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A REVIEW AND EVALUATION OF THE "APPRAISAL REPORT ESTIMATING FAIR MARKET RENTAL VALUE OF PUBLIC RANGELANDS IN THE WESTERN UNITED STATES ADMINISTERED BY USDA - FOREST SERVICE AND USDI - BUREAU OF LAND MANAGEMENT"

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Preliminary Report - Do Not Quote Without Permission of Authors
INTRODUCTION

The use of rangelands administered by agencies of the federal government by domestic livestock has been an issue associated with controversy for many years. One of these issues that has surfaced periodically has been the fees charged livestockmen who use lands administered by the Bureau of Land Management (BLM) and Forest Service (FS). This issue became politically "hot" in 1977 and 1978. This controversy became intense enough that Congress established a fee formula as part of the Public Rangelands Improvement Act (PRIA) of 1978. Congress directed that this formula be used during a seven-year trial period. It was further stipulated that this time would allow the Secretaries of Agriculture and Interior to refine data needed to determine the value of forage taken from federal lands by domestic livestock and to compare this to the value of forage available from private lands. A final report was to be submitted to Congress by March of 1985 that outlined the values that were to be estimated. Several study reports have been prepared as part of this evaluation (see the bibliography of this report).

On July 27, 1984, a report entitled "Appraisal Report Estimating Fair Market Rental Value of Public Rangelands in the Western United States Administered by USDA--Forest Service and USDI--Bureau of Land Management" was released. This report is the only study that has been published to date that was designed to estimate the value of forage obtained by domestic livestock from publicly and privately administered lands. The other reports are either of a theoretical nature or provide estimates of the impact of imposing various levels of fees. As a result, this one study provides the heart of the valuation problem posed by the PRIA guidelines. Several meetings have been held by agency representatives to present the
results of this study and to obtain public input. Unfortunately, these meetings were held shortly after this report was issued and did not provide time for adequate review of the document. This report, therefore, represents one formal review of this important document.

Readers who are not familiar with this document will find the following summary, a complete quotation of an agency-prepared paper, to be a reasonable summarization of the main report. Readers familiar with the original report should (could) turn to page ___ of this study where our review of the "appraisal" report begins.

SUMMARY OF THE APPRAISAL REPORT

HOW THE APPRAISAL WILL BE USED

The law requires that beneficiaries pay a fee "which is equitable to the United States and to the holders of grazing permits and leases" (Section 401(a) of the Federal Land Policy and Management Act of 1976. See also Section 3 of the Taylor Grazing Act). The appraisal results, herein, represent one of many factors to be used in the establishment of alternative fee systems to be reported to Congress. Other factors include:

- Family Ranching/Community Stability: The fee system should promote the stability of family ranching operations and rural communities dependent upon Federal range forage.
- Equity/Permit Holder: The grazing fee system should be equitable and reasonable to the permit holder.
- Equity/Federal Government: The grazing fee system should be equitable and reasonable to the Federal Government.
- Equity/Non-Permittee Livestock Producer: The fee system should consider the effects of the fee on other Federal agencies and State and local governments.
- Administrative Feasibility: The fee system should be administratively feasible.
- Cost Recovery: The grazing fee received should cover the costs of a moderate rangeland management program (excludes costs not related to livestock grazing, e.g., wild horse and burro management).
- Common Data Base: The grazing fee system should provide for a common data base.
- Public Understanding: The fee system should consider the views and needs of the general public.
Permit Value: The fee system should equitably reduce or eliminate the permit value that is associated with Federal land grazing permits.

Improve Range Condition: The grazing fee should promote range management, and improving and maintaining good range condition.

OBJECTIVES OF THE APPRAISAL

The appraisal is the agencies' response to congressional direction that the Secretaries refine their information on the value of public rangelands. The appraisal has two primary objectives:

- First, it will establish an appraised value, which is the amount that a livestock operator would probably pay for grazing use of the public lands if the lands were offered on the open market.
- Second, it will provide the information needed to compare the economic value of public land grazing use now derived by the present PRIA fee formula with the appraised value of the public rangelands.

HOW THE APPRAISAL WAS MADE

During a 17-month period from July, 1982, through November, 1983, two principal appraisers, Forest Service and Bureau of Land Management respectively, and 22 field appraisers from these agencies surveyed the majority of the lessors and lessees of public and private range grazing lands in approximately 340 counties in the 16 Western States, and two counties in western Texas. Each of the counties selected contained significant amounts of Federal rangelands: National Forests, National Grasslands, public lands administered by the Bureau of Land Management, and other Federal agencies such as Fish and Wildlife, Bureau of Reclamation, etc. Field appraisers contacted and/or interviewed more than 100,000 persons and obtained detailed information on between 80 percent and 90 percent of the transactions within the area surveyed.

Lessor or lessee responded to questions about the specifics of grazing land lease arrangements. Questions addressed included such items as unit price (by animal unit month, cow/calf pairs, etc.), payment schedule, and tenure. Other questions about the rights and obligations of the lessor and lessee, such as who constructs and maintains range improvements, were asked to help identify which of those factors affected the unit price and to what extent. Questions about the physical aspects of the land being leased, such as topography, carrying capacity, and physical access, also were included to help determine which public and private land areas are most comparable in their ability to support livestock. These questions were to determine: (1) how much a livestock operator is paying for private grazing lands; (2) what he or she is getting in return.

In addition to the collection and verification of information on grazing use transactions involving lands under any ownership within the assigned counties, the appraisers examined a representative sample of the properties involved in the grazing use and
compiled data pertaining to the general physical, social, economic, and livestock-related factors in each county.

The appraisal includes information on both Forest Service and Bureau of Land Management grazing lands in the Western United States. This information provides the basis for comparability analysis of the Federal lands and the private leased grazing lands.

Information Used in the Appraisal

More than 47,000 lease transactions were cataloged. Initial investigation revealed that grazing fees set in the majority of these transactions were established by administrative order rather than open negotiation between the lessee and lessor. Approximately 7,200 leases reflecting open market negotiations between lessee and lessor were verified. The field appraisers obtained detailed data regarding these transactions. The field information sheet was designed to allow the appraisers to test 99 physical characteristics and lease terms and conditions as elements that could possibly affect the value or price of grazing. These 99 elements were later reduced to 81 potential value factors, with elements producing similar information being combined. This lease information was sorted and arrayed. Multiple regression analyses, as well as a variety of other statistical tests, were made of the data.

Based upon this computer and statistical analysis of the mass data, it was concluded that the most appropriate and valid measure of the appraised value of grazing land is the simple arithmetic mean price of the negotiated leases. In the final analysis on which the appraised value conclusions were based, data was further refined by excluding 15 percent of the lease transactions of the highest reported rates and 15 percent of the lease transactions of the lowest reported rates, thereby resulting in use of 70 percent of the data.

Based upon analyses of the data, the 17 Western State region was divided into six pricing areas. Criteria for selecting the boundaries of the pricing areas included, in order of priority: (1) mean county prices, (2) consideration of the natural vegetation which reflects the influence of soils, climate, and topography, (3) political or administrative boundaries, and (4) physical or geographical features. (The pricing areas are shown on Figure 1.)

The appraisal was made using mass appraisal techniques, acknowledging the wide range of conditions that generally exist on the public rangelands. No attempt was made to account for the differences between individual allotments or tracts. As a result, the value estimates contained in the report are not intended to represent the "site specific" appraised value of any individual allotment. Rather, the value conclusions are intended to represent a reasonable estimate of the appraised value of grazing on the public rangelands.

The private land lease rate was estimated based upon analysis of the market prices within each pricing area. The final estimate of the appraised value of public lands grazing was based upon the indicated private land lease rate adjusted downward 5 percent, which reflects the impact of the terms and conditions of Federal grazing permits and privileges as compared to typical private grazing lease terms and conditions.
Property Data Summary

The Forest Service and the Bureau of Land Management administer grazing on approximately 318 million acres of public rangelands located within the 17 Western States. These public rangelands are divided into more than 30,000 tracts or allotments ranging in size from less than 40 acres to more than 1 million acres. Currently, there are more than 22 million animal months of Federal grazing used annually by the western livestock industry.

The ownership pattern of public rangelands ranges from scattered and intermingled to solid block holdings. The intermingled pattern of ownership describes those areas in which public rangelands (mostly Bureau of Land Management) are intermingled with lands owned by railroads, timber companies, and private individuals. These lands are often found in a checkerboard pattern.

The public rangelands support all of the natural vegetative types known to the west, plus all of the domesticated vegetation introduced during the past 40 to 50 years in range land improvement projects. Forage quality on public rangelands varies substantially from area to area and tract to tract. The estimates of carrying capacity range from less than one acre per head month to more than 99 acres per head month.

Overall Description of Private Grazing Agreements

The private grazing leases typically are verbal 1-year agreements ("handshake agreements") with no written documentation as to the specifics of that agreements. These leases, more often than not, are renewed annually; typical renewal of the private lease being little more than a Christmas card note and check for the following year's lease period. The season of use during the lease year is dictated by the local weather conditions. The agreements do not provide for nonuse at a reduced fee, nor are there typically any provisions for refunds due to reduced use during the grazing season.

The primary condition of these private agreements is that the property not be abused and be returned to the landowner at the end of the term of use in at least the same condition that it was received. The lessee's failure to maintain the condition of the range generally results in the termination of the lease (or no renewal) with no route of appeal. Routine structural range improvements (drift fencing, etc.) on the leased area are generally done by the lessee in some cases using material provided by the landowner. In the case of major range improvements (major water development, etc.) the landowner bears a substantial part of the cost of the improvement either directly or through reductions in rent until the construction is complete. Revegetation is typically handled by the landowner or credited to the lessee if done at his/her expense. In all cases the range improvements of a permanent nature are placed on the property with the prior agreement and consent of the landowner and belong to him/her upon completion.
Comparison of Private Agreements to Public Rangeland Permits/Leases

There are a number of characteristics of the public permit which differ in varying degrees from the generally more informal private grazing agreements. The public rangeland permits are more rigid in content regarding specific use period; specified number and kind of animals authorized to graze; and inclusion of very specific stipulations regarding wildlife, public access, and other uses of the agency lands. Two characteristics that are unique to the public rangelands are the appeal process as to decisions made by the landowner pertaining to the leased area and the privilege of taking nonuse, wherein the lessee can retain his/her privileges through approval of nonuse and not pay the grazing fees for that year. A further difference relates to the length of the agreement. The public permit is generally for a 10-year term. Of the total number of market-negotiated leases, excluding leases where the lessor provides the day-to-day handling of the livestock, 95.2 percent are for a 5-year or less term, with 69 percent of the total being 1 year or less in term.

The majority of permitted public rangelands have stock water on site, are utilized within the same time frames or seasons as similar private lands in the same area, and are accessible to the user via public roads or through the permittee's own property. The range of size is quite broad but similar to that found in the private market. In conclusion, the public rangelands are quite similar to those private lands found in the same general location.

The prices paid for use on non-Federal lands was compared to the prices paid for transactions involving lands in Federal ownership (Table 1). This comparison showed that federally owned land appears to lease for an amount slightly less than that of the non-Federal properties. A -5 percent is indicated when the $6.53 average for Federal ownership (70 percent data) is compared to the $6.87 average for the non-Federal ownerships.

In the negotiated market, any advantage held by the private lessee over the public permittee as a result of the "looseness" of terms and conditions is at least partially offset by the lack of documentable tenure indicated by the private lease market, combined with the appeal rights and availability of nonuse available to the public permittee. In no case, however, were any private leases discovered that contained the rigid stipulations contained in the public permit. Based on the additional requirements (meetings with Forest property, etc.) placed on the public permittee/lessee, it is the opinion of the appraisers that a slight deficiency exists in the public permit as it compares to the typical private lease. This deficiency will be expressed as a 5 percent downward adjustment of the private land lease rate.

The appraisers could find no basis for making an adjustment beyond the 5 percent indicated by this comparison. To make an adjustment in the appraisal greater than 5 percent would be in contradiction to the market evidence. The appraisal values are shown in Table 2. The appraised values are based on an analysis of all transactions which include different payment schedules (i.e., paid in advance of use, periodically, or at the end of the season). The data did show that the price varied by payment schedule. Generally, both agencies require payment in advance and Table 2 shows
### Table 1

**NONFEDERAL OWNERSHIP—70%**

<table>
<thead>
<tr>
<th>Year</th>
<th>Date</th>
<th>Acres</th>
<th>Avg Price</th>
<th>Wgt Price</th>
<th>Median</th>
<th>Leases</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>875,052</td>
<td>$5.11</td>
<td>$5.03</td>
<td>$4.78</td>
<td>498</td>
<td>$9.69</td>
<td>$3.00</td>
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</tr>
<tr>
<td>1978</td>
<td>289,634</td>
<td>6.79</td>
<td>6.72</td>
<td>6.67</td>
<td>158</td>
<td>11.00</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>1,317,960</td>
<td>5.60</td>
<td>6.77</td>
<td>7.21</td>
<td>320</td>
<td>10.50</td>
<td>4.73</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>1,087,138</td>
<td>6.48</td>
<td>6.71</td>
<td>6.67</td>
<td>348</td>
<td>10.36</td>
<td>4.78</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>840,543</td>
<td>7.60</td>
<td>7.53</td>
<td>7.17</td>
<td>444</td>
<td>12.00</td>
<td>5.25</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>508,272</td>
<td>5.51</td>
<td>6.56</td>
<td>6.37</td>
<td>200</td>
<td>10.00</td>
<td>4.56</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>3,725,396</td>
<td>7.29</td>
<td>7.35</td>
<td>7.15</td>
<td>1,131</td>
<td>11.00</td>
<td>5.30</td>
<td></td>
</tr>
</tbody>
</table>

**FEDERAL OWNERSHIP—70%**

<table>
<thead>
<tr>
<th>Year</th>
<th>Date</th>
<th>Acres</th>
<th>Avg Price</th>
<th>Wgt Price</th>
<th>Median</th>
<th>Leases</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>386,525</td>
<td>$5.06</td>
<td>$5.61</td>
<td>$5.50</td>
<td>49</td>
<td>$8.33</td>
<td>$4.27</td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>480,516</td>
<td>5.58</td>
<td>6.12</td>
<td>5.69</td>
<td>29</td>
<td>10.48</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>1,079,309</td>
<td>5.42</td>
<td>5.67</td>
<td>5.19</td>
<td>83</td>
<td>10.00</td>
<td>4.38</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>659,745</td>
<td>7.54</td>
<td>7.07</td>
<td>6.82</td>
<td>69</td>
<td>11.54</td>
<td>5.29</td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>812,071</td>
<td>6.97</td>
<td>6.80</td>
<td>6.50</td>
<td>87</td>
<td>11.00</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>605,201</td>
<td>3.91</td>
<td>5.56</td>
<td>5.80</td>
<td>44</td>
<td>8.68</td>
<td>4.44</td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>4,690,843</td>
<td>6.30</td>
<td>6.80</td>
<td>6.66</td>
<td>266</td>
<td>8.00</td>
<td>5.07</td>
<td></td>
</tr>
</tbody>
</table>

**7-Yr**

<table>
<thead>
<tr>
<th>Year</th>
<th>Date</th>
<th>Acres</th>
<th>Avg Price</th>
<th>Wgt Price</th>
<th>Median</th>
<th>Leases</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>8,862,153</td>
<td>$6.53</td>
<td>$6.87</td>
<td>3,101</td>
<td>15.00</td>
<td>3.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1978</td>
<td>9,088,259</td>
<td>$6.01</td>
<td>$6.53</td>
<td>627</td>
<td>13.00</td>
<td>4.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The entries for each of the 7 years are calculated independent of one another. None of the entries on the 7 year line are meant to be viewed as totals of, or averages of the preceding columns.*
Table 2

APPRAISAL VALUES

<table>
<thead>
<tr>
<th>Price</th>
<th>Area</th>
<th>Private Land Lease Rate</th>
<th>Fair Market Value of Grazing on Public Rangelands</th>
<th>Advance Payment</th>
<th>Payment at the End of the Season</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Maturing Cattle &amp; Horses (over 18 months of age)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$10.00/HDMO-PRMO</td>
<td>$9.50/HDMO-PRMO</td>
<td>$8.55/HDMO-PRMO</td>
<td>$10.45/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>7.70/HDMO-PRMO</td>
<td>7.10/HDMO-PRMO</td>
<td>6.39/HDMO-PRMO</td>
<td>7.81/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>8.00/HDMO-PRMO</td>
<td>7.60/HDMO-PRMO</td>
<td>6.84/HDMO-PRMO</td>
<td>8.36/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6.25/HDMO-PRMO</td>
<td>5.90/HDMO-PRMO</td>
<td>5.31/HDMO-PRMO</td>
<td>6.49/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5.50/HDMO-PRMO</td>
<td>5.20/HDMO-PRMO</td>
<td>4.68/HDMO-PRMO</td>
<td>5.72/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6.75/HDMO-PRMO</td>
<td>6.40/HDMO-PRMO</td>
<td>5.76/HDMO-PRMO</td>
<td>7.04/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yearling Cattle (under 18 months of age)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$7.50/HDMO-PRMO</td>
<td>$7.10/HDMO-PRMO</td>
<td>$6.39/HDMO-PRMO</td>
<td>$7.81/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6.75/HDMO-PRMO</td>
<td>6.40/HDMO-PRMO</td>
<td>5.76/HDMO-PRMO</td>
<td>7.04/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6.25/HDMO-PRMO</td>
<td>5.90/HDMO-PRMO</td>
<td>5.31/HDMO-PRMO</td>
<td>6.49/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5.70/HDMO-PRMO</td>
<td>5.40/HDMO-PRMO</td>
<td>4.68/HDMO-PRMO</td>
<td>5.94/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5.50/HDMO-PRMO</td>
<td>5.20/HDMO-PRMO</td>
<td>4.68/HDMO-PRMO</td>
<td>5.72/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4.75/HDMO-PRMO</td>
<td>4.50/HDMO-PRMO</td>
<td>4.05/HDMO-PRMO</td>
<td>4.95/HDMO-PRMO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sheep</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$1.10/HDMO-PRMO</td>
<td>$1.05/HDMO-PRMO</td>
<td>$0.95/HDMO-PRMO</td>
<td>$1.16/HDMO-PRMO</td>
<td></td>
</tr>
</tbody>
</table>

Note: HDMO stands for Head Month, PRMO stands for Pair Month, (i.e., cow/calf, ewe/lamb, mare/colt).
the recommended adjustment for advance payment and payment at the end of the season.

As previously stated, there may be other, nonmarket reasons for making adjustments to the appraised value through the grazing fee study process, such as:
1. The stated policy of this Administration is that a beneficiary of any federally provided good or service should pay the government a user charge covering the legitimate costs of providing the good or service.
2. Congress has repeatedly stated that the grazing fee should be reasonable and provide stability to the livestock industry.

EVALUATION OF THE APPRAISAL REPORT

The appraisal report represents the first effort reported in the literature where appraisal methodology has been used to estimate the value of forage obtained from "public rangelands." As a result, one would expect the authors to experience some difficulty in applying the methods used in appraising property. This evaluation of the appraisal report is, therefore, divided into two parts. The following section evaluates the appraisal report from the perspective of how well the authors applied appraisal methods. The second section evaluates the report from a somewhat broader perspective—the authors' use of scientific methods.

Application and Use of Appraisal Methodology

"The job of the rural appraiser is to identify, gather and analyze all relevant information; to interpret it in the context of economic principles; and to apply appropriate techniques that will result in a sound estimate of value" (The Appraisal of Rural Property, 1983). This job inevitably involves considerable professional expertise and judgement. As a result, a general methodology has been adopted that is to be used in appraising all property. This involves the following steps (further discussion of these steps can be found in nearly any appraisal book):
1. Definition of the problem. This includes:

   A. Identification of the property
   B. Identification of the property rights to be valued
   C. Date of the estimate
   D. Use of the appraisal
   E. Definition of value
   F. Limiting conditions

2. Preliminary analysis and data selection and collection

3. Highest and best use analysis

4. Value estimate

5. Application of three approaches

6. Reconciliation of value indications and final value estimate


These steps provide the basis for the following evaluation (all of these steps will not be included and the sequence outlined will not be followed in the following evaluation). However, before the application of this methodology is reviewed, it is necessary to outline how this general methodology was altered by the authors.

General approach

Most appraisals involve either a valuation or an evaluation. The differences in these must be kept clearly in mind.

Valuation is the process of estimating market value, investment value, insurable value, or other properly defined value, of an identified interest or interests in a specific parcel or parcels of real estate as of a given date. Examples of valuation assignments are market value estimates of property owned in fee simple or of preservation easements or leasehold estates. Evaluation is a study of the nature, quality, or utility of a parcel of real estate or interests in, or aspects of, real property without reference to a value estimate. Examples of evaluation assignments are land utilization studies, supply and demand studies, economic feasibility studies, highest and best use analyses, and marketability or investment considerations for a proposed or existing development. (The Appraisal of Rural Property, 1983)

Clearly, the appraisal report is a valuation study. However, it does not represent a typical valuation problem. Most valuations are designed to estimate the value of a specific parcel (or parcels) of property. This appraisal report was not designed to yield a value for a specific parcel of
property because a mass appraisal approach was used. Traditional appraisal methods obtain data from several parcels which then provide the basis for obtaining the value of a specific parcel. The use of traditional methods represent an inference from general to specific data. This differs significantly from the mass appraisal methods used which are inferences from specific to general and are particularly subject to tests of statistical significance (see the research methodology section below).

The report uses the term "mass appraisal" to describe the methodology used to collect the data in this study. This term is defined as, "the process of valuing a universe of properties as of a given date, in a uniform order, utilizing standard methodology, employing a common reference for data, and allowing for statistical testing."

This study is quite different in that they have moved into the area where they want to make a statement about the average value of all properties in the population based on a sample of individual units in the population. This methodology of going from the specific to the general or estimating population parameters from a sample is called statistical inference and is used quite commonly in scientific studies. However, this procedure is subject to rigorous statistical analysis and some rather rigid rules about how the data are sampled and used in making the inference to the population (see page __).

One gets the impression from reading this report that a mass effort was made to collect data regardless of how it was related to the parameters they were trying to estimate, then it was sorted, discarded, or kept based on value judgments of the researcher. This procedure is not in keeping with proper statistical procedures where one attempts to make unbiased estimates of the population parameters. One of the tests of good scientific research is the repeatability of an experiment. Could another
scientist repeat this data collection and sorting and come up with the same answers or, as in this case, the same data set? This is especially true for a study of grazing fees entirely done by the two agencies that benefit from higher fees and are perceived by many to be predisposed to a belief that current fees are too low. An attempt was made to skirt this issue by assumption 3 on page 16 of the report:

3. Statistical methods have been employed in the sorting and refining of the comparable private lease data used in this report. The value conclusions reached by the appraisers are based primarily on a direct comparison method of appraisal and do not rely on statistical methodology as their foundation. In no case do the appraisers represent this appraisal report or the conclusions contained herein as being a product of statistical methodology.

However, the basic statistical concepts of making inferences from samples to populations is too fundamental to be disregarded by an assumption imposed by the authors to limit scientific scrutiny of the report.

Definition of the problem

The authors fail at any time to clearly state what was to be valued. This is partially to be expected because of the methods used (mass appraisal), but their failure to clearly define the problem leads the authors to some problems that are discussed below. Of particular importance is the failure of the authors to clearly define the property rights, if any, that are involved in the transactions for which data were collected (more will be said about this later). The authors do indicate that the purpose of the appraisal was to "... estimate the fair market rental that is due the landowner (the United States and the public who own the public rangelands) for the right to graze on the public rangelands. The purpose is not to estimate the value of the lands being grazed" (page 57). However, it must be emphasized that this value will be dictated by the methods used to make this estimate.
Application of the three approaches

Three approaches to valuing property are used by appraisers: income, sales, and cost. The cost approach is correctly rejected by the authors as being inapplicable to the study. However, they also reject the income approach. This method has been widely used by researchers to estimate the value of forage (see the reviews by Brokken and McCarl 1984, and Godfrey and Snyder 1978). The primary reason why this approach was rejected was this "approach would be based solely on the user's ability to pay, and not on fair market value to the owner." It is recognized that the sales approach is generally the best indicator of the value of purchaser's willingness to pay and that the sales approach is primarily used by appraisers for this reason. However, the income approach also could be applied in this case as easily as it is for other types of rural/farm property. The value derived using an income approach would probably have been less than the estimates derived, but they also would have provided a lower bound. The values derived using an income approach should, therefore, have been rejected ex post rather than ex ante if the methodology used by most appraisers had been followed/used. One is, therefore, left with the distinct impression that the income approach was rejected ex ante because it would not show what was desired rather than by examining any evidence for rejecting this approach. The authors clearly, therefore, break with appraisal methods by rejecting this approach without examining the results that could have been obtained using this approach/data.

The sales approach used by the authors represents the most widely used approach utilized by appraisers. It is generally conceded that it represents the most accurate estimate of the value in exchange for a bundle of
property rights. The accuracy of the estimates obtained, however, is dependent upon the data obtained (like any other estimate).

Data selection and collection

When one attempts to gather information on grazing fees or grazing lease rates, he must be aware of the problem that grazing leases cover a wide spectrum of situations relative to which party in the lease provides which services. From the user's point of view it is the total cost of grazing on a lease that is important. This total cost is the cost that must, in the long run, be equated with the value of the product produced from the forage purchased in this lease. Nonfee costs (cost of providing services) are just as important in the total cost as the value of the forage (e.g., see Torell, Godfrey, and Nielsen 1985; and Obermiller and Lambert 1984). When dealing with grazing leases on public and private rangelands, one must take these service (nonfee) costs into account. Grazing leases on private land cover the entire spectrum of arrangements between the landlord and tenant. On the other hand, public land leases are fairly homogeneous in that the government provides the opportunity for the livestockmen to use the land by grazing his animals on it. The permittee (rancher) is required by regulation or by the dictates of good range and livestock management to provide most of the nonfee aspects of using public forage.

The importance of this distinction is especially important when one considers what data to collect. If one collects data from the buyer, then one must be sure that the amount(s) paid for nonforage items that may have been provided by the landlord (e.g., fencing, herding, salting) are deducted from the fees paid. Likewise, the fees paid a landlord (the
approach used by the appraisers) should not include the payment for non-forage items if one is trying to provide an estimate of the forage alone. This procedure was not followed by the appraisers. Instead they segregated those transactions into various subfiles (A through J) in an effort to have the fees received by the various landlords comparable. Criteria were not outlined by the authors for including a particular transaction in a specific file. As a result, one must assume that the allocation of a particular file was consistent. These allocations would have required considerable judgement. If not, the likelihood of biased results is insured. In this particular case, the probability of bias is extremely high for the following reasons.

1. No apparent effort was made to determine (see the questionnaire used) how much, if any, was paid for various services. The questionnaire was only designed to ascertain if a particular service was provided by the landlord or tenant. Therefore, it is likely that some transactions would have included some mixture of services that would not make the various transactions comparable. For example, if one transaction included payment to the landlord for some herding while another included the payment for herding services that were extensive, these two transactions would not be comparable even if the landlord did the herding in both cases because a different bundle of services would have been provided in each case (this is only one of several cases that would likely exist, given the data that was collected). This suggests that the basic economic model used in the study needs to be carefully examined (see page 17).

2. The data were collected from persons or organizations who rented forage to livestock operators. These data would reflect the price a landlord(s) would be willing to sell for forage but it need not
reflect the price a livestock operator is willing to pay for forage unless a competitive market existed for the forage. No test of this hypothesis is contained in the study. There is some evidence that it may be more competitive than some have suggested, but this assumption is needed to derive the estimates contained in the report. To the degree that forage is either purchased or sold in a noncompetitive market at any location, the values contained in the report would not be valid for comparison purposes (see page 31).

3. The questionnaire asked for forage prices over time. The authors clearly indicated in several places that most private leases are verbal agreements for a one-year period. As a result, there is potential for memory bias for those permits that are not for the current year unless some written record was used.

4. Given the fact that most private leases (used by the authors to compare to leases from public lands) are for short periods of time, it is not likely that they would have the same value as leases (permits) to use public lands because a different bundle of property rights were exchanged. This also is true for the sublease of federal lands. Rarely can a sublessee obtain the same bundle of rights as the original lessee. Furthermore, whenever the bundle of rights obtained in a lease differ, the payments paid will differ (one of the basic principles used by all appraisers used to adjust "comparable sales"). Therefore, it is likely that some bias exists in the transactions data because adjustments for differences in the bundle of property rights exchanged were apparently not made.

Furthermore, one has to assume that the data collected in the study on federal lands is representative of all BLM and FS grazing allotments in the
west, i.e., these subleased public lands and a few special lease public lands have the same property rights as the permittee having a permit to use regular grazing allotments. This raises several questions. Are these legal and illegal subleases significantly different from the typical grazing permit? Is it because they are different that they are considered for sublease? If not, why isn't there increased pressure to sublease more of the public lands? Do those who sublease these public lands buy more than is readily apparent in the permit lease?

Theoretical Evaluation and Basis of the Appraisal Study

The authors do not outline what basic economic model (one of the basic tools used by all professional appraisers) was used to derive the results obtained. Implicitly, however, they essentially accept the model used in the 1966 grazing fee study.

The economic model (1966 grazing fee study) for grazing fees and the hypothesis tested to see if a competitive market exists for grazing resources in the West was described in a paper entitled "Public Policy and Grazing (1)." The discussion as presented in this paper is as follows:

An Economic Model for Grazing Fees

As part of the investigative work initiated by the Interdepartmental Grazing Fee Committee in the early 1960's, an economic model was developed to explain how forage is valued on public lands.28

The basic premise of the model argues that the forces of supply and demand operate to establish range forage prices just as they do in any other product market. If this is true, the value of public and private grazing per AUM should be the same within given market areas, assuming, of course, that public and private ranges are substitutes for each other. The logic of this assertion is as follows:

Each rancher knows about what he can afford to pay for an additional animal unit month (AUM) of grazing for a particular season and a given quality forage. If rational and economically motivated, he would be willing to pay up to the price that is equal to the value added to ranch production by the addition of one AUM of grazing. This is referred to as the marginal value product of grazing (MVP). If we let:

\[
P_1 = \text{value of public grazing per AUM}
\]
\[
P_2 = \text{value of private grazing per AUM}
\]

and we assume that public and private grazing are substitutes for each other, ranchers will be willing to pay equal amounts for the two types of grazing up to the point where: \( P_1 = P_2 = \text{MVP} \). If the administered grazing fee for public grazing use \( F_1 \) is less than \( P_1 \) and \( P_2 \) it is also less than the MVP of the public grazing.

If \( F_1 \) is less than the MVP of the grazing, the rancher who has control of the grazing is realizing a product surplus value additional to the grazing fee cost. Since control of grazing is embodied in the grazing permit, the product surplus becomes a marketable item through transfer of the grazing permit. As ranchers bid for control of the grazing permits, the authorization to graze public lands takes on value. This permit value reflects the capitalized surplus product value and can fluctuate as the supply and demand conditions change.

It follows, therefore, that if the public and private grazing have equal value per AUM, the total costs associated with each should also be equal. The costs of private grazing include the private lease rate plus other user non-fee costs such as death loss, herding or fencing costs, moving costs, etc. Public grazing costs include the fee plus user non-fee costs of the same general classifications as for private grazing. In both cases, the types and levels of non-fee costs may vary. The total public grazing cost also includes the grazing permit costs and it is the fluctuation of this cost which should, in the presence of a competitive market, keep the costs of public and private grazing equivalent. The postulate can be advanced therefore that the permit value should be equal to the capitalized difference between the total cost of public grazing and the total cost of private grazing. Stated symbolically,

\[29\] The Forest Service and the BLM have commensurability requirements that must be met before a rancher can qualify for a grazing permit. For a rancher to meet this requirement he must have enough private land resources to provide feed for the permitted livestock while not on the federal lands. Whether institutional barriers to a free market are significantly limiting competition has been tested in other areas with different results, see: Gardner, Transfer Restrictions and Misallocation in Grazing Public Range, 44 J. Farm Econ. No. 1 (1962).
\[
P'_v = \frac{(P_2 + E_2) - (F_1 + E_1)}{i}
\]

where:

- \( P \) = permit value
- \( P'_v \) = private lease rate
- \( E_2 \) = other private user non-fee costs
- \( F_1 \) = public grazing fee
- \( E_1 \) = public user non-fee costs
- \( i \) = relevant rate of interest

This model was tested empirically in Utah in 1966. It was found that the cost differential between total public and private costs, capitalized at about a 4 percent rate of interest, equalled the average permit value. Four percent was considered a reasonable, and if anything, a conservative rate of interest. Thus, the conclusion was reached that a reasonable amount of competition exists given the transfer restrictions and that a relatively free market exists for public grazing. If the competitive market does not exist, there is no reason to expect the capitalized differential between public and private costs of grazing to equal the average permit value.

Another way of looking at the equation for "fair market value" that more closely fits the agency's position and the current study of fees is as follows:

\[
FMV = (P_2 + E_2) - E_1
\]

where \( FMV \) is the fair market value (ignores permit value); \( (P_2 + E_2) \) is the total cost of grazing private land (fee and nonfee); and \( E_1 \) is the nonfee costs of using public land.

The agency's appraisal study approaches the problem of estimating "fair market value" from the private market for grazing. (They originally reported that they were only going to look at the private market.) In order to do this, appraisers must select private leases where the nonfee costs are the same as the nonfee costs on public grazing land. If they did this, then:

\[
FMV = (P_2 + E_2) - E_1
\]

If \( E_2 = E_1 \), (the authors implicitly assume that they are equal), one can estimate "fair market value" directly from the private lease rate. The
It is assumed that the agencies still consider the 1966 fee model valid. Thus, the discussion of the appraisal report will take place within the framework of this model. Two crucial points become apparent when one considers the requirements of the model in getting a data set such that \( E_2 = E_1 \). First, are there enough private leases available for study where the nonfee costs are the same as those imposed on permittees on public lands. Second, if a population of equivalent private leases exists, does the methodology followed by the appraisers in collecting and analyzing the data follow acceptable scientific procedures; and was the study designed in such a way as to get the required data for the model. One should keep in mind that the key issue is that the validity of the results of this report is dependent on the appraiser's ability to select private leases that have the same average nonfee costs as the average nonfee costs of using BLM and FS grazing allotments.

The 1966 fee study reported average nonfee costs higher on public lands than they were on private leases that were considered to be economic substitutes for public grazing. The appraisal report handles this problem by grouping the data collected into subfiles, some of which are based on the nonfee cost items, i.e., subfile "E"—landlord provides all services. After this sorting procedure is completed, a decision is made as to which subfiles have leases in them where the nonfee costs are the same as those on public lands. These subfiles were determined to be D, F, G, H, I, and J. (More will be said about this topic later.) If these subfiles do what they were intended to do, one could compute an average lease rate for the private leases contained in the subfiles and this would be the estimate of
"fair market value." However, the study does not end with this conclusion. In the process of collecting the data, the appraisers came up with a data set of public lands that were subleased to other ranchers and some public lands leased on a competitive bid basis. These data were grouped into the same subfiles as the private lease data and compared to the private lease data. If the public data are representative of BLM and FS grazing allotments, then one would expect the values to be the same as those collected from the private sector.

These data indicate that a competitive market does exist for grazing and that market forces influence both the public and private forage values. The fact that public and private values come out very close to each other should have been expected since they were selected to be the same by putting them in the subfiles.

One needs to look closer at the way the data was collected and analyzed to notice some serious problems with the conclusions. It appears that each of the nonfee costs was not considered by its magnitude but only if it existed or not. For example, the question was asked: Who moves the livestock while on the allotment? Let us assume the tenant does this. No information was gathered as to how much it costs to move the livestock. All that is known is that the tenant does this. Suppose it costs the average permittee $.20 per AUM more to move livestock on the public lands than it does the average tenant on private land. This difference would not show up in the private lease data.

Evidence from the 1966 fee study indicates that the same nonfee cost items exist for public and private grazing leases, but, on average, the nonfee costs are higher on public grazing lands. What has happened since then? There have been more improvements such as fences, grazing systems, water developments, and other improvements which are maintained by the
permittee. Evidence for this can be found in the allotment management plans that have been put into effect over the past fifteen years or so. The BLM has become more strict in requiring permittees to take over the maintenance of range improvements. There also seems to be an attitude within the agencies to encourage more private investment in range improvements on public lands. There was a period in the 1960s where private investment on public lands was discouraged. All of these factors add credibility to the contention that more services are required by the permittee today than was the case at the time of the 1966 fee study and that this has increased the nonfee costs of using public lands relative to the cost of using private leased land.

The serious shortcoming of the appraisal study mentioned above is that data were not collected to quantify the magnitude of the nonfee costs on either the private leases or the public leases. A series of questions were asked to determine who performed such functions as moving livestock, maintaining fences, etc., but not the actual cost of doing these functions. Thus, it is impossible to measure these differences when one looks at the private and public lease rate reported in the study.

The obvious response to this criticism of the appraisal study is to say that this problem was taken care of with the inclusion of the data from the all-federal leases. There seems to be very little evidence from a statistical basis that there is any difference in the total cost of using public or private leased rangeland. In other words, when the same nonfee considerations are included in both public and private leases, their magnitude is irrelevant since they cancel each other. In order to accept this, one would have to conclude that the 1966 fee study was wrong, or there have been significant changes in public policy to reduce the nonfee costs on
public lands, or private nonfee costs have increased significantly faster over time than have those same costs on public lands. (Nonfee costs can increase in at least two ways the units of cost, miles of fence, number of moves, hours of labor, etc., have increased and/or the cost of per unit has increased, i.e., cost per mile of fence maintenance, cost per hour of labor). The evidence would seem to point the other way. Thus, one would have to reject the idea that the nonfee costs are not significantly different for public and private grazing. If this postulate is accepted, one has to come up with reasons why the report is wrong.

A total of 897 federal leases account for the total sample of federal subleases used in this study. It is possible that different classes of livestock on the same lease would count for more than one of the 897 leases, so something less than 897 separate locations are the basis for the analysis. There are 33,632 operators running cattle on 30,286 grazing allotments in the west. The sample then amounts to about 2 to 3 percent of the population. A sample of this size may be sufficient for a homogeneous population, and one could make reasonable estimates of the parameters being studied. However, in the case of grazing leases, we do not have a homogeneous population; we have one where there is wide variation in the amount paid for grazing. An example from the data listed in the study: federal ownership, subfiles D, F through J, 1983, the low value per AUM $.02 the high value $75 per AUM. In 1982, from that same table, the range was from $.63 per AUM to $18 per AUM, which is the least amount of variation shown in the data. The point is that one cannot make reliable estimates of population parameters where the data exhibit such wide variation in the observed data from a sample size of only 2 to 3 percent of the population. Furthermore, "clipping data" does not reduce the variance in the population but only in the sample used. This point is discussed later in this paper.
Sample size is also a problem with the private lease data. The data vary almost as much as the federal data, so one would need large samples in order to make statistically sound estimates of private lease rates. One finds problems in reading the material presented in the study as to the sample size. A statement is made that the sample size is 80 to 90 percent of the population. If this is the case, one would have a difficult time arguing about sample size for the private leases. However, there are a few points that make one wonder about this sample size. Evidence from New Mexico indicate that the appraisers did not sample 80 to 90 percent of those involved in private rangeland leasing (Fowler). In the final analysis, 4,427 observations were used to represent the nonfederal ownership lands in the western United States for subfiles D and F through J. What is the population of leases in these subfiles? It was reported that 47,000 lease transactions were included in the study. Yet the critical conclusions and estimates of comparable values are made on about 11 percent of the data collected. This seems like a lot of wasted effort. It also was reported in a series of "Information Papers" (#3) that information would be gathered on approximately 150,000 verified leases. There appears to be more than a minor discrepancy between the number of leases used and the potential number of leases that were to be collected. One has to wonder on what basis the bulk of the data was discarded. It was reported that 37,789 administrative leases were discarded for various reasons. What impact do these leases, accounting for almost 59 million acres of land, have on the market values of grazing per AUM?

Private investments

Private investments in range improvements on BLM and FS lands are not considered as part of the value of public grazing in this report. These
rancher costs are dismissed by assumption 9 on page 18, i.e., it is assumed that they have been purchased or paid for by the government through lower grazing fees over time. Private investments on public lands were not a one-time situation which was evaluated in the 1966 grazing fee study. Private investment is an on-going activity, new investments are made each year, old investments wear out each year. We are, therefore, dealing with the average value of old and new investments at any given year. Thus, they are not amortized and should be given credit each year. This situation would change only if a trend was established where investments, on the average, were going up or down. Admittedly, this variable may not be crucial on average in measuring the difference between public and private grazing but is an example of how the variables that show the difference between public and private values are dismissed in this report.

Use of Research Methods/Methodology

All research is to be conducted using scientific procedures. The appraisal report should, therefore, stand the test of these standards. One of the primary tests of "good" research is that it is repeatable—i.e., another researcher can use the procedures outlined and obtain the same results. This single criteria raises several questions concerning the appraisal report.

Subfiles

Public and private lease rate data were segregated into ten subfiles. The decision to keep or discard a subfile from the analysis was based on a

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1Professional appraisers also use this criteria because if two professional appraisals differ by more than ____ percent, the appraisals must be submitted for peer review and evaluation.
value judgment as to whether it was reasonably close to being like federal grazing allotments and/or if its price appeared to be set in a competitive market. This procedure raises several questions. First, is the typical BLM or FS grazing allotment well enough defined that it can be used as a standard by which to judge whether an observation (lease) or a subfile of leases should be retained or not? Second, are the criterion for selecting which observation goes in which subfile well enough defined in the questionnaire that another researcher would classify them the same way (i.e., is the experiment repeatable)? One has a tendency to get suspicious of studies where data are collected then screened, after the fact, and part of the data is discarded. This is especially true where the criterion do not appear to be well-defined (and should have been decided upon before data was collected) and the decision seems to be based on value judgments of the researcher.

The argument for adding subfiles D, F, G, H, and I to subfile J seems somewhat arbitrary; "the range in price for mature cattle and horses reflected by each subfile, with the exception of subfiles A, B, C, and E fell well within the range of prices reflected by the most comparable transactions in subfile J. Based on this, subfiles D and F through J were combined as the primary data base upon which the estimates of value are based." Given the range of values listed for nonfederal ownership on page 134 of $.02 to $65 it is surprising that all of the data in the study does not fit in this range not just the subfiles mentioned above. It should be noted that if "proper" appraisal methods had been used, the criteria for combining files would have been comparable property rights not a "range of prices" that were similar. Subfile J has the "most comparable transactions" in it. This subfile has a range of $.20 to $65 (see page 95). One
both federal and nonfederal leases, a different adjustment will be derived depending upon the order of magnitude of these nonfee items. For example, if the nonfee costs for both federal and nonfederal lands were $3, this would result in an 8.8 percent adjustment [($3.87 - $3.53)/$3.87]]. If nonfee costs were assumed to be $2, this would yield a 7 percent adjustment [($4.87 - $3.53)/$4.87]]. Furthermore, if the nonfee costs differed between federal and nonfederal lands (assume nonfederal were 10 percent higher than federal—e.g., $2—federal and $2.20—nonfederal), an 11 percent adjustment would result. It seems from the above examples, therefore, that nearly any adjustment could be derived depending upon the assumptions one makes. As a result, one has to seriously question the formula used by the authors to make these adjustments.

A great deal of time and effort was spent during the study evaluating the physical and biological substitutability of private and public grazing lands. This effort probably increased the homogeneity of the data set collected which further explains why the factors that were expected to affect value did not prove significant. The important issue is whether grazing lands are economic substitutes for each other. Two parcels of grazing land may be economic substitutes for each other but may not be similar biologically. Lush irrigated meadowland may be an economic substitute for high elevation mountain summer grazing on the forest. These types of grazing are economic substitutes but not biological substitutes, the meadowland should have been included in the study. It appears that the highly productive private lands where the nonfee costs per AUM are low were excluded from the study because they were not biological substitutes for public lands.
Nonfee items

Eighty-one variables were considered as possible reasons that the value of similar public and private grazing leases would be different. Every one of these variables were rejected because they have no effect on the relative values of public and private grazing. It makes one wonder how much is known about grazing values when none of the variables that were thought to be important show up in the analysis as being significant. If the above is not the case and we do know something about the variables that influence value (presumably some of these variables are included in the 81), then there must be something wrong with the way they were judged to be important or not.

The statistical methods used by the authors to test the significance of the eighty-one variables were made invalid as a result of the data that were collected. The method used to test the significance of a variable was to regress the dependent variable (fee) against the eighty-one dependent variables, all of which were assumed to be binary (dummy) variables. In fact, most (all?) of these variables (e.g., herding, salting, water maintenance) are continuous variables (the amount of herding, salting, etc.) varies. As a result, the authors would not be able to obtain an unbiased test of the significance of these variables because they violated the assumptions of the statistical model used. It is, therefore, not surprising that the "statistical tests" were not "statistically significant."

The statistical methodology outlined above was used to obtain "statistically significant" results. The statistical appendix contains results that show that several of the "nonfee" variables were statistically significant as explanatory variables. Unfortunately, only private lease data were used in this analysis. A quote from the report states: "All leases
containing any Federal grazing lands, even as little as 1 percent, were excluded from the final data base for the statistical analysis. Thus, the final data set for this analysis consisted of 4,427 leases of non-federal land for grazing by mature animals." However, these statistical results were not used in the report.

The statistical tests used by the authors were expected from one perspective (once the nonfee cost variables were assumed to be binary). Data were placed into a subfile based on similarities of the nonfee costs. One would not expect to find statistical differences based on one of these variables if the order of magnitude of these differences were ignored. For example, all leases where the tenant performs the required management functions are put into a subfile, then a test is made to see if herding by the tenant is a significant variable in explaining the value of the lease. Since they were selected to be the same, one would not expect any significant difference due to one of the variables. The subfiles were selected to be different so one would expect a test between subfiles to show a difference. If the test did not show differences, one would have to question why they were in separate subfiles.

Clipping

A few comments must be made about the decision that was made to clip 15 percent of the observations off the top (the high values) and 15 percent off the bottom (the low values) of each data array. Is it an acceptable statistical practice to reduce the variation in the data by eliminating the extreme values reported? If this is the case, it would always be cheaper to clip the data rather than increase the sample size when one found he had a wide range of values reported in the sample. What seems even more unusual in this study is that the data were sorted into subfiles that
should have taken many of the nonmarket observations out of the data set and resulted in a reduction in the variance. The practice of clipping cannot be logically sound from a statistical point-of-view because it is arbitrary. Why a 15 percent clip, why not 5, 10, or 20 percent? The authors seem to indicate that the results after clipping were more in favor of the livestock industry and were, therefore, "acceptable." This kind of reasoning is unacceptable from a scientific perspective, and this report is being judged on how well it meets the criterion of unbiased scientific research.

The authors justify the 15 percent clip because "the fewest number of leases were eliminated from consideration in the value conclusions at this level." They also stated "the median of each array did not change, as a like number of leases were removed from both the top and the bottom of each array." The justification for the 15 percent clip, because it eliminated the fewest number of leases, does not make any sense. A 10 percent clip would have eliminated less observations or a 5 percent clip would have eliminated even fewer. There does not seem to be any logic to the argument that a 15 percent "clip" minimizes the loss of data.

Clipping data is a very questionable practice at best and unacceptable in a study such as this where data are rejected or kept based on value judgments. From the discussion it seems that the authors assume a normal distribution of the data. In fact, in the statistical section, a statement is made that the data seem to follow the normal distribution. However, if one looks at the tables in the text of the study, the median is usually lower than the mean but not in all cases. If one has a normal distribution, the mean, median, and mode are all the same. Given the fact that the mean and median are rarely equal, the data probably had a skewed distribu-
tion. If so, clipping further distorts the results, but it is not known in what way.

**Yearly data**

The data collected covered a seven-year period from 1977 through 1983. A decision was made to use all seven years of data in the analysis. The authors indicate that a 70 percent clip plus putting heavier weight on the last four years tends to level the time effect out. How this is accomplished in the analysis is not readily apparent. Furthermore, this conclusion does not fit with the index of private lease rates in the West. The forage value index used in the current fee formula shows a significant increase in values over this seven-year time period which would not result in an evening of the time effect.

One of the probable reasons for this difference stems from the fact that no adjustment was made for the effect of inflation or deflation, a practice that is common to most economic analyses. Furthermore, the use of data over a seven-year period violates one of the principles used in appraisals—appraisals are made for a point in time—unless adjustments for differences in time are made. One is, therefore, left with the distinct impression that the other years were only included to increase the size of the sample with no adjustments made to insure comparability.

**SUMMARY AND CONCLUSIONS**