government.

The first of these grants, the Morrill Grant, was made by an act of July 2, 1862 (12 Stat. 503). The grant was made to the territory of Montana, to be vested in the state upon statehood, and totalled 90,000 acres. It was specified that: the monies derived from the sale of the lands to be used for the endowment, support, and maintenance of an agricultural college (now Montana State University).

In 1864, the Organic Act (13 Stat. 85), while not a grant itself, reserved all sections numbered sixteen (16) and thirty-six (36) in each township of the Montana Territory. This reservation was for the purpose of providing for schools in the states erected from the territory.

A second land grant of 46,080 acres, for the use and support of a university (now the University of Montana), was made by an act of February 18, 1881 (21 Stat. 326).¹ Like the Morrill, this grant was

¹Two additional grants for this purpose, totalling 640 acres were made in 1904 and 1905 (33 Stat. 64, 33 Stat. L 1080).

effective upon Montana's admission into the union.

The Enabling Act, (25 Stat. 676) approved February 22, 1889, admitted Montana into the Union along with North Dakota, South Dakota, and Washington, and granted to the state, those lands reserved by the Organic Act. These lands, sections sixteen (16) and thirty-six (36) in each township, were granted for the support of common schools (§10). This public school grant, by far the largest of the three, totalled 5,188,000 acres. Since some of these sections had been homesteaded, some included within boundaries of Indian reservations, and some otherwise disposed of prior to the Enabling Act, other lands were to be selected by the state in lieu thereof.² Approximately 22,918 acres remain to be selected from the public domain (see page 44 for elaboration).

The Enabling Act also granted additional lands, for various purposes, as follows:

- 32,000 acres for public buildings at the capital for legislative, executive, and judicial purposes (§12).
- 46,080 acres (confirming the grant of February 18, 1881) for university purposes (§14).
- 9.75 acres for a penitentiary at Deer Lodge City, Montana (§15).

²For an in-depth history of this selection process, see Burnett, G. Wesley Jr., "Montana Becomes a Landlord - A Study of State Land Selection," unpublished Ph.D. dissertation (Philosophy), Graduate College, University of Oklahoma, Norman, Oklahoma, 1976.

- 90,000 acres (confirming the grant of July 2, 1862) for the use and support of agricultural colleges (§16).
- 100,000 acres for the establishment and maintenance of a school of mines (Montana College of Mineral Science and Technology) (§17).
- 100,000 acres for state normal schools (Eastern and Western Montana Colleges) (§17).
- 50,000 acres for agricultural colleges (Montana State University) (§17).
- 50,000 acres for the establishment of a state reform school (Pine Hills School) (§17).
- 50,000 acres for the establishment of a deaf and dumb asylum (School for the Deaf and Dumb) (§17).
- 150,000 acres for public buildings at the Capital (§17).

The major grants totalled approximately 5,856,720 acres. Several minor grants later followed.

The state acquired an additional 159,229 acres of land from the federal government in 1958, when an exchange of 9,354 acres of state land, within Glacier National Park, was made for 168,583 acres of public domain throughout the state.³

The state also gained title to 340,979 acres of land, due to fore-closed mortgages on farm loans which were financed through an investment of school trust funds.⁴ The lands acquired through defaulted farm

³ Biennial Report, Commissioner of State Lands and Investments, June 30, 1960, p. 11.

⁴ Biennial Report, Commissioner of State Lands and Investments, June 30, 1954, p. 21.

loans became the property of the state, were transferred to the common school funds, and thereafter became subject to sale and disposal in the same manner as other state lands.

As of June 30, 1976, unsold land in the school and institution accounts totalled 5,130,623.66 acres.

The Enabling Act specifically provides that all monies received from the sale of lands belonging to the common school grant, and the other grants, together with proceeds from the sale of timber, oil royalties and other minerals should be credited to a permanent fund for each of the land grants.⁵ It also provides that permanent funds cannot be used for any other purpose than for the support and maintenance of the various land grant institutions and must forever remain inviolate as the property of each of the land grant funds.

The Board of Land Commissioners was created by the 1899 Constitution and was recreated by Article X, Sec. 4 of the 1972 Constitution. The board consists of the Governor, the Attorney General, the Secretary of State, the State Auditor, and the Superintendent of Public Instruction. The Constitution gives the board the authority to "direct, control, lease, exchange, and sell school lands and (other) lands . . . under such regulations and restrictions as may be

⁵Statistical Report, Commissioner of State Lands, June 30, 1976, p. 1.

provided by law." The Department of State Lands acts under the direction of the board and administers the laws charged to the Board.

The Constitution provides that "the public school fund and the permanent funds of the Montana university system and all other state institutions of learning shall be safely and conservatively invested in:

- (a) Public securities of the state, its subdivisions, local government units, and districts within the state, or
- (b) Bonds of the United States or other securities fully guaranteed as to principal and interest by the United States, or
- (c) Such other safe investments bearing a fixed rate of interest as may be provided by law."⁶

Rentals received from land leases, interest on deferred payments on land sold, mineral lease rentals, interest on funds derived from land sales and invested in specified securities and all other actual income is made available for the maintenance and support of the public school and other land grant institutions.⁷

Table 1.1 shows the original grant, the acreage remaining and the fund for each grant as of June 30, 1976.

⁶Constitution of Montana (1972), Article VII, Section 13.

⁷Statistical Report, 1976, p. 1.

Table 1.1

Original Grants of Land to the State of Montana,
Land Grant Institutions, and Acreages and Funds
as of June 30, 1976⁸

Fund	Original Grant	Acreage as of June 30, 1976	Fund as of June 30, 1976
Public School	5,188,000	4,595,800.81	\$71,653,649.30
University of Montana	46,720	18,160.87	943,713.11
Montana State University-Morrill Grant	90,000	62,977.31	1,499,422.51
Montana State University-Second Grant	50,000	32,408.31	793,287.52
Montana College of Mineral Science and Technology	100,000	59,606.22	1,513,638.69
State Normal School	100,000	62,890.00	1,294,005.08
Deaf and Blind Asylum	50,000	36,235.86	628,967.81
State Reform School	50,000	28,744.01	650,015.98
Public Buildings	182,000	186,227.08	---
Veterans Home	1,275.61	1,275.61	8,398.47
"Militia Camp" now used as an Agricultural Experiment Station	640	640	---
Agricultural and Manual Training School	5,000	5,000	---
State Penitentiary	9.75	9.75	---

⁸Statistical Report, 1976, p. 1.

The Focus

The Department of State Lands manages approximately 4,648,990 acres of range and cropland, which it leases to Montana farmers and ranchers. As of June 30, 1976, the amount of land classified as "grazing" was 4,112,301.93 acres which represents approximately 88 percent of the total acreage of state lands administered by the Department. It is this vast acreage of grazing lands to which this study is directed.

Base grazing fees per animal unit month (as determined by the statutory formula) and total income per year from state grazing lands, for the past ten years are shown in Table 1.2. For 1977, the base grazing fee is \$1.48 per AUM.

Table 1.2

Base Grazing Fee per AUM and Total Grazing Income per Year (1967-76)

Year	Base Grazing Fee	Total Grazing Income ⁹
1967	\$.74	\$ 964,897.41
1968	.76	1,000,003.45
1969	.76	987,657.79
1970	.80	1,046,969.41
1971	.85	1,129,996.48
1972	.87	1,186,595.62
1973	.95	1,320,466.94
1974	1.69	2,163,806.97
1975	1.79	2,287,853.57
1976	1.30	1,754,287.39

⁹ Biennial Report, Commissioner of State Lands and Investments, June 30, 1968, and Statistical Reports, Commissioner of State Lands, June 30, 1970, 1972, 1974, 1976.

Chapter 2

NATURE OF THE RESEARCH

The Problem

In 1942, Henry T. Murray wrote, "The problem of the administration of these lands may be likened unto a two edged sword; on the one hand we have the school interest, on the other we have the livestock and farming interests. Unless this extensive acreage is fairly and impartially administered, injustices may result."¹⁰ Although much has changed since then, the basic problem still exists thirty five years later, in 1977.

The hypothesis presented is that statutory objectives of state grazing land administration are not effectively being met, that grazing fees on state land are low, and that the grazing fee formula should be modified.

Montana's grazing fees are lower than current BLM and Forest Service fees and also lower than other state grazing fees in most surrounding states. The estimated average price of grazing on private land in Montana for 1976 was \$7.40 per A.U.M., as reported by the U.S.D.A. High competitive bids and the fact that grazing leases are

¹⁰ Murray, Henry T. "State Land Management in Montana", unpublished M.S. Thesis, Department of Agricultural Economics, Montana State College, Bozeman, MT, 1942, p. 10.

marketable also support the hypothesis.

Purpose and Procedure of the Study

The purpose of the study is to examine the current administration of state grazing lands in light of the guiding objectives set forth by law. Questions to be addressed include: Under what conditions were lands granted to the State of Montana? Are the objectives stated in these conditions being met? If not, what can be done to better accomplish and maintain the desired goals? What is the "market price" of state land grazing? Is the present grazing fee formula in need of revision?

The study will begin with an overview of the present goals and constraints of the system, including relevant laws, land board policies and current administrative procedures (all with respect to grazing lands). Existing barriers to the achievement of statutory obligations will then be identified. Special emphasis will be given to a statistical analysis of grazing revenues, specifically, the areas of competition and grazing fees. The study will conclude with a presentation of possible management alternatives along with their expected implications, and the author's recommendations.

Chapter 3

GOALS AND CONSTRAINTS OF STATE GRAZING

LAND ADMINISTRATION

Laws

The Enabling Act (§11) stipulates that all lands granted by the Act "shall be disposed of only at public sale after advertising." Minimum sale prices of \$10 per acre for tillable lands capable of producing agricultural crops and \$5 per acre for lands principally valuable for grazing purposes are set forth. The Act states that "any of the said lands may be exchanged for other lands, public or private, of equal value and as near as may be of equal area."

The Act allows the lands to be leased "under such regulations as the legislature may prescribe." It does however make restrictions on lease tenure; "leases for grazing and agricultural purposes shall be for a term not longer than ten years."

It is the Enabling Act which also requires the full market value concept to guide all dispositions of land interests. The relevant part of §11 reads as follows:

The state may also, upon such terms as it may prescribe grant such easements or rights in any of the lands granted by this act, as may be acquired in privately owned lands through proceedings in eminent domain; provided, however, that none of such lands, nor any estate or interest therein, shall ever be disposed of except in pursuance of general laws

providing for such disposition, nor unless the full market value of the estate or interest disposed of, to be ascertained in such manner as may be provided by law, has been paid or safely secured to the state." (Emphasis added)

This "full market value" principle also is included, in nearly the exact language in the 1972 Constitution of Montana, Article X, Section 11, which is titled "Public land trust, disposition."

Section 81-103, R.C.M. 1947 specifies guiding rules and principles for the Board of Land Commissioners to follow in the administration and management of state lands. The section is as follows:

81-103. POWERS AND DUTIES OF BOARD. The board shall exercise general authority, direction, and control over the care, management, and disposition of state lands, and subject to the investment authority of the board of investments, the funds arising from the leasing, use, sale, and disposition of those lands or otherwise coming under its administration. In the exercise of these powers, the guiding rule and principle is that these lands and funds are held in trust for the support of education, and for the attainment of other worthy objects helpful to the well-being of the people of this state; and the board shall administer this trust to secure the largest measure of legitimate and reasonable advantage to the state. The board shall manage these lands under the multiple-use management concept defined as: The management of all the various resources of the state lands so that they are utilized in that combination best meeting the needs of the people and the beneficiaries of the trust, making the most judicious use of the land for some or all of those resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources, and harmonious and coordinated management of the various resources each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources. (Emphasis added)

That portion implementing the multiple-use management concept was added through an amendment in 1969.

Section 81-302 concerns the classification-reclassification of state lands and land use. This section was amended to its present form by the 1974 Legislature through House Bill 22. This bill is one of the most significant pieces of legislation dealing with the administration of state lands, that has been passed in recent years.

81-302. CLASSIFICATION -- RECLASSIFICATION -- RECORDS.

(1) The state lands are classified as follows:

(a) Class 1. Lands which are principally valuable for grazing purposes.

(b) Class 2. Lands which are principally valuable for the timber that is on them, or for the growing of timber or for watershed protection.

(c) Class 3. Lands which are principally valuable for the production of crops.

(d) Class 4. Lands which are principally valuable for uses other than grazing, crop production, timber production or watershed protection.

(2) The classification or reclassification shall be so made as to place state land in the class which best accomplishes the powers and duties of the state board of land commissioners as specified in section 81-103.

When state lands are classified or reclassified in accordance with these duties and responsibilities, special attention shall be paid to the capability of the land to support an actual or proposed land use authorized by each classification. A capability inventory shall be made prior to changing the classification, information on soils capability, vegetation, wildlife use, mineral characteristics, public use, aesthetic values, cultural values, surrounding land use and any other resource, zoning or planning information which is related to the classification. Should a parcel of state land in one class have other multiple use or resource values which are of such significance that they do not warrant classification for the value, the land shall, nevertheless, be managed insofar as is possible to maintain or enhance these multiple-use values.

(3) It is the duty of the department to classify or reclassify state lands so that no state land will be sold, leased or used under a different classification from that to which it actually belongs.

(4) All field books, plats, maps, and records of the department shall show the class to which each tract therein belongs, and whether it belongs to the public schools of the state or to a state institution or other entity according to the grant or instrument by which title to the land has passed to the state; they shall also show whether or not the coal or other minerals in the land are reserved by the United States; and shall contain any other information the department considers necessary.

This statute modified the previous classifications of state lands.

Prior to this enactment, the classes were as follows:

- a) Class 1. Grazing lands, being all those lands which are valuable only for grazing.
- b) Class 2. Timber lands, being all those lands which are principally valuable for the timber that is on them.
- c) Class 3. Agricultural lands.
- d) Class 4. Lands within the limits of any town or city or within three (3) miles of those limits.

Of major importance was the addition that state land be placed "in the class which best accomplishes the powers and duties of the state board of land commissioners as specified in section 81-103."

Also important was the addition of the sentence concerning multiple-use management.

Section 81-401 contains the policy for appraising and leasing state land. It states that "in the interest of accomplishing a

sustained income for the school and other trust funds . . . , agricultural and grazing lands and town and city lots shall be appraised from time to time but not less than once during the term of every lease by competent appraisers." The purpose of appraising grazing lands is to determine "the general condition . . . , and the carrying capacity. . ." Section 81-402 stipulates that the "rental rate for leasing all state grazing lands shall be based upon the appraised animal-unit-month carrying capacity as provided in section 81-433."

Section 81-404 outlines the relevant factors to be considered in the appraisal of grazing lands as follows:

81-404. APPRAISAL OF GRAZING LANDS.

(1) The department shall appraise the grazing lands owned by the state as to their animal-unit-month carrying capacity, and make and preserve records thereof in its office, and from time to time re-examine these lands as to their animal-unit-month carrying capacity so as to keep the records thereof in its office reasonably accurate.

(2) In appraising these grazing lands the following factors shall be taken into consideration:

(a) Inventory of the forage resources--kind, amount, and location of vegetation.

(b) Accessibility and usability of this forage resource as influenced by topography, availability of stockwater, and season of usability.

(c) Condition of soils--the erosion situation.

(d) Other and related resources--such as timber, game animals, need for watershed protection.

(e) Record of needed improvements and facilities--fuel and stock water, revegetation, rodent control, trails, fences, and the like.

(f) Pertinent facts and figures submitted by stockmen living in the area and directors of state grazing districts including the land or in its vicinity.

(g) Carrying capacity set for similar land in a state grazing district in which the land is situated.

Section 81-405 deals with renewal of leases, competitive bids, and the "preference right" of lessees. When a lease expires and no applications have been received 30 days prior to expiration, the lessee may renew his lease at the rental rate provided by law. If other bid applications have been received, the "holder of the lease has the preference right to lease the land covered by his former lease by meeting the highest bid made by any other applicant." Bids for leases and renewal applications must be in writing, sealed, and submitted to the Department.

Section 81-407 requires that no agricultural or grazing lease may be for a period other than five (5) or ten (10) years. It also provides that:

When a lease expires or is canceled the department shall immediately notify the holder of the lease and all persons who have expressed an interest in leasing the land during, or immediately preceding, the term of the expired or canceled lease. If the legislature raises the rentals for state grazing lands during the term of any leases of grazing land which are not issued as a result of competitive bidding, the lessee shall, for the years after the increase becomes effective, pay the increased rental, and the terms of grazing leases shall so provide.

Section 81-412 sets a rental due date and provides for cancellation for nonpayment. Rental for the first year of the leasing term is due at the time of the lease execution. "The rental for each succeeding year on leases . . . , is due and payable before

March 1, and if not paid by April 1 the lease is cancelled." Thus rental for grazing land is paid prior to the normal grazing season.

Sections 81-413, 81-414, and 81-415 are important in determination of "best use" and reasonable management rules:

81-413. LAND TO BE LEASED IN COMPACT BODIES--INSPECTIONS TO DETERMINE BEST USE OF LAND. All lands shall be leased in as compact bodies as possible, and care shall be taken not to separate parts of any section from the section lines of public highways or from any available water supply, or in a form that will make it more difficult to lease the remaining state lands in the section in which they are located. If there are applications or bids for renting certain land for grazing purposes and also applications or bids for renting the same land for agricultural purposes, an inspection of the land shall be made by the department at the earliest practical opportunity and a determination made, based on its findings, of the highest and best use which can be made of the land or portions thereof. Any lease of the land subsequent to the application or bids shall be such as to return to the state revenue commensurate with the highest and best use.

81-414. CHANGE IN TERMS OF LEASE. When land is leased for grazing purposes, and the lessee desires to cultivate any part of the land, he shall, before doing any such cultivation, make application to the department stating how much land he desires to cultivate and showing the location in the section of the land, and agree that for the remainder of the term of the lease the annual rental shall be at the rate of the original lease until such time as the first crop is harvested from the cultivated portion of the lease. At the time of the first harvest, the lease shall be at the original rate for that portion remaining as grazing land plus crop share rental for that portion cultivated. If any person cultivates lands leased for grazing purposes without first securing the right to do so under this section, the department shall either cancel the lease, subject to the appeal procedure provided in section 81-422, or require the lessee to pay twice the regular agricultural rental on the land so cultivated in addition to the grazing rental. The provisions of this section shall be incorporated in every lease.

81-415. CONDITIONS OF LEASES--CANCELLATION FOR VIOLATION OF RULES. It shall be a condition of all leases of agricultural or grazing state lands, (a) that, in the case of agricultural lands, the lessee shall observe the ordinary rules for good management of agricultural lands and shall handle the leased land with the view of maintaining its productivity and minimizing wind and soil erosion and noxious weeds, and planting crops with a view of securing the greatest yields of good quality, and (b) that, in the case of grazing lands, the lessee shall observe the ordinary rules for good range management and shall manipulate the numbers, class, distribution, and season of the range use and the handling, feeding, breeding, and marketing of grazing livestock with a view of securing the production of the maximum of livestock and livestock products, consistent with the conservation of the land resources and the perpetuation of its productivity, and to these ends the state land lease may not be abused by over-grazing.

(2) For the gross violation of any of these rules, the lease involved shall be canceled by the department, subject to the appeal procedure provided in section 81-422.

Section 81-419 allows for leases on state lands to be assigned and subleased. However, it is important to note that "if a lessee subleases state lands on terms less advantageous to the sublessee than the terms given by the state, or subleases state lands without filing a copy of the sublease with the department and without receiving its approval, the department shall cancel the lease subject to the appeal procedure provided in section 81-422."

Section 81-421 allows for compensating the former lessee for improvements and describes the conditions for doing so:

81-421. COMPENSATION FOR IMPROVEMENTS.

(1) A lessee of state lands may place upon the lands a reasonable amount of improvements directly related to conservation of the land or necessary for proper utilization of it. These

improvements may consist of fences, cultivation, and improvement of the land itself, irrigation ditches, sheds, wells, and reservoirs, and similar improvements. When another person becomes the lessee of such lands, he shall pay to the former lessee the reasonable value of these improvements at the time the new lessee takes possession. However, if any of the improvements consists of breaking (meaning the original plowing of the land), and one (1) year's crops have been raised on the land after the breaking, the compensation for the breaking may not exceed two dollars and fifty cents (\$2.50) per acre, and if two (2) or more crops have been raised on the land after the breaking, the breaking shall not be considered as an improvement to the land. If the former lessee and the new lessee are unable to agree on the reasonable value of the improvements, the value shall be ascertained and fixed as provided in section 81-421.1.

(2) In determining the value of these improvements, consideration shall be given to their original cost, their present condition, their suitability for the uses ordinarily made of the lands on which they are located, and to the general state of cultivation of the land, its productive capacity as affected by former use, and its condition with reference to the infestation of noxious weeds. Consideration shall be given to all actual improvements and to all known effects that the use and occupancy of the land have had upon its productive capacity and desirableness for the new lessee. The former lessee may, however, remove the movable improvements on the land and dispose of them to parties other than the lessee; if he fails to remove the improvements from the land within sixty (60) days from the date of the expiration of his lease, all of the improvements become the property of the state, unless the department for good cause grants additional time for their removal. Before a lease is issued to the new lessee he shall show that he has paid the former lessee the value of the improvements as agreed upon by them or as fixed and determined under section 81-421.1, or that he has offered to pay the value of the improvements as so fixed and determined, or that the former lessee elects to remove the improvements.

Section 81-422 sets forth the reasons for, and the procedure following the cancellation of a lease:

81-422. CANCELLATION OF LEASES.

(1) The department may cancel a lease for any of the following causes: fraud, misrepresentation, or concealment of facts relating to its issue, which if known would have prevented its issue in the form or to the party issued; using the land for other purposes than those authorized by the lease; and for any other cause which in the judgement of the department makes the cancellation of the lease necessary in order to do justice to all parties concerned and to protect the interests of the state. Such cancellation does not entitle the lessee to any refund of rentals paid or exemption from the payment of any rentals, penalties, or other compensation due the estate.

(2) When the department cancels a lease pursuant to this section or sections 81-414, 81-415, or 81-419, it shall immediately notify the lessee by certified mail of the cancellation and the reasons therefor. The date of cancellation is fifteen (15) days from the date the notice is received by the lessee. The lessee has fifteen (15) days after the receipt of the notice to file with the department a notice of appeal for a hearing before the board. If notice of appeal is filed, the lease remains in effect until the decision of the board. Within ten (10) days after notice of appeal has been filed, the department shall set the time and place of hearing and shall so notify the lessee. The board may, after ten (10) days' notice to the lessee, change the time and place of hearing.

(3) Under rules it adopts, the board shall conduct an open hearing to determine whether the lease should be reinstated. The burden of proof is on the lessee to show why the lease should not be canceled. If the lease is reinstated, all of the lessee's rights and privileges thereunder shall be preserved; if not, the land shall be open for releasing as provided by law. If the board finds that the terms of the lease have been violated, but in its judgment the violation is not serious enough to warrant cancellation, it may reinstate the lease and assess a penalty up to three (3) times the annual rental against the lessee.

Section 81-425 authorizes any lessee of a grazing or agricultural lease of state lands to pledge his lease or mortgage his leasehold interest. Copies of receipts of pledge agreements or mortgages must be filed with the Department.

The method and formula for calculating the minimum annual state grazing land rental is found in section 81-433:

81-433. FORMULA FOR FIXING ANNUAL RENTAL.

(1) In this section:

(a) "Animal unit" means one (1) cow, one (1) horse, five (5) sheep, or five (5) goats.

(b) "Animal-unit-month carrying capacity" means that amount of natural feed necessary for the complete subsistence of one (1) animal unit for one (1) month.

(2) The board shall establish the per annum rental rate per section of all grazing lands which are the property of the state upon the animal-unit-month basis as provided in this section.

(3) In fixing the minimum annual rental per section, the following formula shall be used:

The base rental shall be computed by multiplying fifty cents (50¢) plus three (3) times the average price per pound of beef cattle on the farm in Montana for the previous year times the animal-unit-month carrying capacity of the land.

(a) The minimum annual rental for grazing lands with an annual carrying capacity of more than fourteen (14) and less than twenty (20) animal units per section is the base rental.

(b) The minimum annual rental for grazing lands with an annual carrying capacity of more than nineteen (19) animal units per section is ten cents (10¢) more than the base rental.

(c) The minimum annual rental for grazing lands with an annual carrying capacity of less than fifteen (15) animal units per section is ten cents (10¢) less than the base rental.

(4) The carrying capacity of the land, to be used in the above formula, shall be in accordance with the determinations of the department made under section 81-404.

(5) The average price per pound of beef cattle on the farm in Montana shall be taken from statistics published by the United States Department of Agriculture current at the time of computation of the rental, or from other reliable sources current at such time.

A grazing fee "formula" based on beef prices was initiated in 1952. Prior to that year, fees had been based on land value. The present formula was adopted by the 1973 Legislature. From 1964 to 1973, the base rental had been thirty-two cents (32¢) plus two (2) times the average price per pound of beef. It has been a common practice to charge the minimum when no competitive bids are in effect.

Section 81-434 provides that conservation requirements necessary for the protection of grass or forage crops shall be incorporated into competitive bid leases, when rental prices are higher than that set by the formula.

The Board of Land Commissioners is authorized to exchange and sell state land when in the best interests of the state. Regarding exchanges, Section 81-307 states: "The board is authorized to exchange state land for private land provided that the private land is of equal or greater value than the state land and as closely as possible, equal in area. The board shall place priority on exchanges which result in consolidation of state lands in more compact bodies."

The power to decide when to hold land sales and what lands to sell lies with the Land Board, "as the best interests of the state may appear to require," as set forth in Section 81-907. This section states that "as a general rule no sale of state lands shall be held unless applications have been made for the purchase of lands within one (1) county by prospective purchasers representing at least twelve

(12) families." Other relevant regulations worth noting, concerning the sale of grazing lands, are as follows:

- 1) All sales are made only at public auction held at the county seats of the county in which the land is located.
- 2) No person or corporation is entitled to purchase more than one (1) section of state land; grazing lands may be listed not exceeding that size tract.
- 3) Lands are sold to the highest qualified bidder with the restrictions that:
 - a) No lands may be sold for less than the appraised value.
 - b) Lands principally valuable for grazing purposes may not be sold for less than five dollars (\$5) per acre.
 - c) The lessee of the land has a preference right to meet the high bid.
- 4) Terms of payment on sales: No less than 10 percent of the purchase price must be paid on the day of the sale. The balance is payable through a period of thirty-three (33) years on the amortization plan; the interest rate on the balance is set by the Board, but can be no less than five (5) percent per year. Payment may be made in full at any time before maturity by paying the balance on the principal and interest accrued up to date of payment.

- 5) The purchaser of state lands must, in addition to the land purchase price, make payments for any improvements on the land belonging to the lessee, unless the lessee desires to remove such improvements.

Cost sharing for improving state grazing land is provided for through the Resource Development Program. Chapter 24 of Title 81, R.C.M. 1947 allows for the development of state land resources, with Section 81-2401 setting forth this policy:

It is in the best interest and to the great advantage of the State of Montana to seek the highest development of state-owned lands in order that they might be placed in their highest and best use and thereby derive greater revenue for the support of the common schools, the university system and other institutions benefiting therefrom and that in so doing the economy of the local community as well as the state is benefited as a result of the impact of such development.

Section 81-2403 provides for a resource development account in the earmarked revenue fund to be used for investments in the improvement and development of state lands. The types of development to be considered are:

. . . those projects that will develop or conserve the various state land resources including: water, both surface and underground, grazing land, agricultural land and timber land to the benefit of the state. They may also include expenses necessary to perfect title to lands claimed by the state which are suitable for development and other expenses or costs which in the judgment of the board of land commissioners are desirable or necessary in order to develop or increase the value of the land or the revenue therefrom. Appropriations from the account shall be expended for no other purpose.

Since the enactment of the Resource Development Law (1967 Legislative Session), the following types of investment projects have been undertaken: land leveling, sprinkler irrigation, water spreading, irrigation wells, rip-rap, range renovation, surveys and inventories, sagebrush spraying, stockwells, and stockwater pipelines.

Land Board Policies

There are three land board policies concerning grazing land that have been adopted and which are in effect. It should be noted that when a new Land Board comes into existence, old policies remain in effect unless they are changed by the new Board, legislation, or court decisions.

The first policy concerns competitive bids. This policy came about through the court case of Thompson vs. Babcock, 147 Mont. 46. In the case the Montana Supreme Court ruled that the Land Board has the right to reject certain bids; but, that if the bid is within the range of the market values of the community, the procedures of 81-405, R.C.M. 1947 must be followed. The court ruled that the Board of Land Commissioners has considerable discretionary power when dealing with dispositions of interest; that the board should not speculate on short term benefits but should seek to secure a sustained income to the Trust. On March 9, 1966, two months after the case was decided, the Land Board adopted a policy that "the

Commissioner be authorized to hold hearings when appeals of competitive bids are made, in order to obtain findings of fact and conclusions for submission to the board for a decision."¹¹

The second policy has to do with the sales of state land. On June 14, 1967 the Land Board adopted a policy that state lands only be sold when said sale shows a clear cut advantage to the trust.

The criteria to be used in determining such advantage are as follows:¹²

- 1) The return from the sale of agricultural land when invested at the current rate, must yield at least double the present income.
- 2) Grazing land will only be sold when the land is so situated either as to size of tract or topography as to make future leasing difficult or when said sale will make possible a needed community or industrial development. In these cases sales will be considered only when the application contains a guaranteed bid of fair market value of the land which value when invested at the current rate of return will at least exceed three times the present rental.

¹¹Minutes, State Board of Land Commissioners. Vol. XIII, p. 350. This policy has now been adopted into law through the passage of HB 526, 1977 Legislative Session.

¹²Ibid., p. 481.

Of significance is the fact that at the present time, and for nearly the last 6 years, the Land Board has had an unwritten policy of "no land sales" at all.

The third policy allows a rental waiver on lessee-financed range renovation. This policy was adopted April 17, 1972 and reads as follows:¹³

On those state lands where the lessee has filed a written request with the Commissioner stating he will invest his own time and money to renovate state grazing land, the Land Board may waive grazing rental during period of non-use not to exceed two years.

It is required that the plan be submitted to and approved by the Department prior to renovation. Rental guidelines for both partial and complete renovation were also adopted. Lessee financed renovation of range land is considered an "improvement" and is compensable under Section 81-421.

The Administrative System

Administrative Practices

The responsibilities for administration of state grazing land, along with the 536,700 acres of agricultural land, lies with the Land Administration Division. The management structure currently consists of the Administrator, the Chief of the Field Bureau, and five (5)

¹³Minutes, State Board of Land Commissioners. Vol. XV, p. 120.

fieldmen. Rental billing and collection is handled by the Centralized Services Division.

The first administrative practice to be described is the classification of state grazing lands. These lands are categorized as Class 1 - lands which are principally valuable for grazing purposes. The criteria for classifying land as such are as follows:

- 1) The land is Class IV to Class VIII as determined by the Soil Conservation Service land capability classifications
or
- 2) Even if Class III or better, the land is not deemed suitable by the Department, for crop production. The following are the Department's minimum requirements for land breaking:
 - a) Soils 20 inches or more in depth over shale, bedrock, or sand and gravel.
 - b) Not over a 9 percent slope.
 - c) Must be sandy loam through clay loam textures.
 - d) Not over 35 percent coarse fragments throughout profile.
 - e) Water table must be at least 20 inches below the surface during the growing season.
 - f) Saline or alkali condition no more than slight.
 - g) No saline-seep potential.
 - h) Annual precipitation must be at least 10 inches.
 - i) Frost free period (32° F.) of 90 or more days.

- j) Soils shall not be subject to flooding or surface ponding during the growing season.
 - k) Soils with wind erosion potential shall be put in strips of not more than 10 rods. As the hazard increases, the maximum width or strips will be decreased as determined by the department.
- 3) Or if no applications with higher bids for other acceptable uses are received prior to renewal of the lease.

Appraising state grazing land to determine carrying capacity is probably the most important practice related to grazing land administration. Appraisals are conducted usually one (1) year prior to renewal of the leases. A field evaluation is completed for each tract of land in each lease. The number of lease renewals per year varies considerably; there is a sequence of five (5) relatively small years (range of 121-402¹⁴ lease renewals) followed by five (5) big years (range of 1140-1758 lease renewals). In the years of the large number of lease renewals, an additional fieldman is usually employed to handle the increased appraising responsibilities.¹⁵

¹⁴These lease renewal figures include the total number of grazing and agricultural leases.

¹⁵SB 261, passed by the 1977 Legislature, will allow the Department to issue 4, 5, and 6 year leases during the 5-year period 1979-1983, in order to achieve uniformity in the number of lease renewals per year.

Range appraisal methods are adopted from those recommended by the USDA - Soil Conservation Service. The fieldmen make use of the "Technicians' Guides to Range Sites, Condition Classes and Recommended Stocking Rates in Soil Conservation Districts of Montana." These guides give an animal-unit-month per acre rating based on species and quantity of species, range soil groups, and precipitation zones. This rating can be modified if warranted by other factors, namely water and shelter. When a tract has available stockwater, the capacity rating is increased by one (1) animal unit per section. This same increase of one (1) animal unit applies to tracts with adequate available shelter (usually timber shelter). Also for Resource Development projects involving development of stockwater such as wells, springs, etc., the carrying capacity rating is increased by one (1) animal unit per section, resulting in an increased rental for the tract.

The Department tries to maintain state grazing land in better than "fair" condition. If a fair range condition or less is approached and is the result of overgrazing or poor management, the carrying capacity rating will not be reduced. When overgrazing is determined, the lessee is contacted and required to adopt and implement a plan for renovation. The Department has the authority to cancel the lease, if necessary. Past reports indicate that the heaviest use of state land

is during those years near the time the leases are to be reappraised. This may be so it won't look too good to the neighbors for competitive bids nor for the appraisal.¹⁶

Lessees of state grazing lands are allowed to participate freely in federal cost-sharing programs. In many cases the Department, through the Resource Development Fund, cost shares in conjunction with Federal programs. Lessees are also able to incorporate state grazing lands into cooperative management plans such as BLM allotments, State Grazing Districts, grazing associations, etc. In such cases, the district or association usually becomes the "lessee".

Rentals

The AUM rental is determined through a statutory formula. As previously stated in Section 81-433, it reads as follows:

The base rental shall be computed by multiplying fifty cents (50¢) plus three (3) times the average price per pound of beef cattle on the farm in Montana for the previous year times the animal-unit-month carrying capacity of the land.

In calculating this rate, there are some administrative practices that should be mentioned. The data used to determine the "average price" are supplied to the Department by the Statistical Reporting Service. These figures cover the period from September of one year through August of the next year, and are then used to

¹⁶Communication with Department field personnel.

calculate rentals due on March 1 the following spring. For continuing leases, this means a lag of six (6) months between the calculation of the AUM rate and the rental due date. In other words, "the average price . . . for the previous year" is not actually used but rather, the average price for a year's period ending six (6) months prior to the rental due date. The main necessity for this lag has been the preparation of lease applications and bid forms (manually prepared) which are usually mailed out in late November to prospective lessees. Since the bid forms must state the minimum price, the rental calculations must be completed prior to their preparation.

With regard to "average price per pound of beef cattle on the farm," the average prices used represent a combined average price for both feeder and fattened cattle. According to the SRS, the statistical base for either feeder or fattened cattle alone is too low to produce a reliable figure.¹⁷ Also the average price data used is weighted by monthly cattle movement data which was determined for the 1968-1970 period using brand inspection records of the State Department of Agriculture. The project to monitor cattle movements by this means has been discontinued.

Another Department policy involving rentals concerns the harvest

¹⁷Memorandum, Robert Duncan to Commissioner Ted Schwinden, November 13, 1974, p. 2.

harvest of grass on grazing land. Presently, a lessee must pay the AUM rental plus one-fourth crop share on any grass that is cut. The crop-share payment is required only in those years that a grass "crop" is taken, which is usually those years of above average precipitation. If the lessee chooses to graze more cattle instead, only the regular AUM rental applies. Whether this results in resource abuse is not known. This irregular "double payment" policy is specifically addressed in Chapter 7.

Chapter 4

BARRIERS TO ACHIEVING STATUTORY OBLIGATIONS

A major obstacle to sound policy development has been the inconsistency between the Enabling Act and the Revised Codes of Montana concerning the purpose of state school lands, and various resulting interpretations. A consistent administrative program requires a precise statement of purpose, acceptance of that purpose, and elimination of ambiguities.

Since the Enabling Act grant of 1889, the Montana Supreme Court has held that the lands granted by Congress for the support of common schools and the funds established from the proceeds and income of those lands constitute a trust.¹⁸ The Court has likewise adopted a consistent view that the Enabling Act terms are to be strictly interpreted and adhered to.

Conflicts have arisen when interest groups and the legislature through statutory amendments have tended to treat school trust lands as if all the rights in those lands belonged to the State of Montana. If this were the case, then the legislature would have the authority to specify land uses without full compensation to the fund such as

¹⁸Griffing, Virginia G. "The Significance of the Trust Concept in the Administration and Management of Montana's School Lands." Unpublished paper, the School of Law, the University of Montana, Missoula, MT, 1975, p. 47.

for general educational purposes, recreation, preservation, etc.¹⁹ Such treatment is not consistent with the trust concept. The State does not have proprietary rights in its lands as does the Federal Government in its public lands. Virginia Griffing in "The Significance of the Trust Concept in the Management and Administration of Montana School Lands" describes the States' rights as follows:

The State..., has only the legal title to the granted lands as trustee of a charitable trust. The equitable title is in the beneficiaries of the trust, which are, according to the Enabling Act, the common schools of the state. The Montana constitutional language regarding a "trust for the people" conveys the same meaning in this context... - that the beneficiaries of the trust are the people of the state who may use the benefits of the trust for the support of common schools.²⁰

In 1927, the Montana legislature adopted the statute declaring the guiding rule and principle in administering state lands and trust funds is that they are "held in trust for the support of education and for the attainment of other worthy objects helpful to the well-being of the people of this state...". In 1969, the added multiple-use concept clause called for "the management of all the various resources of the state lands so that they are utilized in that combination best meeting the needs of the people and the beneficiaries of the trust." (emphasis added.) Griffing states: "Insofar as these statutory directives are acted upon in a way that

¹⁹Ibid., P. 48.

²⁰Ibid., p. 48.

would result in the diversion of either the funds or the lands from the purpose of producing income for the common schools, the state opens itself to liability to suit for breach of trust or breach of contract by any person properly in a position to enforce the trust or the contract."²¹

The multiple-use concept of school lands can be implemented within the requirements that each use that has value to the land compensates the school fund for that value. A use may not be donated by the state to private persons, other state agencies, or to the people as a whole.²²

More recently, the Montana Natural Areas Act of 1975 probably contains the most inconsistencies with the Enabling Act. It is grounded on the assumption that the legislature may create additional purposes for the trust, either those which are generally educational, or others for the well-being of the people in general.²³ It allows for natural areas to be designated on state land or state owned trust land to be traded for natural areas on federal, county or private land, without compensation to the school trust fund. Because of the subsequent controversies since its enactment, the Department postponed

²¹Ibid., p. 49.

²²Ibid.

²³Ibid., p. 50.

making any formal proposals to designate State Natural Areas, and sought the Attorney General's legal opinion on the question regarding the need to compensate the School Trust Fund.

On July 7, 1976 the Attorney General issued the opinion, which supports the contentions of Griffing and is based on several pertinent court cases.²⁴ It reads as follows:

So that the state will not commit a breach of trust under the Enabling Act and Montana Constitution, the state must actually compensate its school trust in money for the full appraised value of any school trust lands designated as or exchanged for natural areas pursuant to the Montana Natural Areas Act of 1974. Such compensation can only be avoided by securing the consent of Congress.

Of importance is a paragraph in the letter containing the opinion, which emphasizes trust objectives:

While the Enabling Act does not say in so many words that the state is under a duty to sell or lease school trust lands, it is elementary that this trust be administered so as to secure the largest measure of legitimate advantage to the beneficiary. Rider, 94 Mont. at 307. As a practical matter this means the state must do something to generate and sustain income from school trust lands whenever possible. State ex rel. Ebke v. Board of Educational Lands and Funds, 47 N.W. 2d 520, 523 (Neb. 1957); Lassen v. Arizona, *infra*, 385 U.S. at 463. The state's discretion is not whether but how to seek gain from school lands for best advantage to the trust. See Thompson v. Babcock, 147 Mont. 46, 409 P. 2d 808 (1966).

We are now in a position to summarize the statutory objectives of state land administration:

²⁴ 36 Opinions of the Attorney General, No. 92, (1976).

1. The Board shall administer the trust to secure the largest measure of legitimate and reasonable advantage to the beneficiaries of the trust.
2. The "full market value" concept shall guide all dispositions of interests in state school trust lands.
3. Long term productivity shall not be impaired; the Board shall seek to secure a sustained income to the Trust.

For purposes of this thesis and for the development of a consistent administrative policy, an assumption is made that these objectives are correct and documented as such. It is upon these objectives that the framework for a sound policy can and must be based. An additional assumption to be made in developing administrative policy for state grazing land is that the state, as trustee, will seek to avert risk.²⁵

Current Administration

Classification-Reclassification

The classification-reclassification of state lands (Section 81-302) is a major responsibility charged to the Department by the 1974 legislature. It involves classifying and leasing land in the class "which best accomplishes the powers and duties of the state board of land commissioners as specified in section 81-103." It also

²⁵Two U.S. Supreme Court decisions support this assumption: Ervien v. U.S., 251 U.S. 41, 64 L. Ed. 2d 128 (1919); Lassen v. Arizona, 385 U.S. 458 (1967).

emphasizes multiple-use management. In being consistent with the "objectives", this system should seek to secure the largest measure of legitimate and reasonable advantage to the beneficiaries of the trust; in other words, to seek the highest and best uses which compensate the trust.

Implementation of this system has been slow and problematic. Of concern has been just how much control and influence the Department should exert in seeking optimum land uses. Initial attempts of planning for the implementation called for extensive data collections and analyses of land characteristics in order to determine best use. What was missing from these initial attempts and of major importance, was the realization of the significance of demand. A tract of land cannot be leased for a particular land use unless someone is willing to lease it for that use. Highest and best use is highly dependent upon the various use demands, as would be indicated through a bidding process. The Attorney General's opinion on natural areas and monetary compensation to the Trust strengthens the bidding process as a viable solution to land use determination. Because the general public is not the beneficiary of the school trust, welfare considerations and non-monetary satisfactions are not priority items. Maximizing long term returns to the beneficiaries is of priority.

Stimulating demand for state land would seem to be an effective mode of achieving administrative objectives. A preliminary draft of

rules implementing the classification-reclassification system as drawn up by a legal intern employed during the summer of 1976 includes this tactic. The proposed procedure can be briefly summarized as follows:

1. Prior to lease renewal, the Department would make a preliminary review and could make recommendations for alternative uses (largely based on tract evaluations by fieldmen for potential uses).
2. Public notice of information availability - lists of renewal leases including legal descriptions of each tract, its classification and proposed reclassification, if any, would be prepared by county one (1) year prior to renewal. Copies of the list for each particular county would be posted in the courthouse for public inspection. Copies of lists would be available to any interested persons upon request. The Commissioner would release to the press, information concerning the availability of such items.
3. Interested persons would be allowed to propose alternative uses. For all uses analyzed and approved by the Department, applications and bids would then be accepted. Lessees would then be determined on the basis of the highest bid, while recognizing the preference right of the current lessee.

The inclusion of "information availability" has met with much resistance within the Department. Current lessees clearly are sensitive to anything that may result in loss of lease or higher rentals. Feelings of protective "ownership" seem to accompany the acquisition of state land leases. Certain attitudes that adopting such a method would be "political suicide" are evident. Others cite competitive bidding as leading to increased land degradation.

Exchanges

Consolidation of state lands into more economical units is advocated by some people. Not only could lessees benefit in having larger "blocks" but the state could also eliminate certain administrative costs such as travel, fee billings, and appraising for those smaller, hard-to-get-to tracts that, if exchanged, might benefit the trust.

No attempt will be made in this study to analyze the costs and benefits of land exchanges. What will be emphasized is that exchanges as a management alternative, when in the best interests of the trust, is provided for by law. Sections 81-413 and 81-307 stipulate "all lands shall be leased in as compact bodies as possible" and that "the board shall place priority on exchanges which result in consolidation of state lands in more compact bodies." At the present time, the management alternative of land exchanges is not actively used by the

Department and Board of Land Commissioners.

Sales

While the Board of Land Commissioners is authorized to sell state lands when in the best interests of the Trust, this alternative likewise has been given little weight by the Department or Board. Acre sales of state land for the past ten (10) years have been as follows:

<u>Year ending:</u>	<u>Acres</u>
June 30, 1967	3375.95
June 30, 1968	2633.81
June 30, 1969	1709.96
June 30, 1970	360.00
June 30, 1971	280.28
June 30, 1972	11.00
June 30, 1973	60.00
June 30, 1974	0.00
June 30, 1975	0.00
June 30, 1976	19.62

There has been a sharp decline in acres sold, illustrating the unwritten policy of "no sales" which has developed. In the past five (5) years, less than one hundred (100) acres have been sold.

With respect to grazing land, let us again look at the Land Board's written policy concerning sales:

Grazing land will only be sold when the land is so situated either as to size of tract or topography as to make future leasing difficult or when said sale will make possible a needed community or industrial development. In these cases sales will be considered only when the application contains a guaranteed bid of fair market value of the land which value

when invested at the current rate of return will at least exceed three times the present rental.

The reasons for sale seem to be quite restrictive and yet, at the same time, unclear. "Situating either as to size of tract or topography as to make future leasing difficult" implies that the land will not tend to attract competitive bids for grazing purposes. Although Department administrators have stated that small, isolated tracts (of which there are many) can be sold under this policy, active steps to identify and offer such tracts for sale are not taken. (In 1959, a large number of tracts associated with the "Glacier Park Exchange" were offered for sale by the Department. Many were sold and many were not, due to such reasons as the lands being generally of "poorer" type, lack of interest in land investments, no competition, etc. No significant land sale "offerings" have been made since that time..)

In the land board minutes of June 14, 1967, this statement was made by the Board in justifying the adopted criteria:

"while such bonds (government) are an excellent investment from the standpoint of security, their value as a hedge against inflation is questionable and for this reason we find dollars invested in this manner twenty years ago constantly eroding in terms of purchasing power."²⁶

²⁶ Minutes, State Board of Land Commissioners, Vol. XIII, p. 481

The resulting requirement that the return on investment be at least three (3) times the present rental for grazing is not too restrictive given the present level of rental rates. Table 4.1 gives the average per acre returns to grazing land for the past five years.

Table 4.1

Acres of State Grazing Land, Total Revenue,
and Average Returns Per Acre
(1972-76)

Year	Acres ²⁷	Revenue	Per Acre
1972	4,139,455.43	\$1,186,595.62	\$.287
1973	4,138,198.40	1,320,466.94	.319
1974	4,136,941.57	2,163,806.96	.523
1975	4,124,621.70	2,287,853.57	.555
1976	4,112,301.93	1,754,287.39	.427

Using average investment yield rates for those years, the average minimum grazing land sale values necessary to have met the policy requirement are given in Table 4.2.

²⁷ The acreage figures for 1973 and 1975 are interpolated as these data are only compiled for the end year of each biennial statistical report.

Table 4.2

Average Investment Yield Rates and Required
Minimum Sale Value Per Acre
(1972-76)

Year	Average Investment Yield Rates ²⁸	Required Minimum Sale Value/Acre
1972	4.2%	\$20.50
1973	5.56%	17.21
1974	5.56%	28.22
1975	5.82%	28.61
1976	6.68%	19.18

Indemnity Lieu Selections

Interestingly, while the Department is reluctant to sell any land, it is also in no hurry to complete its indemnity lieu selections. The Biennial Report of June 30, 1964 drew special attention to the importance of the lieu selections: "the selection of this remaining acreage is long overdue . . . barring any unforeseen developments this project should be completed within the next two years."²⁹ Yet, at the present time, there still remains 22,918.12 acres (nearly all non

²⁸Board of Investments. "Trust and Legacy Fund", Fiscal Year Report, 1974-75, p. 12, 1975-76, p. 14.

²⁹Biennial Report, Commissioner of State Lands and Investments, June 30, 1964, p. 11.

mineral in character") to be selected from the Federal domain.³⁰ It should be pointed out that the actual transfer of selected land from the Federal government to the State is a slow process due to the necessary verification of records, negotiations, public notification, paper work, etc. The Federal government is, however, relatively prompt in processing selection requests.

Aside from a special selection of 778 acres of forestland at the request of Montana's School of Forestry (completed 1977), the last indemnity lieu selection was completed in 1969. In 1972, a selection (3,660.92 acres) was made in southeastern Montana using up most of the "mineral in character" acres. A moratorium on this coal-related selection was imposed by the Federal government, pending a Utah court case involving Federal-state conflicts over mineral rights and is still in effect. Selection of "non-mineral" acres is, however, independent of this conflict and remains a responsibility.

Lease Cancellations

Montana's statutes list several conditions for which the lease involved shall be cancelled. Such violations include: mismanagement, overgrazing, concealment of facts, using the land for nonauthorized purposes, and nonpayment of rental by April 1. Leases cancelled,

³⁰ Department records, May 4, 1976.

except for those cancelled for nonpayment, are subject to the appeal procedure provided in Section 81-422.

There have been very few lease cancellations in recent years. The threat to a lessee of having a lease actually cancelled is quite minimal. The normal administrative procedure has consisted of sending a series of notices to the lessee, in order to solicit the desired action. Cancellations for mismanagement and overgrazing are especially rare.

Delinquent rental is a frequent problem, as often the April 1 deadline passes for several leases each year, with many violations "habitual." In the past, the Department has been very lenient in this area. Currently, however, there is a more stringent attitude developing toward overdue rental payments.

Competitive Bidding

Statistics

There are currently 7054 leases that contain grazing land (out of the total of approximately 8536 state surface leases). Of the 7054 grazing leases, 562 of them are leased on a competitive bid basis. (A competitive bid lease results from someone "bidding" over and above the minimum fee, through a written sealed bid procedure.) Thus, approximately only 8 percent of all grazing leases are competitive. The average competitive bid on state grazing land during the

period 1967-76 was \$3.52 per AUM. Data concerning competitive grazing leases by county is shown in Table 4.3. During 1976, increased income due to competitive bidding is estimated at \$192,286.57.³¹

Since grazing leases are normally issued for ten (10) year periods, the county lease data includes all competitive bids made during the last ten years. In terms of acreage, the 273,814.1 acres of competitively bid land constitutes 6.66 percent of the total grazing acreage (4,112,301.93 acres as of June 30, 1976). Thus, in 1976, approximately 17 percent of all grazing income came from about 7 percent of the land which was leased on a competitive bid basis. It should be pointed out that if the statutory minimum ever rises above a competitive bid, then the statutory minimum is the fee that is charged.

Table 4.4 is presented to give some indication of the amount of competitive bidding over the last ten (10) years. It appears that there has been an increasing trend in the number of competitive bid leases, especially so in 1972 and 1973. However, 1974 started the sequence of the five (5) small years of lease renewals. Since 1967 and 1968 did have quite large percentages of competitive leases, whether the 9-14 percent range of leases being bid competitively will

³¹This is the difference between the total competitive income and the expected minimum fee income, assuming an average fee of \$1.30 per AUM for the 86,794 competitive AUM's.

Table 4.3

Competitive Grazing Lease Data by County,
for State Grazing Lands (1967-76)

County	# of Competitive Grazing Leases	# of Competi- tive Grazing Acres	# AUM's	Total Bids	Average Bid/AUM
Beaverhead	7	9258.0	2825	\$ 5999.95	\$ 2.12
Big Horn	18	10958.06	3603	17601.35	4.89
Blaine	12	7181.86	2076	6586.09	3.17
Bronxwater	6	2453.15	720	2585.00	3.59
Carbon	10	4829.08	1353	4541.24	3.36
Carter	13	6333.6	1968	7045.00	3.58
Cascade	28	12153.07	3641	12763.84	3.51
Chouteau	22	13250.61	3481	10799.52	3.10
Custer	1	571.02	203	500.00	2.46
Daniels	1	25.6	8	40.00	5.00
Dawson	27	13783.24	4576	18175.47	3.97
Fallon	13	4367.94	1442	7269.21	5.04
Fergus	32	15311.91	4880	20521.22	4.21
Gallatin	3	935.70	316	1155.00	3.66
Garfield	10	5040.00	1371	5520.00	4.03
Glacier	3	1991.26	666	2366.50	3.55
Golden Valley	8	4040.50	1148	3807.65	3.32
Granite	4	2290.14	625	1912.99	3.06
Hill	25	9894.67	3368	13747.12	4.08
Jefferson	7	3350.20	943	1681.50	1.78
Judith Basin	27	8643.33	3659	15831.20	4.33
Lewis & Clark	11	11105.56	4821	11597.16	2.41
Liberty	7	1727.37	549	1576.06	2.87
Madison	5	4877.80	1200	2055.00	1.71
McCone	20	10505.40	3082	11849.50	3.84
Meagher	8	5407.69	2125	9001.30	4.24
Musselshell	7	3707.30	1048	3403.60	3.25
Park	8	2578.25	964	3398.82	3.53
Petroleum	10	6175.98	1657	4396.44	2.65
Phillips	13	5364.53	1464	3659.80	2.50
Pondera	6	1803.50	586	1841.55	3.14
Powder River	7	3698.37	1039	4300.00	4.14
Powell	7	5156.47	1747	4125.00	2.36
Prairie	8	3783.71	1219	8874.00	7.28
Ravalli	1	120.0	38	180.00	4.74
Richland	20	9095.82	3175	14351.82	4.52
Roosevelt	7	2057.28	639	2747.20	4.30
Rosebud	12	5300.95	1326	3377.50	2.55
Sanders	2	795.0	286	1277.00	4.47
Sheridan	10	2087.74	724	1951.80	2.70
Silver Bow	3	1940.20	582	827.50	1.42
Stillwater	18	7359.25	2566	9768.06	3.81
Sweetgrass	6	3022.98	958	3307.50	3.45
Teton	18	5869.34	2186	6383.55	2.92
Toole	22	10882.83	3041	8350.21	2.75
Treasure	1	640.0	132	806.51	6.11
Valley	10	4624.44	1487	4957.90	3.33
Wheatland	15	9200.26	2798	8545.53	3.05
Wibaux	7	3117.78	1158	4336.25	3.74
Yellowstone	16	5145.36	1325	3322.36	2.51
TOTALS	562	273814.1	86794	\$305,118.77	\$3.52

Table 4.4

Relative Competition for Grazing Leases (1967-76)

<u>Year</u>	<u>No. of Surface Leases Renewed</u>	<u>No. of Grazing³² Leases Renewed</u>	<u>No. of Competitive Bid Leases</u>	<u>Percent of Grazing Leases Comp. Bid</u>
1967	121	100	16	16.0
1968	202	167	20	11.98
1969	1474	1218	56	4.60
1970	1584	1309	76	5.81
1971	1290	1066	62	5.82
1972	1140	942	100	10.62
1973	1758	1453	135	9.29
1974	402	332	42	12.65
1975	302	250	25	10.0
1976	263	217	30	13.82
TOTALS	8536	7054	562	Ave: 7.97%

³² The ratio of 7054/8536 was applied to the known number of surface leases renewed per year (these data include cropland only leases) to estimate the number of grazing leases renewed per year.

continue will not be able to be determined until the significantly "large" years begin again in 1979. There has been an increase in the long run, however, In 1960, less than 4 percent of 5700 grazing leases were bid competitively, as compared to just under 8 percent now.³³

Table 4.5 shows the average competitive bid per AUM for the ten year period. Column number five gives the statutory minimum fee; column six gives the ratio of the minimum grazing fee to the average competitive bid for each year. The ratio of statutory minimum to average competitive bid has tended to be quite consistent. Figure 4.1 gives a graphical look at the two sets of data. As one would expect, the competitive bids and the statutory minimum, which is variable with the price of beef, show a positive correlation. A simple regression of the statutory minimum (X_i) on the average competitive bid per AUM (Y_i) yields the following equation:

$$Y_i = .14 + 3.88 (X_i)$$

This may be interpreted as a 1¢ change in the statutory minimum will lead to a 3.38¢ change in the state average competitive bid per AUM for that year. The coefficient of determination, R^2 , which gives the

³³ McDowell, James I. and Jerome E. Johnson. "An Economic Analysis of Alternative Methods for Establishing Grazing Rentals on State School Lands in North Dakota," Agricultural Economics Report No. 37, Dept. of Agricultural Economics, North Dakota State University, Fargo, N.D., September, 1964, p. 15.

Table 4.5

Competitive Bids on State Grazing Lands (1967-76)

Year	Bid Total	AUM Total	Ave. Competitive Bid/AUM	Statutory Minimum Fee	Ratio
1967	\$ 7054.95	2818	\$2.50	\$.74	.296
1968	8280.30	3822	2.17	.76	.35
1969	19197.23	7593	2.53	.76	.30
1970	31111.45	10906	2.85	.80	.28
1971	25898.89	8568	3.02	.85	.281
1972	49804.74	15035	3.31	.87	.263
1973	84708.17	23830	3.55	.95	.268
1974	26987.48	5560	4.88	1.69	.346
1975	22984.73	3634	6.32	1.79	.283
1976	29090.83	5028	5.79	1.30	.225
TOTALS	\$305118.77	86794	Ave: \$3.52		Ave: .289

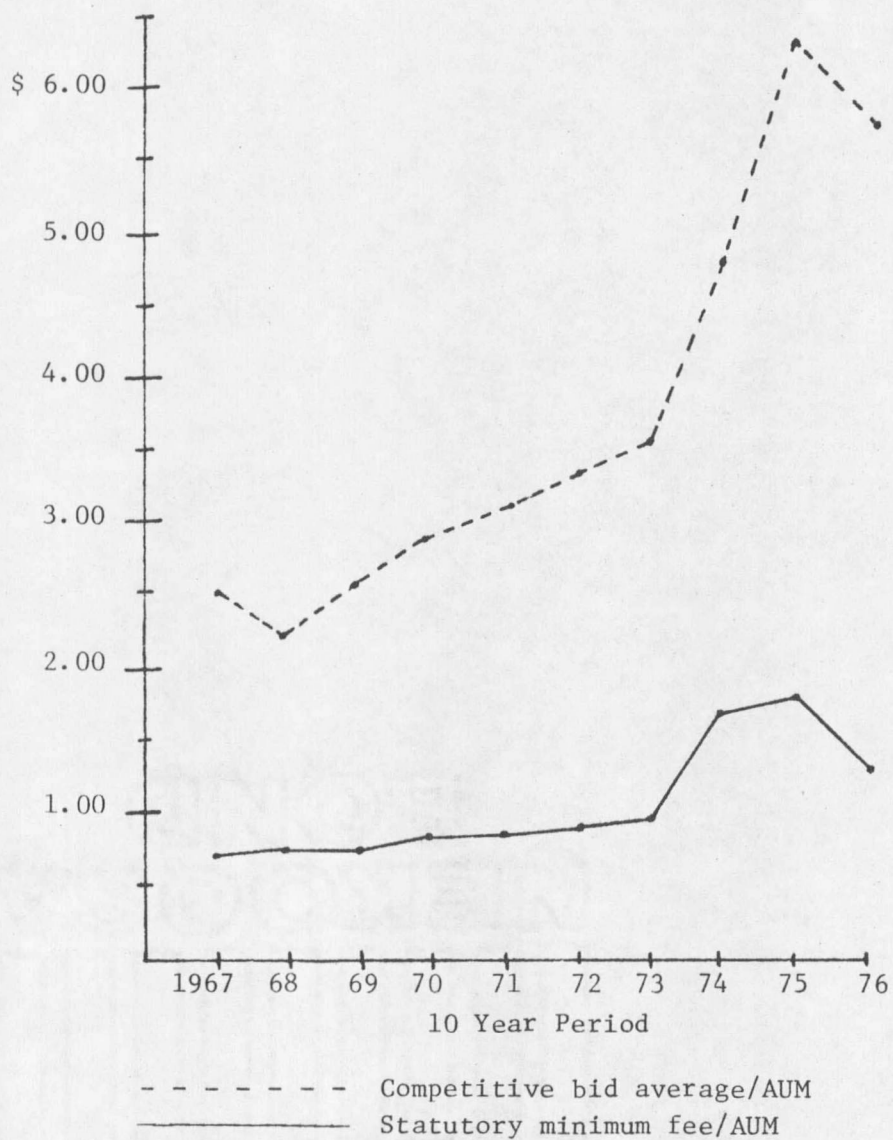


Figure 4.1 Ten Year Trends of the Average Competitive Bid and Minimum Fee for State Grazing Land (1967-76)

proportion of the total variation in the dependent variable (ave. competitive bid) that is explained by the independent variable (statutory minimum), equals .85. The standard error of the coefficient is .496, giving a calculated "t value" of 6.81, which indicates, at the 99 percent confidence level, the hypothesis that there is no relationship between the two sets of data, can be rejected.

Although the ratio dropped progressively from 1974 to 1976, it is interesting to note that the statutory fee formula change in 1974 boosted the ratios over what they would have been under the old formula. With the old formula ($32¢ + (2 \times \text{Ave.})$ price of beef), the fees for 1974-1976 would have been \$1.11, \$1.18, and \$.85. The resultant ratios would have been .227, .187, and .147 respectively.

Barriers

Efforts to encourage competition appear to be consistent with state land objectives. In addition to increasing revenue, competitive bids give some indication of the market value of state grazing land. Through the competitive bid procedure, anyone wishing to use the land has an opportunity to express his interests openly. Although the 8 percent figure leaves room for improvement, there are certain barriers to competition that constrain the system.

The first barrier, an important one, is that of neighbor relations. Competitive bidding on a neighbor's lease naturally has the

general interpretation of being "anti-neighborly." Therefore, neighboring ranchers on friendly terms who wish to remain that way, will seldom bid against each other.

Isolated tracts will also tend to eliminate competition. If the lessee's private land surrounds a state tract, distance and accessibility problems clearly weigh against another rancher's decision to bid on the tract.

Another barrier to competitive bidding is the existence of the preference right and the lessee's right to appeal competitive bids. At the time of lease renewal, if other bid applications have been received, the current lessee "has the preference right to lease the land covered by his former lease by meeting the highest bid made by any other applicant." If the lessee feels that the high bid is excessive, he may meet the bid and request a competitive bid hearing (Land Board policy). At the hearing, the lessee is given the opportunity to state why he believes the bid is unreasonable. The bidder is also invited to the hearing to defend the bid. The deciding factor is whether or not the bid is within "community (county) standards", based on other existing state grazing leases, and testimony concerning other private leases in the county. Thus, it is the "market" price concept that applies; a rancher's ability to pay is not considered. If the bid is deemed to be too high, the Department then makes a recommendation to the Land Board that the bid be lowered

to the "high level" range of the county.

Since the lease period covers ten (10) years, bids are in effect for that time. However, "speculative" bidding, that is to bid high in anticipation of increasing beef prices, is not allowed. The factor again is the current range of grazing rentals at the time of renewal. In effect, about the only way a bidder can get a lease is to bid near the high level range of county standards and hope that the lessee feels it's too much, does not want to speculate, and does not meet the bid. If the bidder bids a reasonable amount, the lessee will meet it; if he bids over county standards, the lessee can appeal the bid and probably get it lowered. One important advantage of bid hearings is that they protect the lessee from "spite" bidding. (At the present time, the preference right is being challenged as unconstitutional in District Court of the 1st Judicial District, Albert Jerke v. Department of State Lands.)

Influence of "big operators" and grazing districts and associations seems also to be a deterrent to competition. A "big operator" is defined as a rancher leasing 10,000 or more state grazing acres. Data collected shows that these operators, plus the grazing districts and associations, currently lease a total of 816,826.53 acres or 19.86 percent of all state grazing land. With respect to competitive bids, this group has only 4.27 percent of the competitive leases and

6.51 percent of the competitively bid acres.³⁴ The average competitive price per AUM is \$3.10 which is about 12 percent lower than the total average of \$3.52. It appears that there are legitimate reasons that help explain this decreased bidding. Access is probably the significant factor hindering bidding against "big operators." When a lessee has over 10,000 acres of state land contained in several leases, plus his own deeded land, chances are good that many of the leases are "protected" because of inaccessibility. With grazing districts and associations, the "neighbor concept" probably is prevalent. Ranchers usually prefer not to bid against a grazing cooperative and get a whole group of individuals upset. The possibilities of joining the district or association would be a better alternative. It is also a fact that state grazing districts, through their by-laws, are required to lease all state land within their boundaries.³⁵

The last barrier to be discussed is that of lack of information. Prospective users often don't find out where state land is, and when it is up for renewal. Contacting only those persons who have "previously expressed an interest" restricts the number of bidders considerably.

³⁴This group has 24 competitive grazing leases, 14 held by "big operators and 10 by grazing districts/associations. These leases collectively total 17,834.29 acres.

³⁵R.C.M. (1947), Section 46-2316.

The effects of these barriers can be illustrated to some extent by comparing the relative "competitiveness" in each county, as shown in Table 4.6. The geographic distribution can be seen more clearly in Figure 4.2. The "good neighbor" concept is especially prevalent in Daniels County, where nearly 24 percent of the total county acreage is state land. In this county, only .02 percent of all state grazing land is on competitive bid. Two geographic patterns, consisting of counties with less than 5 percent competition, are identified on the map (shaded areas). It is worth noting that state grazing districts and grazing associations are common in eastern Montana, in addition to a tendency toward larger sized farms and ranches.³⁶ It would appear that the mountainous regions of southwestern Montana contribute to access restrictions. Several grazing districts are also existent in this area of the state.

³⁶ This can be seen by analyzing data obtained in the 1969 Census of Agriculture for "average Size of Farm" and "All Farms-Number," part 38 Montana Section 2. County Data.

Table 4.6

Relative County "Competitiveness" for State Grazing Land

County	Total Grazing Acres *	# of Competitively Bid Grazing Acres	% of Total
Beaverhead	328,601	9258	2.82
Big Horn	83,642	10958	13.10
Blaine	170,116	7182	4.22
Broadwater	24,069	2453	10.19
Carbon	42,050	4829	11.48
Carter	141,204	6334	4.49
Cascade	64,617	12153	18.81
Chouteau	205,486	13251	6.45
Custer	135,255	571	.42
Daniels	117,255	26	.02
Dawson	75,030	13924	18.56
Deer Lodge	6,773	-0-	0.00
Fallon	59,657	4368	7.32
Fergus	144,107	15312	10.63
Flathead	1,281	-0-	0.00
Gallatin	36,754	936	2.55
Garfield	166,637	5040	3.02
Glacier	6,532	1991	30.48
Golden Valley	46,485	4041	8.69
Granite	10,953	2290	20.91
Hill	101,580	9895	9.74
Jefferson	30,802	3350	10.88
Judith Basin	81,959	8643	10.55
Lake	5,515	-0-	0.00
Lewis & Clark	105,781	11106	10.50
Liberty	67,735	1727	2.55
Lincoln	919	-0-	0.00
Madison	122,797	4878	3.97
McCone	83,611	10505	12.56
Meagher	89,125	5408	6.07
Mineral	115	-0-	0.00
Missoula	1,233	-0-	0.00
Musselshell	54,973	3707	6.74
Park	31,572	2578	8.17
Petroleum	62,954	6176	9.81
Phillips	179,855	5365	2.98
Ponder	33,025	1804	5.46
Powder River	139,928	3698	2.64
Powell	39,858	5156	12.94
Prairie	69,209	3784	5.47
Ravalli	7,728	120	1.55
Richland	71,996	9096	12.63
Roosevelt	16,388	2057	12.55
Rosebud	175,802	5301	3.02
Sanders	10,049	795	7.91
Sheridan	31,612	2088	6.61
Silver Bow	12,787	1940	15.17
Stillwater	39,252	7359	18.75
Sweet Grass	46,624	3023	6.48
Teton	91,968	5869	6.38
Toole	78,609	10883	13.84
Treasure	36,828	640	1.74
Valley	184,168	4624	2.51
Wheatland	70,140	9200	13.12
Wibaux	25,961	3118	12.01
Yellowstone	71,487	5145	7.20

* As of June 30, 1968. This is the latest data available by county and is assumed to be relatively close to the present county acreage.

Figure 4.2

Competitiveness for State Grazing Land (1976)



Upper number - % of grazing acres on competitive bid.

Lower number - # of state grazing acres in county (1968 data)

Chapter 5

DETERMINING A MINIMUM GRAZING FEE

The subject of grazing fees has been an important public issue for many years. In the early 1960's, interest in this area began to grow, resulting in several studies since that time. The majority of these reports have dealt with the pricing of public lands, as opposed to state trust lands. Still, up to the present time, a satisfactory grazing fee system, acceptable to all interests, has not been devised. Since there is a conflict of interests - some want to increase revenue from public and state lands while others would have users pay as little as possible - no grazing fee system can satisfy all interests.

An act known as the Federal Land Policy and Management Act of 1976 was passed by the last Congress and signed into law by President Ford on October 22, 1976.³⁸ As required by the Act, a study and report on livestock grazing fees on BLM and Forest Service lands is to be made by the USDA and the Interior Department. As a result, a joint task force has been established to prepare the report, which is to be submitted to the Congress by October 21, 1977.³⁹ The Task Force

³⁸ Montana Farmer-Stockman, "Federal Land Act of 1976," Vol. 64, No. 10, Feb. 3, 1977, p. 52.

³⁹ Montana Farmer-Stockman, "Grazing Fee Study Getting Started," Vol. 64, No. 12, March 3, 1977, p. 61.

is charged with preparing recommendations that would establish fees equitable to the Federal Government, and to holders of grazing permits and leases. Under the Act, no change in grazing fees can be made prior to submission of the report.

It is expected that a technical committee report, "Review of Public Land Grazing Fees," which was completed in November, 1976, will be used as a primary document by the Grazing Fee Task Force.⁴⁰ This report was submitted in fulfillment of the Memorandum of Understanding signed in July, 1976 between the Bureau of Land Management, Forest Service, Economic Research Service, and Statistical Reporting Service. Highlights of the report will be discussed later in this chapter.

Related Research

Economic Considerations

An open competitive bid system of fees, where at least the second highest bidder's value of marginal product is gained, would come closer than any formula system in attaining the goal of collecting "full market value." It is assumed the second highest bidder stops bidding when the value of his marginal product is reached. (Note that under the conventional auction system, the highest bidder bids what he needs to in order to get the bid, not necessarily the value of his marginal product. A Dutch auction system, where the price

⁴⁰Federal Register, Vol. 42, No. 24, Friday, February 4, 1977, p. 6980.

starts high and then is lowered until someone accepts the bid, would be more theoretically ideal in realizing the highest possible price.) It is clear that a fee formula cannot determine this value for all cases. A minimum grazing fee formula for state grazing lands will have to settle for something less, which like the Federal government, might be termed "fair market value."

First-order conditions for profit maximization require that (a) "each input be utilized up to a point at which the value of its marginal product equals its price."⁴¹ In addition, optimum input combination occurs where the marginal rate of technical substitution equals the price ratio or alternatively, (b) that the ratios of marginal product divided by input cost, for all inputs, are equal.⁴² At this optimum point, the contribution to output of the last dollar spent for each input is the same. These conditions are shown in equation form as follows, using a two variable input (x and y) example:

$$a) \quad VMP_x = P_x$$

$$VMP_y = P_y$$

$$b) \quad \frac{MP_x}{P_x} = \frac{MP_y}{P_y} = \mu$$

In a competitive situation, users of factors x and y will use an amount of these factors, and/or bid up the price of these factors

⁴¹Henderson, James M. and Richard E. Quant. Microeconomic Theory, (McGraw-Hill Book Company, 1971), p. 68.

⁴²Ibid., p. 64.

until an equilibrium condition is reached and the equality explained above is achieved.

There is little doubt that grazing fees for public and state grazing lands are below the full value of the marginal product for these lands. This is best evidenced by the "capital values" that grazing permits and leases have taken on, the result of the original underpricing of government grazing lands. This aspect has been verified through several studies. A study in Montana by Degn and Jensen (1965) empirically concluded that federal grazing permits "do have a monetary value to the Montana cattle rancher."⁴³ Implications of fee increases on these values will be discussed later.

There have been several attempts to determine the "marginal value" of grazing. Martin, in 1966, used the discounting procedure to convert capitalized marginal values in terms of sale price into marginal values in terms of fees.⁴⁴ The analysis was based on data from 160 bona fide ranch sales from 1957 through 1963. The formula

⁴³Degn, Arne M. and Clarence M. Jensen. "An Estimation of the Value of Federal Grazing Permits Used by Cattle Ranches in Montana." Montana Agricultural Experiment Station, Research Bulletin, Montana State University, Bozeman, MT, August 1965, p. iv.

⁴⁴Martin, William E. "Relating Ranch Prices and Grazing Permit Values to Ranch Productivity," J. Range Management, Vol. 19, No. 5, September 1966, p. 250.

used in the analysis is:

$$R = V r$$

where R equals the discounted fee differential; V is the sale value of the permit; and r is the discount market rate of interest. The marginal value product is obtained by adding R to the grazing fee. In addition, Martin offers the hypothesis that ranching is an investment in several other "outputs" besides beef including tax shelters, land and lease appreciation, and the ranching way of life.⁴⁵ He proposes that these outputs also constitute part of the return of investment and should be considered in the determination of fees.

In a study by Nielsen, it was assumed that the marginal value product (MVP)⁴⁶ of grazing is represented by private lease rates. He states that "the private lease rate, set in a competitive market, comes nearer to estimating the MVP of grazing than any other economic indicator available."⁴⁷ He establishes the value of public grazing as the private MVP minus the non-fee costs of using public ranges.

⁴⁵Ibid., p. 249.

⁴⁶The term MVP, as used in other studies, is assumed to be interchangeable with Henderson's and Quant's VMP as the production function is assumed to be continuous.

⁴⁷Nielsen, Darwin B. "Economic Implications of Variable Versus Single Grazing Fees," J. Range Management, Vol. 25, No. 1, January 1972, p. 4.

Kearl, on the other hand, discounts the marginal value productivity approach. His work in valuing public grazing is done from the standpoint of average value productivity. He uses a residual computation process to allocate returns among the various factors of production, including the operator's management, labor, and capital. Results from his study show a residual return to land and taxes, from livestock production, amounting to \$1.40 per AUM equivalent for 1970-74.⁴⁸ In effect, private lease rates should not therefore be called market prices, as these high rates cannot be economically justified for the entire livestock enterprise on a year-long basis. In a personal letter (February 17, 1976) to the author, Kearl writes:

range land and the nonrange feed resources on a ranch are used in approximately fixed proportions. As far as I am concerned it is impossible to derive a marginal value productivity of one resource out of a set of resources when all are used in fixed proportions. That means that you cannot assign a value per AUM for the grazing land at higher than the average return per AUM to all the feed resources.

Kearl's approach is debatable. First of all, there is little evidence that feed resources are used in rigidly fixed positions. At the margin, substitutions are possible. Second, there is some question as to why public and state lands should be the shock absorber

⁴⁸Kearl, W. Gordon. "Assessment on Productivity of Agricultural Lands in Wyoming," AE 75-13, Division of Agricultural Economics, University of Wyoming, Laramie, WY, December 1975, p. iii.

for high costs, low prices, or poor management. An argument can also be made that labor and management should be the residual, rather than land and taxes.

Next, there are economic implications concerning fee increases that are important to consider. One is loss of permit or lease value. A rancher who has bought Federal permits or state leases at a price, is in effect paying the market value for the grazing. If grazing fees are suddenly increased to market value, the capitalized value of the permit or lease would fall to zero, and the rancher would then be paying for the grazing right twice. Even to longtime permittees or lessees, "permit value" is real in the form of an opportunity cost. Nielsen and Roberts stress the recognition by government of permit value as a legitimate cost of ranching.⁴⁹ They point out many instances where the government does recognize this value such as collateral for loans, reimbursement when permits are lost due to government land use projects, and the allowance of permit loss as a "capital loss" by the IRS. Hooper states that, for the government to raise fees without compensating permittees for the capitalized permit value, would be "penalizing the permittee for a Government policy not of the

⁴⁹ Nielsen, Darwin B. and N. Keith Roberts. "Position Statement on Current Grazing Fee Issues and Problems," Ag. Econ. Series 68-3, Utah Agricultural Experiment Station, Utah State University, Logan, Utah, November 19, 1968, p. 4.

ranchers' own making, but a product of our own political system."⁵⁰

Some economists thus argue that if permit value is recognized, there is no justification for fee increases. According to most court evidence, however, such "property rights" do not exist.

Another result of fee increases is an obvious one, that of annual income losses. The effect of increased fees on an individual rancher's income will depend on his degree of dependency on public grazing, his equity position, and his ability to adjust his operation.⁵¹ There is also an income loss in the secondary sectors of the economy - the ranching communities. The level of economic interdependence between the ranching sectors and the community business sectors is diminished and both suffer. Two estimates of the derivative income multipliers, 1.6 and 2.0, were made in 1968 studies in Oregon and Utah. The multiplier is interpreted to mean that a \$1.00 decrease in the primary ranching sector income will lead to, for example, a secondary business sector loss of \$.60. It should be clear that economic impacts will

⁵⁰Hooper, Jack F. "Potential for Increases in Grazing Fees," J. Range Management, Vol. 20, No. 5, September 1967, p. 302.

⁵¹Peryam, J. Stephan and Carl E. Olson. "Impact of Potential Changes in BLM Grazing Policies on West Central Wyoming Cattle Ranches," Research Journal 87, Agricultural Experiment Station, University of Wyoming, Laramie, WY, April 1975, p. 17.

be greatest on those communities that have the greatest dependence on public and/or state lands.

To minimize the impacts of fee increases, it is desirable to spread increases over a number of years in small increments. This is the method that was employed by the Federal government in their 1969-1976 system.

The ranch operator can attempt to compensate for income losses in ways such as becoming more efficient, i.e. increasing calving percentages and increasing selling weights, increasing forage production on privately owned grazing lands, ranch enlargement, and/or by ranch resource reorganization.⁵² The best course of action will naturally depend on individual circumstances and the cost structure of each ranch.

Formulas

In 1964, a report entitled "An Economic Analysis of Alternative Methods for Establishing Grazing Rentals on State School Lands in North Dakota" was completed by McDowell and Johnson. Their recommendations basically amounted to the system existing in Montana at that time (which is still in effect). The recommendations included a variable rental formula, rentals established on an animal-unit-month

⁵²Ibid., p. 15-16.

basis, and a simple formula.⁵³ Their formula proposal was:

AUM rental = $50¢ + (5P \overset{0}{-} 25\%)$, where P is the average annual price of steers and heifers in North Dakota, and zero to minus 25 percent permits a sliding percentage adjustment up to 25 percent in the rental for differences in grazing capacity . . . the 50-cent constant represents a conservative estimate of land taxes and administrative costs per AUM.⁵⁴

The criteria used in the selection of the grazing fee formula recommended include:

. . . charging according to amount of the forage produced, measured in terms of the AUMs available; the user's ability to pay, measured in terms of the average prices of livestock received during the previous year; effects of the formula on the livestock industry, as studied over a typical livestock cycle, the longrun productivity of the land; and administrative feasibility.⁵⁵

It can be seen that Montana's current formula is quite similar to the recommended one. It is interesting to note that North Dakota does not yet have a variable formula, and instead has a set fee. One argument against variable lease prices was brought out in the report and is worth noting:

. . . often when livestock prices are low or falling, the demand for grazing lands is increased because producers are withholding livestock from the market hoping for significant price increases.⁵⁶

⁵³ McDowell and Johnson, op. cit., p. 21-22.

⁵⁴ Ibid., p. 22.

⁵⁵ Ibid., p. 21.

⁵⁶ Ibid., p. 14.

Leistritz and Dunn, also from North Dakota State University, proposed a formula in 1971, for determining fees on federal range lands:⁵⁷

$$\text{Grazing Fee per AUM} = (\text{base}) \times \frac{\text{Index of range livestock prices}}{\text{Index of prices paid for inputs}}$$

This formula includes an adjustment factor for the costs of producing range livestock as well as for prices received, similar to a parity price ratio. The level of the grazing fee is dependent upon the "base" term. Two alternatives are presented for establishing the base.

One method involves defining the base as the difference between the private land lease rate and the nonfee costs of grazing on public lands. It is stressed that "all user costs, including the permit value, be considered in determining the base fee."⁵⁸ Here "permit value" is used to refer to investments in improvements on public land and in the "commensurable unit" which a federal land lessee must own.

The other method considers what constitutes a "fair return" to the resources of the stockman, which is Kearl's approach. The base fee is set at the maximum level which allows a fair level of return to

⁵⁷ Leistritz, F. Larry and Edward V. Dunn. "An Economic Analysis of Grazing Fee Levels on Federal Range Lands," Ag. Econ. Report No. 76, Dept. of Agricultural Economics, North Dakota State University, Fargo, ND, April 1971, p. 35.

⁵⁸ Ibid., p. 34.

the stockman's labor and capital to be earned. It should be pointed out that this method is not permitted by Montana law, which sets forth the objective to maximize the return to the school trust fund.

The use of a prices paid index was proposed in lieu of the private lease fee index. In a previous study, Leistritz concluded, through an empirical analysis, that private rents have a strong functional relationship with land prices over time, but not with net farm income.⁵⁹ Thus, the exclusion of the private fee index is aimed at preserving a "fair" level of return to the rancher.

Leistritz and Dunn advocated the establishment of different grazing fee levels for different ranching areas, dependent on resource bases, production practices, and cost structures.⁶⁰ They emphasized the requirement for precise information concerning practices, costs, and returns.

In January of 1969, the Bureau of the Budget announced a revision in the method of establishing grazing fees on public rangelands in the western U.S. that, if implemented, would result in fee increases. The study by Leistritz and Dunn was undertaken as a result of this announcement, at the request of the North Dakota Grazing Association.

⁵⁹Ibid., p. 32.

⁶⁰Ibid., p. 36.

The Federal government's proposed formula involved the establishment of a base grazing fee, as determined by the first method above, on the basis of data collected by the Statistical Reporting Service in 1966. It was further proposed that the base fee be adjusted annually only by an index factor of the preceding year's private land lease rates, using 1966 as the base year. Previously, livestock prices were considered in adjusting the fee. In addition, the increase in fees was to be achieved over a ten year period in order to minimize the impact of the adjustment.

On the basis of the data analysis, the Technical Committee (composed of representatives from the SRS, ERS, FS, BLM, and Bureau of the Budget) came to the following conclusions:⁶¹

- (1) the data did not provide a basis for differential fees between Forest Service and BLM,
- (2) the data did not provide a basis for establishing separate fees for cattle and sheep,
- (3) the data analysis provided a basis for a public land grazing fee of \$1.23 per animal unit month.

A summary of the cost data used in setting the "base", as reprinted in an article by Nielsen, is given in Table 5.1.

As it turned out, this system was implemented and remained in

⁶¹Federal Register, op. cit., p. 6985.

Table 5.1

Summary of Combined Average Public Costs and
Private Costs per Animal Unit Month, 1966⁶²

Itemized Costs	Cattle		Sheep	
	Combined Public Costs	Private Costs	Combined Public Costs	Private Costs
Lost animals	\$.60	\$.37	\$.70	\$.65
Association fee	.08	--	.04	--
Veterinary	.11	.13	.11	.11
Moving livestock to and from allotments	.24	.25	.42	.38
Herding	.46	.19	1.33	1.16
Salting and feeding	.56	.83	.55	.45
Travel to and from allotments	.32	.25	.19	.43
Water	.08	.06	.15	.16
Fence maintenance	.24	.25	.09	.15
Horse	.16	.10	.16	.07
Water maintenance	.19	.15	.11	.09
Developmental depreciation	.11	.03	.09	.02
Other costs	.13	.14	.29	.22
Private lease rate	--	1.79	--	1.77
Total costs	\$3.28	\$4.54	\$4.53	\$5.66
Difference		\$1.26		\$1.13
Weighted average			\$1.23	

⁶²Nielsen, op. cit., p. 4.

effect during the 1969-1976 period, resulting in much controversy. As mandated by the Federal Land Policy and Management Act of 1976, no further increases in fees can be made until the current Task Force study is completed. Thus for 1977, grazing fees for BLM and Forest Service lands remain at the 1976 levels of \$1.51 and \$1.60 (per AUM) respectively. "Fair market value" for 1976 is listed at \$1.94, as determined by the 1969 fee system.⁶³

The 1976 Technical Report

This latest report, "Review of Public Land Grazing Fees" was done within existing administrative constraints that a fair market value fee must be collected and that permit value would not be considered a valid cost factor in determining public land grazing fees.

The Technical Committee recommends the following formula for determining grazing fees:⁶⁴

$$\text{FMV (Fair Market Value)/AUM} = A \frac{(L + P)}{100}$$

A = \$1.23 base established from 1966 survey

L = The improved Index of Private Land Lease Rates

P = The reconstructed Index of Beef Prices minus the Prices

Paid Index (selected items only)

⁶³ Federal Register, op. cit., p. 6989.

⁶⁴ Ibid., p. 6981.

According to the report, the ideal system of optimal input use and profit maximization by the operator does not exist, at least not in the short-run. Instead, the economic premise for the real world is based on the theory of fixed assets as postulated by Glenn L. Johnson.⁶⁵ This states that resources usually considered variable in production such as labor and capital, can actually become fixed in their present use. This happens because their "alternative use outside of production can temporarily drop as far as zero."⁶⁶ It is then stated that:

. . . the value in use that would be expected to accrue to these resources is often used by managers to bid up the use value (returns) of resources that have continued to remain variable.⁶⁷

This can happen even during periods of decreasing marginal revenue, as is evident with the bidding up of the range forage resource for livestock production. The report lists four (4) reasons for the inability to efficiently adjust production levels and resource allocation:⁶⁸

- 1) The combination of resources used in the livestock production process are not discrete, but a bundle or package

⁶⁵Ibid., p. 6983

⁶⁶Ibid.

⁶⁷Ibid.

⁶⁸Ibid., p. 6987.

of resources, which cannot easily be separated in the short-run.

- 2) Variable resources become fixed because of the length of the production process.
- 3) The demand curve faced by the firm is perfectly elastic while that of the industry is inelastic.
- 4) The role of the price system as an organizer of production may work imperfectly, possibly due to an inability to bridge the gap from present product prices to expected price levels in the future.

The report recognizes the open competitive bid system as the most efficient solution to obtaining full fair market value. Yet it also admits that a competitive environment is effectively eliminated by institutional goals, tenure arrangements, access restrictions, legislative requirements, and management guidelines.

The variables in the proposed formula are included because the committee felt that these factors will measure changes in the value of the resource in both the long-run and the short-run. The index of private land lease rates is chosen because:

- 1) it is reflective of a competitive environment.
- 2) It theoretically measures changes in efficiency of range resource use over time.
- 3) It should give a close estimation of fair market value that

would be obtained under a competitive bid system.

- 4) It reflects changes in the level of economic parameters such as the inflation rate, purchasing power of the dollar, and the value of farm real estate.⁶⁹

The combined index of beef prices and prices paid is included because it is felt that this index does reflect short-run instabilities in the value of the range resource, as well as contributing to economic stability.

The report stresses the need for improvement in data collection procedures. Currently private lease rates are obtained through a U.S.D.A. general purpose questionnaire in which respondents report the going rate for pasturing cattle on private land in their particular area. Additional questions more specifically addressed to the respondent are listed. It is recommended that the \$3.65 private lease base value for 1964-68 continue as the proper base. Some modification was also suggested for the prices paid index to more accurately reflect true costs of production. Possible components mentioned are motor supplies, motor vehicles, farm machinery, farm supplies, building and fencing materials, interest per acre, and wage rates.

Interestingly, the report makes a strong stand against a tiered system of fees based on carrying capacity, as Montana state grazing

⁶⁹ Ibid.

lands are priced. Relevant examples that do not support this system include:⁷⁰

- 1) Intra-allotment differences in forage production and grazing conditions are just as variable as inter-allotment differences.
- 2) Livestock water may be the limiting factor on some rangeland and not forage quality.
- 3) Winter ranges (usually of low productivity) may have greater economic value to the stockman than summer ranges because the alternative is to feed expensive hay.

Several studies are cited to support the claim that no statistical evidence supports a tier system based on forage production. In addition, it appears that existing cut-off points (14 head and 19 head sections for state lands) are arbitrary and without foundation.

The recommendations conclude with the proposal that a 25 percent upper limit be imposed in the event that changes in economic conditions would cause a sudden fee increase.

Additional Fee Statistics

The "full market value" concept should be an important consideration in Montana's policy of fee setting. As a statutory objective,

⁷⁰Ibid., p. 6988.

this concept is to "guide all dispositions of interests" in state school trust lands. A question yet unanswered is how to determine the "market price" of state land grazing.

A comparison between the minimum statutory fee, the competitive bid average, and private lease rates in Montana for the last five years is shown in Table 5.2.⁷¹ Note that the ratios for 1976 and 1977 (competitive bid average and private lease rates are conservatively estimated) are below the ratios prior to the last fee formula modification implemented in 1974.

It is also interesting and hopefully worthwhile to compare fee rates in other western states. Table 5.3 shows these rates for the past three years. It can be seen that Montana's 1976 base grazing fee was lower than all others listed except for Arizona and Wyoming.

Before making any conclusions about the level of Montana's fees, it is important to look at the composition of the total grazing land supply in Montana. Since the major concern is lease rates, the relevant land supply is that land available to ranchers for lease. Table 5.4 gives the "leaseable" grazing acres as of June 30, 1976, included under the control of the four major units of grazing land ownership.

⁷¹The private lease rates are those reported by the U.S.D.A. in "Farm Real Estate Market Developments," Economic Research Service, U.S. Department of Agriculture, July 1976, p. 37.

Table 5.2.

Comparisons Between the Statutory Minimum, the Average Competitive Bid
on State Grazing Land, and the Private Lease Average for
Montana (1972-77)

Year	(A) Statutory Minimum	(B) Ave. Comp. Bid	Ratio A/B	(C) Private Fee Average	Ratio A/C
1972	.87	3.31	.263	\$4.30	.202
1973	.95	3.55	.268	4.80	.198
1974	1.69	4.88	.346	6.60	.256
1975	1.79	6.32	.283	7.00	.256
1976	1.30	5.79	.225	7.40	.176
1977 (projected)	1.48	6.00	.247	7.60	.195

Table 5.3.
Grazing Fees on Other State and Federal Lands (1974-76)⁷²

Other grazing lands	1974	1975	1976
Arizona	\$.73	\$.69	\$.66
California	1.00	1.00	1.51 (same as BLM)
Colorado	3.00	2.50	2.50
Idaho	2.64-3.40	2.00-4.50	2.00-4.50 (depends on land quality and demand)
Montana	1.69	1.79	1.30
Nebraska	7.00-9.00	9.00	8.75
North Dakota	2.65	2.65	2.65
Oregon	1.00	1.25	1.50 (trying to reach fair market value \$3.00)
South Dakota	2.47	2.68	1.58 (1976-attempted to set rate at \$4.50-lost court case-under appeal)
Utah	NR	NR	1.50/1.76 (lower/higher elevations)
Washington	2.87-3.00	3.50	3.50
Wyoming	1.25	1.25	1.25
BLM	1.00	1.00	1.51
Forest Service(average)	1.11	1.11	1.60
Average	2.30	2.44	2.37
NR - not reported			

⁷² Data from other states was obtained through correspondence with the respective state land departments.

Table 5.4

"Leaseable" Grazing Acres, Ownership,
and Percent of Ownership - Montana (1976)

Ownership	"Leaseable" Grazing Acres	Percent of Total
Private (Source: Report of the Dept. of Revenue 1976)	37,210,260	70.9
BLM (Figure supplied to Department by BLM 9/10/76)	8,011,596	15.3
State (DSL Statistical Report June 30, 1976)	4,112,302	7.8
Forest Service ("Net suitable"- Source: Mac Green, U.S.F.S. May 1976)	<u>3,142,685</u>	<u>6.0</u>
	52,476,843	100.0

Of the 37,210,260 privately owned grazing acres, it is unknown just how many of these acres are leased. For analysis purposes, an assumption figure of 7.4 percent will be used (this figure corresponds to the percent acre tenancy of all agricultural land in Montana - 1969 Census of Agriculture. Bureau of the Census, Washington, D.C.). Therefore it is assumed that 2,753,559 privately owned acres are rented and the estimated "leased" acres supply appears as follows in Table 5.5.

It must be emphasized that private land is the most readily obtainable grazing land because private leases are usually for a

Table 5.5

"Leased" Grazing Acres, Ownership,
and Percent of Ownership - Montana (1976)

Ownership	"Leased" Grazing Acres	Percent of Total
Private	2,753,559	15.6
BLM	8,011,596	45.5
State	4,112,302	23.4
Forest Service ("open" acres)	<u>2,726,245</u>	<u>15.5</u>
	17,603,702	100.0

shorter lease period and do not have "preference rights". It is also estimated that leased private land makes up approximately only 15 percent of all leased grazing land. It is nearly impossible to determine the market value of grazing per AUM when nearly 85 percent of the leased land supply is comprised of BLM, State, and Forest Service land, all of whose AUM rates are basically set by methods other than the market forces of supply and demand. It is only in the private sector, a small part of total leased acre supply, where the short run forces of supply and demand can operate freely to accommodate grazing needs for various kinds of emergency situations which occur in the ranching business. It is hypothesized that this demand for short term grazing resources, falling upon a small sector of the total market, overestimates the market price for such resources if

they were available in a free market system. The extent of this over-estimation, if any, is not known.

It is, however, possible to compute a weighted "average price paid" per AUM in these four market sectors by multiplying the percents of total leased supply times the appropriate rental rates, and then summing the weighted sector prices (see Table 5.6).

Table 5.6

Weighted Average Price Paid per AUM - Montana (1976)

		AUM Rental		Weighted Price
Private	1.56 percent of the leased supply	@ \$6.90	=	\$1.0764
BLM	45.5 percent of the leased supply	@ \$1.51	=	.6871
State	Noncompetitive 92 percent x 23.4 percent of the leased supply	@ \$1.30	=	.2799
Forest Service	15.5 percent of the leased supply	@ \$1.60	=	<u>.2480</u>
		Total	=	\$2.3573

The average price paid per AUM for 1976, as weighted by the market supply, is \$2.36. Note that a private lease rate figure of \$6.90 is used rather than the reported \$7.40. This is to allow for the "non-fee costs" of using public and state lands. The cost data for the federal

fee base , from 1966, shows a difference of \$.53 (see Table 5.1). However, the results of interviews conducted by Peryam and Olson (Wyoming, 1975) indicate it "costs the rancher 14¢ more/AUM to use the BLM than it does his private lands."⁷³ A liberal allowance of \$.50 per AUM was used for computing the weighted average. In addition, the concept of the AUM is considered and assumed to be the same for all sectors, and defined as the amount of forage consumed by a cow-calf unit during one month.

A Pricing Model

It was previously mentioned that the open competitive bid system is the ideal determinant of full market value. If all state grazing leases were on a competitive bid basis, then the "sum value of all full market values added" would be realized. But only 8 percent of the grazing leases are competitive, and market value remains elusive.

This fact led to the construction of a model. It is based on the premises that competitive bids represent full market value on individual lease tracts, and that, if competitive bids can be statistically explained, then an estimate of market value can be made for a given tract where competitive bids have not been made.

Methodology

The statistical method employed for this model is that of

⁷³Peryam and Olson, op. cit., p. 8.

multiple linear regression. This method is based on the proposition that changes in one variable can be explained by reference to changes in other variables. Such a relationship is described by a multiple linear regression equation of the form

$$Y_i = B_1 + B_2 X_{i2} + B_3 X_{i3} + \dots + B_k X_{ik} + \epsilon_i$$

where Y denotes the dependent variable, the X 's denote the explanatory variables and ϵ is a stochastic disturbance. The subscript i refers to the i^{th} observation for all $i = 1, 2, 3, \dots, n$; the second (numerical) subscript identifies the variable in question (the number of explanatory variables is $K-1$). The nature of this type of model is stochastic, implying that for various values of the X_{ik} 's, there is a whole probability distribution of values of Y . The regression coefficients may be interpreted as follows:⁷⁴

B_1 = the mean of Y_i when each of the explanatory variables is equal to zero; sometimes called the "intercept".

B_k = the change in the expected value of Y_i , $[E(Y_i)]$, corresponding to a unit change in the k^{th} explanatory variable, holding the remaining explanatory variables constant; sometimes called the "regression slope" or the "partial regression coefficient."

Also included in the full specification of the regression model

⁷⁴ Kmenta, Jan. Elements of Econometrics, (New York: The Macmillan Company, 1971), p. 349.

are basic assumptions concerning the natures of the disturbance term and the explanatory variables. These assumptions are summarized as follows:⁷⁵

- (1) ε_i is normally distributed; continuous, ranging from $-\infty$ to ∞
- (2) $E(\varepsilon_i) = 0$; distributed around zero.
- (3) $E(\varepsilon_i^2) = \sigma^2$; homoskedasticity - every disturbance has the same variance σ^2 whose value is unknown, regardless of X_{ik} values.
- (4) $E(\varepsilon_i \varepsilon_j) = 0$ ($i \neq j$); nonautoregression of disturbances.
- (5) Each of the explanatory variables is nonstochastic with values fixed in repeated samples and such that, for any sample size, $\sum_{i=1}^n (X_{ik} - \bar{X}_k)^2 / n \neq 0$ for every $K = 2, 3, \dots, K$.
- (6) The number of observations exceeds the number of coefficients to be estimated.
- (7) No exact linear relation exists between any of the explanatory variables.

Derivation of the regression coefficients is accomplished through the technique of least squares estimation, which involves minimizing the sum of squared deviations of the observed values from their mean. In

⁷⁵ Ibid., p. 348.

equation form, the sum of squares to be minimized is:⁷⁶

$$S = \sum_{i=1}^n (Y_i - B_1 - B_2 X_{i2} - B_3 X_{i3} - \dots - B_k X_{ik})^2$$

Once the coefficients are determined, various tests are available to determine the significance of the independent variables, to establish confidence intervals for the coefficients and $E(Y_i)$, to measure the "goodness of fit" of the sample regression equation, and more.

In testing the significance of regression coefficients, the statistic used is:⁷⁷

$$\frac{\hat{B}_k - Y_k}{S_k} \approx t_{n-k} \quad (k = 2, 3, \dots, k)$$

where $\hat{B}_k$ is the coefficient to be tested, Y_k is some specific number (for these tests = 0), and S_k is the standard error of the regression coefficient (the square root of the variance of the coefficient). The computed t value is then compared to the appropriate value for the t statistic, from the table of the t distribution. This value for a two-tailed test ($H_0: B = 0$, $H_A: B \neq 0$) for infinite degrees of freedom, at a 90 percent level of confidence (.05) equals 1.645, and at a 95 percent level (.025) equals 1.960.

Another test is that of the "goodness of fit" of the model and is

⁷⁶Ibid., p. 350.

⁷⁷Ibid., p. 366.

denoted by R^2 , the coefficient of determination. R^2 is commonly used to describe how well the sample regression line fits the observed data. It is shown as:⁷⁸

$$R^2 = \frac{SSR \text{ (regression sum of squares)}}{SST \text{ (total sum of squares)}} = \frac{\sum_i (\hat{Y}_i - \bar{Y})^2}{\sum_i (Y_i - \bar{Y})^2}$$

Thus $0 \leq R^2 \leq 1$, with an R^2 value of 1 indicating the best fit possible.

The adjusted R^2 , denoted by $\bar{R}^2$ is defined as:

$$\bar{R}^2 = R^2 - \frac{K-1}{n-k} (1 - R^2)$$

This measure "takes into account the number of explanatory variables and the number of observations"⁷⁹ and is always less than R^2 , if

$$R^2 < 1.$$

The competitive bid model was initially set up in this equation form:

$$Y_i = B_1 + B_2 X_{i2} + B_3 X_{i3} + B_4 X_{i4} + B_5 X_{i5} + B_6 X_{i6} + B_7 X_{i7} + B_8 X_{i8} \\ + B_9 X_{i9} + B_{10} X_{i10} + \epsilon_i$$

where

Y_i = the competitive bid per animal-unit-month (AUM)

X_{i2} = number of potential bidders who had previously expressed an

⁷⁸Ibid., p. 233.

⁷⁹Ibid., p. 365.

interest in the particular lease (a measure of accessibility)

- X_{13} = the size of tract (acres)
- X_{14} = carrying capacity of tract (AUM's/acre)
- X_{15} = previous year's beef cattle price (\$/lb.)
- X_{16} = previous year's feed price index
- X_{17} = previous year's land value index
- X_{18} = tract fenced or not fenced (0 or 1)
- X_{19} = tract has water or no water (0 or 1)
- X_{110} = cropland included in lease or no cropland included in lease (0 or 1)

The observations (Y_i) and corresponding variables used for the regression, compiled from Department records by the author, encompass all individual competitively bid state grazing leases effective in six (6) Montana counties in 1976. The data used represents two geographic areas (see Figure 4.2). The observations of competitive leases by county, include 27 in Dawson, 20 in McCone, 20 in Richland, 28 in Cascade, 32 in Fergus, and 27 in Judith Basin. Although the sample is not randomly chosen, the 154 observations represent 27.4 percent of the 562 total number of competitively bid grazing leases in effect at the time of the study (1976). The six counties used were chosen because of their large number of competitive leases and their geographic locations; the six counties are also at relatively high levels of competition.

Note that assumption five is violated as most of the independent variables are stochastic rather than controllable. As a replacement, the assumption that stochastic variables are independent of ϵ will be made, as this does not change the properties and feasibility of least squares estimation.⁸⁰ No other violations are apparent.

Results

Regression runs were made using the multiple linear regression program on computer at the Department of Highways, with cooperation from the Department of Community Affairs. In addition to using "all county" data, two "county groups" were geographically segregated for the regressions. The first "county group" includes Dawson, McCone, and Richland; the second, Cascade, Fergus, and Judith Basin. Printouts of special interest are contained in the Appendix, page 129-133.

The first printout is presented to show the results of including all variables. (On the printouts, if the computed t value is outside the -1.645 range, the hypothesis that $H_0 : B = 0$ for the coefficient is rejected at the 90 percent level of confidence). The variables X_4 (carrying capacity), X_5 (previous year's beef cattle price), and X_6 (previous year's feed price index) were eliminated as not being significant in the statistical explanation of competitive bids.

⁸⁰ Ibid., p. 301.

Elimination of X_4 , carrying capacity, is not a surprise as bids are based on an AUM basis. Two measures of prices received and prices paid for beef production are X_5 , previous year's beef cattle price, and X_6 , previous year's feed price index. They do not statistically explain competitive bids (t values of .42 and -.76 respectively).

Attention is focused on the three printouts (pages 130-132) which include variables X_2 (number of potential bidders) X_3 (size), X_7 (land value index), X_8 (fence), X_9 (water), and X_{10} (cropland included). Coefficients significant at the 90 percent confidence level for the "all county" run are:

B_2 - the number of interested parties

B_3 - the size of tract (a negative correlation)

B_7 - previous years land value index

B_9 - water

The significance of B_2 and B_7 are not unexpected as B_2 is a measure of competition and access; B_7 supports other studies' conclusions that "rents" have tended to follow land values and not net income. The coefficients may be interpreted that a competitive bid may be expected to increase \$.44 for each additional potential bidder, decrease \$.002 for each additional acre of land, increase \$.02 for each unit increase in the previous years land value index, and be \$1.35 higher per AUM for a tract with water.

It is interesting that B_8 (fence) is significant for the 1st

county group (B_2 , B_9 , B_{10} are not) and that B_{10} (cropland included) is significant for the 2nd county group (B_3 is not). One explanation might be that the 2nd county group is more predominately a farming area.

Low R^2 values (.17 to .28) led to the construction of another model, again including nine independent variables where

Y_i = the competitive bid per animal-unit-month (AUM)

X_{i2} = number of potential bidders who had previously expressed an interest in the particular lease

X_{i3} = the size of the tract (acres)

X_{i4} = previous year's beef cattle price (\$/lb.)

X_{i5} = previous year's land value index

X_{i6} = tract has water or no water (0 or 1)

X_{i7} = tract has water and fence (0 or 1)

X_{i8} = size of tract (X_{i3}) times X_{i7} (water and fence 0 or 1)

X_{i9} = Montana private lease rate average per AUM for year bid was made

X_{i10} = statutory minimum fee per AUM for year bid was made

The combination of having both water and fence was combined in the variable X_7 . X_8 was used to test whether larger "unit" tracts, fenced and having water, would result in higher bids. Two additional AUM rental rates were included, X_9 , the state private lease rate average, and X_{10} , the statutory minimum fee. In Chapter 4, it was

shown that the statutory minimum fee per AUM was highly correlated with the average competitive bid per AUM for all leases competitively bid during the period 1967-76. The statutory minimum was used in this regression model to test its significance as a determinant of individual bids.

Results of various combination selections again did not yield a "good fit." The best run (R^2 of only .171) included significant coefficients B_2 (potential bidders), B_3 (size), B_5 (land value index), and B_7 (water and fence combination). This printout is shown on page 133. Substitutions of correlated variables showed that B_7 (water and fence) is more significant than B_6 (water), t values of 2.64 and 2.52 respectively, and that B_5 (land value index) is more significant than B_9 (private lease average), with t values of 2.63 and 2.27 respectively. Coefficients for the previous year's beef price, the statutory minimum (a function of the beef price), and X_8 (the test concerning large "unit" tracts) were not significant. The significance of X_8 would have statistically supported consolidation of small tracts into larger units, in order to attract higher bids. (It should be emphasized that the objectives of consolidation are aimed mainly at uncompetitive tracts and toward reducing administrative costs.)

Since the regression equations do not fit the observed data with much accuracy, the model as an estimator of market value is not acceptable. It had been hoped that a "minimum market value" could be

estimated by using conservative values for the explanatory variables and then setting up the lower interval at an acceptable confidence level. The model is useful, however, in identifying variables which can be expected to result in higher competitive bids and those which can not.

Specification errors of the model should predominately be the omission of other relevant explanatory variables. There are at least five (5) other variables, for which data was not available for this regression, that might be expected to influence a competitive bid. They are: 1) local private lease rates, 2) rancher's debt service load, 3) rancher's dependency on state and federal land, 4) rancher's expectations, and 5) rancher's dependency on rangeland beef production.

Chapter 6

ADMINISTRATIVE ALTERNATIVES

Past conflicts concerning state land administration can be attributed to basic misunderstandings of real objectives. Proper analysis of alternatives must therefore be conducted in light of the statutory objectives that have been identified:

- 1) "to secure the largest measure of legitimate and reasonable advantage without impairing long-term productivity"
- 2) "to fully compensate the trust for all interests disposed of"
- d) "to secure a sustained income to the trust".

Since the beneficiaries of the trust are the land grant institutions, and not the state, "welfare-oriented" goals such as recreation, preservation (natural areas), public access, etc. are secondary to income maximization. Multiple goals in land use can, however, be achieved when those uses are paid for. The primary goal is attaining maximum economic returns; understanding and acceptance of this directive is necessary by all interest groups and decision-makers. Conflicting goals must not continue to deter the establishment of a concrete action policy.

The Sale vs. Retention Alternative

Assuming that state grazing land management should be in the interest of achieving maximum revenue, efforts to increase revenues

from surface use of grazing lands "must encompass all or part of two alternatives: (1) alteration in surface rental fees, either directly by fee changes or indirectly by changes to higher or more intensive uses, or (2) sale of state lands and investment of the resulting proceeds."⁸¹ Potential revenues from holding these lands include:

(1) expected grazing fees and (2) expected change in land value.

Potential revenues from sale include: (1) expected capital gains, (2) expected interest on invested funds, and (3) expected taxes resulting from inclusion of the previously tax-exempt lands on the tax rolls.

Uncertainties about the future and certainties of the past, which reveal judgement errors, complicate the management process. In relation to current grazing fees, returns from interest and investment from sales look favorable. Wennergren and Roberts add that "sale of lands may meet with less resistance than increasing surface-use fees."⁸² An increase in grazing fees is, and has historically been, a hot issue among the livestock industry. Wennergren and Roberts also state that "sales might be accomplished on terms satisfactory to interested ranchers (and) such ownership might add security to the livestock

⁸¹Wennergren, E. B. and N. K. Roberts. "Federal Grant Lands in Utah," Bulletin 437, Agricultural Experiment Station, Utah State University, Logan, Utah, January, 1963, p. 15.

⁸²Ibid., p. 17.

industry."⁸³

On the other hand, retention of grazing lands is supported by recent trends in land value. In Montana, the value per acre of grazing land has appreciated an average of 9.5 percent per year over the last twenty-six years. U.S.D.A. indexes of average value per acre for those years are given in Table 6.1. It is interesting to note that the rate of increase over the last two years in Montana has been more than double the rate of increase for the 11 western states. Despite depressed cattle prices, optimism for longer term price improvement seems to be evident in grazing land values. The U.S.D.A. projects that "the present bullish market, outside investment, the purchase of rural land for home and/or recreation sites, and farm enlargement will contribute to land price increases."⁸⁴ They also add that land value increases during the last five years have created an upward trend psychology. In addition, if grazing fees were to increase, as has been the general trend in other western states, the retention argument would be strengthened.

Past sales of state land, especially those of other states, add to the current reluctance to sell. In retrospect, the decisions to sell large amounts of land during the 1930's and 1940's have been

⁸³ Ibid.

⁸⁴ Economic Research Service. "Farm Real Estate Market Development" CD-81, U.S. Department of Agriculture, July, 1976, p. 4.

Table 6.1 Indexes of Average Grazing Land Value per Acre
for Montana and 11 Western States (1950-76)⁸⁵
(1967 = 100)

Year	Montana Index	Yearly % Change	11 Western States	Yearly % Change
1950	30		34	
1951	37	23.3	39	14.7
1952	41	10.8	45	15.4
1953	42	2.4	45	0.0
1954	40	-4.8	44	-2.2
1955	42	5.0	45	2.3
1956	46	9.5	47	4.4
1957	50	8.7	50	6.4
1958	55	10.0	54	8.0
1959	62	12.7	58	7.4
1960	67	8.1	61	5.2
1961	69	3.0	66	8.2
1962	74	7.2	70	6.1
1963	76	2.7	76	8.6
1964	83	9.2	81	6.6
1965	89	7.2	86	6.2
1966	97	9.0	92	7.0
1967	100	3.1	100	8.7
1968	105	5.0	108	8.0
1969	112	6.7	117	8.3
1970	126	12.5	126	7.7
1971	137	8.7	134	6.3
1972	157	14.6	148	10.4
1973	171	8.9	164	10.8
1974	215	25.7	196	19.5
1975	256	19.1	212	8.2
1976	301	17.6	227	7.1

⁸⁵Ibid., p. 13

characterized as economically unsound in light of today's situation. However, present management decision-making must continue. It must be understood that the only way appreciated land values can be realized is through sale, at some point in time. Wennergren and Roberts stress the importance of continually analyzing alternatives:

However wrong these past actions may appear, they need not unduly influence present management decisions.

...The effect of changing conditions over time on returns to state land is important to management decisions.

...unfounded future expectations and fear of repeating past mistakes should not lead to a general policy of "waiting and hoping". Decisions must be made (and are made) at various points in the sequence of time.⁸⁶

The alternative of sale vs. retention of state lands is a complex and controversial topic. Detailed analyses of the specific costs and benefits of the alternatives will not be explored here; an additional potential indepth study exists in that area. However, a framework for analysis will be presented.

Wennergren and Roberts developed an analytical framework for making decisions, in this area, faced with the complications of uncertainty and time. It basically involves comparing the present values of the expected flow of revenues from the alternatives with respect to time. A brief summary of the discounting procedure, its relevance, and adaptability follow.

⁸⁶ Wennergren and Roberts, op. cit., p. 18.

The two alternatives for administering a tract of state grazing land are: (1) to sell the land and invest the funds or (2) to retain the land and charge surface fee rentals. Expected revenues for each alternative have previously been mentioned.

Alternative one (sales and investments) is expressed as: ⁸⁷

$$S = \sum_{i=1}^N \left[\frac{C_{i1} + \dots + C_{ip}}{(1+r)^i} + \frac{D_{i1} + \dots + D_{iq}}{(1+r)^i} + \frac{T_{i1} + \dots + T_{iw}}{(1+r)^i} \right]$$

where:

S is the sum $(\sum_{i=1}^N)$ of the present value of the flow of expected net returns from selling an acre of state land at current sale prices and discounted from perpetuity (N).

$(1+r)^i$ is the discount factor. r is the rate of interest assumed pertinent.

$\frac{C_{i1} + \dots + C_{ip}}{(1+r)^i}$ is the discounted capital gains or loss resulting from the expected net change per acre equivalent in the fund invested in one or more securities (1, 2, ...p) in any single year (i).

$\frac{D_{i1} + \dots + D_{iq}}{(1+r)^i}$ is the present value of the flow of expected net interest per acre equivalent from returns of funds invested in one

⁸⁷Ibid., p. 33-34.

or more securities (1, 2, ... q) in a single year (i).

$\frac{T_{i1} + \dots + T_{iw}}{(1+r)^i}$ is the present value of the flow of expected net returns from any tax (1, 2, ... w) per acre equivalent levied on the previously tax-exempt land for a single year (i). (The Montana average tax per acre on grazing land for the years 1973 and 1974 was \$.15 and \$.14 respectively.)⁸⁸ Note that not all of this tax would accrue to common school support, as a portion would be used for other county purposes.

Alternative two (holding and leasing) is expressed as:⁸⁹

$$D = \sum_{i=1}^N \left[\frac{L_i}{(1+r)^i} + \frac{F_{i1} + \dots + F_{ik}}{(1+r)^i} \right]$$

where:

K is the sum $\left(\sum_{i=1}^N \right)$ of the present value of expected net returns from holding an acre of state land for the period and discounted from perpetuity (N).

⁸⁸ Report of the State Department of Revenue, Director of State Department of Revenue, July 1, 1972 - June 30, 1974, p. 108-109. (The current tax per acre figures are assumed to be about the same as assessed values and mill levies were not significantly different in 1975 and 1976).

⁸⁹ Wennergren and Roberts, op. cit., p. 35.

$\frac{L_i}{(1+r)^i}$ represents the present value of the expected net change per acre in land value for any single year (i).

$\frac{F_{i1} + \dots + F_{ik}}{(1+r)^i}$ is the present value of the flow of expected net returns per acre from each surface use (1, 2, ...k) in any single year (i).

S and K can then be compared in order to select the appropriate alternative. It is also possible to set S and K equal in order to derive the value of any one variable, given the expected value of all other variables. Wennergren and Roberts illustrate this using the highly speculative component of land value increase as an example. What can be derived is the minimum increase in land value necessary by year (N) to make holding the land equally profitable with its sale. By altering the formulas for S and K, this value can be computed as:⁹⁰

$$\sum_{i=1}^N \frac{L_i}{(1+r)^i} = S - \left[\frac{F_{i1} + \dots + F_{ik}}{(1+r)^i} \right]$$

The value $\sum_{i=1}^N \frac{L_i}{(1+r)^i}$ represents the discounted change in land value. This can be converted to a non-discounted value by:

$$\left[\sum_{i=1}^N \frac{L_i}{(1+r)^i} \right] \left[\sum_{i=1}^N (1+r)^i \right]$$

⁹⁰ Ibid., p. 37.

The decision then involves determining "whether or not the land value may be expected to increase by this magnitude over the period considered."

Examples of applying this framework will not be presented, as it was not the intent of this study to empirically evaluate sales alternatives.

Alternatives for Generating Revenue

Revenues from Montana's state lands are realized from several sources. The major sources of income are: rentals on agricultural leases, interest on bonds, rentals on oil and gas leases, interest-Montana Trust & Legacy Fund, rentals on grazing leases, and oil and gas royalties. It is expected that coal royalties will also become an increasingly important source in the future with the intensified coal development that is taking place.

Grazing revenues have tended to be quite constant relative to the total revenue generated from all sources. The relative contribution of grazing rentals for the last ten years is given in Table 6.2.

Grazing rentals have contributed approximately 10 percent of total income annually for the last ten years. With increased mineral activity, this ratio is expected to decrease (assuming no drastic changes in beef prices).

Grazing fee revenue is a function of four variables:

Table 6.2

Contribution of Grazing Rentals to Total Income from all Sources
of State Land Revenue (1967-76).

Year	Grazing Rentals	Income from All Sources	Ratio %
1967	\$ 964,897.41	\$ 8,653,442.69	11.15
1968	1,000,003.45	13,874,225.52	7.21
1969	987,657.79	12,328,791.89	8.01
1970	1,046,969.41	10,531,013.01	9.94
1971	1,129,996.48	10,327,632.19	10.94
1972	1,186,595.62	11,194,760.05	10.60
1973	1,320,466.04	13,442,091.44	9.82
1974	2,163,806.97	18,783,570.75	11.52
1975	2,287,853.57	21,467,559.45	10.66
1976	1,753,053.30	22,618,078.96	7.75

- 1) carrying capacity of the land
- 2) the amount of competitive bidding
- 3) the actual competitive bids
- 4) the minimum statutory fee

Attempts to improve grazing revenue must be aimed at one or more of these areas. In line with the objectives of "seeking to secure the largest measure of legitimate and reasonable advantage" and "to secure full market value" for the grazing interest, the Department and Land Board are obligated to make those attempts if in the state's "best interests."

Carrying Capacity

Carrying capacity, in terms of animal-unit-months (AUM's), can be increased by range improvement, either by special projects or improvements in lessee management. Since grazing appraisals are conducted only once during a ten year lease period, carrying capacity improvement is likely to be recognized only after substantial time lags.

Cost sharing projects through Resource Development concerning grazing land include: range renovation, sagebrush spraying, and stockwater wells and spring development. Lessees can, if they desire, totally finance range renovation with the Department's previously mentioned rental waiver policy. However, improvement projects and good management are voluntary for the most part. Only when the "fair" to

"poor" condition of a tract is approached or when overgrazing is evident, is renovation, or other improvement plans, mandatory. Although the Resource Development Bureau actively seeks potential projects, actual grazing land project completions have been relatively low in number and slow in progressing because of necessary negotiating, required paperwork, and lessee hesitancy. In addition, at the present level of grazing fees, few if any range improvement practices are attractive to the state on the basis of being sound investments. In light of these factors, significant improvements relating to carrying capacities are probably a least likely occurrence.

Competition

The institutional barriers to competition have previously been expounded and emphasized. However, there are alternatives available toward enhancing the low level of competition that should be considered. The contribution to income from those grazing leases on competitive bid (8 percent of all grazing leases at the time of this study) is significant: \$192,287 additional returns in 1976 over and above what these leases would have generated at the minimum rental.

The barrier that can most easily be penetrated is that of information. If more potential bidders can be made aware of information relative to leases, the system will be more efficient. The proposed procedure of "information availability" was mentioned in Chapter 4 as a stimulant to land use demand as well as competition. One method of

opening information channels would be to publicly advertise lease renewals, although this would involve considerable expense. Contacting persons who have "previously expressed an interest" is required by statute. Assuming this is not enough, any efforts to improve the information system is at the discretion of the Department and Board of Land Commissioners.

Another alternative concerns the existence of preference rights and competitive bid hearings. Whether preference rights should be eliminated and leases granted to the highest bidder, as is done in North Dakota is an ultimate political question. The main arguments against eliminating the preference right include: increased instability of tenure, high risk for lessees dependent on state land, an increase in overgrazing, and reduced incentive to make improvements or invest in projects.

But what about the trust and the purposes for which the lands were granted? Perhaps a compromising situation could be attained. Preference rights could be granted to those lessees investing in resource development projects. This would add incentives to make improvements. The Department could still reserve the right to reject certain bids, when in the best interests of the trust. The bid format might also be changed as will be explained in the next section. In any case, the obstacle that the preference right and bid hearing presents to competition must be recognized as real. The outcome of

the pending court case (Jerke v. Department of State Lands) will probably be indicative of possibilities for change.

The hypothesis that competitive bidding leads to increased overgrazing may have some validity, but it is doubtful. As long as a lessee can earn an economic rent by paying less than he would have to pay in the private sector, he should have an interest in protecting the resource and keeping the lease. A bidder cannot rationally maximize production over his ten-year lease period by overgrazing from the start. Only if he plans to give up the lease will he overgraze as then future productivity will be of no value to him. This type of tendency to overgraze during the latter years of the lease term exists under the present system. From an administrative standpoint, there are procedures that could better check this problem. Perhaps, competitively bid tracts should be appraised more than once during the lease period. Section 81-434 specifically calls for special management care on competitively bid tracts. Also, lease cancellation, which is a rarity now, might become more of a reality.

Competitive Bids

Currently, the bid per AUM is locked in for the lease term and does not change unless the minimum statutory fee is greater. There are two alternative formats for competitive grazing bids that will be proposed.

The first comes from a recommendation made by McDowell and Johnson, and states that a bid be for a "premium to obtain the lease, which would be in addition to the minimum grazing rental."⁹¹ Under this system, the bidder only pays the premium for the first year, and is charged only the minimum for the remaining years.

The second, as set forth by the author, proposes that bids be made in the format of \$X.XX in addition to the statutory minimum fee per AUM per year. Although the bid would remain the same, the competitive rental would fluctuate in accordance with the minimum fee, depending on the variables included in the formula.

Another alternative concerning competitive bids would be to allow the highest bidder to bid again if the current lessee met his first bid. This would be only fair to the bidder in light of the preference right and would result in higher returns to the trust.

The Minimum Grazing Fee Formula

The present formula [50¢ + (3 times the average price/lb. of beef for the previous year) per AUM] has been in effect since 1974. Any efforts to improve grazing revenue through changing this minimum formula will have to gain Legislative approval in order to be implemented. It is not an easy task.

⁹¹McDowell and Johnson, op. cit., p. 22.

The first decision to be made concerning the present formula is whether or not to change it at all. The 1977 Legislative session has passed by with no attempts made. This is not surprising as the economic situation of the western livestock industry is not good, and has not been good since the years of 1972-1973. Trends toward increasing trust revenues through a fee formula change will most likely occur during periods of prosperous livestock prices. Then, it may be the "political" thing to do, and cattlemen will be less adverse. If optimistic upward projections for cattle prices materialize in the late 1970's, the 1979 Legislature can be expected to be more active in this area.

If the formula is to be changed, various alternatives exist as to how the fee should be determined, and to what level it should be set. The current formula's factors could be increased or an entirely new formula could be adopted. Many of these formula alternatives were presented in the previous chapter and will not be repeated here. It is assumed from previous studies, that grazing fees should be charged on an AUM (carrying capacity) basis, should be variable depending on short- and long-run economic conditions, and should be feasible to administer.

It must be remembered that private rates and competitive bids are marginal prices. Although by definition they approach full market values for individual tracts, they may not be justified for an entire

enterprise. It was previously argued in this study, pp. 72-73, that because of "asset fixity" ranchers may bid up the price of one resource while accepting low or even zero return on others which become "fixed" in production.

A minimum statutory fee has to be aimed at a fair market value. Barlowe outlines five leading considerations that normally arise in the development of "mutually acceptable and advantageous leasing arrangements." They are: "(1) equitable sharing arrangements covering costs and returns, (2) comparable rental arrangements with all products, (3) opportunities for a fair return from all investment inputs, (4) flexibility, which permits adjustments for changing costs, prices, and production, and (5) arrangements that recognize social justice and welfare objectives."⁹² These are no less areas of concern in the pricing of public and state grazing lands, although the statutory objectives are primary.

Maintaining long-term productivity is emphasized as this is a goal of both the government and the stockmen. Ciriacy-Wantrup states the following with respect to grazing land conservation, which supports Montana's system:

public landlords generally try to take resource conservation

⁹² Barlowe, Raleigh. Land Resource Economics, (New Jersey: prentice Hall, Inc., 1972), p. 466.

into account. They foster stability of tenancy through assigning priorities for grazing permits, provide for compensation in cases of unexhausted improvements at the termination of the lease, cooperate with tenants in such improvements, employ rents (grazing fees) variable with livestock prices, and insist on lease clauses and regulations designed to prevent overgrazing.⁹³

For Montana, a number of relevant factors, to be considered in pricing state grazing lands, have been accumulated. They are briefly summarized as follows:

1. It is estimated that nearly 85 percent of the leased grazing land supply is made up of public and state land. Although the private lease rate is a market price, it is questionable whether this rate should be used as an absolute indicator of the price level at which fees should be set for all leased grazing land.
2. Only 8 percent of all state grazing leases are competitive (1976) - the competitive system faces many barriers.
3. The average bid per AUM on competitive state leases is \$3.52 (1976).
4. The average price paid in the private sector for 1976 is \$7.40 per AUM.
5. The estimated average price paid per AUM for 1976, as weighted

⁹³ Ciriacy-Wantrup, S.V. Resource Conservation, (Agricultural Experiment Station, University of California Division of Agricultural Science, Third Edition, 1968), p. 158-159.

- by the market supply sectors, is \$2.36.
6. The average price paid per AUM in other western states and for the federal lands in 1976 is \$2.37.
 7. The value of grazing per AUM, as determined by the 1969 BLM fee system is \$1.94 for 1976.
 8. Significant explanatory variables of competitive bids on state grazing lands, as determined by a regression model, include: the number of interested potential bidders, the size of the tract, the previous year's land value index, and the presence of water and fence.

It is estimated, by the author, that approximately 1,114,745 AUM's are being leased at the minimum rate. This gives some indication of the impacts that might be expected from fee increases. For example, an increase of \$.50/AUM would be expected to result in an income transfer of \$557,372.50 from state grazing land lessees to the school trust. This is in addition to derivative sector losses, dependent upon the multiplier used. Polzin's "An Income Model for the State of Montana"⁹⁴ uses regression estimates to imply that derivative earnings will change by approximately \$.60 for each \$1 change in gross

⁹⁴Polzin, Paul E. "An Income Model for the State of Montana," Unpublished paper written while author was Research Economist, U.S. Forest Service, Intermountain Range and Experiment Station, Missoula, MT., 1974, p. 15.

farm receipts. An increase in grazing fees should have nearly the same effect on the local communities as a decrease in receipts, assuming the majority of any increase in fees will end up in urban rather than rural areas. If a multiplier of 1.6 is assumed, total income losses to the primary and derivative sectors from a \$.50/AUM increase would amount to approximately \$891,796. To lessen the short-run impacts of this type of transfer payment between the livestock industry and the trust, it would follow, given such political intent, that grazing fee increases be gradual.

A final alternative to be presented involves raising the statutory minimum fee to the point that some grazing land would not be leased. If the goal is to "secure the largest return to the trust," this pricing policy, a concept used for other property ownership such as motels, airlines, railways, etc., is probably legitimate. It will not be advocated due to evident political and administrative problems. However, it is interesting and important to be aware of this pricing method in analyzing and adopting a grazing fee policy.

Chapter 7

RECOMMENDATIONS

The search for an optimum administrative plan for state entrusted grazing lands is extremely complex. Differences in interpretation of the law, political value judgments, and difficult economic pressures result in policy issues that seem insoluble. But, in the areas of regulation and price, there will always exist a preference function to determine a "better" way of doing things. This "comparison approach" is, of course, a function of the criteria used.

State entrusted grazing lands are important. The economic contribution of this resource, both current and potential, to the support of various schools, is significant. Every citizen is affected by this vast trust. Every citizen should be aware of possible inefficiencies that exist in its management. The common citizen is no less a "trustee" than a member of the Land Board, a Department of State Lands administrator, or a state land lessee. Understanding and acceptance of the statutory objectives by all concerned is a mandatory requirement for effective administration. Ciriacy-Wantrup sums up the prevailing political problem very well:

Public landlords, however, are in a peculiar position relative to their tenants: The public servants who represent the landlord (officials of the U.S. Forest Service, Grazing Service, and so on) are subject to a considerable amount of political pressure by the tenants through both local organizations and representatives in Congress. Although these public servants of the landlord are not directly employed by the tenants, the

latter have frequently much more influence upon them than have the great majority of taxpayers who are no less employers but whose individual interest is smaller and who are frequently less informed.⁹⁵

The study now concludes with the author's recommendations for better regulating and pricing state entrusted grazing lands in accordance with the statutory objectives

1. Recognize and Consider the Sales Alternative.

The current "no sales" policy inhibits sound decision making over time and defers any analysis to an indeterminate future. An aggregate "sell all" policy is not being advocated, but rather, the importance of considering the sales alternative in the management of individual tracts. There are certain types of grazing tracts, i.e., small, isolated tracts, non-mineral in nature, suitable only for grazing, etc. that in the "best interests of the Trust," merit this type of analysis. However, in most cases, the selling price will be an "administered price" rather than a "market price" because there will only be a single bidder for many small isolated tracts of land.

The significance of the sales concept as a viable and efficient management alternative is emphasized. Land management decisions must be made throughout the sequence of time. The Department and Land Board should take an active management role in this regard and abandon the

⁹⁵Ciriacy-Wantrup, op. cit., p. 159.

present indecisive philosophy of "waiting."

2. Complete the Remaining In-lieu Selections.

Approximately 22,918 in-lieu acres remain to be selected. There is no apparent reason why land selections should not be a priority objective of the Department and Land Board. Assuming the lands to be selected are grazing lands, the income lost each year can be estimated as follows.

A rating of 16 head per section converts to .3 AUM per acre. If it is assumed that this will be the average productivity rating and a fee of \$1.50 is used, the income foregone amounts to an annual loss of \$10,313. If, however, the land selected is of a competitive nature, and a fee of \$5.79 is used (1976 competitive bid average) the potential revenue lost to the school trust is estimated at \$39,809 per year.

3. Open Information Channels Concerning State Leases.

The classification-reclassification system can never effectively work without opening information channels to all interested parties. Competition should be encouraged as a determinant of "highest and best use" and for obtaining "full market value."

The previously mentioned procedure of compiling lists of lease information and making them available to interested persons upon request, is recommended. Having this information available in each county's courthouse is also desirable. Data concerning the location of state land, its current and potential land uses, and when leases are

up for renewal is public information that should actively be made public.

There would be some costs involved in preparing these lists. However, the lists would only need to be prepared once, as the lease renewal dates will normally occur every ten years. The lists could then be revised when any changes would take place.

The effect that this recommendation would have on competitive bidding is difficult to estimate. As an example, assume that an additional twenty percent (20 %) of the noncompetitive AUM's would attract bids. It has been estimated that 1,114,745 AUM's are being leased at the minimum rate. Twenty percent of these or 222,949 AUM's at \$5.79 (the competitive bid average for 1976) would have returned an additional \$1,001,041 in 1976 $[(\$5.79 - \$1.30 \times 222,949)]$. Figure 7.1 illustrates expected increased incomes, assuming various levels of increased competitive bidding at \$5.79 per AUM.

4. Initiate Prompt Cancellation of Leases When Warranted.

Habitual violations involving mismanagement must be controlled. Continuous periods of grace do not provide initiative for maximum lessee efficiency in management. As in a normal landlord-tenant relationship, if the lessee does not manage the resource properly in accordance with the standards set, a more efficient manager should be employed. A closer watch on potential problem tracts would be a good preventive measure.

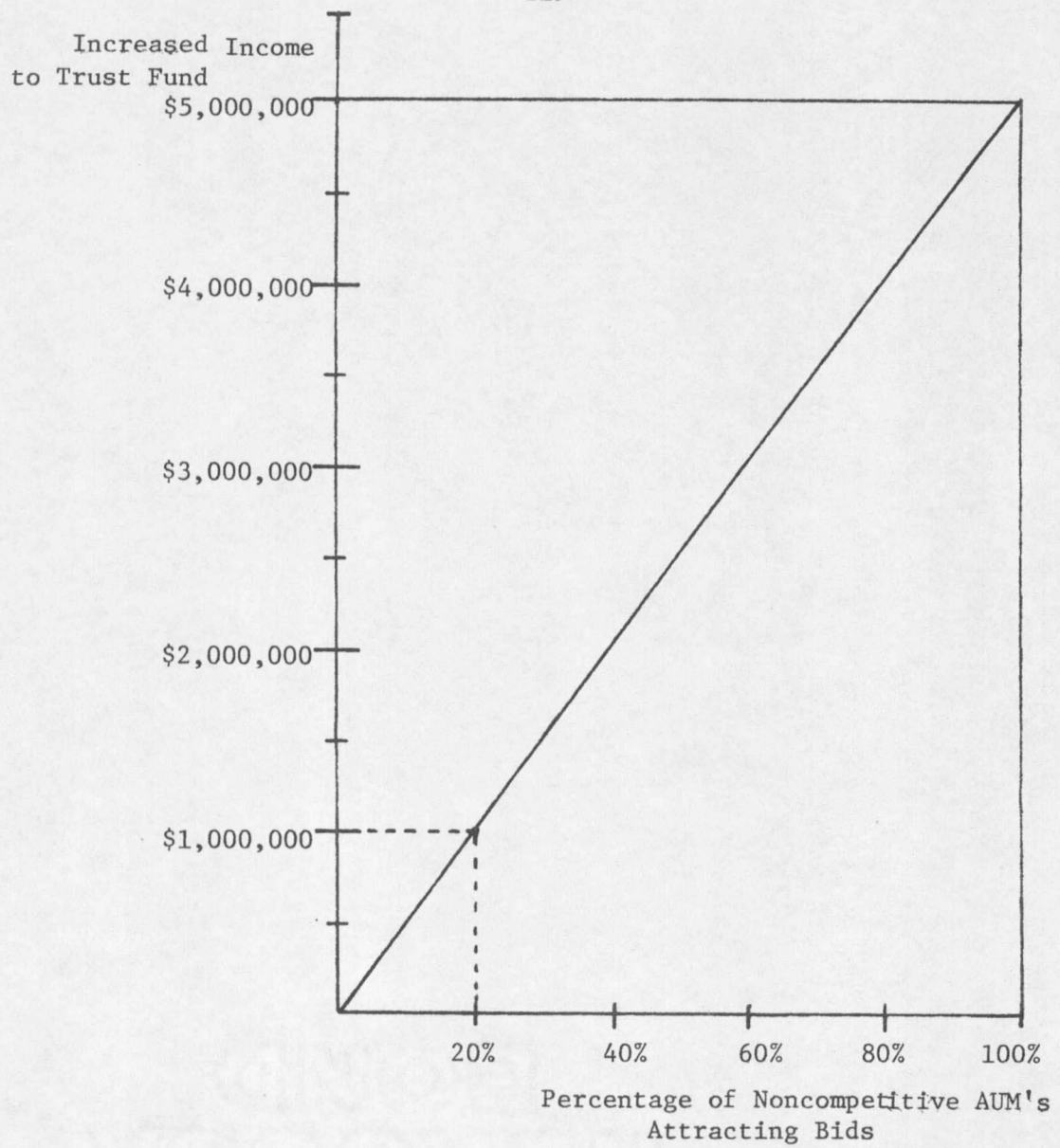


Figure 7.1 Expected Increased Income Resulting From Various Levels of Increased Competitive Bidding.

Short-run monetary impacts of implementing this recommendation will not be significant since AUM carrying capacity is fixed for the lease period. Over the long run, however, if productivity is improved by the new lessee, the carrying capacity rating may increase, the probability of competitive bidding will be greater, and long-term productivity will be maintained.

Interestingly, this recommendation was made by Murray in the 1942 study.

5. Eliminate Charging for Grass "Crops" on Grazing Land.

Charging AUM rental on a grazing tract, plus 1/4 crop share for those years in which there is enough grass to cut constitutes double pricing. The AUM carrying capacities are based on soil characteristics and average annual precipitation zones. It only follows that in some years there will be less, and in some years more, than average rainfall. For a tract classified as grazing, that normally does not produce enough grass to harvest, the way in which the grass is utilized during a wet year should be at the lessee's discretion. Whether grazed or cut, the grass has been paid for through the AUM rental.

Eliminating this policy will result in decreased income, estimated however to be less than \$10,000 per year.

6. Adopt a New Uniform Competitive Grazing Bid Format.

It is recommended that grazing bids be in the form of:

\$X.XX in addition to the statutory minimum fee per AUM"

In this format, bids would not be locked in for the entire ten year lease period. If the economic situation of the livestock market was falling, the lessee would be given an equitable break in rental; if it was improving, the trust would be compensated accordingly. The built-in flexibility eliminates risk of speculation in making the bid, and is "fair", from both perspectives.

This format is complementary to the next recommendation, adopting a formula that allows for changes in production costs as well as changes in beef and land prices.

7. Adopt a New Grazing Fee Formula.

The present formula is not recommended because it does not reflect costs of production, does not reflect long-term trends, and thus, becomes quickly outdated. A better adjusting formula over time will alleviate the need for, and occurrence of, grazing fee battles in the Legislature.

The formula recommended is one similar to that outlined in the 1976 technical report:⁹⁶ (See p.72.)

$$F_t = B_T \left(\frac{L_{t-1} + P_{t-1}}{100} \right)$$

F_t = the minimum grazing fee per AUM for year t.

B_T = the base fee for the base year T

L_{t-1} = previous year's index of land value for grazing land in Montana (T-1 = 100)

⁹⁶ Federal Register, op. cit., p. 6981.

P_{t-1} = previous year's combined index of the beef price index
minus the prices paid index for Montana ($T-1 = 100$)

Note that a land value index is used in lieu of the private lease index. This should not result in a major deviation as the two have been shown to have a strong functional relationship.

The combined index should follow the construction of the method proposed by the Federal government. The components would be the same, except that Montana data would be used. This index is reflective of short-run market conditions and is equitable in promoting stability. Data refinement would be necessary, however, in constructing a reliable Prices Paid Index for Montana. The Statistical Reporting Service has discontinued the maintenance of this index on an individual state basis.

The base fee should be set by the Legislature. It can be defined simply as a "market price from which to start." There are several alternatives for establishing a base fee which have previously been discussed.

For reasons previously elaborated, it is recommended that the tier system of fees be eliminated, with a single fee per AUM applying to all tracts. In addition, setting a percent limit on the amount of increase or decrease allowable in one year is recommended.

An example of the recommended fee system is presented below. The land value index is taken from Table 6.1. The prices received data

corresponds to average beef prices actually used in past fee determinations with the current formula (includes the six month lag previously discussed in Chapter 3).

The prices paid index used in the example is "Prices Paid, Interest, Taxes and Farm Wages Rates," as reported by the U.S.D.A., Statistical Reporting Service. U.S. data is used for this index because of the discontinuation of this data collection in Montana. Also, the index figure used is a monthly quotation (December 15) and is not a "previous year's average."

The base year for the example is 1974. Therefore, the indexes are reconstructed using 1973=100, and are as follows:

Grazing Land Value Index

Year	U.S.D.A. Index (1967=100)	Reconstructed Index
1973	171	100
1974	215	126
1975	256	150
1976	301	176

Prices Received Index

Year	Ave. Price/lb. (beef cattle)	Index (1973=100)
1973	\$39.58	100
1974	42.94	108
1975	26.56	67
1976	32.50	82

Prices Paid Index

Date	U.S.D.A. Index (1967=100)	Reconstructed Index
December 15, 1973	153	100
December 15, 1974	179	117
December 15, 1975	184	120
December 15, 1976	195	127

To complete the fee computation, a "base" fee for 1974 is needed. Four (4) different bases will be illustrated for comparison. The first base used is (1) \$1.50, which for 1974 is close to what Kearn might allow as the average value product of grazing. This is also close to the \$1.54 figure determined to be "fair market value" by the 1969 BLM fee system for 1974.⁹⁷ The fees would then be calculated as follows:

$$F_{1974} = \$1.50 \quad \frac{100 + (100-100)}{100} = \$1.50$$

$$F_{1975} = \$1.50 \quad \frac{126 + (108-117)}{100} = \$1.50 (1.17) = \$1.76$$

$$F_{1976} = \$1.50 \quad \frac{150 + (67-120)}{100} = \$1.50 (.97) = \$1.46$$

$$F_{1977} = \$1.50 \quad \frac{176 + (82-127)}{100} = \$1.50 (1.31) = \$1.97^{98}$$

The other base fees used are:

⁹⁷ Federal Register, op. cit., p. 6989.

⁹⁸ If an upper limit increase of 25 percent was imposed, the fee for 1977 would instead be \$1.83.

(2) \$1.69 - representing Montana's actual statutory minimum grazing fee per AUM in 1974.

(3) \$2.30 - representing the average AUM rental fee on other state and federal grazing lands in 1974 (Table 5.3).

(4) \$6.10 - representing Montana's 1974 private lease average, \$6.60 (Table 5.2) minus the non-fee costs of using state grazing land (assumed to be \$.50 per AUM). This value corresponds to the method of determining marginal value product presented by Nielsen.⁹⁹

Table 7.1 shows the computed grazing fees using these four different 1974 base fees. To show the income effect of each base, the fifth column is constructed to estimate 1976 grazing income assuming 1,114,745 AUM's were leased at the minimum rental. Compare these estimates to the \$1,449,168.60 actually received from minimum rentals at \$1.30 per AUM.

It is clear that the determination of the "base" level is very important in terms of grazing revenues. Several alternatives of base determination have been presented. There are many factors to consider and all should be weighed carefully by policy makers. Economic rent is currently being gained by state grazing land users. Determination of state policy changes, a question of who should and will get what,

⁹⁹Nielsen, op. cit., p. 4.

Table 7.1

Computed Grazing Fees and Estimated 1976 Grazing Revenue
 Projecting 1974 Base Fees of \$1.50, \$1.69, \$2.30 and
 \$6.10 using the Recommended Formula.

Description	1974 Base	1975 Fee	1976 Fee	1977 Fee	Estimated 1976 Noncompetitive Revenue	Difference Between 1976 Est. and Actual
Average Value Product (Kearl)	\$1.50	\$1.76	\$1.46	\$1.97	\$1,627,527.70	\$178,359.10
Actual 1974 Statutory Min.	1.69	1.98	1.64	2.21	1,838,181.80	379,013.20
Ave. 1974 Fee Other State and Federal Lands	2.30	2.69	2.23	3.01	2,485,881.30	1,036,712.70
Marginal Value Product (Nielsen- Private Fee Average Minus Non-Fee Costs	6.10	7.14	5.92	7.99	6,599,290.40	5,150,121.80
Actual Minimum Fee 1974-77	1.69	1.79	1.30	1.48	1,449,168.60	-----

is a function of the political system. The "base fee" that is finally established will result from Legislative negotiation.

In conclusion, the major emphasis, given the objective of increasing grazing revenues, must be on the statutory minimum fee. The other areas including carrying capacity improvement, enhancement of competition, and bid format changes are important for policy betterment. However, grazing income is, and will probably always be, primarily dependent on the minimum fee. Of all state grazing leases, 92 percent are leased at the minimum rate. Even with the best of luck, a significant and timely shift from non-competitive to competitive is unlikely. The barriers to competition that have been identified give added importance to the goal of implementing an efficient fee formula and fee level. Although "full market value" is attainable only through competitive bidding or sale, seeking a "better" market value through the fee formula should be the primary aim for pricing state entrusted grazing lands.

APPENDIX

MULTIPLE REGRESSION.....ALL COUNTY

Selection..... 1

Variable No.	Mean	Standard Deviation	Correlation X Vs. Y	Regression Coefficient	Std. Error of Reg. Coef.	Computed T Value
2	2.29221	1.28807	0.20387	0.42859	0.20139	2.12816
3	451.18164	320.43848	-0.22947	-0.00230	0.00092	-2.50804
4	0.34019	0.07618	0.10017	-1.34579	3.77324	-0.35667
5	29.34460	5.60156	0.13980	0.02635	0.06232	0.42289
6	107.50648	30.57919	0.16356	-0.01333	0.01762	-0.75671
7	141.53246	35.39125	0.19363	0.02713	0.01388	1.95473
8	0.88961	0.31440	0.11619	1.07178	0.86979	1.23223
9	0.72727	0.44681	0.20279	1.51085	0.61544	2.45490
10	0.31818	0.46729	0.12243	0.37809	0.62622	0.60376
Dependent 1	4.54518	3.38313				
Intercept		-0.29307				
R Squared		0.18007				
Adjusted R Squared		0.12882				
Std. Error of Estimate		3.15772				

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ANALYSIS OF VARIANCE FOR THE REGRESSION

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	9	315.32715	35.03635	3.51376
Deviation from Regression	144	1435.84961	9.97118	
TOTAL	153	1751.17676		

THE DURBIN-WATSON STATISTIC FOR SELECTION 1 IS 1.99156.

MULTIPLE REGRESSION.....ALL COUNTY

Selection.....1

Variable No.	Mean	Standard Deviation	Correlation X Vs. Y	Regression Coefficient	Std. Error of Reg. Coef.	Computed T Value
2	2.29221	1.28807	0.20387	0.43874	0.19890	2.20588
3	451.18164	320.43848	-0.22947	-0.00228	0.00090	-2.54084
7	141.53246	35.39125	0.19363	0.01989	0.00722	2.75523
8	0.88961	0.31440	0.11619	0.98721	0.81724	1.20798
9	0.72727	0.44681	0.20279	1.35380	0.57167	2.36818
10	0.31818	0.46729	0.12243	0.31939	0.61500	0.51934
Dependent 1	4.54518	3.38313				
Intercept		-0.21182				
R Squared		0.17622				
Adjusted R Squared		0.14260				
Std. Error of Estimate		3.13265				

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ANALYSIS OF VARIANCE FOR THE REGRESSIONS

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	6	308.59448	51.43240	5.24099
Deviation from Regression	147	1442.58228	9.81348	
TOTAL	153	1751.17676		

THE DURBIN-WATSON STATISTIC FOR SELECTION 1 IS 1.97732.

MULTIPLE REGRESSION.....1st GROUP OF COUNTIES

Selection.....1

<u>Variable No.</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Correlation X Vs. Y</u>	<u>Regression Coefficient</u>	<u>Std. Error of Reg. Coef.</u>	<u>Computed T Value</u>
2	2.29851	1.24334	0.13667	0.25377	0.38725	0.65531
3	498.11938	356.11743	-0.23203	-0.00415	0.00159	-2.60346
7	147.00000	37.33864	0.19390	0.02824	0.01349	2.09329
8	0.95522	0.20837	0.13769	4.84180	2.51567	1.92465
9	0.67164	0.47316	0.14766	0.71329	1.03405	0.68981
10	0.34328	0.47839	0.02227	-1.36402	1.18416	-1.15189
Dependent 1	4.69788	4.03661				
Intercept		-2.60520				
R Squared		0.18947				
Adjusted R Squared		0.10842				
Std. Error of Estimate		3.81151				

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ANALYSIS OF VARIANCE FOR THE REGRESSION

<u>Source of Variation</u>	<u>Degrees of Freedom</u>	<u>Sum of Squares</u>	<u>Mean Squares</u>	<u>F Value</u>
Attributable to Regression	6	203.76163	33.96027	2.33763
Deviation from Regression	60	871.65869	14.52764	
TOTAL	66	1075.42017		

THE DURBIN-WATSON STATISTIC FOR SELECTION 1 is 1.88646.

MULTIPLE REGRESSION.....2nd GROUP OF COUNTIES

Selection.....1

Variable No.	Mean	Standard Deviation	Correlation X Vs. Y	Regression Coefficient	Std. Error of Reg. Coef.	Computed T Value
2	2.28736	1.32864	0.28325	0.55216	0.20465	2.69814
3	415.03442	286.90039	-0.24481	-0.00133	0.00103	-1.28722
7	137.32184	33.42441	0.18896	0.02186	0.00827	2.64245
8	0.83908	0.36959	0.11334	0.21064	0.73343	0.28719
9	0.77011	0.42320	0.28772	1.50609	0.64207	2.34568
10	0.29885	0.46040	0.23762	1.30980	0.65765	1.99163
Dependent 1	4.42766	2.79740				
Intercept		-1.01513				
R Squared		0.27686				
Adjusted R Squared		0.22263				
Std. Error of Estimate		2.46644				

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ANALYSIS OF VARIANCE FOR THE REGRESSION

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	6	186.32451	31.05408	5.10478
Deviation from Regression	80	486.66626	6.08333	
TOTAL	86	672.99072		

THE DURBIN-WATSON STATISTIC FOR SELECTION 1 IS 2.09521

MULTIPLE REGRESSION.....LANDS

Selection..... 4

Variable No.	Mean	Standard Deviation	Correlation X Vs. Y	Regression Coefficient	Std. Error of Reg. Coef.	Computed T Value
2	2.29221	1.28807	0.20387	0.44824	0.19762	2.26817
3	451.18164	320.43848	-0.22947	-0.00250	0.00079	-3.14228
5	141.22076	34.84074	0.19231	0.01916	0.00729	2.62740
7	0.65584	0.47664	0.21943	1.41108	0.53386	2.64319
Dependent 1	4.54518	3.38313				
Intercept		1.01222				
R Squared		0.17060				
Adjusted R Squared		0.14834				
Std. Error of Estimate		3.12214				

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ANALYSIS OF VARIANCE FOR THE REGRESSION

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	4	298.75732	74.68933	7.66219
Deviation from Regression	149	1452.41943	9.74778	
TOTAL	153	1751.17676		

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