

AN EVALUATION OF THE PRIA GRAZING FEE FORMULA

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ABSTRACT

The federal grazing fee is currently set using the Public Rangeland Improvement Act (PRIA) fee formula established in 1978 and modified in 1986. The formula is adjusted annually using indices of private land grazing lease rates (Forage Value Index, FVI), prices received for beef cattle (Beef Cattle Price Index, BCPI), and costs of beef production (Prices Paid Index, PPI). The FVI tracks price movement in the private forage market and was the only index originally proposed to be included in the fee formula. Public land ranchers and an Interdepartmental Grazing Fee Technical Committee assigned to study grazing fee alternatives in the 1960s questioned the ability of the FVI to account for short-term demand, supply, and price equilibrium, and, for this reason, the BCPI and PPI were added to the fee formula. Over 30 years of data are now available to evaluate whether adding the BCPI and PPI did, in fact, help explain short-term market fluctuations. This analysis shows, as earlier studies did, that, if tracking the private forage market is the primary objective, then the fee formula should have included only the FVI. Including the BCPI and, especially, the PPI has caused calculated grazing fees to fall further and further behind private land lease rates. Had the \$1.23 base fee in the PRIA formula been indexed by only the FVI, the federal grazing fee would have been \$3.84/AUM instead of \$1.35/AUM in 2000. It is time to consider the feasibility of a competitive bid system for public lands, or, at the very least, adopt a new fee formula that generates more equitable grazing fees.

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INTRODUCTION

Public land grazing fees have a long history of conflict and political negotiation. Some of the major areas of contention include how much should be charged, how grazing fees should be adjusted through time, and whether fees should vary in different areas of the West. All three of these issues were part of the debate when the Public Rangeland Improvement Act (PRIA) fee formula was adopted in the 1970s, and the debate continues.

The PRIA fee formula includes a base charge of \$1.23/AUM that is adjusted annually using the forage value index (FVI), beef cattle price index (BCPI), and prices paid index (PPI). This was not the original and only proposal for the federal grazing fee formula. In fact, a long and interesting history of debate and conflict preceded implementation of the PRIA fee formula (Backiel and Rogge 1985, USDI/USDA 1977). In this paper, we review the relevant history of the PRIA fee formula. We discuss the original fee proposal supported by the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) that precluded the BCPI and PPI, and then evaluate whether the addition of these two “ability-to-pay” indices, as they came to be called, helped to further track and explain the movement of grazing lease rates over time, as was originally projected. Similar studies conducted 15 years ago also evaluated the validity of including the ability-to-pay indices in the PRIA fee formula (Brokken and McCarl 1987, McCarl and Brokken 1985). This study provides an update of the analysis and demonstrates the continued problems that adding these indices to the fee formula have created.

THE HISTORY OF THE PRIA FEE FORMULA

The history of grazing fees and grazing fee legislation is well documented in previous grazing fee studies including, USDI/USDA (1977) and USDA/USDI (1986, 1992). A detailed historical review of grazing fee policy also is provided by Backiel and Rogge (1985). Our objective in Table 1 is to briefly review the key decisions and legislation that resulted in adoption of the PRIA fee formula in its current form, and to relate those decisions to the historical rationale provided for including the indices now in PRIA. Recognizing this history is important for assessing whether PRIA has met the objectives of those that proposed and adopted the fee formula. A quick review of the abbreviated history also will be important for understanding the various terms and important legislation described below.

METHODS AND PROCEDURES

Over 30 years of data are now available to evaluate whether adding the BCPI and PPI to the PRIA fee formula did in fact improve the formula’s predictive ability, as envisioned by the 1977 Grazing Fee Technical Committee. However, changes in data collection and policies have altered how

PRIA-generated fees are computed. The data used to compute the FVI was redefined with a 1986 Executive Order (EO) issued by President Ronald Reagan (Table 1). The Executive Order also directed that a minimum fee of \$1.35/AUM would be charged under the PRIA fee formula. Neither of these limitations and changes are considered in the analysis presented here. We start with the earlier statistical model defined by McCarl and Brokken (1985):

$$FVI_{t+1} = \beta_0 + \beta_1 FVI_t + \beta_2 BCPI_t + \beta_3 PPI_t + u_t \quad (1)$$

The historical FVI calculated on an AUM basis was used in the analysis, and the 1986 data redefinition ordered under EO 12548 was not used. The restricted 25% maximum annual fee increase, adapted when PRIA was initiated, also was not considered. Our analysis considers grazing fees that would be generated by the unrestricted PRIA formula. Additional regressions were done to determine whether results were different when the FVI series was calculated following the mixed data definition of EO 12548 (FVIPRIA in Appendix A).

Performing the regression suggested by equation 1 results in an estimate of the private land lease rate index (FVI_t) during the current period, based on indexed values of private land lease rates, beef prices, and production costs during the previous period. As noted by McCarl and Brokken (1985, p. 775), the regression of current and lagged index values is based on a normalization of private land lease rate data. Predicting lease rates at year $t+1$ is equivalent to predicting FVI_{t+1} with normalization of the data. The error term (u_t) captures random differences in the FVI between years.

Dividing the predicted FVI_t by 100 and multiplying by the 1964–1968 base lease rate (\$3.65/AUM) used to estimate the FVI index provides an estimate of the private land lease rate at time t . Similarly, if recognition is given that public land grazing fees should be less than private land lease rates, when the higher non-fee grazing costs for public lands are considered, then equation 1 provides a tracking of public land grazing fees when the base fee rate is reduced. Multiplying by the \$1.23/AUM base of PRIA, for example, provides a grazing fee estimate during year t , except the beta coefficients of equation 1 are not restricted. The PRIA formula implies the restrictions $\beta_0 = 0$, $\beta_1 = 1$, $\beta_2 = 1$, and $\beta_3 = -1$.

Several alternative statistical results are possible if the beta coefficients in equation 1 are varied and estimated using regression techniques. First, it may be that an equal unitary weighting should not be attached to each index, but with all three indices statistically important in predicting forage value. Second, the appropriate weighting for any particular index may not be statistically different from one while other indices are statistically insignificant. As noted by Brokken and McCarl (1987, p. 63), justification for PRIA would be evident if the implied restrictions of PRIA are not statistically significant (i.e., imposing the above restrictions does not

Table 1. An abbreviated history of grazing fees and the PRIA fee formula.

Grazing Fee Study and Legislation	Description
1924 Rachford Appraisal	Based largely on an appraisal of supposedly comparable privately owned land (Rachford 1924) and the recommendation of Dan Casement, a Kansas livestock producer assigned by the Secretary of Agriculture to review the appraisal, variable fees and the practice of basing fees on the price of beef and lamb was adopted and prevailed in the USFS from 1928 until the mid-1960s (Backiel and Rogge 1985, USDI/USDA 1977, p. 2-2). The \$0.05/AUM fee on BLM land, first adopted by the Taylor Grazing Service in 1936, had no specific economic rationale except to cover administrative costs of the land agencies. It was a politically negotiated compromise (USDI/USDA 1977, p. 2-3).
1966 Grazing Cost Study	In 1959–1960, an interdepartmental task force was formed to undertake a joint grazing fee study that would be used to develop a uniform approach to grazing fees between the federal land agencies. One of the major responsibilities of the task force was the 1966 Western Livestock Grazing Survey that provided a total grazing cost comparison of nearly 10,000 public land permittees and private land forage lessors. This total cost comparison indicated that, if interest on the permit investment was excluded (which was controversial), a weighted average base grazing fee of \$1.23/AUM would make total grazing costs on public and private lands equal. This base rate was a weighted average for both BLM and USFS lands, and for cattle and sheep operations (USDI/USDA 1977, p. 2-22). Because total grazing costs were as variable within ranching areas of the West as they were between areas, no statistical basis could be found for differentiating fees between grazing districts or areas (Arthur D. Little Inc. 1967, 1968). The weighted average \$1.23/AUM cost differential became the base value used in PRIA. Further, the interdepartmental task force proposed to adjust the base fee annually by an index of private grazing land lease rates, the FVI (Backiel and Rogge 1985).
1969 Grazing Fee Proposal	In 1969, a new fee schedule for USFS and BLM lands was announced that adapted the proposed fee increases to the \$1.23/AUM base rate (USDI/USDA 1977, p. 2-27). The 1969 fee schedule and formula would use the FVI to adjust fees through time. Implementation of the 1969 fee schedule proceeded with controversy and various legal delays and fee moratoriums.
1973 American National Cattlemen's Association proposal	In October 1973, the American National Cattlemen's Association (now the National Cattlemen's Beef Association, NCBA) proposed a new fee formula to the Secretaries of Interior and Agriculture that would use indices of beef prices and prices paid to adjust grazing fees. The 1964–1968 period would serve as the base period for both indices, and, as noted by Backiel and Rogge (1985), the new formula would have shifted the basis for fee adjustment from a private land lease rate equivalency, based on the FVI, to an ability-to-pay basis using the BCPI and PPI. The new formula was not accepted by the land agencies.
1976 Federal Land Policy and Management Act (FLPMA)	The 1976 Federal Land Policy and Management Act (FLPMA) set out major, overall public land management and policy objectives and mandated that a grazing fee study be submitted to Congress within one year. The resulting 1977 Grazing Fee Study evaluated seven alternative procedures for determining grazing fees, including the fee formula proposed by the NCBA and another formula, which eventually became PRIA, proposed by a Technical Committee assigned to review public land grazing fees by the Senate Interior and Insular Affairs committees (USDI/USDA 1977). The technical committee fee formula was supported by livestock interests because, similar to their own proposal, it included livestock prices and production costs as adjustment factors. Inclusion of these price and cost factors was of primary concern to livestock interests and they maintained that severe hardships to thousands of individual ranchers could be avoided by including these indices in the fee formula (Backiel and Rogge 1985, p. 28). The Grazing Fee Technical Committee argued that the FVI would adequately measure the long-term trend grazing fee and forage values. However, they questioned the ability of the index to capture short-term instabilities that result during periods of disequilibrium (USDI/USDA 1977, p. 3-34). They suggested that, by adding the BCPI and PPI, the fee formula would be better able to account for short-term fluctuations in forage demand and supply. It also provided a compromise between the land agencies that wanted to use only the FVI and public land ranchers who wanted to use only the BCPI and PPI. Including all three indices was criticized because beef prices and production costs should already be included when ranchers formulate lease bids based on livestock production value. Research has since shown this to be the case (Van Tassell and McNeley 1997, McCarl and Brokken 1985).
1978 PRIA Fee Formula	H.R. 10587, which eventually became PRIA, was introduced in January 1978 and fees were set using the new PRIA fee formula in 1979. Using the PRIA formula, grazing fees increased in both 1979 and 1980. In both years, the 25-percent limit of change that was included in the legislation kept fees below the calculated value. The \$2.36/AUM fee in 1980 was the highest fee ever reached, and PRIA-generated fees have trended downwards ever since. The PRIA fee formula is

calculated as

$$Fee_t = \$1.23 \times \frac{(FVI_{t-1} + BCPI_{t-1} - PPI_{t-1})}{100}$$

The data used to estimate the indices are described in detail in USDI/USDA (1977) and USDA/USDI (1992). Kearl (1989) provides a critical review of the data collection procedures and the index components. Historical values for the indices are provided in Appendix A.

Executive Order 12548

The PRIA fee formula expired on December 31, 1985, but was indefinitely extended by Executive Order 12548 (2/14/86) with an imposed minimum fee of \$1.35/AUM. The Executive Order also included a provision that changed the data series used to compute the FVI from a \$/AUM to a \$/head-month basis. We understand that this change occurred not because of a perceived need for a different data series, but rather the loose language used in the Executive Order, i.e. those writing the order did not recognize that \$/head-month and \$/AUM values are not the same and specified \$/head-month instead of the \$/AUM index that had historically been used (Personal communication, Mr. Don Waite, former BLM economist, Washington, D.C.). The changes proposed in the Executive Order were implemented with the 1986 fee year.

significantly decrease the explanatory power of the model as measured by R^2).

The statistical significance of the restrictions was tested using restricted least squares regression. Using the residual sum of squares from the restricted (RSS_R) and unrestricted (RSS_{UR}) models, the appropriate test statistic is given by an F-distribution with m and $n-k$ degrees of freedom. The test statistic also can be formulated in terms of the model R^2 values. “ m , n , and k ” denote the number of restrictions imposed, the number of observations, and the number of parameters estimated in the unrestricted model, respectively. As noted in any basic econometrics or statistics book, the appropriate F-statistic can be computed in one of two ways:

$$F = \frac{(RSS_R - RSS_{UR})/m}{RSS_{UR}/(n-k)} \text{ or } \frac{(R_{UR}^2 - R_R^2)/m}{R_{UR}^2/(n-k)} \quad (2)$$

Statistical significance of the F-statistic would suggest that at least one of the imposed model restrictions does not hold.

Using data defining annual values of the PRIA indices (Appendix A), equation 1 was first estimated with no restrictions imposed on the beta coefficients. This unrestricted model resulted in equations similar to those estimated by McCarl and Brokken (1985), Torell et al. (1989), Rimbey (1990), and Bartlett et al. (1993) to evaluate what parameter weighting should be attached to the PRIA indices to best predict forage value on a West-wide and state-level basis. These unrestricted regressions are now used to index state land grazing fees in Idaho and New Mexico (Rimbey 1990, Torell et al. 1989).

To test various restrictions on the estimated parameters, additional restricted models were evaluated using the TEST statement within PROC REG of SAS (Freund and Littell 1991). The first set of restrictions tested were that PRIA is an appropriate model formulation, or the null hypothesis of the first test, $H_0: \beta_0 = 0, \beta_1 = 1, \beta_2 = 1, \text{ and } \beta_3 = -1$. A second test specified H_0 as $\beta_1 = 1, \beta_2 = 0, \text{ and } \beta_3 = 0$ and was used to test

whether the BCPI and PPI jointly added explanatory power to the model. It further tested whether only the lagged FVI variable should be used to predict FVI during the current period, similar to the original grazing fee adopted in 1969 (USDI/USDA 1977).

The analysis is conducted with recognition that the data used to compute PRIA indices has been criticized on numerous accounts. Major criticisms include: a relatively small amount of data is collected to represent all of the western states; the FVI is based on hearsay as people are asked to recall or speculate on lease rates in the area; the BCPI is computed for cattle weighing over 500 pounds and does not include the lighter feeder calves produced on many western ranches; and the PPI excludes major feed expenses for western ranches. Kearl (1989), Brokken and McCarl (1987), and USDA/USDI (1986, 1992) provide additional detail about these and other criticisms, and evaluate ways the indices could be changed and improved.

RESULTS

Using data from the 1964–1999 period, the unrestricted PRIA equation was estimated to be:

$$\hat{FVI}_t = 4.327 + 0.900^* FVI_{t-1} + 0.115^* BCPI_{t-1} - 0.014 PPI_{t-1} \quad (3)$$

(10.81) (0.158) (0.055) (0.073)

$$R^2 = 0.977, \quad \bar{R}^2 = 0.975, \quad n = 35.$$

The standard error of the estimate is in parentheses and a * signifies that the variable was individually statistically significant at the $\alpha = 0.05$ level.

Durbin’s h statistic was estimated to be -1.25 , which does not indicate a significant problem with autocorrelation in the model ($p < 0.11$). White’s test for heteroscedasticity also did not indicate a significant problem ($p < 0.476$). Multicollinearity was a problem in the model. Data for the FVI and PPI

variables were highly correlated, with the condition index estimated to be 13.7, and with over 95% of the variation in these two variables explained by the third eigenvalue defined by the collinearity diagnostic options in SAS (Freund and Littell 1991). This was not an unexpected result. As noted by McCarl and Brokken (1985), the FVI conceptually includes the other two variables.

Testing the restrictions imposed by PRIA, using equation 2, resulted in a highly significant F-statistic ($F = 1,003$, $p < 0.0001$). This suggests that at least one of the restrictions implied by PRIA does not hold. The second test, $H_0: \beta_1 = 1$, $\beta_2 = 0$, and $\beta_3 = 0$, resulted in an insignificant F-statistic ($F=1.53$, $p < 0.23$), suggesting that the PRIA restrictions that did not hold in the first test were the inclusion of the BCPI and PPI. Similar to the earlier findings of McCarl and Brokken (1985), these added indices did not improve the ability of the fee formula to predict forage value and did not help explain short-term market imperfections, as envisioned by the 1977 Grazing Fee Technical Committee. Including these two indices in the PRIA formula with a weighting of one, or even including them in the equation at all, was a mistake if predictive power of the equation is important. Using a unitary weighting, while intuitive in a practical sense, does not give the correct coefficient in a statistical sense.

The appropriate adjustment factor suggested by the second statistical test is not exactly equal to the 1969 fee formula (i.e., $FVI_t = 1 \times FVI_{t-1}$). Rather, the implied equation includes a statistically significant intercept:

$$FVI_t = 6.171^* + 1 \times FVI_{t-1} \quad R^2 = 0.974, \quad \bar{R}^2 = 0.974. \quad (4)$$

(1.84)

Additional analysis showed ($F = 2.14$, $p < 0.12$) that if the second test is modified to $H_0: \beta_0 = 0$, $\beta_2 = 0$, and $\beta_3 = 0$, such that the intercept is forced to zero and β_1 is not fixed at one, then the estimated slope coefficient for the lagged FVI variable is 1.027, and this slope coefficient is statistically different from one. This suggests that nominal FVI grew by 2.7% per year over the study period¹ and that this increasing value should be considered when predicting forage value on a \$/AUM basis:

$$FVI_t = 1.027 \times FVI_{t-1} \quad R^2 = 0.997, \text{ but redefined when forced through the origin} \quad (5)$$

(0.009)

The results were the same when the regressions used the PRIA definition of the FVI (Appendix A). Conclusions of all statistical tests were identical. The estimated beta coefficients were slightly different, but statistically unchanged. The slope coefficient of equation 5, for example, increased to 1.028 while the intercept term in equation 4 changed to 6.571. Similarly, the conclusions of the statistical tests and implications of the analysis remain unchanged relative to the earlier findings of McCarl and Brokken (1985).

DISCUSSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

Adding the BCPI and PPI to the PRIA formula did not improve the fee formula's ability to predict annual forage values. In fact, adding these two indices ruined the predictive ability of the formula and PRIA-generated grazing fees have fallen further and further behind the private land lease rates through time (Fig. 1). The 1977 Grazing Fee Study (USDI/USDA 1977, p. 1-8) stated that a desirable fee formula should prevent future discrepancies and adjust so that fair market value is charged in future years as well as the present. By this standard, the PRIA formula has not been a desirable fee formula.

Had only the FVI been used to adjust grazing fees (the 1969 fee formula), the federal grazing fee would have been \$3.84/AUM during the 2000 grazing season. If equation 5 had been used, whereby growth in the FVI is recognized and expected, the 2000 fee would have been \$3.94/AUM (Fig. 1). Fair market value of public land forage was estimated to be about 1/3 the private land lease rate (PLLR) during the 1964–1968 base period of PRIA ($\$1.23/\text{AUM} \div \$3.65/\text{AUM} = 0.337$). The \$3.94/AUM fee obtained from equation 5 would represent nearly the same ratio of value in 2000 ($\$3.94/\text{AUM} \div \$11.40/\text{AUM}$ average 2000 PLLR = 0.346). The fee would now be in the \$3 to \$5/AUM range that we estimated to be “fair market value” during 1992 as part of a Grazing Fee Task Group assigned to advise BLM and USFS on grazing fees (Bartlett et al. 1993). But, even with adjustment in the updating mechanism of the fee formula, value estimates for public land forage will remain controversial. There is no general agreement about the comparability of private and public land forage, nor is there agreement about what allowances and deductions should be credited to compensate for differences in forage quality, location, and non-fee grazing costs (Kearl 1989).

On the criteria of equity, if the historical precedent of not including interest on the grazing permit investment as a grazing cost is continued (USDI/USDA 1977, p. 3-8), the PRIA fee formula has been increasingly fair, if not generous, to public land ranchers. It has been unfair to livestock growers that do not hold public land grazing permits, when judged against the criteria that an equitable fee should charge a similar amount as if the resource was used privately (USDI/USDA 1977, p. 1-8). If PRIA continues, it is unlikely that the grazing fee will again rise above the \$1.35/AUM floor set by EO 12548. In fact, if the PRIA index continues on the same trend, the unrestricted index could be negative by 2016² (Fig. 1).

¹Over the same study period the rate of inflation averaged 5.1% and average lease rates fell in real terms. McCarl and Brokken (1985) reported a similar coefficient for the earlier 1964–1983 period, 1.0264.

²Fitting a linear trend line to the PRIA index since 1979, when PRIA was implemented, results in the trend line $\text{PRIA} = 108.05 - 0.0536 \times \text{Year}$.

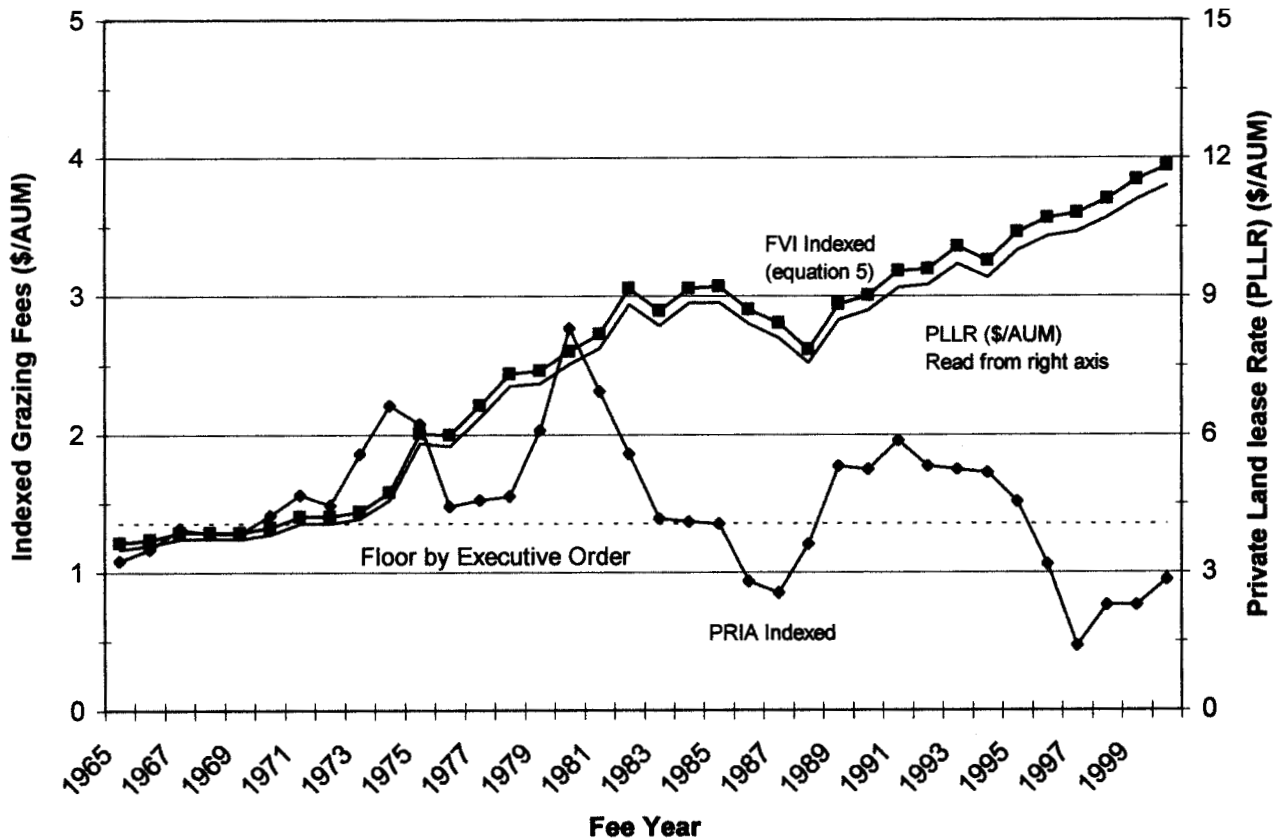
The \$1.35/AUM grazing fee floor is a minimal grazing fee. Yet, there is no evidence that public land ranchers are subsidized and make an inflated rate of return because of low grazing fees. As noted by Martin and Jeffries (1966), Pope and Goodwin (1984), and Torell and Bailey (2000), agricultural properties are overpriced relative to their livestock earning potential. Private and public land ranchers have paid too much for western ranches and grazing permits based on the value of livestock production. At current grazing fee rates, or even with no grazing fees, public land ranchers will continue to make a rate of return below what could be made from alternative investments of similar risk (Torell and Bailey 2000). Inflated ranch prices and grazing permit investments demonstrate that public land ranchers are willing to pay more than the current grazing fee to graze public lands.

A second welfare and equity issue identified by McCarl and Brokken (1985) involves the question of whether grazing fees should vary across states, regions, and land parcels. Many do not recognize the justification and rationale for the uniform PRIA grazing fee. The \$1.23/AUM base rate of

PRIA represented the average difference in total grazing costs between private leased lands and public lands. This amount was the grazing fee that made total grazing costs equal in 1966. Grazing cost studies used to set the base rate (Arthur D. Little, Inc. 1967, 1968) searched for alternative regions and areas to differentiate grazing fees, but to no avail. Extreme variability was found both within and between regions.

Many were surprised that the extensive 1966 grazing cost survey did not support variable and regional grazing fees. As noted by Nielsen (1972, p. 5), "Many people believe that forage quality should play a vital role in determining grazing fee levels, i.e., the higher the quality and quantity of forage per acre, the higher the fee per AUM. The data available (grazing cost survey data) do not support this notion." Calculating lease rates on a \$/AUM basis eliminates differences observed on a \$/acre basis.

A 1992 update of the total grazing cost study (Bartlett et al. 1993) also found extreme variability in total grazing costs and could not establish statistical differences between states.



Note: Read the private land lease rate (PLLR) from the right axis and all indexed grazing fees from the left axis.

Figure 1. Private land lease rates (\$/AUM) compared with indexed grazing fees computed using the unrestricted PRIA index and the FVI from equation 5.

Because of the extremely variable costs, and because many public land ranchers were paying more than private land lessees for grazing, even before considering grazing permit investments, the 1992 Grazing Fee Task Group discounted the total cost approach as a way to value forage.

Numerous studies have found that private land lease rates vary by region. Private land lease rates, as reported each year by USDA's National Agricultural Statistics Service (NASS) (Various Issues), have been shown to be statistically less in New Mexico and Arizona when compared to other states, and lease rate differences between other states also have been noted (Fowler et al. 1986, Tittman and Brownell 1984, Van Tassell and McNeley 1997, LaFrance and Watts 1995). The validity of using state-level NASS data to determine regional and state-level forage values is questionable, however, with the small sample size and extreme variability of lease rate data collected in each state (Kearl 1989). As noted by USDA/USDI (1992, p. 24) in a comparison of the annual NASS data to the extensive Tittman and Brownell (1984) forage appraisal, the NASS data appeared to provide a reasonable short-term indicator of western trends in lease rates, but matched poorly as an indicator value in any particular state. As noted by Van Tassell and McNeley (1997), when economic models were developed from cross-sectional NASS data on a state-by-state basis, results were not consistent between states and the theoretical model did not perform consistently. There is a need for improved and expanded data gathering if grazing fees or forage values for specific states or regions are of interest.

Heterogeneous lease rates and other issues related to grazing fees have led researchers and policy analysts to different conclusions about how grazing fee policy should proceed. Nielsen (1972, p. 6) suggested that a competitive bid system would come closest to collecting full market value. Gardner (1963, 1983, 1989, 1997) argued that permittees should be given permanent rights to their grazing allotments. They should then be allowed to sell those rights to the highest bidder without restriction. He proposed that this disposal program might start with long-term competitive leases on an experimental basis and felt that the eventual privatization of the public lands would improve the efficiency of resource allocation (Gardner 1983, p. 227). Similarly, LaFrance and Watts (1995) concluded public lands should be permanently transferred to the private sector. Whittlesey et al. (1993) would base grazing fees on the public cost of providing grazing in the multiple use framework. Fees would differ by grazing unit as acceptable stocking rates, grazing practices, and administrative costs vary.

While no uniform grazing fee recommendation has been made, perhaps a uniform message from the previous research does emerge—the current PRIA-generated fee is inadequate. A growing disparity has arisen between private land lease rates and the public land grazing fee. The PRIA fee formula does not differentiate between observed state-level differences in private lease rates, but it does meet the objectives of

being administratively feasible and capable of being used by all agencies (McCarl and Brokken 1985). But, the benefit of simplicity is outweighed by the formulas poor tracking ability.

There seems to be general agreement that, to discover allotment-specific forage values, we must either establish a market for public land grazing through privatization of public lands or by determining lease prices with a competitive bid system. Whittlesey et al. (1993) do not disagree with this assessment, but believe the exercise of discovering "fair market value" would be futile and that our efforts would be better served by concentrating on assuring that agency administrative costs plus additional costs for protecting and mitigating damages to multiple resource users are covered.

Establishing a market for public land grazing through a competitive bid system has strong theoretical appeal, and it has been proposed and studied numerous times in the past (Nielsen 1972, Martin and Jeffries 1966, USDI/USDA 1977, USDA/USDI 1992). However, the option of moving to a competitive bid system has been repeatedly rejected by the federal land agencies. They believe it would be disruptive to the stability of permittees and rural communities dependent upon public land forage, and would not be manageable given the isolated and scattered nature of many public land grazing permits, especially with current permit structure, regulation, and staffing (USDI/USDA 1977, p. 7-7, USDA/USDI 1992, p. 40, USDI/USDA 1993, p. 15). No effort has been undertaken to seriously evaluate the feasibility of moving to a competitive bid system on public lands. As noted by the land agencies, scattered and isolated allotments create obstacles for having multiple and competitive bids submitted under an open eligibility bidding system. But, in many cases, market-driven competitive bids and lease rates could be obtained. Average bid rates for selected areas or grazing districts could then be used to set fees for tracts for which a competitive bid was not possible.

As noted by McCarl and Brokken (1985, p. 777), the desirability of moving to a competitive bid system will ultimately depend on transaction and administrative costs under bidding. Other key issues include the desire for simplicity, the feasibility and need to alter current rules and regulations to open and expand the number of eligible bidders, and equity concerns about who gains and loses as grazing policies change. McCarl and Brokken (1985) express a concern that the data needed to implement a competitive bid system will not be forthcoming and question whether its social value would be worth the costs incurred in its development. If this is true, and we must settle for a somewhat arbitrary institutionalized system for setting grazing fees, then the analysis presented here has several clear implications for the development of a new fee system.

Clearly, the BCPI and PPI should be discarded when judged against the criteria of formula tracking ability and equitable grazing fees. Van Tassell and McNeley (1997) have documented that beef prices and production costs are adequately captured in the FVI, as economists argued should

be the case when decisions were originally made to include the BCPI and PPI in the PRIA fee formula. Further, as demonstrated by McCarl and Brokken (1985), adding these two indices did not improve the tracking ability of the PRIA fee formula as was originally envisioned, and, in fact, had exactly the opposite effect. This study documents that the tracking ability of PRIA has not improved with time. PRIA-generated fees will likely continue at minimum allowed levels.

Perhaps the best estimate of what private forage will lease for next year is what it leased for this year. The lagged FVI has proven to track private land lease rates through time. It likely does not matter whether per AUM or per head-month rates are used in defining the FVI and there is always room to improve the lease rate data collection process and to expand sample size. The weighting of the lagged FVI could be 1, but an improved tracking could be obtained by recognizing that nominal forage values would be expected to grow over time. Efficient pricing of public forage on a site-specific basis will be more complicated and may require data collection and administrative costs that would not be justified from grazing values.

One can only speculate about why the PRIA grazing fee formula has persisted for over 20 years. Economists pointed out problems of double counting with the formula even before it was implemented (Backiel and Rogge 1985). The poor tracking ability of the formula was identified before PRIA expired in 1985 (McCarl and Brokken 1985). Yet, the PRIA fee formula, with Executive Order modification, continues.

According to Darwin Nielsen, an agricultural economist actively involved with the grazing fee discussions as PRIA was adopted, political influence and pressure from public land ranchers played a significant role in the decision to include the BCPI and PPI in the PRIA fee formula (personal communication, Darwin B. Nielsen, Utah State University, retired, October 10, 2000). Public land ranchers have actively lobbied to maintain the fee formula and perhaps the persistence of the formula can be attributed to their continued political activity.

Numerous grazing fee proposals have surfaced since the PRIA formula expiration date in 1985, including fee proposals studied in 1986 and updated in 1992 (USDA/USDI 1986, 1992). This was followed by the Incentive-Based Grazing Fee System in 1993 (USDI/USDA 1993), a study of grazing costs in Idaho, New Mexico, and Wyoming.

The Incentive-Based Fee Study was completed just as the Clinton administration came to Washington, D.C. The new administration started with an enthusiasm and desire to do something positive for the environment. Public lands were perceived to be in bad shape (USDI/USDA 1994, p. 5) and the new administration planned to reform grazing and mining regulations, and moved in a new direction—Rangeland Reform '94. Grazing fees and alternatives to improve rangeland health were considered in the draft Environmental Impact

Statement (EIS) document (USDI/USDA 1994), but the focus eventually moved to rangeland health.

Grazing fee and management alternatives proposed in Rangeland Reform '94 were extremely controversial. BLM and USFS received over 20,000 comments to the draft EIS (USDI/USDA 1995). Efforts to change grazing fee policy under Rangeland Reform '94 were never completed. According to Lee Oteni, special assistant to the BLM Director and project leader for Rangeland Reform '94 in 1994, as Rangeland Reform '94 documents were finalized, BLM did not believe increasing the grazing fee and pursuing other Rangeland Reform '94 management initiatives would be worth the political capital it would take (personal communication, October 25, 2000).

Politics, not economics, has been the primary way grazing fee policy has evolved. One of the recommendations of our earlier work with BLM and USFS on the Incentive-Based Fee System (Torell et al. 1993) was to not do any more economic studies to define the market value of public land forage based on market price comparisons. This recommendation was reinforced as the politics of more recent grazing fee initiatives progressed. It will be interesting to see where the political support for grazing fees and public land grazing moves in the future.

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APPENDIX A

Indices used to compute the PRIA grazing fee.

Data Reporting Year	Fee Year	FVIAUM ^a	FVIPRIA ^a	BCPI	PPI
1964	1965	96	96	87	95
1965	1966	98	98	94	97
1966	1967	102	102	104	99
1967	1968	102	102	105	103
1968	1969	102	102	109	107
1969	1970	105	105	123	113
1970	1971	111	111	134	118
1971	1972	111	111	134	124
1972	1973	114	114	167	130
1973	1974	125	125	195	140
1974	1975	159	159	178	168
1975	1976	158	158	160	198
1976	1977	175	175	164	215
1977	1978	193	193	163	230
1978	1979	195	195	216	246
1979	1980	206	206	294	275
1980	1981	216	216	291	319
1981	1982	242	242	268	359
1982	1983	229	229	262	378
1983	1984	242	242	256	387
1984	1985	243	243	262	395
1985	1986	230	251	243	397
1986	1987	222	233	235	388
1987	1988	207	234	272	381
1988	1989	233	240	297	386
1989	1990	238	243	306	402
1990	1991	252	253	326	419
1991	1992	253	265	327	436
1992	1993	266	275	316	440
1993	1994	258	279	333	451
1994	1995	274	282	304	455
1995	1996	282	301	277	473
1996	1997	285	293	252	499
1997	1998	293	310	281	512
1998	1999	304	323	272	514
1999	2000	312	326	281	516

Source: USDA/USDI (1992, p. 18) and updated values reported in USDA-NASS *Agricultural Prices*.

^aThe PRIA fee formula expired with the 1986 fee year, and Executive Order 12548 mandated that the FVI be defined as the per head per month rate for pasturing cattle on private rangelands in the 11 western states. This was a redefinition relative to the per AUM definition previously used. The FVIPRIA column includes this redefinition, beginning with the 1986 fee year.