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Research surrounding the topic of the federal grazing fee started in the 1960's and extended into the 1990's. The current project updated the non-fee costs (all costs of grazing on public and privately leased lands except for the federal grazing fee) associated with livestock grazing by comparing the total non-fee cost of grazing on public allotments to grazing on privately leased land in Wyoming, Idaho, and California.

This project found an overall non-fee total for federal land grazing in the states of Wyoming, Idaho, and California was \$31.08 AUM^{-1}. For privately leased grazing in these same states, it is \$34.18 AUM^{-1} to graze.

The overall non-fee total to graze on BLM land in Wyoming, Idaho, and California was \$30.77 AUM^{-1} and \$31.29 AUM^{-1} on USFS land.

A small allotment size brought a total of \$34.14 AUM^{-1} for private land, \$35.68 AUM^{-1} for BLM, and \$61.02 AUM^{-1} for USFS land. Medium allotment and lease sizes showed a total non-fee cost of \$31.28 AUM^{-1} for private land, a \$38.35 AUM^{-1} for BLM land, and \$39.41 AUM^{-1} for USFS land. Finally, for large allotment and leases a total non-fee cost of \$30.42 was shown for private, \$28.70 AUM^{-1} for BLM, and \$21.73 AUM^{-1} for USFS land.

Evaluating Non-Fee Grazing Permit Costs

By

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CHAPTER 1: INTRODUCTION

Introduction

Regulation of livestock grazing on federal land has been in effect since as early as 1897 when regulation of livestock on Forest Reserves was put into place (CAST, 1996). Since then, much of the western United States has been set aside for protection under the Federal Government. The regulation and protection of most of this land has been put in the hands of the U.S. Forest Service (USFS) and the Bureau of Land Management (BLM). It is said that around 85% of federal land is utilized for the grazing of livestock (CAST, 1996). With such a high utilization rate it becomes increasingly important to understand federal grazing permit costs in addition to the added expenses of grazing on public land. When compared to private land leases, leasing on public land can lead to added costs to the rancher. These costs can come from sharing the land as part of the federal agencies multiple use goals, traveling to sometimes difficult to reach areas, and through compliance with regulations set forth to protect the land (CAST, 1996). All of these extra costs should be taken into account when deciding the appropriate amount to be charged to ranchers grazing on federal land.

The current fee, as seen in Equation 1 uses the initial base forage value established by the 1966 Western Livestock Survey (Torell, 2003), cost of beef production (PPI), price received for beef cattle (BCPI), and the Private grazing land lease rate (FVI) (Bartlett, 1993). It was formally established in the Public Rangelands Improvement Act of 1978 and extended through Executive Order No. 12548 in 1986 with a minimum fee of $1.35 AUM (Torell, 2003).

$$\text{Fee} = \$1.23\ (\text{Private grazing land lease rate (FVI)} + \text{Cost of beef production (PPI)} - \text{price received for beef cattle (BCPI)}/100) \quad (1)$$

Many people believe that the public grazing fee should match that of the private lease rate, which tends to be higher in price. They say that the fee is set too low and brings a form of "subsidy" for ranchers grazing on the public land (Obermiller et al., 1990). Others argue that the permit price is too high and does not account for the added costs that ranchers have to pay for livestock grazing on public lands, as stated above. The conflicting views on the federal grazing fee has sparked many research studies throughout the years.

Studies on the federal grazing fee started in the 1960s and have been taking place ever since. The basis of the studies comes from comparing the costs of federal land grazing to that of privately leased grazing. Past studies have sought to come up with the best methods for determining forage value, while also comparing the extra costs associated with grazing (Bartlett, 1993).

As a result of past studies, a research team was formed in the 1990s to look deeper into the federal land grazing fee. That study was conducted by the 1992 Grazing Fee Task Group (Torell et al., 1993). This group was made up of multiple researchers and worked closely with the U.S Forest Service (USFS) and Bureau of Land Management (BLM). That project had many objectives including determining the basis for establishing grazing fees and forage values, determining a price range for the grazing fee, and determining a procedure for updating the grazing fee. Since the federal grazing fee is set administratively (Quigley and Tanaka, 1988) and not determined by a competitive market, it becomes difficult to establish a market value for federal land forage (Bartlett, 1993). Out of the 1992 study came a suggestion

of determining the forage value of public lands by comparing it to the price paid for alternative forage. In this case the alternative forage would be that of private lands, which is established in a competitive market. Therefore, the competitive price in the private forage market would be used to value public land forage (Bartlett, 1993). This must be done while taking into consideration the differences between leasing privately and leasing publicly. A method called the Total Cost Approach was used to quantify these considerations. The Total Cost Approach aims to compare the total fee and non-fee costs[1] of grazing on privately leased land with non-fee costs of grazing on public land. The difference between these two total non-fee costs is suggested to be the fair grazing fee for federal land (Bartlett, 1993).

This current study replicates the Total Cost Approach study conducted in the 1966 and 1992 studies. This will allow for a comparison to be made across all of the studies conducted within the last 50+ years on the topic of the federal grazing fee. Data from this study will show how non-fee costs may have changed over time. Established trends will aid future research on the grazing fee, and when necessary, help in the reevaluation and adjusting of grazing fees.

Objectives

This project was initiated with the intention of evaluating the non-fee costs of federal and privately leased grazing allotments and following the study conducted in 1992 as closely as possible.

[1] Throughout this thesis, non-fee costs are all costs of grazing on public and private lands except for the federal grazing fee.

The project objectives are:

1.) To collect, analyze, and interpret the non-fee permit costs associated with federal grazing allotments in Wyoming, Idaho, and California.
2.) To compare total costs of grazing on public and private lands.
3.) To evaluate changes in total costs of grazing on public and private lands over time.

Significance of Research

The research conducted in this study will be based on the work gathered by the 1966 Western Livestock Survey and the 1992 Grazing Fee Task Group. These studies aimed to obtain the ideal permit costs of federal land grazing. In addition to the permit costs, these studies aimed to establish the best methods to value federal land forage and create a suitable grazing fee formula. The 1966 Western Livestock Survey established the total cost difference between public land permittees and private land lessees. This difference of \$1.23 AUM^{-1} was later used in forming the federal grazing fee formula in the Public Rangelands Improvement Act of 1978 (Torell, 2003). Furthermore, the 1992 study concluded that the market forage value was the most appropriate way to place a forage value on federal land grazing (Bartlett et al., 1993).

Permit grazing has been part of the USFS since 1905 (Williams, 2005) and the BLM since 1934 (Prevedel, 2005). Together these two agencies manage around 307 million acres of land with 57% of them managed by BLM and 43% by the Forest Service. Of these 307 million acres, 262 million acres (85%) are grazed by livestock (CAST, 1996). With over half

of the beef cattle in the western United States utilizing federal land it is important to look at how much producers are paying to do so. At a glance, a person could argue that public and privately leased grazing are the same and should reflect that in the cost of the fee. For the 1992 study, the average private land lease rate for all 11 western states was \$9.41 AUM^{-1} (Bartlett et al., 1993). However, in the 1992 study, an average rate of \$7.76 AUM^{-1} was found in just the three states of Wyoming, Idaho, and New Mexico. This difference shows how variation across states and time can adjust the average private lease rate (Bartlett et al., 1993). However, both of these values are higher than the public grazing permit fee of \$1.35 AUM^{-1}; yet research done in 1966 and 1992 have shown that public land grazers are paying a comparable amount to graze on federal lands. This study will find the current non-fee costs associated with grazing on private and public land. A comparison of the non-fee costs will then be made between privately leased and federal land grazing.

This comparison is significant because the federal grazing fee can have a large influence on the affordability of grazing on public land for ranchers. If the fee is set too high and paired with the additional non-fee costs, it can lead to financial instability within the federal land ranching community (CAST, 1996). This is why research is necessary to determine the appropriate grazing fee range set by the federal government. The fee must allow for the market between private land grazers and public land grazers to remain competitive and not give an advantage to one over the other. Research that compares and contrasts fee and non-fee costs to these two groups of ranchers helps ensure this ideal outcome.

Since the federal grazing permit system is not active in a competitive market and the price cannot be adjusted by itself, frequent studies have to be conducted to ensure the permit

fee remains fair and appropriate (Van Tassell, 1994). By aiding the research on non-fee permits costs that has been ongoing for the last 50 years, the current study gains relevance.

CHAPTER 2: LITERATURE REVIEW

Grazing Fee and Rangeland History

After the expansion of the United States in the early 19th century many important events took place that shaped the history of the country. Most of the land at this time was owned by the federal government, but many acts were passed that changed that in the 19th century. By the end of the century almost half of the federal land had been given to states and private ownership through land grants and the passing of the Homestead Act in 1862 (Prevedel, 2005). The land was being utilized by many different industries including mineral mining, timber harvest, and livestock grazing. Concern began to rise as many of these endeavors went unchecked, and the land began to reflect this over exploitation. In response to this exploitation, much of which took place on rangelands and forests, many people began to voice concern for the land (Prevedel, 2005).

In 1891, the Forest Reserve Act, also known as the Creative Act, was passed in Congress. This was the first step in land conservation and protection in the west and stated that the government could set aside land as forest reserves when necessary (Prevedel, 2005). From 1898 to 1905 these forest reserves were managed by forest reserve superintendents, supervisors, and rangers. These positions were appointed by senators and the Department of the Interior's General Land Office along with surveyors and mappers from the US Geological Survey (USGS). In 1905 all of the forest administration was unified under the Department of Agriculture's Bureau of Forestry that was later named The U.S. Forest Service. The USFS was tasked with mapping forests, providing trail access, and administering sheep and cattle

permits (Williams, 2005). Another major event that began to protect federal grazing land was that of the Taylor Grazing Act of 1934. This act placed the responsibility of the remaining federal land (not set aside for forest reserves) into the hands of the Department of the Interior's Grazing Service, later to be named the Bureau of Land Management (Holechek, 1981).

Since the USFS and BLM were formed, they have been tasked with managing federal lands and all of the activities that take place on them; one of these activities being livestock grazing. Many ranchers in the west depend on public grazing leases to maintain their herd health and population. They place their herds on BLM land typically in the spring and fall, and the USFS land in the summer. During the winter they keep their cows close by on their own private land (CAST, 1996). Livestock grazing on federal land has become an important part of ranching in the west, and many events have taken place in history that have influenced its management.

As stated in the Taylor Grazing, the Secretaries of the Interior and the Secretary of Agriculture, the departments that the BLM and USFS are under, should be tasked with issuing permits and leases on federal land (BLM, 2001). The Federal Land Policy and Management Act (FLPMA) of 1976 stated that the Secretary of Agriculture and the Secretary of the Interior shall conduct a study that determines the correct grazing fee to be enforced on federal lands (U.S. Department of the Interior et.al, 2001). These two Secretaries were tasked with establishing a fee charge but had to take into account many considerations. They have to understand the costs generally associated with livestock grazing, forage value, and other considerations that can affect the amount charged as a fee. Once this initial study was

conducted, they were also tasked with implementing a schedule for such studies to continue on this matter (BLM, 2001).

FLPMA also brings into light the fairness of the grazing fee and determining a fair way to value forage or the utilization of public lands for grazing. The term of setting a "fair market value" (FMV) for grazing fees shows up first in the Taylor Grazing Act of 1934 when officials were in charge of setting a "reasonable" fee for livestock grazing (Collins, 1989). This term has shown up in multiple other legislative acts and bills over the years. It most recently showed up in FLPMA for developing a FMV when determining grazing fees. However, this act and previous acts do not define the appropriate process by which to determine the FMV. This makes defining and maintaining a FMV difficult due to the complexity of federal livestock grazing. Since federal livestock grazing permit markets are not an open and competitive market, it is hard to determine a fair way to establish market value. That is why different approaches must be discussed in order to determine the best one (Collins, 1989).

The Grazing Fee Issue

The federal grazing fee amount has been a long and controversial subject. Many groups say the grazing fee price is too low and acting as a "subsidy" to ranchers to graze on federal land (Obermiller, 1990). These groups argue that if grazing fees are set too low it could encourage overuse of the land and the forage available. They also believe that the low grazing fees allows for public land ranchers to have a competitive advantage over those buying feed and forage in a private market (Steward, 1998). Another topic on federal land is

the need for allowing multiples uses. The Multiple Use-Sustained Yield Act of 1960 mandated federal agencies to treat all resources including timber, range, water, and recreation as equal (Williams, 2000). This bill highlighted the concern of the public that federal land was mainly being used for livestock grazing and timber harvesting only and there was no room for other types of management. This concern of the public adds even more pressure to the grazing fee controversy.

The argument set against these groups is that the grazing fee is only a portion of the amount of money ranchers pay to graze on federal land (Obermiller, 1990). Potential other forms of payment come from sharing the land with other users, restrictions on the time of year cows graze, and overall regulation of maintenance and improvements to the land (CAST, 1996). In a survey of 42 ranchers done in Lake County, Oregon and Modoc County, California this statement, along with many others, was extracted from the interviews about the added costs of grazing on federal land:

"Being called a welfare rancher because of the price on public land grazing is not a true picture. You have to fix the fences, salt the cows, and keep the cows outta here and into there. Next year we are going to have to have someone up there all the time. So that's an extra employee. We run more bulls, because the cattle spread out more. This is a cost. We have quite a bit of coyote problems too. The cost of gathering is extensive also—the cows are hard to find." (Steward, 1998, pg. 82).

Raising the Fee

Since the federal land grazing fee has been a controversial subject for so many years the easy thing to do would be to raise the fee, right? This question is important when looking at the grazing fee issue because it all comes down to the grazing fee cost. Many studies have set out to analyze that action and inform the public of the effects of doing so. When altering policy and other land management decisions it is important for the agency to understand the effects the actions will have. BLM and USFS are constantly seeking tools for analyzing results of management decisions, and the case of the federal grazing fee is no different (Torell et al., 2014). The National Environmental Policy Act (NEPA) of 1969 requires public land managers to not only analyze environmental impacts of their management decisions but also the social and economic impact the decision could potentially have (Torell et al., 2014). The question on whether to raise or lower the fee has been the stem of research on this topic. In order to understand the issue of federal land grazing it is important to understand the events that have shaped it.

The 1966 Research and Results

The research that began in the 1960's had a goal of finding the non-fee grazing costs associated with grazing on federal and privately leased land. This study established the 14 categories that are considered non-fee costs as seen in Table 1. These were the original 14 categories that were accounted for and were left out of the total grazing costs that both private and public lessees paid (Obermiller, 1992). For private leases, the private land lease rate itself was included in the cost categories. This is because the private land lease rate often makes up

Table 1. Description of non-fee cost categories (Bartlett, 1993)

Cost Category	Description
Lost animals	Value of livestock that die or disappear on the lease or allotment
Association fees	Dues, fees, and assessments by grazing association
Veterinary	Veterinary and medicine expenses for sick or injured animals grazing on a lease
Moving livestock	Expenses to move livestock to and from the lease, including hired trucking, labor, and vehicle expenses.
Herding	Labor and vehicle expenses to check animals and to move livestock to new pasture or areas within the lease.
Miscellaneous and mileage	Labor and vehicle expenses to go to meetings, round up strays, or deal with various problems associated with the lease.
Salt and feed	Salt and feed expenses while livestock are on the lease.
Water	Cost of pumping and hauling water to the lease
Horse	Cost of using horses on the lease
Improvement maintainence	Labor, vehicle expenses, materials, and equipment to maintain improvements on the lease.
Development depreciation	
Federal land	Annual depreciation allowance for range improvements located on federal land and used on the allotment or lease. Only the rancher's share of cost is considered.
Private land	Annual depreciation allowance for range improvements located on private, state, or other uncontrolled lands but used totally or partially on the allotment or lease. Only the rancher's share of the cost is considered. Improvements used to service both private and federal lands are prorated based on the estimated percentage of use on the lease.
Other	Miscellaneous expenses including insect control, predator control, and other undefined items.
Private lease rate	Fee paid to private lessors of forage for forage and services provided.
Total labor	Total labor costs summed across various categories defined above.
Total vehicle mileage	Total vehicle costs summed across various categories defined above.

a majority of the lessee's expenses as the lessor takes care of many added costs. This study used the Total Cost Approach to determine the base price of $1.23/AUM for the PRIA grazing fee formula as shown in Equation 1 (Torell, 1993).

The Total Cost Approach takes the total fee and non-fee costs of grazing on private land and the non-fee costs on public land and finds the difference. In the 1966 study, the $1.23 AUM^{-1} was the difference of total cost per AUM between grazing on private land and non-fee costs of grazing on public land as shown in Table 2. In 1966 it cost grazers on private land leases $1.23 AUM^{-1} more to graze than it did for ranchers leasing public land (Obermiller, 1992).

In other words, the non-fee cost for grazing cattle was $3.28 AUM^{-1} for public permits and the total cost was $4.54 AUM^{-1} for private leases with a difference of $1.26 AUM^{-1}. For grazing sheep, the non-fee cost for public leases was $4.53 AUM^{-1} and the total cost was $5.66 AUM^{-1} for private leases with a $1.13 AUM^{-1} difference. The weighted average of these differences for both sheep and cattle resulted in $1.23 AUM^{-1} (Obermiller, 1992). This amount was said to be the value of public land forage and also the grazing fee to be charged for federal land grazing (Torell, 1993).

Table 2. Non-fee costs of federal and privately leased grazing with cost difference in the 1966 study (Rimbey, 2011).

Item	Cattle Public	Cattle Private	Sheep Public	Sheep Private
Lost Animals	$0.60	$0.37	$0.70	$0.65
Association Fee	$0.08		$0.04	
Veterinary	$0.11	$0.13	$0.11	$0.11
Moving Livestock To & From	$0.24	$0.25	$0.42	$0.38
Herding	$0.46	$0.19	$1.33	$1.16
Salt and Feed	$0.56	$0.83	$0.55	$0.45
Travel To & From	$0.32	$0.25	$0.49	$0.43
Water	$0.08	$0.06	$0.15	$0.16
Horse	$0.16	$0.10	$0.16	$0.07
Fence Maintainance	$0.24	$0.25	$0.09	$0.15
Water Maintainance	$0.19	$0.15	$0.11	$0.09
Development Depreciation	$0.11	$0.03	$0.09	$0.02
Other Costs	$0.13	$0.14	$0.29	$0.22
Private Lease Rate		$1.79		$1.77
Total Non-Fee Costs	$3.28	$4.54	$4.53	$5.66
Cost Difference/Forage Value	$1.26		$1.13	
Weighted Cost Difference	$1.23			

(weighting by relative AUMs of cattle and sheep on public lands)

Source: USDI and USDA. 1977 Study of Fees for Grazing Livestock on Federal Lands. Table 5, Page 2-22

The Public Rangeland Improvement Act of 1978

Prior to 1978, the grazing fee for federal land was produced using a FMV model derived using the 1966 study (Nielson et al., 1984). This model was based on the idea that the value of forage lies in a traditional competitive market in which supply and demand interact to form a price (Bartlett et al., 1993). This model posited that ranchers are profit maximizers and will be willing to pay a certain price for their forage. This model assumed that private and public land grazing were interchangeable and their productivity the same. This would mean

that a rancher would be willing to pay the same for both types of land. If this were the case, the private land market could be used to predict the public land grazing market. The fee from using the 1996 study used the private lease rate added to the non-fee cost of grazing on privately leased land and the non-fee costs of grazing on public land. This model was argued against due to the fact that it made the value of public land and private land grazing the same without taking into account productivity and quality differences (Nielson et al., 1984).

Since the 1962 model for establishing a grazing fee was being argued against, Congress set out with a goal of computing a formula for the federal grazing fee. FLPMA mandated that a grazing fee study be reported to Congress within a year (U.S. Department of the Interior et.al, 2001). The 1977 Grazing Fee Study evaluated seven different ways to determine a grazing fee. One of these ways was proposed by the American National Cattlemen's Association, now National Cattlemen's Beef Association (NCBA). The association proposed only using beef prices and prices paid in adjusting the grazing formula. However, this was not accepted by federal agencies who only wanted to use the Forage Value Index (FVI) for the fee (Torell, 2003).

The proposal by NCBA and the 1977 Technical Committee, who was proposing present day PRIA, were both evaluated in the 1977 Grazing Fee Study. The Technical Committee suggested using the Beef Cattle Price Index (BCPI), Prices Paid Index (PPI), and Forage Value Index (FVI) in the formula to account for short term fluxes in the market (Torell et al., 2003). The addition of utilizing the FVI while also including factors that take into account short term instabilities in the market was the compromise between federal agencies and grazing interests for the formula.

Congress then passed the Public Rangeland Improvement Act of 1978. This formula (Equation 1) took the base price of \$1.23 AUM^{-1} found in the 1966 study and adjusted it annually by taking into account the private lease rates representing the Forage Value Index, Beef Cattle Price Index, and Prices Paid Index for beef production (Torell, 1993). Adjusting for these economic conditions is said to help adjust the FMV of grazing each year (Nielson et al., 1984). In order to do this the FVI was created (Nielson et al., 1984). In the beginning the FVI was known as the Range Forage Index (RFI). The RFI was created from average rental rates paid by ranchers for private forage that were collected from the Farm Real Estate Market Developments. This was developed from the Farm Report Questionnaire that was sent to farm operations in 11 western states annually. This was done by weighting the state values collected by the weights determined in the 1966 Western Livestock survey and dividing by the average value for private land leases from 1964-1968 of \$3.65 AUM^{-1} (Nielson and Garratt,1984). The RFI was later renamed the FVI and is used in the current grazing fee formula.

The Public Rangeland Improvement Act was important in establishing a grazing fee formula that would be used in the future by both the BLM and USFS. The formula was set forth in a meeting in 1978 and would be evaluated after a seven-year experiment period lasting from 1979-1985 (Nielson and Garratt, 1984). Following the seven-year trial, Executive Order 12548 was signed in 1986 stating that the 1978 PRIA formula would continue to be used with a modified the base price of \$1.23 AUM^{-1} to \$1.35 AUM^{-1} (NARA, 2016).

Oregon Study Conducted in the 1990s

After the study conducted in 1966 there was a gap in the research done on grazing fees that directly compared grazing costs. There had been reviews, changes in law and regulation, and changes in production costs since the 1966 study and there was the question if a simple indexing of numbers was enough to update the grazing fee (Obermiller, 1992). It was decided that the USDA/SEA (Science Emphasis Area) Extension Service would collect and analyze data around grazing costs in Oregon. This study aimed to gather data to provide updated costs associated with public and privately leased grazing (Obermiller, 1992). The results from the 1966 study and results from the 1983 Oregon study, all updated to show 1990 dollars, were slightly different. On private leased land the updated indexed cost from 1966 to 1990 dollars was \$14.79 AUM^{-1} and the Oregon 1983 costs were \$15.03 AUM^{-1} in 1990 dollars. This resulted in a \$0.24 AUM^{-1} difference which could have indicated little change had occurred in the structure of the private grazing land market (Obermiller, 1992). However, for public land grazing the updated 1966 cost resulted in \$14.29 AUM^{-1} in 1990 dollars, and the Oregon 1983 updated cost was \$16.83 AUM^{-1} in 1990 dollars, resulting in a \$2.54 difference. This indicated a potential structural change in the public land grazing livestock industry since 1966. However, these data were only collected in Eastern Oregon and do not fully represent all of the western states. It could not be used as a general description of the public land grazing livestock market (Obermiller, 1992).

It did however point out that many things can change in just 24 years, and so there remained a need to revisit the issue of federal land grazing. Updated non-fee grazing costs

would better reflect the changes in policy, regulation, and technology that happened within the livestock industry (Obermiller, 1983).

Study Conducted in 1992

Since there was a pressing need for updated costs associated with livestock grazing on public and privately leased land, a new project was formed. This project was formed to continue to evaluate the grazing fee issue and update costs that would reflect updated policy, regulations, and technology in the livestock industry. This project was formed as a group of researchers by the BLM and the USFS to recommend grazing fee policy for public lands and was known as The Grazing Fee Task Group (GFTG) (Torell, 1993). The GFTG consisted of researchers from four western states along with appraisers from both the BLM and the USFS.

The first problem the group tackled was that of the incentives for ranchers to uphold rangeland stewardship. Under this goal came four other objectives for this project. First, determine the basis for establishing current forage values. Second, determine the basis for establishing grazing fees. Third, determine appropriate pricing areas. Fourth, determine an appropriate procedure for updating the grazing fee (Bartlett, 1993). The GFTG believed that the primary way of establishing a grazing fee would be based on the value of forage on public lands and would therefore need to find a way to value the forage (Torell, 1993.) The group surveyed both private and public ranchers in order to determine the total cost of grazing livestock. The three states in which this survey took place were Idaho, New Mexico, and Wyoming (Torell, 1993).

This study produced many recommendations for future research on the grazing fee issue. From this study it was concluded that the market value of forage was the best way to obtain forage value. This form of value is obtained by comparing, or setting, the market value of public land forage even to the amount that buyers in a private permit market are willing to pay (Bartlett, 1993). This method included obtaining the total cost of grazing on private land and the non-fee costs of grazing on public land. The difference between the grazing costs was established as the forage value for public land and could also be considered the grazing fee amount (Bartlett, 1993). The other methods looked at to compare forage value were permit value, production analysis, and competitive bidding.

The permit value method used the permit value that occurred in a competitive market to determine the value of forage. Permit value is defined as the difference in costs of public and private grazing discounted over perpetuity. It is the amount that a willing buyer would pay a willing seller for a federal AUM. As costs change between grazing private and public land, the value of a permit fee balances out the supposed advantage of public land ranchers because they had already paid that difference. In the 1992 study a value of \$3.00 AUM^{-1} to \$5.00 AUM^{-1} was found based on the permit value approach. This method depends heavily on the interest rate used for permit investments, and it why it is not always promoted (Bartlett,1993).

The production analysis looked at various production analyses and budgets to value forage on public land. This method can be done without data on private and public leases. However, production costs of ranchers are needed for this analysis. Often, enterprise budgets are used in this technique to gather the value of the producer's output and all costs, except the

cost for federal forage are subtracted out. This then leaves a return for the public land forage. This method can be subjective as values are assigned to unpaid resources and leaves a wide range of forage values available based on the subjective amount assigned (Bartlett, 1993).

The competitive bidding valuation uses a real forage market system to find a value for public forage. By using the interaction of buyers and sellers, it is possible to indicate a value that buyers are willing to pay for public land forage. However, many factors such as structure, regulations, and staffing would limit the use of this method for valuing public land forage (Bartlett, 1993).

For reasons listed above, it was established that the market value approach was the best method to value forage. Under this method, the Total Cost Approach was used to value public land forage. The 1992 study found an average cost for Wyoming, Idaho, and New Mexico for both cattle and sheep grazing on public and private lands. For cattle, it was estimated to cost \$18.15AUM^{-1} on public land and \$19.04 AUM^{-1} on private land. This resulted in \$0.89 AUM^{-1} difference[2] for cattle. For sheep, it cost \$24.87 AUM^{-1} on public land and \$20.46 AUM^{-1} for private land. This resulted in a -\$4.41 AUM^{-1} for sheep. Almost all of the categories as defined in Table 1 were shown to be higher in cost for public land ranchers than private land ranchers. The possibility of this was said to be because of multiple uses and the regulations that public land ranchers must follow.

[2] The difference is computed as private land non-fee costs minus public land non-fee costs. A positive value indicates that private land non-fee costs are greater than those on public land and would be indicative of the what the federal grazing fee should be to equate total costs on private and public lands. A negative value shows it cost more to graze on public land.

The 1992 study aimed to update information on the grazing fee issue and give recommendations based on the findings. The final recommendations from this study were to keep the grazing fee in a range from \$3-5 AUM^{-1} and be applied west wide. The study found that it was not necessary to determine the grazing fee based on geographic location. The base grazing value should be updated annually with the Forage Value Index, and that the BLM and USFS should look into a potential bid system that could create a market for public land grazing (Bartlett, 1993).

Current Situation

Since the study that was conducted in the 1992 no further research has been done in comparing grazing costs between private and public land. However, since then, there have been changes in public land policy and the multiple uses it brings, economic conditions under which ranches operate, and the way in which society believes and thinks public lands should be utilized. Rimbey and Torell (2011) conducted a project to find the total grazing cost difference between private and public land grazers without conducting an in-depth survey like that of the 1992. These researchers used the information of grazing costs found in the 1992 and used the agricultural prices paid indices (NASS, 2011) to update the costs to as much as possible in 2010. This project used the same three states of New Mexico, Wyoming, and Idaho. In other words, they took the 1992 value of a particular category and multiplied it by the amount that the NASS index price has increased (Rimbey and Torell, 2011). This study found that in 2010 public land non-fee costs were around \$33.24 AUM^{-1}, and the private land non-fee costs were around \$32.04 AUM^{-1}. From this study it was estimated that the cost difference between public land and privately leased land was -\$1.20 AUM^{-1} with non-fee

costs being higher on public land. Again, from this research comes the need to continue to update numbers for the federal grazing fee.

CHAPTER 3: METHODS AND DESIGN

Research Methods

This research project seeks to align as closely as possibly with the research done in 1992 by The Grazing Fee Task Group. The overall goal of this project is to evaluate the non-fee allotment costs associated with federal land grazing and grazing on privately leased land. In order to do this, non-fee costs must be obtained from federal allotment permittees along with those that graze on privately leased land. Information will be obtained on the categories listed on Table 1. It includes lost animals, association fees, veterinary fees, moving livestock, herding, labor and mileage, salt and feed, water, horses, improvement maintenance, development depreciation for federal and private land, private lease rates, and other expenses not captured elsewhere (Bartlett et al., 1993). An interview packet was retrieved from the 1992 study and updated to match the production year of 2018. Gathering all of the financial information for the year 2018 allows for the most accurate comparison between allotments and private leases.

The project and sampling protocols were approved by the University of Wyoming Institutional Review Board (Appendix A). In the beginning of 2020, the COVID-19 quarantine occurred, and therefore, a revised protocol for collecting data was submitted and approved by the board (Appendix A). COVID-19 caused further issues with collecting data and slowed the procedures.

The packet for the current study contains sections on range developments, range maintenance, other cash costs, miscellaneous costs, death loss, labor, transportation, and horse

use (Table 1). A new section covering expenses involving technology was added to the survey. Technology has been a growing expense and structural change in ranching in the last 30 years, and therefore, technology costs were included in the 2018 survey.

Sampling Procedure

In beginning the sampling process, lists of federal permittees were retrieved from the Wyoming Stock Growers Association, Idaho Cattle Association, and California Cattleman's Association for each state. These lists included all permittees, both association and non-association members, from both the BLM and USFS. However, it was not specifically listed as to which agency a permittee was leasing from. The sample size for this project was based on the number of federal permittees in each state and was generated by the lists obtained for Wyoming, Idaho, and California.

The number of federal allotments needed for an adequate sample size was similar for each state. The sample size was based on a 90% confidence level with a 10% margin of error. As seen in Equation 2 the population proportion, z-score, percentage expected, and population size were used to determine the sample size for each state. (Survey Monkey, 2020).

$$Sample\ Size = \frac{z^2 xp(1-p)}{1+(\frac{z^2 xp(1-p)}{e^2 N})} (2)$$

Where, p = the population proportion

z = z-score

p = percentage expected

N = population size

Table 3 shows the desired number of allotments for Wyoming, Idaho, and California along with the components of the sample size equation. This is consistent with the 1992 study (Bartlett, 1993). In hopes of receiving at least a 50% response rate, the desired number was doubled before sampling to account for no responses or returned packages. A sample was then randomly generated from the list of federal permittees in each state using the Survey Monkey calculator (Survey Monkey, 2020).

Table 3. Minimum desired sample size for Wyoming, Idaho, and California.

	Population Size (N)	Margin of Error (€)	Z-score (z)	Percentage (p)	Sample Size
Wyoming	3469	10%	1.65	50%	68
Idaho	2443	10%	1.65	50%	68
California	851	10%	1.65	50%	64

Following the initial random sampling for each state, a project packet was sent to all permittees on the sampled list. The package contained the federal land (Appendix B) and privately leased (Appendix C) survey packets. The packet included a cover letter from UW research team, a consent form for the project, and a letter from the Public Lands Council and partnering state cattle or livestock association (Appendix D). A joint cover letter between Public Lands Council and each state association was used in hopes of increasing producer participation. It can be noted that using letters written by these associations could potentially favor a sector of the ranching community that is familiar with the association's goals and values.

After the packet was sent, follow-up phone calls were made when phone numbers were available. Due to a low response rate, two follow-up letters were sent to unresponsive producers in all three states. For the state of Idaho, the desired sample size was reached after the first round of sampling. For this state alone, non-fee costs of federal and privately leased grazing took place with the addition of an analysis of non-fee grazing costs on state land. This part of the project was done for the Idaho Department of Lands and is not a direct part of this thesis research. The research team interviewed overlapping producers in Idaho simultaneously when possible. This combination of projects was beneficial in collecting an adequate sample size.

Due to a low response rate in Wyoming and California, it was decided a second list of federal permittees would be randomly sampled. The second list received the same packet, phone call, and follow-up letters as the first random sample. The financial information gathered from producers on the second list targeted data from 2018 in order to remain consistent throughout the project. Due to a low response rate for the second round of sampled permittees in both Wyoming and California, it was decided a third sample would be drawn. The third list received the same packet, phone call, and follow-up letters as the first two samples. All financial information was gained for the 2018 year to remain consistent throughout the project.

In order to gather private leases for the 1992 study, researchers worked closely with USDA-NASS to obtain information on private lease holders. In addition to this, past private lease holder lists were also available for the project. However, for the 2018 project, both of these methods were unavailable and other methods had to be utilized to gather private leases.

Private leases were located for the project using two methods. First, if a producer from the sampled federal list agreed to participate and had both federal allotments and private leases, two packets were filled out for that producer. Another method used to gather private leases was announcements and coordination with state agencies and associations. Announcement for private leases were made in Wyoming Stock Growers Association, California Cattleman's Association, and Public Lands Council publications. For the state of Wyoming, announcements were also posted in local Farm Service Agency and Conservation District offices.

This form of obtaining private leases does provide an error in independence between the two types of producers for the study. It also resulted in a nonrandom sample of respondents.

Interview Process

The interview process began after receiving initial contact from producers willing to participate in the study. Before the COVID-19 lock-down, the interview packet was filled out during an in-person interview. In the state of Idaho, interviews were conducted with the research assistant for the state lands research project. Besides one interview, all of the interviews for the state of Idaho were conducted in person. One interview took place over the phone due to timing and funding of the project.

For the state of Wyoming, in-person interviews were conducted for the first round of sampling. The second and third round of sampling took place at the beginning of 2020. At this time, COVID-19 forced travel restrictions by the University of Wyoming and travel for

interviews was not permitted. Producers were given the choice of a phone interview or filling the packet on their own and returning it to the research team. In the case of the permittee filling out the packet on their own, it was necessary to keep close contact in case any questions arose for the producer. A follow-up call was then made by the research team when questions arose in reviewing the packet once it was mailed back.

For the state of California, no in-person interviews took place due to COVID-19 travel restrictions. All of the participants were given the choice of a phone interview or filling the packet out on their own. Once again, in the case of the permittee filling out the packet on their own, it was necessary to keep close contact in case any questions arose for the producer. A follow-up call was then made by the research team when questions arose while reviewing the packet once it was mailed back.

Cost Analysis

The research packet for this project consisted of 16 pages and obtained financial information on grazing on federal and privately leased land. Information was gained on basic allotment and private lease information including acreage, vegetation type, topography, grazing management, and AUM information. The AUM number and allotment/lease size were the main factors that were used for the 2018 study. The 1992 study used vegetation and topography to further compare federal and privately leased land, but this project did not conduct that type of analysis since our objective was not to determine whether different grazing fees should be established based on productivity.

The first cost information obtained through the packet was that of range developments. This was the only section of the survey that went back to years before that of 2018. This section collected total cost information on range developments that had taken place on a federal allotment or private lease. However, many allotments and leases had been in the producer's family for over 50 years, so improvement costs for the current permittee were the only development costs that were calculated for this survey. This left the assumption that the current permittee had only invested in improvements since they had taken over the allotment or lease. Total range developments were calculated on an annual cost based on the useful life of the development (NRCS, 2020) and an annual discount rate of 7% which is the standard rate used to portray long-term rate of return and risk factor. Labor and material costs associated with a development were included in the total development amount and not listed in a separate section. If labor was used for a development, the labor hourly wage provided by the producer was used to account for hours of work. This total was then added into the total range development cost.

After the range development section, non-fee costs were collected for the year 2018 only. The next section, maintenance, included any work done on range developments in 2018. Maintenance costs included materials, labor, and vehicle expenses needed to upkeep developments on an allotment or lease. If vehicle prices were counted in the maintenance section, the average cost per gallon of gasoline, $2.72 or $3.42 for diesel was used if mileage was given (EIA, 2021). Labor maintenance costs were also included in this section. Labor hourly wages were provided by producers for manager, family, hourly, and daily workers. Information on hours and number of workers was used to compute the total labor costs.

The other cash cost section consisted of salt, protein and supplements, grain, hay, contractor, predator, and other cash costs of the packet. Other cash costs included any expense not accounted for in the packet such as dog food, horse shoeing (if used for horses used on allotment), and vehicle repair (if occurred on allotment). If other cash costs were accounted for, the price was only used if the expense occurred during the time the livestock was on the allotment or lease and was weighted based on the amount of public or private the expense was used for.

Miscellaneous costs for this project accounted for expenses that occurred because of regulation and policy occurring on a federally owned or privately leased permit. This includes miles and hours accumulated for meetings and paperwork, vandalism repair, stray roundup due to fence or gate damage, and land or animal monitoring. If labor or vehicle miles were accounted for in this section, the average gas price for the year 2018 and the producer's hourly wage were used to compute the total. To avoid counting twice, miles and labor hours used for vandalism repair and stray roundup were not counted in the labor or vehicle expenses for maintenance.

For lost animal costs, any animal that was found dead or was not gathered off the allotment or lease was considered a death loss for the permit. It was assumed that cattle lost off of the allotment or lease would have made it to market, so prices received for cattle was used in calculated death loss. Cattle and sheep prices in each state for the year 2018 can be found in Appendix E.

When computing moving livestock and herding costs in the statistical analysis, information on labor hours and number of workers was obtained from each producer. Labor hourly wages were provided by producers for manager, family, hourly, daily, and exchange workers. Information on hours and number of workers was used to compute the total labor costs for each section of moving livestock and herding. Moving livestock included labor hours used to bring livestock to allotment, gathering, and moving livestock off allotment. Herding livestock included labor hours required to herd and distribute livestock while on the allotment, and animal health and inspection. Total labor costs for each category were then combined with the total vehicle costs to form total moving livestock and total herding costs.

When computing moving, herding, and travel vehicle costs in the analysis, gasoline costs of $2.72 and diesel averaging $3.42 were used (EIA, 2021). The moving livestock section included information on both labor and mileage for livestock to allotment, gathering, and moving livestock. If mileage was given for moving livestock to and from the allotment, mileage and number of vehicles was obtained. If a total hauling expense was involved, that total was added to the total moving cost for that allotment.

Horse cost involved horse use while livestock was on the federal allotment or private lease. Total horse numbers and days used were obtained for livestock to allotment, livestock distribution/herding/grazing management, livestock gathering, livestock off allotment, maintenance of allotment, and animal health and maintenance. Horse costs used the annual cost of horses by using an expected useful life and a discount rate of 7%. This total was then divided out based the percent federal land it was used on.

The last section included information on technology use on allotments or private leases. The first section asked for costs associated with cell phone applications that are paid for by the permittee or lessee. These can include applications for weather or GPS use. The second section obtains information on devices purchased for use on the federal allotment or lease. This can include, radios, GPS units, or drones. Annual cost was calculated for devices based on the useful life and a discount rate of 7%. This total was then divided out based the percent federal land it was used on.

Statistical Analysis

The goal of this project was to align as closely with the 1992 study. For this reason, similar analysis took place in order to create a comparison between the two studies.

First, the data were summed up for each individual section of the packet. The total costs for that particular section were added up and divided by the total number of federal or private AUMs. This then created a $ AUM^{-1} for each section of the packet. The study could have divided costs among allotment numbers since that is the sample size of the study. However, in order to align with the 1992 study, it was decided that costs would be divided out based on AUMs in order for a comparison between the two studies to be possible. Each section was then separated into a non-fee cost category used in the 1966 and 1992 studies as shown in Table 1. A total $ AUM^{-1} for public and privately leased land was summarized by totaling the $ AUM^{-1} for each cost category on the specific lease type. The average and median $ AUM^{-1} was then calculated along with the minimum and maximum $ AUM^{-1} to indicate the range of costs.

Multiple costs were analyzed for both federal and private leases between the three states and as a three-state average. Public and privately leased non-fee costs were summarized for each state. Total non-fee cost for each state was used to summarize a three-state weighted average. The weighted average took into account the number of cattle and sheep AUMs in the state. Costs were separated out to allow for comparison between BLM and USFS land. Differences were analyzed both within each state and as a three-state average. The averages for the 2018 study were then compared to those of the 1992 study. Costs were divided up based on size of allotment. In the 1992 study, the size of the permit or lease was found to have a large influence on the amount of costs the producer accrues (Bartlett, 1993). In order to understand and compare this trend, the project found the three-state average for small, medium, and large allotments. A small allotment or lease size was less than 500 AUMS. A medium allotment was between 501 and 1000 AUMS, and a large allotment being any AUM number higher than that.

Due to a lack of independence between federal allotments and private leases for this study a t-test to compare costs was not appropriate. A compiled private lease list was not available for the study, and therefore, it was necessary to use private leases from producers who also had a federal permit. This eliminated independence. For this reason, the study only reports total numbers, median, and minimum and maximum costs.

CHAPTER 4: RESULTS

This chapter will summarize the results for the current grazing project and compare them to the results of the 1966 and 1992 studies. First, an overall view of the data collected will be given for each state. This includes the total number of allotments, ranchers, and AUMs sampled for the project. Next, an analysis of the costs between federal allotments and private leases will be summarized separately for Wyoming, Idaho, and California. A summary of the 2018 study along with summaries of the 1966 and 1992 studies is displayed to allow for a comparison across time. Following that comparison, costs will be shown for grazing costs on BLM and USFS land for each state of the current project along with those of the 1992 project. Next, data costs are shown based on size of allotments and leases for the current and 1992 study, and are separated into small, medium, and large sizes.

Each table displays the average (mean), median, minimum, and maximum number for each data set and category. The average represents the mean cost associated with each particular category while the median represents middle cost, or the number that appeared in the middle of a sorted list of costs. Next, the minimum cost displays the lowest cost associated with any particularly category. The maximum cost then displays the highest cost for the category. Together these numbers provide a range for each category and data set. Collectively these numbers allows the reader to interpret data and identify any significant outliers.

Due to the low number of both federal allotments and private leases for sheep, it was decided that all public and privately leased totals for the 2018 study would be a combined

weighted average between cattle and sheep. In other words, the costs for the 2018 include both cattle and sheep costs and no comparison is made between the two.

Total Numbers

For the state of Wyoming, there was a total response rate of 3% for the survey packets. That means 3% of the people who received the packet participated in the study. This number excludes packets that were returned to sender because of the wrong delivery address. For the state of Idaho, there was a total response rate of 6% for the survey packets. That means 6% of the people who received the packet participated in the study. This number excludes packets that were returned to sender. For the state of California, there was a total response rate of 4% for the survey packets. That means 4% of the people who received the packet participated in the study. This number excludes packets that were returned to sender.

The results for numbers included in the statistical analysis for Wyoming, Idaho, and California are listed below. As stated before, since the initial contact for this study included a joint cover letter between the Public Lands Council and each state association, a response bias is possible. It was felt that this response bias was worth the risk in order to validate a study conducted out of Wyoming into other states to encourage participation. To begin, Table 4 shows the number of allotments, ranchers, and AUMs collected for each state of the current project.

For the state of Wyoming, there was a total of 69 allotments sampled for grazing on federal land. As Table 3 indicates, Wyoming needed 68 allotment samples to reach a confidence level of 90%. This allotment number was composed of both BLM and USFS land

with a total of 53 BLM allotments and 16 USFS allotments. There were 14 private leases sampled for Wyoming. All of the sampled private leases grazed cattle and no leases were recorded for sheep grazing.

For the state of Idaho, there was a total of 89 federal allotments sampled. As indicated on Table 3, the desired sample size for Idaho was 68 allotments in order to reach a 90% confidence interval. Of these 89 federal allotments, 60 of them were BLM and 29 were USFS. There were 18 private leases for the state of Idaho. Two of these leases recorded costs for sheep grazing and the rest recorded the cost of grazing cattle on private leases.

California had a total of 49 federal allotments sampled for the project. This resulted in an 85% confidence level for this state. In order to attempt to reach a confidence level of 90%, a total of three letters were sent to the sampled lists for California. Two of the letters were from the University of Wyoming research team and one letter was written jointly between California Cattleman's Association and Public Lands Council. Multiple announcements from the research team were posted in both California Cattleman's Association and Public Lands Council publications, and several phone calls were made in order to increase allotment numbers for this state. Of the allotments, 20 of them were on BLM land and 29 of them on USFS land. All of the federal allotments for California were grazed by cattle. No record was taken of sheep grazing on BLM or USFS land in California. There were 16 private leases for this state and only cattle grazing was recorded. No private lease contained information on sheep grazing in the state of California.

Table 4. Allotment, AUM, and rancher total for Wyoming, Idaho, and California. Numbers are divided out by cattle number and sheep number.

	Wyoming		Idaho		California	
	BLM		**BLM**		**BLM**	
	Cattle	Sheep	Cattle	Sheep	Cattle	Sheep
Total Number of Allotments	36	17	49	11	20	0
Total Number of Ranchers	17	3	21	5	14	0
Total AUMS	18492	15524	33596	12021	12628	0
	FS		**FS**		**FS**	
	Cattle	Sheep	Cattle	Sheep	Cattle	Sheep
Total Number of Allotments	12	4	20	9	29	0
Total Number of Ranchers	8	1	14	3	18	0
Total AUMS	7475	1737	24723	8365	19161	0
	Private		**Private**		**Private**	
	Cattle	Sheep	Cattle	Sheep	Cattle	Sheep
Total Number of Leases	14	0	16	2	16	0
Total Number of Ranchers	6	0	9	1	9	0
Total AUMS	22471	0	5463	565	5174	0

Private vs. Public

Wyoming

For the year 2018, the total non-fee cost of grazing on federal land in Wyoming was \$35.05 AUM^{-1}. The non-fee cost to graze on privately leased land for the same year was \$32.80 AUM^{-1} as shown in Table 5. The average private land lease rate in the state of Wyoming in 2018 was \$22.50 AUM^{-1} (NASS, 2021). The \$22.50 AUM^{-1} lease rate is considered a non-fee cost category and therefore, it is included in the total non-fee cost of privately leased grazing.

Table 5. Non-fee costs ($ AUM-1) on federal land and privately leased land in Wyoming.

Wyoming		
	2018 Public	**2018 Private**
Item		
Lost Animals	6.35 (8.20,0.40,37.0)	1.67 (1.70,1.30,9.80)
Association Fees		
Veterinarian	0.23 (0.09,0,2.87)	0.03 (0,0,0.29)
Moving Livestock	5.91 (0.12,0,35.43)	2.43 (0.01,0,25.00)
Herding	7.14 (0.13,0,46.06)	2.42 (0.01,0,25.00)
Salt and Feed	1.99 (0.89,0,35.90)	0.78 (0.41,0.21,1.67)
Travel	0.04 (0.03,0,0.28)	0.01 (0.003,0,0.45)
Water	1.36 (0.80,0,50.86)	0.21 (0,0,1.12)
Horse Cost	1.01 (1.12,0,5.59)	0.01 (0.01,0,0.04)
Maintenance	4.24 (0.20,0,16.45)	2.04 (0.01,0,12.50)
Development Depreciation	4.86 (1.21,0, 49.43)	0.43 (0,0,28.74)
Other Costs	1.86 (0.64,0,13.40)	0.25 (0,0,10.75)
Technology	0.06 (0.01,0,0.31)	0.00 (0,0,0)
Private Lease Rate		22.50
Total Non-Fee Costs	35.05 (37.63,10.78,135.25)	32.80 (37.02,7.69,66.99)

Note: Numbers in parenthesis represent the median, minimum, and maximum numbers. The sample size for 2018 public was 69 allotments and the sample size for 2018 private was 14 leases.

Idaho

For the year 2018, the total non-fee cost of grazing on federal land in Idaho was $29.83 AUM^{-1}. The average cost to graze on privately leased land for the same year was $33.58 AUM^{-1} as shown in Table 6. The average private land lease rate in the state of Idaho in

2018 was \$18.00 AUM^{-1} (NASS, 2021). The \$18.00 AUM^{-1} lease rate is considered a non-fee cost category and therefore, it is included in the total non-fee cost of privately leased grazing.

Table 6. Non-fee costs (\$ AUM-1) on federal land and privately leased land in Idaho.

Idaho		
	2018 Public	**2018 Private**
Item		
Lost Animals	7.48	2.53
	(4.30,0,54.60)	(1.20,0,17.90)
Association Fees		
Veterinarian	0.48	0.12
	(0,0,4.80)	(0.02,0,1.37)
Moving Livestock	5.68	4.36
	(0.06,0,38.46)	(0.16,0,51.43)
Herding	4.45	2.74
	(0.12,0,25.35)	(0.16,0,14.54)
Salt and Feed	1.96	1.08
	(1.0,0,12.60)	(1.15,0,7.22)
Travel	0.03	0.01
	(0.003,0,0.78)	(0,0,0.34)
Water	1.29	0.07
	(0.16,0,16.67)	(0,0,5.00)
Horse Cost	0.19	0.09
	(0.08,0,1.90)	(0.02,0,0.73)
Maintenance	4.06	2.62
	(0.16,0,20.00)	(0.30,0,14.00)
Development Depreciation	3.12	0.50
	(1.85,0,27.98)	(0,0,7.50)
Other Costs	1.05	1.34
	(0.31,0,7.94)	(0.14,0,10.01)
Technology	0.03	0.11
	(0,0,0.36)	(0,0,1.99)
Private Lease Rate		18.00
Total Non-Fee Costs	29.83	33.58
	(32.74,7.02,95.06)	(32.27,9.60,118.79)

Note: Numbers in parenthesis represent the median, minimum, and maximum numbers. The sample size for 2018 public was 89 allotments and the sample size for 2018 private was 18 leases.

California

For the year 2018, the total non-fee cost of grazing on federal land in California was \$28.79 AUM^{-1}. The average cost to graze on privately leased land was \$40.89 AUM^{-1} as shown in Table 7. The average private land lease rate in the state of California in 2018 was \$21.40 AUM^{-1} and was the number used to account for private lease rates in the study (NASS, 2021).

Table 7. Non-fee costs ($ AUM^{-1}) on federal land and privately leased land in California.

California		
	2018 Public	**2018 Private**
Item		
Lost Animals	2.75 (2.43,0,31.58)	2.72 (2.26,0,7.70)
Association Fees	0.00	0.00
Veterinarian	0.14 (0,0,5.28)	0.53 (0,0,1.34)
Moving Livestock	10.62 (0.13,0,67.13)	6.70 (0.02,0,22.88)
Herding	4.44 (0.13,0,37.13)	1.57 (0.08,0,5.71)
Salt and Feed	1.22 (0.29,0,38.95)	2.52 (0.57,0.09,3.94)
Travel	0.03 (0.01,0,1.21)	0.01 (0,0,0.09)
Water	0.96 (0,0,12.92)	0.14 (0,0,0.75)
Horse Cost	0.37 (0.13,0,3.25)	0.18 (0.02,0,1.23)
Maintenance	4.81 (0.02,0,53.41)	2.52 (0.005, 0, 9.00)
Development Depreciation	2.48 (0.35,0,17.09)	2.01 (0,0,34.73)
Other Costs	0.96 (0.07,0,14.58)	0.54 (0,0,1.79)
Technology	0.03 (0,0,0.99)	0.03 (0,0,0.60)
Private Lease Rate		21.40
Total Non-Fee Costs	28.79 (19.88,0.14,183.40)	40.89 (19.95,3.49,81.72)

Note: Numbers in parenthesis represent the median, minimum, and maximum numbers. The sample size for 2018 public was 49 allotments and the sample size for 2018 private was 16 leases.

Three-State Average

The results for both federal and privately leased grazing costs for the 2018 study are displayed in Table 8. This table shows non-fee costs for the three states of the 2018 study and includes a weighted three-state average for federal and privately leased grazing. The average

weighted cost between all three states accounts for the different number of cattle and sheep AUMS and adjusts average costs for each state. The weighted average non-fee costs for public land grazing in all three states for the year 2018 were \$31.08 AUM^{-1}. On privately leased land, the weighted average non-fee costs of grazing were \$34.18 AUM^{-1} as shown in Table 8.

Table 8. Averages by state and the three-state weighted average for public and privately leased grazing

	2018	
State	**Public**	**Private**
Wyoming	35.05	32.80
Idaho	29.83	33.58
California	28.79	40.89
Three State Average	31.08	34.18

The total non-fee grazing costs of public and privately leased land in the three states of the 1992 and 2018 studies are compared in Table 9. In the state of Wyoming, total costs of grazing on federal land were \$32.08 AUM^{-1} in 1992 and \$35.05 AUM^{-1} in 2018. For privately leased land, there was a total of \$38.10 AUM^{-1} in 1992 and \$32.80 AUM^{-1} in 2018.

In the state of Idaho, the 1992 study showed a total cost of \$35.83 AUM^{-1} for federal land and \$29.83 AUM^{-1} for federal land in 2018. A total cost of \$38.78 AUM^{-1} was found on privately leased land in 1992 and a total of \$33.58 AUM^{-1} was found in 2018.

No comparison can be made between California and New Mexico for the 1992 and 2018 study since they are two separate states that were studied.

Table 9. Non-fee costs of federal land and privately leased land in 2018 compared to totals of the 1992 study.

	1992			2018	
State	**Public**	**Private**	**State**	**Public**	**Private**
Wyoming	32.08	38.10	Wyoming	35.05	32.80
Idaho	35.83	38.78	Idaho	29.83	33.58
New Mexico	41.59	43.92	Calfironia	28.79	40.89
Three-State Average	40.07	43.37	**Three-State Average**	31.08	34.18

The total non-fee costs of public and privately leased grazing can be compared between all three studies that have taken place.

Starting in the 1966 study, an average non-fee cost between sheep and cattle on public land was \$27.14 AUM^{-1} in 2018 dollars as shown in Table 10. For privately leased land, a total non-fee cost of \$36.50 AUM^{-1} was found between cattle and sheep.

The 1992 revealed a weighted non-fee cost of grazing on public land of \$40.07 AUM^{-1} and a cost of \$43.37 for privately leased land.

The 2018 study showed a weighted non-fee cost of grazing on public land of \$31.08 AUM^{-1} and a cost of \$34.18 for privately leased land.

Table 10. Non-fee and total fee costs of federal land and privately leased land in Wyoming, Idaho, and California in 2018 compared to totals of 1996 and 1992 studies.

Item	1966 **Public**	1966 **Private**	1992 **Federal**	1992 **Private**	2018 **Federal**	2018 **Private**
All Values in 2018 $						
Lost Animals	2.06	1.41	6.19	3.46	6.18	1.99
Association Fees	0.55		0.99		0.00	0.00
Veterinarian	1.25	1.44	0.28	0.32	0.34	0.12
Moving Livestock	2.66	2.66	6.37	3.62	6.77	3.43
Herding	7.23	4.38	12.13	7.37	5.21	2.35
Salt and Feed	3.39	4.58	2.24	2.97	1.82	1.10
Travel	2.66	2.15	1.36	0.39	0.03	0.01
Water	0.72	0.62	0.90	0.28	1.24	0.17
Horse Cost	0.76	0.45	0.69	0.33	0.46	0.05
Maintenance	3.79	3.64	6.86	4.24	4.26	2.22
Development Depreciation	0.82	0.22	0.99	0.37	3.48	0.69
Other Costs	1.25	1.20	1.07	0.32	1.26	0.49
Technology					0.04	0.02
Private Lease Rate		13.77		19.70		18.00
Total Non-Fee Costs	27.14	36.50	40.07	43.37	31.08	34.18

[1] Averages for 1966 weighted by 80% cattle and 20% sheep AUMS (Obermiller, 1992)

[2] Averages for 1992 weighted by 88% cattle and 12% sheep (Bartlett, 1993)

[3] Averages for 2018 study weighted by 80% cattle and 20% sheep

BLM vs. USFS

The results of comparing the total non-fee costs of livestock grazing on different land ownership types are summarized below. This section will look at the non-fee costs of grazing, regardless of livestock type, on Bureau of Land Management (BLM), U.S Forest Service (USFS), and private land. This analysis was done in the 1992 study as well and both studies will be looked at.

For the state of Wyoming, the total non-fee costs of grazing on BLM land in 2018 was \$30.56 AUM^{-1}. The total non-fee cost of grazing on USFS land was \$49.88 AUM^{-1}. For the state of Idaho, the non-fee cost to graze on BLM land was \$33.22 AUM^{-1} and \$25.15 AUM^{-1} on USFS. Lastly, in the state of California the total non-fee cost to graze on BLM land was \$22.49 AUM^{-1} and \$32.95 AUM^{-1} on USFS land as shown in Table 11.

Table 11. Total non-fee costs of grazing on BLM, USFS, and private land in Wyoming, Idaho, and California for the year 2018.

	Wyoming		Idaho		California	
	BLM	**USFS**	**BLM**	**USFS**	**BLM**	**USFS**
Item						
Lost Animals	5.38 (7.80,0.40,24.80)	9.94 (8.30,1.40,37.00)	7.79 (3.50,0,45.50)	7.06 (7.50,0,54.60)	2.14 (2.09,0,20.85)	3.15 (2.43,0,31.58)
Association Fees						
Veterinarian	0.25 (0.09,0,2.87)	0.16 (0.03,0,0.53)	0.37 (0.02,0,3.24)	0.63 (0,0,4.81)	0.18 (0,0,5.28)	0.11 (0,0,3.98)
Moving Livestock	4.57 (0.13,0,35.43)	10.87 (0.16,0,24.48)	5.23 (0.06,0,23.94)	6.30 (0.05,0,38.46)	8.58 (0.005,0,48.28)	11.96 (0.61,0,67.13)
Herding	5.65 (0.11,0,16.79)	12.63 (0.23,0,46.06)	5.31 (0.19,0,51.43)	3.28 (0.08,0,12.20)	2.89 (0.04,0,24.83)	5.47 (0.16,0,37.13)
Salt and Feed	2.31 (1.02,0,35.89)	0.79 (0.43,0.13,4.65)	2.61 (0.95,0,12.62)	1.06 (0.43,0,2.50)	0.29 (0.26,0.09,5.37)	1.84 (0.49,0.11,38.95)
Travel	0.03 (0.03,0,0.17)	0.07 (0.03,0,0.28)	0.04 (0.003,0,0.63)	0.02 (0.002,0,0.78)	0.02 (0.01,0,1.21)	0.04 (0.01,0,1.01)
Water	1.12 (0.81,0,50.86)	0.48 (0.06,0,2.06)	1.85 (0.31,0,16.67)	0.53 (0.08,0,7.86)	1.34 (0,0,5.29)	0.71 (0.14,0,12.92)
Horse Cost	0.79 (0.89,0,5.59)	1.81 (1.63,0.01,5.05)	0.13 (0.06,0,0.96)	0.28 (0.13,0,1.89)	0.18 (0.06,0,3.25)	0.49 (0.14,0,1.62)
Maintenance	3.82 (0.15,0,50.86)	5.79 (0.26,0,16.45)	4.55 (0.25,0,20.00)	3.37 (0.08,0,15.00)	3.68 (0.002,0,11.25)	5.55 (0.06,0,53.41)
Development Depreciation	4.95 (1.21,0,49.43)	4.55 (4.82,0.05,19.27)	3.93 (1.26,0,26.22)	2.01 (1.88,0,27.98)	2.79 (0.17,0,8.46)	2.27 (1.07,0,17.09)
Other Costs	1.61 (0.64,0,6.73)	2.77 (0.64,013.40)	1.39 (0.25,0,7.94)	0.59 (0.35,0,4.50)	0.37 (0,0,5.83)	1.34 (0.20,0,14.58)
Technology	0.07 (0.01,0,0.31)	0.03 (0.03,0.0.30)	0.03 (0,0,0.36)	0.02 (0,0,0.35)	0.03 (0,0,0.62)	0.03 (0,0,0.99)
Total Non-Fee Costs	30.56 (37.10,10.78,87.50)	49.88 (45.52,31.17,135.25)	33.22 (32.52,7.02,91.12)	25.15 (33.17,17.74,95.06)	22.49 (12.77,0.14,76.56)	32.95 (38.80,8.05,184.63)

Numbers in parenthesis represent the median, minimum, and maximum numbers. The sample size for Wyoming public was 53 BLM allotments and 16 USFS allotments. The sample size for Idaho was 60 BLM allotments and 29 USFS allotments. The sample size for California was 20 BLM allotments and 29 USFS allotments.

Table 12 shows the 2018 study results alongside the results from the 1992 study. As shown, for the state of Wyoming, the total non-fee cost of grazing on BLM land was \$30.96 AUM^{-1}. The non-fee cost of grazing on USFS land in 1992 was \$35.94 in the state of Wyoming. The total non-fee cost to graze on BLM land in the state of Idaho was \$32.85 AUM^{-1} and \$48.02

AUM^{-1} to graze on USFS. For the state of New Mexico, it was \$33.84 AUM^{-1} to graze on BLM land and \$54.62 AUM^{-1} on USFS. This led to a three-state weighted average of \$35.99 AUM^{-1} for BLM land, \$51.04 AUM^{-1} for USFS land, and \$41.91 AUM^{-1} for private land.

Table 12. Total non-fee costs of grazing on BLM, USFS, and private land in Wyoming, Idaho, and New Mexico in 1992 along with the costs in Wyoming, Idaho, and California in 2018. All numbers have been updated to 2018 dollars.

	1992				2018		
	BLM	USFS	Private		BLM	USFS	Private
	All values in 2018 $						
State				State			
Wyoming	30.96	35.94	38.78	Wyoming	30.56	49.88	32.80
Idaho	32.85	48.02	43.92	Idaho	33.22	25.15	33.58
New Mexico	33.84	54.62	38.10	California	22.49	32.95	40.89
Three-State Average	35.99	51.04	41.91	Three State Average	30.77	31.29	34.18

Allotment Size

In order to compare how allotment size influences non-fee costs of private, BLM, and USFS grazing, a comparison was done between different allotment sizes based on AUM number. The allotments and private leases were split into three categories. The first category was size small and covered any allotment or private lease with a total AUM number equal to or below 500. Next was size medium and covered an AUM total above 500 but below 1000. Lastly, size large covered any AUM size that was above 1000. This allotment or private lease size comparison was also performed in the 1992 grazing study and a comparison between the two studies is made.

The results for non-fee costs divided among allotment and lease size is shown in Table 13. The total non-fee cost of grazing on small private leases was \$34.14 AUM^{-1} and \$31.28

AUM^{-1} for medium size leases in the 2018 study. The total non-fee cost for large allotments was \$30.42 AUM^{-1}. For BLM small allotments, the total non-fee cost was \$35.68 AUM^{-1} and \$38.35 AUM^{-1} for medium size allotments. The total non-fee cost to graze on large BLM allotments in 2018 was \$28.70 AUM^{-1}. The total non-fee cost for USFS land was \$61.02 AUM^{-1} for small allotments, \$39.41 AUM^{-1} for medium allotments and \$21.73 AUM^{-1} on large allotments.

Table 13. Total non-fee costs based on different allotment size (small, medium, large) on public and private lands.

2018			
	Private	**BLM**	**USFS**
AUM Size (S) Category			
S ≤ 500	34.14	35.68	61.02
	(32.09,3.49,118.79)	(37.10,0.36,91.12)	(38.88,11.61,184.63)
500 < S < 1000	31.28	38.35	39.41
	(24.49,7.69,81.72)	(33.13,0.14,87.50)	(39.67,13.29,106.15)
S ≥ 1000	30.42	28.70	21.73
	(25.41,9.60,66.99)	(22.28,8.43,60.71)	(20.15,8.05,39.50)

Numbers in parenthesis represent the median, minimum, and maximum numbers. The sample size for BLM allotments was 91 small, 17 medium , and 25 large. The sample size for USFS allotments was 36 small, 24 medium, and 14 large. The sample size for private leases was 28 small, 9 medium, and 11 large.

Table 14 shows a comparison between allotment sizes for the 1992 and 2018 studies. As shown in the table, the total non-fee cost of grazing on small private leases was \$47.44 AUM^{-1} for cattle and \$46.47 AUM^{-1}for sheep in the 1992 study. A total of \$42.97 AUM^{-1} for cattle grazing on medium was found and \$42.20 AUM^{-1} for grazing sheep. The total non-fee cost for large allotments was \$45.46 AUM^{-1} for cattle and \$48.96 AUM^{-1} for sheep. An extra size category in the 1992 study showed a total of \$31.74 AUM^{-1} for cattle grazing and \$42.51 AUM^{-1} for sheep grazing on allotments larger than 3000 AUMs.

For BLM small allotments in the 1992 study, the total non-fee cost was \$44.03 AUM^{-1} for cattle and \$77.03 AUM^{-1} sheep. For medium size allotments in 1992, a total of \$30.29 AUM^{-1} was found for cattle on BLM land and \$46.67 AUM^{-1} for sheep. The total non-fee cost to graze on large BLM allotments in 1992 was \$33.57 AUM^{-1} for cattle and \$57.52 for sheep. For the large category consisting of allotments larger than 3000 AUMs, a total of \$27.85 AUM^{-1} was found for cattle and \$23.36 AUM^{-1} for sheep.

For USFS small allotments in the 1992 study, the total non-fee cost was \$65.61 AUM^{-1} for cattle and \$99.86 AUM^{-1} sheep. For medium size allotments in 1992, a total of \$49.86 AUM^{-1} was found for cattle on USFS land and \$66.39 AUM^{-1} for sheep. The total non-fee cost to graze on large USFS allotments in 2018 was \$42.99 AUM^{-1} for cattle and \$68.09 for sheep. For the large category consisting of allotments larger than 3000 AUMs, a total of \$34.30 AUM^{-1} was found for cattle and \$53.45 AUM^{-1} for sheep.

Table 14. Total non-fee costs based on different allotment and lease size (small, medium, large) for both the 1992 and 2018 studies. All numbers have been updated to match the year 2018.

1992							2018			
	Cattle			Sheep						
	Private	**BLM**	**USFS**	**Private**	**BLM**	**USFS**		**Private**	**BLM**	**USFS**
AUM Size (S) Category							**AUM Size (S) Category**			
	All Values in 2018 $									
S ≤ 500	47.44	44.03	65.61	46.47	77.03	99.86	**S ≤ 500**	34.04 (32.09,3.49,118.79)	35.71 (37.10,0.36,91.12)	60.89 (38.88,11.61,184.63)
500 < S < 1000	42.97	30.29	49.86	42.20	46.67	66.39	**500 < S < 1000**	31.26 (24.49,7.69,81.72)	38.35 (33.13,0.14,87.50)	39.27 (39.67,13.29,106.15)
S ≥ 1000	45.46	33.57	42.99	48.96	57.52	68.09	**S ≥ 1000**	30.38 (25.41,9.60,66.99)	28.70 (22.28,8.43,60.71)	21.73 (20.15,8.05,39.50)
S > 3000	31.74	27.85	34.30	42.51	23.36	53.45				

Numbers in parenthesis represent the median, minimum, and maximum numbers for the 2018 study. The sample size for BLM allotments was 91 small, 17 medium , and 25 large. The sample size for USFS allotments was 36 small, 24 medium, and 14 large. The sample size for private leases was 28 small, 9 medium, and 11 large.

CHAPTER 5: DISCUSSION

This section will focus on discussing the results of the current study. Discussion will be made on potential differences of total non-fee costs between public vs. private, BLM vs. USFS, and allotment and lease size. Discussion will also take place on comparisons and trends between the 1966, 1992, and 2018 studies.

Due to the lack of number of sheep allotments for the 2018 study, it was decided all costs would be summarized for public and privately leased land. This number would reflect both cattle and sheep grazing where possible. No sheep data were collected for Wyoming privately leased land or California public and privately leased land. Idaho had a total of two private sheep grazing leases. For this reason, it was decided sheep would not be correctly represented and weighted totals would be calculated for all comparisons.

Private vs. Public

Differences in total non-fee costs between public and privately leased land can potentially come from any of the cost categories previously discussed. Each category has the potential to be higher on either type of land and for multiple different reasons. Common reasons for added costs in each category will be discussed below.

Livestock loss on an allotment or lease often comes from predation or overall loss of the animal. This can be from predators killing livestock directly or from livestock never being found and recovered off the allotment or lease. If livestock were not found or recovered off an allotment or lease it is counted as a loss because the animal never made it to market. This can occur because of the size and terrain of allotments or leases. It can also come from gates and

fences being left open and livestock wandering away from the area. Gates being left open or fence damage can be more common on federal land because of multiple use. This can add to a higher number of users on the land and resulting in more damage or wear on property.

Occasionally, veterinarian jobs have to be completed out on allotments or leases because the livestock do not come home before heading somewhere else. This is especially the case when allotments or leases are located far away from the ranch headquarters and transporting livestock back and forth is not possible. These expenses often come from bills or materials used on the allotment to treat injured or sick animals. If an allotment or lease is in a steep area with rough terrain, there is potential for an increase in injury to livestock.

Moving and herding expenses can increase on an allotment or lease for multiple different reasons. If the allotment or lease is large it can require more vehicle miles, labor, labor hours, and horses to locate livestock. It often takes more vehicle miles and labor to move livestock around in the allotment or lease, especially if pastures are not available. These expenses can also increase if the lease or allotment is located in an area with rough terrain.

Salt, mineral, and supplemental feed can also increase on an allotment or lease if pastures are not available. Salt and mineral can often be used to move livestock around an allotment or encourage livestock to move away from water sources if needed. Minerals are also used if livestock is out on a lease or allotment for an extended period of time.

Travel expenses can increase on an allotment or lease if travel is required to meet with federal personnel or a landlord. Expenses in this category can also increase if gates are left open and livestock gets out or if fence damage allows for livestock to wander. This is often the case

with federal land as multiple use requires producers to share the land with other public users. This can potentially increase the likelihood of fence or gate damage.

Water costs can increase on an allotment or lease if there is no water on the land. This can then require the producer to haul water which increases vehicle and labor expenses. Water costs can also increase if a producer has to put materials, labor, and vehicle miles into maintaining and fixing water developments on an allotment or lease.

Horse costs can often be high on federal land due to the large size of allotments or leases. Horses are sometimes needed over OHV's because they are not allowed in federally protected areas or the terrain is too rough. It can also require more horse use to gather and move livestock if the allotment or lease is large in size or located in rough terrain.

One cost category that can often be high is that of development depreciation and maintenance. These costs can potentially be higher on federal land because it is the responsibility of the federal permittee to maintain and provide upkeep on developments on allotments. This includes labor, materials, and vehicle miles. Often, developments and maintenance are included with a private-lease rate, and therefore the producers are usually not responsible for these costs.

Other cash costs that can be associated with grazing on federal and privately leased land are materials and labor needed for predator. Other costs, especially for sheep producers, can include dog food while the dogs are out on the allotment or lease. This category also included any contract work done on a lease or allotment.

Technology has become an increasing cost of grazing on privately leased and federal land. Often, especially if the area is large and has rough terrain, GPS units and two-way radios

are used by the hired labor. This can increase the cost to the producer because there is an initial investment in the tools.

Three States

The trend in costs of total non-fee costs of privately leased and public land could potentially be from a recent increase in development costs, multiple use, and federal policy. Federal land permittees have to put more financial resources into improvements, maintenance, vandalism, and stray roundup repair on federal permits than they do on privately leased land. Often, private leases are treated as a rental where the landowner is responsible for general maintenance and upkeep. This includes developments on the property as well. Federal land permittees are responsible for water and fence developments along with the materials and labor to maintain them.

The trend of non-fee costs of public and privately leased land could also come from BLM and USFS lands requiring multiple use management. This concept of multiple use means that recreation and business industries may utilize the land along with the livestock industry. Examples include hunting, fishing, hiking, oil and gas, OHV, endangered species, and biodiversity among other uses. Often livestock producers are in charge of road maintenance, fencing, water development, and other facilities that other federal land users come in contact with. Repairing and maintaining these facilities can add expenses to a federal permittees non-fee cost. In recent years, population growth has led to a higher use of federal lands for different outdoor activities. This could be leading to a higher cost of maintenance and repairs for the federal permittee on BLM or USFS land.

Federal policy can also potentially influence the total non-fee costs that federal land permittees pay for grazing. Changes in the Threatened or Endangered Species in the United States can also influence non-fee costs of federal permittees. If a land area is considered critical habitat for an endangered species, it is the responsibility of the federal land agency to make sure actions on that land do not harm or modify the habitat (FWS, 2018). This can sometimes result in an alteration of AUMs or the grazing season on a federal allotment.

BLM vs. USFS

Differences in total non-fee costs between BLM and USFS land can potentially come from any of the cost categories previously discussed. Each category has the potential to be higher on either type of land for multiple different reasons. Common reasons for added costs in each category will be discussed below.

Lost animals on a BLM or USFS allotment can cause differences between the two types of land. Often, USFS allotments are located in steep, remote, and forested areas. This can account for an increase in death loss because of the allotments being in hard-to-reach areas or the inability to find animals that stray. If an animal is not located and moved off the lease it is counted as a death loss. Predation on both BLM and USFS land can also account for lost animals.

Veterinarian jobs have to be completed out on BLM or USFS land because the livestock do not come home before heading somewhere else. This is especially the case when allotments or leases are located far away from the ranch headquarters and transporting livestock back and forth is not possible. USFS land can be located far away from ranch headquarters and is often in

rough and steep locations. For this reason, veterinary bills can potentially be high on USFS because animals are at a higher risk of injury because of the rough terrain.

Often, there can be a difference in moving and herding costs between BLM and USFS land. This is often because USFS land is in harder to reach areas with steeper terrain. This can require more time, labor, and vehicle miles to locate animals and move them around the allotment or lease. If the area is heavily forested this can also increase the time to gather and move livestock off the allotment. This then increases labor and vehicle costs for the producer.

Salt and feed costs can occur on both BLM and USFS land. Salt can be used as a way to move livestock around a federal allotment. Animals can congregate around a water source or riparian area causing damage to soil and vegetation in these places. Salt and minerals can be used to encourage movement to other parts of the allotment.

Travel expenses can increase on BLM and USFS land if travel is required to meet with federal personnel or travel is required for paperwork. Expenses in this category can also increase if gates are left open and livestock get out, or if fence damage allows for livestock to wander. This is often the case with federal land as multiple use requires producers to share the land with other public users. This can potentially increase the likelihood of fence or gate damage. Expenses can be especially high on USFS land if the allotment is located farther from ranch headquarters and more gas is needed to get to and from the allotment.

Water and other developments, development depreciation, and maintenance tend to be high on both BLM and USFS land. Often, developments centered around fencing and roads are higher on USFS because of the remote locations. These areas often have more snow which can result in more fence and other development damage. However, water developments can

potentially be higher on BLM land. This is due to the fact that forested areas often have more water sources for livestock. Often, BLM land does not come with water sources and developments must be made to acquire them.

Costs of horse use can potentially be higher on BLM and USFS land. If an allotment is located in a remote or steep area, more horses could be required to locate, gather, and move livestock. This is especially true if an area is federally protected and does not allow OHV use or is too rough for vehicle use.

Other costs such as predator control or expenses can be high on both BLM and USFS land. Often, if sheep producers are involved there are added expenses of food, dog food, shelter, and other bills that come with having labor with livestock 24 hours per day and 7 days a week.

Technology has been a growing expense for both BLM and USFS land. These lands, especially USFS, can be located in remote areas. This can then require labor to use GPS or two-way radios if cell phone reception is not available.

Allotment Size

Allotment and lease size can potentially influence the overall total non-fee costs a producer is paying. There are multiple reasons this can occur on both private leases and federal allotments.

Smaller allotments and leases can often lead to higher prices because grazing costs are spread out over fewer AUMs. Categories such as development and maintenance costs are often consistent but fewer livestock utilize them. Larger costs for smaller allotments and leases could also come from labor and transportation costs. The same amount of labor and vehicles could

potentially be used on a small allotment or lease as on a large one, especially for gathering livestock on and off the land. If the allotment or lease is located away from the ranch, the transportation costs can increase while the small number of AUMs to distribute the costs can remain the same.

Large allotment sizes can also lead to higher costs per AUM for a producer. This can be because of the labor number, labor, hours, and vehicle miles needed to move livestock around a lease or allotment. It can take longer to locate livestock and longer to gather and move them within the allotment or lease. A large allotment or lease can also lead to an increase in the time it takes to transport livestock off an allotment. This again can be due to size making it more difficult to locate animals. There can also be a potential increase in development and maintenance costs if more materials and labor must go into an increased number of developments. Fence maintenance in particular can increase with a large allotment or lease due to the miles that require annual upkeep or development.

Additional Non-fee Issues

There were many additional factors that influence non-fee costs on both federal and privately leased land but are not easily quantified. The first issue is that of multiple use on federal land. Although some expenses such as vandalism, stray roundup, and road maintenance could be quantified, many other expenses that fall on federal land permittees were left out. With the increase of multiple use activities occurring on federal land comes the increase in livestock-human interaction. Privately leased permits have the advantage of private property rights and the ability to prohibit other uses of the land. Federal permittees must work with the general public in order to use the land and this can occasionally result in user conflict. While livestock interaction

does not always lead to death or injury, it is possible that interaction with humans and OHVs can cause stress which leads to a decrease in weight and breeding. OHVs and other vehicles can cause damage to the roads and possible water developments that the permittees must fix or risk damage to vehicles.

Another consideration for both federal and privately leased land grazing is that of an increase in predation, especially in northern Wyoming and Idaho. While direct kills influence livestock deaths, it is difficult to quantify stress and injury due to predators (Steele et al., 2013). Interactions with predators can cause stress to an animal that influences their weight and ability to breed for the following year. Some cases reported in Idaho also mentioned direct injury to the livestock that did not directly result in death but influenced prices received at market.

Other Considerations

As stated before, it was not possible to produce a test that looks at significant differences between public and privately leased grazing. This is because of a lack of independence in the study. Due to the nature of obtaining private leases for this project, it was not possible to separate out producers filling out a form for federal allotment and those filling out one for private leases. There was no single list that this project could obtain that contained private leases for each state in the study. For this reason, it was necessary to gather private leases by overlapping with producers who also held a federal permit or gathering by association announcements. Again, by using the associations it has the potential to bias the results of the study.

For this reason, it was necessary just to report average total costs along with the median and range of $ AUM^{-1} for both federal allotments and private leases.

In the 1992 study, they concluded the study by recommending a grazing fee range of $3-5 which is a range of $6.60-11.01 in 2018 dollars (Bartlett, 1992). For this study, the overall numbers reported would not fall within this suggested range.

CHAPTER 6: CONCLUSIONS AND FUTURE RESEARCH NEEDS

In conclusion, the overall non-fee total for federal land grazing in the states of Wyoming, Idaho, and California was \$31.08 AUM^{-1}. For privately leased grazing in these same states, it was \$34.18 AUM^{-1} to graze. This would imply a federal grazing fee of \$3.10 to make the total costs of grazing be equal for public and privately leased land. The overall non-fee total to graze on BLM land in Wyoming, Idaho, and California was \$30.77 AUM^{-1} and \$31.29 AUM^{-1} on USFS land. A small allotment size brought a total of \$34.14 AUM^{-1} for private land, \$35.68 AUM^{-1} for BLM, and \$61.02 AUM^{-1} for USFS land. Medium allotment and lease sizes showed a total non-fee cost of \$31.28 AUM^{-1} for private land, a \$38.35 AUM^{-1} for BLM land, and \$39.41 AUM^{-1} for USFS land. Finally, for large allotment and leases a total non-fee cost of \$30.42 was shown for private, \$28.70 AUM^{-1} for BLM, and \$21.73 AUM^{-1} for USFS land.

When looking at non-fee costs of federal and privately leased grazing in the United States, it is important to identify and interpret the differences and similarities between the two types of grazing land. Research on this topic started in the 1960s, continued into the 1990's, and must be updated in order to compare between the two types of grazing. Before this study, it had been over 30 years since these numbers were examined. Future research on this topic would be beneficial in identifying trends in grazing costs of public and privately leased grazing. It can potentially help producers identify where costs will be high in either type of grazing situation. Understanding and revealing a trend in non-fee grazing costs can aid federal agencies and private grazing industries in managing grazing. It can also help ensure that neither public nor private ranches have a competitive advantage over the other. In other words, if the total costs of grazing are the same between public and privately leased ranching then the playing field would be level.

As shown in the three states examined in this study, there can be differences based on location and some ranches will always have an advantage over other ranches due to a variety of factors beyond the scope of a non-fee cost study.

That is why it is recommended to update these numbers occasionally. This would aid in having the data that compares the two types of grazing on a more regular basis. Such information can aid in discussions of public land grazing. Future research on this topic would leave to an overall better understanding of the non-fee costs of federal land grazing.

It is recommended that future studies include more or all states to truly capture differences. If personal interviews are used as the method for data collection, teams of two interviewers are generally more efficient. One can ask questions and the other can record results. Due to the complexity of the data in allocating costs to public permits or private leases, the research team will need to be involved. It is unlikely that a mail-only or web-based survey instrument will be effective in gathering this information.

LITERATURE CITED

[AMS] Agriculture Marketing Service. January 10, 2017. National Weekly Lamb. United States Department of Agriculture. https://mpr.datamart.ams.usda.gov/htmlResults.do?pk=38624884&path=Products\Sheep\Weekly%20Lamb\(LM_LM351)%20National%20Weekly%20Lamb.

[AMS] Agriculture Marketing Service. January 24, 2017. National Weekly Lamb. United States Department of Agriculture. https://mpr.datamart.ams.usda.gov/htmlResults.do?pk=38624884&path=Products\Sheep\Weekly%20Lamb\(LM_LM351)%20National%20Weekly%20Lamb.

[AMS] Agriculture Marketing Service. January 31, 2017. National Weekly Lamb. United States Department of Agriculture. https://mpr.datamart.ams.usda.gov/htmlResults.do?pk=38624884&path=Products\Sheep\Weekly%20Lamb\(LM_LM351)%20National%20Weekly%20Lamb.

[AMS] Agriculture Marketing Service. February 24, 2017. National Weekly Lamb. United States Department of Agriculture. https://mpr.datamart.ams.usda.gov/htmlResults.do?pk=38624884&path=Products\Sheep\Weekly%20Lamb\(LM_LM351)%20National%20Weekly%20Lamb.

Alward, Gregory S. and Bradley J. Sullivan. 1984. Estimated Impacts of Increased Federal Grazing Fees on Income and Employment in 13 Western States. National Technical Information Service, U.S. Department of Commerce, Springfield, VA.

Bartlett, T, Neil Rimbey, Allen L. Torell, and Larry W. Van Tassell. 1993. The Federal Grazing Fee: 1993. Grazing Fee Task Group. Garner Files no. 28. http://gardnerfiles.com/28-c%20The%20Federal%20Grazing%20Fee%201903.pdf.

Bureau of Land Management (BLM). 2018. BLM and USFS Announce 2018 Grazing Fees. U.S. Department of Interior. https://www.blm.gov/press-release/blm-and-forest-service-announce-2018-grazing-fees.

Collins, Alan R., George Constantino. 1989. A Procedural Approach to Address Fairness of Livestock Grazing Fees on Public Lands. Proceedings of a Symposium Sponsored by the Western Regional coordinating committee of Range economics. SRM Meeting Billings Montana, 1989.

Council of Agricultural Science and Technology (CAST). 1996. Members: W.A. Laycock, D. Loper, F.W. Obermiller, L. Smith, S.R. Swanson, P.J. Urness, and M. Vavra. Grazing on Public Lands Task force rep. no. 129. https://www.cast-science.org/wp-content/uploads/1996/12/CAST_R129_Grazing-on-Public-Lands.pdf.

Dyer, Holly et al. 2018. Enterprise Budget Lost River and Mountains: MLRA 12. University of Wyoming Extension: B-1332.1. file:///C:/Users/kdoller1/Downloads/B-1332-web%20All%20MLRA%20Enterprise%20Budgets%20(2).pdf.

Dyer, Holly et al. 2018. Enterprise Budget Owyhee High Plateau University of Wyoming Extension: B-1332.16. file:///C:/Users/kdoller1/Downloads/B-1332-web%20All%20MLRA%20Enterprise%20Budgets%20(2).pdf.

Dyer, Holly et al. 2018. Enterprise Budget North Intermountain Desertic Basins. University of Wyoming Extension: B-1332.22. file:///C:/Users/kdoller1/Downloads/B-1332-web%20All%20MLRA%20Enterprise%20Budgets%20(2).pdf.

Dyer, Holly et al. 2018. Enterprise Budget Cool Central Desertic Basins and Plateaus. University of Wyoming Extension: B-1332.34. file:///C:/Users/kdoller1/Downloads/B-1332-web%20All%20MLRA%20Enterprise%20Budgets%20(2).pdf.

Dyer, Holly et al. 2018. Enterprise Budget Northern Rolling High Plains. University of Wyoming Extension: B-1332.24. file:///C:/Users/kdoller1/Downloads/B-1332-web%20All%20MLRA%20Enterprise%20Budgets%20(2).pdf.

[EIA] U.S. Energy Information Administration. 2021. Petroleum & Other Liquids. U.S. Department of Energy. https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_a.htm.

[ESMIS] USDA Economics, Statistics, and Market Information System. December 7,2018. USDA Weekly National Lamb Market Summary. Vol. 25. No. 48. U.S. Department of Agriculture. https://downloads.usda.library.cornell.edu/usda-esmis/files/rn301140q/x059cc21m/fq977z985/LSWLAMB.PDF.

[ESMIS] USDA Economics, Statistics, and Market Information System. December 14, 2018. USDA Weekly National Lamb Market Summary. Vol. 25. No. 49. U.S. Department of Agriculture. https://downloads.usda.library.cornell.edu/usda-esmis/files/rn301140q/f4752m89m/x633f4799/LSWLAMB.PDF.

[ESMIS] USDA Economics, Statistics, and Market Information System. December 21, 2018. USDA Weekly National Lamb Market Summary. Vol. 25. No. 49. U.S. Department of Agriculture. https://downloads.usda.library.cornell.edu/usda-esmis/files/rn301140q/bz60d1472/m900nz63k/LSWLAMB.PDF.

[ESMIS] USDA Economics, Statistics, and Market Information System. December 28, 2018. USDA Weekly National Lamb Market Summary. Vol. 25. No. 50. U.S. Department of Agriculture. https://downloads.usda.library.cornell.edu/usda-esmis/files/rn301140q/qr46r5166/fn107298v/LSWLAMB.PDF.

Finzel J., Stewart, D., & Summer, D.. 2017. Sample Cost for Beef Cattle: Cow- Calf Production San Joaquin Valley- South. University of California Agriculture and Natural Resources Cooperative Extension: Agricultural Issues Center, UC Department of

Agriculture and Resource Economics. file:///C:/Users/kdoller1/Downloads/17beefcowcalfsjvfinaldraft91217%20(1).pdf.

Forero, L., Ingram, R., Nader, Gl., Stewart, D., & Summer, D. 2017. Sample Cost for Beef Cattle: Cow-Calf Production Northern Sacramento Valley. University of California Agriculture and Natural Resources Cooperative Extension: Agricultural Issues Center, UC Department of Agriculture and Resource Economics. file:///C:/Users/kdoller1/Downloads/2017beefcowcalfsacvalleyfinaldraft63017.pdf.

Holechek, Jerry L. 1981. A Brief history of Range Management in the United States. Rangelands 3:16.

[USDA] National Agricultural Statistics Service. 2019a. Agricultural Prices. December 2018. ISSN: 1937-4216. https://downloads.usda.library.cornell.edu/usda-esmis/files/c821gj76b/t435gj88z/7s75dj599/agpr0119.pdf

[USDA] National Agricultural Statistics Service. 2019b. Agricultural Prices. February 2019. ISSN: 1937-4216. https://www.nass.usda.gov/Publications/Todays_Reports/reports/agpr0219.pdf

[NRCS] Natural Resource Conservation Service. 2020. Field Office Technical Guide. United States Department of Agriculture. https://efotg.sc.egov.usda.gov/#/details.

Nelson, Judy Ellen and Michael Garratt. 1984. Evaluation of the Forage Value Index. U.S Department of Agriculture Forest Service and U.S. Department of the Interior Bureau of Land Management.

Nielsen, Darwin B. 1982. Grazing Fees for Public Lands: What's Fair? Utah Science: Vol. 43 No.1, Spring 1982. https://core.ac.uk/download/pdf/32543534.pdf.

Obermiller, Frederick W. 1992. Costs Incurred by Permittees in Grazing Cattle on Public and Private Rangelands and Pastures in Eastern Oregon: 1982 and 1990. Oregon State University Extension Service, Corvallis Or.

Obermiller, Frederick W., and David K. Lambert. 1984. Costs Incurred by Permittees in Grazing Livestock on Public Lands in Various Western States. Department of Agricultural and Resource Economics, Oregon State University, Corvallis, OR.

Obermiller, Frederick W., and Dodi Reeseman (eds.) 1990. Current issues in Rangeland Resource Economics. University of Oregon Extension Service, Corvallis OR.

Prevedel, David A., and Curtis M. Johnson. 2005. Beginning of Range Management: Albert F. Potter, First Chief of Grazing, U.S Forest Service, and a Photographic Comparison of his 1902 Forest Reserve Survey in Utah with Conditions 100 Years Later. United States Department of Agriculture: Intermountain Region, Ogden, Utah.

Public Lands Foundation (PLF). 2014. America's Public lands: origin, history, future. Public Lands Foundation, Arlington, VA.

Quigley, Thomas M. and E.T Bartlett. 1990. Livestock on Public Lands: Yes! Western Regional Coordinating Committee (WRCC 55) on Range Economics. Current Issues in Rangeland Resource Economics: Oregon State Extension Service.

Quigley, T.M. and J.A. Tanaka. 1988. The federal grazing fee: a viewpoint. Rangelands 10:130-131.

Rao D., Stewart D., & Summer, D. 2018. Sample Cost for Beef Cattle: Cow- Calf Production Central Coast. University of California Agriculture and Natural Resources Cooperative Extension: Agricultural Issues Center, UC Department of Agriculture and Resource Economics. file:///C:/Users/kdoller1/Downloads/18beefcowcalfcentralcoast81018%20(1).pdf.

Rimbey, Neil, and Allen L. Torell. 2011. Grazing Costs: What's the Current Situation? University of Idaho, Agricultural Economics Extension Series No 2011-022.

Steward, Judith A. 1998.Perspectives from the Ranching Culture in the 1990's: Addressing Mythological and Environmental Concerns. Thesis for Master of Arts and Interdisciplinary Studies, Oregon State University.

Survey Monkey. 2020. Sample Size Calculator. https://www.surveymonkey.com/mp/sample-size-calculator/

Tanaka, J., and Kristie Maczko. 2017. Proposal Application: Public Lands Endowment Trust. Department of Ecosystem Science and Management, University of Wyoming.

[NARA] The U.S National Archives and Records Administration. 2016. Executive Order 12548, 51 Fed. Reg. 5985 (February 19, 1986), at https://www.archives.gov/federal-register/codification/executive-order/12548.html.

Torell, Allen L, Larry W. Van Tassell, Neil R. Rimbey, Tom E. Bartlett, Tom Bagwell, Paul Burgener, and Julie Coen. 1993. The Value of Public Land Forage and the Implications for Grazing Fee Policy: A summary of the BLM and USFS Incentive-based grazing fee study, Grazing Fee Task Group. College of Agriculture and Home Economics: Agriculture Experiment Station, Bulletin 767, Las Cruces NM.

Torell, Allen L., Neil R. Rimbey, Larr W. Van Tassell, John A. Tanaka, and E. Tom Bartlett. 2003. An Evaluation of the federal grazing fee formula. Journal of Range Management.

Torell, Allen L., Neil R. Rimbey, John A. Tanaka, David T. Taylor, and J.D. Wulfhorst. 2014. Ranch level economic impact analysis for public lands: a guide to methods, issues, and applications. Ecosystem Science and Management Faculty Publications. University of Wyoming: Wyoming Scholars Repository.

U.S Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. U.S Department of the Interior, Bureau of Land Management Office of Public Affairs, Washington D.C 69 pp.

[FWS] U.S. Fish and Wildlife Service. 2018. Endangered Species: Listing and Critical Habitat. U.S. Department of the Interior. https://www.fws.gov/endangered/what-we-do/critical-habitats.html.

U.S Government Publishing Office (GPO). 1978. Public Law 95-514-95th Congress. U.S. Government Publishing Office 92 STAT. 1803. https://www.govinfo.gov/content/pkg/STATUTE-92/pdf/STATUTE-92-Pg1803.pdf.

Van Tassel, Larry W., Neil R. Rimbey, Allen L. Torell, and Tom E. Bartlett. 1994. Current Issues in Rangeland Economics: Assessing the Total Cost Approach in Determining the Value of Public Grazing. University of Idaho: Idaho Agricultural Experiment Station.

Williams, Gerald: Ph.D., The USDA Forest Service – The First Century. 2005. Forest Service Office of Communication, FS-650, by the USDA Forest Service, Washington, DC. https://www.fs.usda.gov/sites/default/files/media/2015/06/The_USDA_Forest_Service_TheFirstCentury.pdf.

APPENDIX A

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Protocol #20190612JT02426

Re: IRB Proposal "*Evaluating Non-fee Grazing Permit Costs in the Context of Social and Economic Characteristics of Public Land Ranchers*"

Dear John, Kasey, Tom, and Kristie:

The proposal referenced above qualifies for exempt review and is approved as one that would not involve more than minimal risk to participants. Our exempt review and approval will be reported to the IRB at their next convened meeting on June 20, 2019.

Any significant change(s) in the research/project protocol(s) from what was approved should be submitted to the IRB (Protocol Update Form) for review and approval prior to initiating any change. Further information and the forms referenced above may be accessed at the "Human Subjects" link on the Office of Research and Economic Development website: http://www.uwyo.edu/research/human-subjects/index.html. Please note that exempt protocols are approved for a maximum of three years. If your study extends beyond three years, or beyond the duration that is approved in your protocol form, please be sure to submit an update before expiration to extend the duration. If you are not able to submit the update in time, you will need to submit a new exemption request for the project.

You may proceed with the project/research and we wish you luck in the endeavor. Please feel free to call me if you have any questions.

Sincerely,

Nichole Person

Nichole Person
Staff Assistant, Research Office
On behalf of the Chairman,
Institutional Review Board

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Protocol #20190612JT02426

Re: IRB Proposal "*Evaluating Non-fee Grazing Permit Costs in the Context of Social and Economic Characteristics of Public Land Ranchers*"

Dear John, Kasey, Tom, and Kristie:

The proposal referenced above qualifies for exempt review with a minor modification and is approved as one that would not involve more than minimal risk to participants. Our exempt review and approval will be reported to the IRB at their next convened meeting August 20, 2020.

Any significant change(s) in the research/project protocol(s) from what was approved should be submitted to the IRB (Protocol Update Form) for review and approval prior to initiating any change. Per recent policy and compliance requirements, any investigator with an active research protocol may be contacted by the recently convened Data Safety Monitoring Board (DSMB) for periodic review. The DSMB's charge (sections 7.3 and 7.4 of the IRB Policy and Procedures Manual) is to review active human subject(s) projects to assure that the procedures, data management, and protection of human participants follow approved protocols. Further information and the forms referenced above may be accessed at the "Human Subjects" link on the Office of Research and Economic Development website: http://www.uwyo.edu/research/human-subjects/index.html. Please note that exempt protocols are approved for a maximum of three years. If your study extends beyond three years, or beyond the duration that is approved in your protocol form, please be sure to submit an update before expiration to extend the duration. If you are not able to submit the update in time, you will need to submit a new exemption request for the project.

You may proceed with the project/research and we wish you luck in the endeavor. Please feel free to call me if you have any questions.

Sincerely,

Nichole Person

Nichole Person
Staff Assistant, Research Office
On behalf of the Chairman,
Institutional Review Board

APPENDIX B

2019 Grazing Cost Evaluation

Federal Grazing Costs

This evaluation is being conducted in selected western states to accurately determine the total costs of running livestock on federal and privately leased rangeland. The purpose of this information is to update the costs of federal and private grazing for western livestock producers. This survey is being conducted by the University of Wyoming, Wyoming Stock Growers Association, Idaho Cattle Association, and the Public Lands Council. It is intended that results from this cost evaluation will provide a valid comparison between private and public grazing costs to use in evaluating grazing fees.

Be assured that any information you provide will be strictly confidential. Only summary statistics by state or region will be released.

Enumerator

_____

I. GENERAL RANCH DESCRIPTION

The following information is for the 2018 operating year. Please include accurate information for your land as well as your federal allotments.

A. What was your average livestock inventory on January 1, 2018?

1.) Mother Cows_____ No.Repl. Heifers_____ No.
Bulls_____ No.

2.) Yearling market livestock (Over 6 months of age)
Raised Steers_____ No. Raised Heifers_____ No.

Purchased Steers_____ No.Purchased Heifers_____ No.

3.) Ewes_____ No.Rams_____ No.
Yearlings_____ No.

4.) Horses_____ No.

5.) Other Livestock (specify) _____No.

II.LIST OF ALLOTMENTS

A. Are your allotments managed as separate units ☐ or as one large block of land ☐ ?

B. In this please provide a list of all federal allotments permitted/leased in 2018.

1. Allotment 1

Allotment Number

Operator Number

Is this allotment a BLM ☐ or USFS allotment ☐ ?

Name of BLM field office or Forest ranger district in which allotment is located:

2. Allotment 2

Allotment Number

Operator Number

Is this allotment a BLM ☐ or USFS allotment ☐ ?

Name of BLM field office or Forest ranger district in which allotment is located:

3. Allotment 3

Allotment Number

Operator Number

Is this allotment a BLM ☐ or USFS allotment ☐ ?

Name of BLM field office or Forest ranger district in which allotment is located:

C. For any additional allotments please add another page like this one.

III. ALLOTMENT CHARACTERISTICS AND MANAGEMENT

This section will be filled out for allotments identified in Part II and used during 2018.

A. Allotment Information

	Allotment 1	Allotment 2	Allotment 3
Allotment Name			
Allotment Number			
Individual or common allotment?			
If BLM, classified as Section 3 or Section 15?			
IF BLM, categorized as M, I, or C?			
Total 2018 Grazing Use (AUMs)			

B. Allotment Acreage and Ownership

Type of Ownership	Acreage			AUMS of Grazing		
	Allotment 1	Allotment 2	Allotment 3	Allotment 1	Allotment 2	Allotment 3
Bureau of Land Management						
U.S. Forest Service						
Other Federal						
State Trust Land						
Private Lease						
Uncontrolled						
Other (describe)						

TOTAL						

C. What type of vegetation is on this grazing allotment?

Type	Allotment 1	Allotment 2	Allotment 3
(1) Sagebrush	%	%	%
(2) Salt Desert Shrub (Atriplex, Greasewood)	%	%	%
(3) Chaparral (Oakbrush, Mt. Mahogany, Chamise)	%	%	%
(4) Creosote bush (Blackbrush, cactus, mesquite, etc.)	%	%	%
(5) Pinyon-Juniper	%	%	%
(6) Coniferous Forest Types (Ponderosa, Lodgepole, etc.)	%	%	%
(7) Broadleaf Woodland (Aspen, Oaks, Cottonwood-River Bottom)	%	%	%
(8) Native Grassland	%	%	%
(9) Native Meadowland	%	%	%
(10) Seeded Grasses	%	%	%
(11) Invasive Annual Grasses	%	%	%
(12) Other (Describe)	%	%	%

D. What were the number of livestock on this allotment in 2018?

Allotment 1	On the Allotment		Off the Allotment	
	Number	Date	Number	Date
Total Cows (Include cows with calves and dry cows)				
Weaned Calves (Weaning age to I year old)				
Yearlings (I to 2 years old. excluding cows listed above)				
Bulls				
Ewes				
Rams				

Weaned Lambs (weaning age to 1 year old)				
Wethers				
Horses (Include only horses under permit or license)				

Allotment 2	On the Allotment		Off the Allotment	
	Number	Date	Number	Date
Total Cows (Include cows with calves and dry cows)				
Weaned Calves (Weaning age to I year old)				
Yearlings (I to 2 years old. excluding cows listed above)				
Bulls				
Ewes				
Rams				
Weaned Lambs (weaning age to 1 year old)				
Wethers				
Horses (Include only horses under permit or license)				

Allotment 3	On the Allotment		Off the Allotment	
	Number	Date	Number	Date
Total Cows (Include cows with calves and dry cows)				
Weaned Calves (Weaning age to I year old)				
Yearlings (I to 2 years old. excluding cows listed above)				

Bulls				
Ewes				
Rams				
Weaned Lambs (weaning age to 1 year old)				
Wethers				
Horses (Include only horses under permit or license)				

E. What topographic features best describe this allotment? (Give proportion)

Description	Allotment 1 %	Allotment 2 %	Allotment 3 %
Steep			
Steep and Rocky			
Rolling Hills			
Gentle, Flat			
Other (describe)			

F. How many pasture (units) are there in this allotment?

Allotment 1

Allotment 2

Allotment 3

G. How would you describe your current grazing management plan on each allotment?

	Allotment 1	Allotment 2	Allotment 3
Scheduled rest rotation among a number of pastures (one or more pastures used each year). How many pastures are used each year?	Y N _____	Y N _____	Y N _____
Scheduled deferred rotation among a number of pastures. How many pastures are used each year?	Y N	Y N	Y N

Open rotation with scheduled moves. How many pastures were used each year? How many moves while in this lease?	Y N	Y N	Y N
Continuous grazing, with all livestock distributed freely	Y N	Y N	Y N
Decision deferment (i.e., non-scheduled moves, Savory)	Y N	Y N	Y N
Other (specify)	Y N	Y N	Y N

H. How many years have you had each allotment or how long has each allotment been in your family?

Allotment 1

Allotment 2

Allotment 3

I. If Allotment was purchased:

	Allotment 1	Allotment 2	Allotment 3
Year Purchased			
How much was paid? ($/AUM or $/AUY)			

IV. RANGE DEVELOPMENT AND MAINTENANCE COSTS

Include here ail range improvements and developments that service the allotment or allow harvest of forage, regardless of land ownership. Include all improvements made to run your operation.

New Development

Type of Development	Code Description	Year Developed	Land Ownership (e.g. Federal, State, Private)	Number	Units	Total Improvements	Dollars Rancher Invested (incuding hired labor)	Hours of unpaid labor including operator and other unpaid	Percent Improvement use on this allotment	Percent Improvement use for other purposes (e.g. irrigation)
Development Code										
Wells										
Spring										
Ponds										
Fence (Specify Type)										
Roads										
Corrals and Chutes										
Oilers										
Dipping Vats										
Seeding										
Spraying										
Windmills										
Brush Control										
Noxious Weed Control										
Other (Specify in Notes)										

B. Range Improvement Maintenance

Maintenance Item	Cost
Water Maintenance	
(1) Water pumping costs (gas, electric, diesel, service)	
(2) Contract expenses to haul water?	
(3) Materials to maintain and clean wells and stock ponds	
(4) Cost of bulldozers, and other equipment for water maintenance?	
(5) Other costs in maintaining stock ponds, wells, and springs on the allotment?	
Fence Maintenance	
(6) What was the cost of materials and equipment to maintain fences on the allotment during the last grazing season?	
Other Costs	
(7) Did you have any costs in implementing or maintaining improvements other that those we have for the 2018 grazing season?	

V. OTHER CASH COSTS

This section of the questionnaire will be used to list the cash costs expended in grazing livestock on this allotment.

A. What were your cash expenditures for the following items that were used while livestock were on this allotment in 2018?

Description	Units	Dollars
(1) Salt		
(2) Veterinary and Medicine		

(3) Protein Supplements. Grain, Hay		
(4) Contractor Feed		
(6) Predator Control (Poisons, trappers)		
(7) Others (not previously listed)		

Do association fees pay for: (check all that apply)

☐ Grazing Fees ☐ Herding, rider

☐ Salt and Supplements ☐ Fence and Improvement maintenance

☐ Other (specify_____)

B. Miscellaneous Costs

What were the cash and non-cash expenditures for the following items pertaining to this allotment during 2018? (Paperwork, stockmen's grazing meetings, NEPA, vandalism, rounding up stray stock after gates are left open, meetings with federal personnel, endangered species protocol etc.)

	Transportation		Labor			
	Vehicle Type	Mileage	Manager Operated (hrs)	Family (hrs)	Regular Hired (hrs)	Day (hrs)
Paper work						
Meetings						
Vandalism						
Stray roundup						

VI. DEATH LOSSES

A. What was the average 2018 Livestock sale weights?

Steer calves	
Heifer calves	
Yearling steers	
Yearling heifers	
Cull cows	
Lambs	
Cull Ewes	
Cull bucks	
Wool per ewe	

B. How many livestock died or disappeared on this allotment in 2018?

Cows_____
Yearling Steers_____Yearling Heifers_____
Steer Calves_____Heifer Calves_____
Bulls_____
Rams_____Ewes_____
Lambs_____

VII. LABOR

This section of the questionnaire asks about the labor requirements (number of people and the hours required) to move livestock to allotment, to herd and distribute livestock on allotment, to gather and move livestock from allotment, to maintain the physical requirements of the allotment (fences. water tanks. dams. etc.) and the labor requirements for animal health and maintain (herd checking, doctoring. salting, feeding, watering, etc.) throughout 2018.

A. Hired Labor Information

	Pay Unit* (code)	Wage rate per unit time	Approx. monthly cost for social security, unemployment, insurance, room and board, and benefits
Hired Manager			
Hired labor			
Day labor			

•paid by: hour=I day=2 week =3 month =4 unpaid=5 exchange=6

B. Labor numbers and hours worked for 2018 year

	Livestock to allotment (A)		Herding, distribution, grazing mgt. (B)		Maintain allotment		Animal health and periodic Inspection (D)		Gathering & moving livestock (E)	
	no.	hrs.	no.	hrs.	no.	hrs.	No.	hrs.	No.	hrs.
Yourself/manager										
Family members										
Regular hired labor										
Day Labor										
Exchange Labor										

VIII. TRANSPORTATION

This section of the questionnaire asks about the vehicle requirements to move livestock to allotment, vehicle requirements to herd and distribute livestock on allotment, gather and move livestock from allotment, maintain the physical requirement of the allotment (fences, water tanks, dams. etc.) and the vehicles requirements for animal health and maintenance checking, doctoring, salting, watering, etc.) throughout 2018.

(Please: use hours on farm and industrial equipment instead of miles)

This section of the questionnaire will ask about the transportation of livestock to and from the allotment.

A. What is the distance from your ranch headquarters to this allotment?

_____ miles

B. If livestock were not taken directly from the ranch headquarters, give the distance from the last lease, allotment or owned pasture used.
_____miles

C. How were the livestock moved onto this allotment?
_____ Hired trucks$_____Total Cost

_____ Owned trucks

_____ Trailed

_____ Other (specify _____)

D. What was the distance to remove livestock from this allotment or owned pasture?

_____miles

E. How were the livestock moved off of this allotment?
_____ Hired trucks$_____Total Cost

_____ Owned trucks

_____ Trailed

_____ Other (specify _____)

If hired trucks were used, what was the total cost in transporting livestock from the allotment?

$

F. Please fill out the following table with as much detail as possible:

	Livestock to allotment		Herding and Distribution in lease		Gathering and moving livestock in lease		Lease Maintenance		Animal Health and Maintenance	
Vehicle type used*	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)

•Some vehicles that might be used: Pickup, Pickup-stock trailer, Stock truck, Semi-tractor trailer, All-terrain vehicle (ATV), Water-tank truck, Tractors, Implements.

Of the total costs for equipment (to this allotment) what percentage was done by:

_____% Rented/Contracted
_____% Owned equipment

IX. Horse Use

This section of the questionnaire will ask you about the horse requirements to operate and maintain this allotment throughout 2018.

A. Horse requirements to operate and maintain this allotment

Horse Requirements		
	Average number of horses	Average days horses
Livestock to allotment		
Livestock distribution/herding/grazing management		
Livestock gathering		
Livestock off allotment		
Maintenance of allotment		
Animal health and maintenance		

B. What percent of the total horse requirements were used by the following:

_____% Owned horses _____ % Rented Horses

_____% Horses provided by hired range riders

_____% Horses provided by friend or neighbor

_____% other (specify_____)

*Sum should equal 100%

X. Technology

This section will ask questions in the use of technology to maintain allotments throughout 2018.

A. Is there use of any subscriptions to local weather, road or other apps?

App: _____

Cost: _____

App: _____

Cost: _____

App: _____

Cost: _____

B. Was any mobile technology purchased to use on this allotment? (Ex: laptop, Ipad, GPS)

Device:_____

Cost:_____

Device:_____

Cost:_____

Device:_____

Cost:_____

END (Thank you)

APPENDIX C

2019 Grazing Cost Evaluation

Private Grazing Lease 2019

This evaluation is being conducted in selected western states to accurately determine the total costs of running livestock on federal and privately owned rangeland. The purpose of this information is to update the costs of federal and private grazing for western livestock producers. This survey is being conducted by the University of Wyoming, Wyoming Stock Growers Association, Idaho Cattle Association, and the Public Lands Council. It is intended that results from this cost evaluation will provide a valid comparison between private and public grazing costs to use in evaluating grazing fees.

Be assured that any information you provide will be strictly confidential. Only summary statistics by state or region will be released.

Enumerator _____

I. GENERAL RANCH DESCRIPTION

The following information is for the 2018 operating year. Include accurate information for your deeded land as well as your private leases.

A. What was your average livestock inventory on January I, 2018?

1. Mother Cows_____ No.Repl. Heifers_____ No.

Bulls_____ No.

1. Yearling market livestock (Over 6 months of age)
Raised Steers_____ No. Raised Heifers_____ No.

Purchased Steers_____ No.Purchased Heifers_____ No.

2. Ewes_____ No.Rams_____ No.
Yearlings_____ No.

3. Horses_____ No.
5. Other Livestock (specify) _____No.

II.LIST OF PRIVATE LEASES

A. Are your leases managed as separate units ☐ or as one large block of land ☐ ?
B. In this section, please provide a list of all private leases in 2018.

1. Lease 1

Landlord Name

County

2. Lease 2

Landlord Name

County

3.Lease 3

Landlord Name

County

C. For any additional leases please add another page like this one.

III. Lease Arrangement

A. How were you charged for this lease and what was the lease rate?

	Rate Lease 1	Rate Lease 2	Rate Lease 3
a)_____per acre	$		
b)_____per head per month	$		
c)_____ per pound of grain	$		
D_____ per cwt of gain	$		
e)_____other (specify_____)	$		

B. Amount Paid for Lease

	Lease 1	Lease 2	Lease 3
Dollar Amount Paid for Lease			
When as the Grazing Lease Paid?	Beginning of Grazing Season ☐ After ☐ Other (Specify) ☐ _____	Beginning of Grazing Season ☐ After ☐ Other (Specify) ☐ _____	Beginning of Grazing Season ☐ After ☐ Other (Specify) ☐ _____

C. Terms and Conditions of Lease

	Lease 1	Lease 2	Lease 3
Maintenance of Property	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Liability Insurance	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Daily Livestock Care	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Receiving and Shipping Livestock	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Water Supply	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Death Loss Adjustment	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Livestock Tax132	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Utilities	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐
Other (specify)	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐	Lessor ☐ Lessee ☐

D. What other rights, besides grazing, were associated with the lease?

	Lease 1	Lease 2	Lease 3
Recreational			
Wood Harvesting			
House			
Barns			
Equipment			
Crop Aftermath			
Hay			
Other (specify)			

IV. LEASE CHARACTERISTICS AND MANAGEMENT

A. This section will be filled out for each lease identified in Part Il and used during 2018.

	Lease 1	Lease 2	Lease 3
Lease Name			
Turn on/gathering dates for 2018	Date on_____ Date off_____	Date on_____ Date off_____	Date on_____ Date off_____
How many acres in in this lease?			
Of these total acres, how many are used for grazing?			

B. What type of vegetation is on this grazing lease?

Type	Lease 1	Lease 2	Lease 3
(1) Sagebrush	%	%	%
(2) Salt Desert Shrub (Atriplex, Greasewood)	%	%	%
(3) Chaparral (Oakbrush, Mt. Mahogany, Chamise)	%	%	%
(4) Creosote bush (Blackbrush, cactus, mesquite, etc.)	%	%	%
(5) Pinyon-Juniper	%	%	%
(6) Coniferous Forest Types (Ponderosa, Lodgepole, etc.)	%	%	%
(7) Broadleaf Woodland (Aspen, Oaks, Cottonwood-River Bottom)	%	%	%
(8) Native Grassland	%	%	%
(9) Native Meadowland	%	%	%
(10) Seeded Grasses	%	%	%
(11) Invasive Annual Grasses	%	%	%
(12) Other (Describe)	%	%	%

C. What were the number of livestock on this lease in 2018?

Lease 1	On the Lease		Off the Lease	
	Number	Date	Number	Date
Total Cows (Include cows with calves and dry cows)				
Weaned Calves (Weaning age to I year old)				
Yearlings (I to 2 years old. excluding cows listed above)				
Bulls				
Ewes				
Rams				
Weaned Lambs (weaning age to 1 year old)				
Wethers				
Horses (Include only horses under permit or license				

Lease 2	On the Lease		Off the Lease	
	Number	Date	Number	Date
Total Cows (Include cows with calves and dry cows)				
Weaned Calves (Weaning age to I year old)				
Yearlings (I to 2 years old. excluding cows listed above)				
Bulls				
Ewes				
Rams				
Weaned Lambs (weaning age to 1 year old)				
Wethers				
Horses (Include only horses under permit or license)				
Lease 3	On the Lease		Off the Lease	
	Number	Date	Number	Date
Total Cows (Include cows with calves and dry cows)				
Weaned Calves (Weaning age to I year old)				
Yearlings (I to 2 years old. excluding cows listed above)				
Bulls				
Ewes				
Rams				
Weaned Lambs (weaning age to 1 year old)				
Wethers				

Horses (Include only horses under permit or license)				

D. What topographic features best describe this lease? (give proportions)

Description	Lease 1 %	Lease 2 %	Lease 3 %
Steep			
Steep and Rocky			
Rolling Hills			
Gentle, Flat			
Other (describe)			

E. How would you describe your current grazing management plan for each lease?

	Lease 1	Lease 2	Lease 3
Scheduled rest rotation among a number of pastures (one or more pastures used each year). How many pastures are used each year?	Y N _____	Y N _____	Y N _____
Scheduled deferred rotation among a number of pastures. How many pastures are used each year?	Y N _____	Y N _____	Y N _____
Open rotation with scheduled moves. How many pastures were used each year? How many moves while in this lease?	Y N _____	Y N _____	Y N _____
Continuous grazing, with all livestock distributed freely	Y N _____	Y N _____	Y N _____
Decision deferment (i.e., non-scheduled moves, Savory)	Y N	Y N	Y N

Other (specify)	Y N	Y N	Y N

IV. RANGE DEVELOPMENT AND MAINTENANCE COSTS

Include here ail range improvements and developments that service the IDL leases or allow harvest of forage, regardless of land ownership. Include all improvements made to run your operation.

New Development

Code Description	Year Developed	Land Ownership (e.g. Federal, State, Private)	Number	Units	Total Improvements	Dollars Rancher Invested (incuding hired labor)	Hours of unpaid labor including operator and other unpaid	Percent Improvement use on this allotment	Percent Improvement use for other purposes (e.g. irrigation)										

Type of Development	Development Code	Wells	Spring	Ponds	Fence (Specify Type)	Roads	Corrals and Chutes	Oilers	Dipping Vats	Seeding	Spraying	Windmills	Brush Control	Noxious Weed Control	Other (Specify in Notes)	

B. Range Improvement Maintenance

Maintenance Item	Cost
Water Maintenance	
(I) Water pumping costs (gas, electric, diesel. service)	
(2) Contract expenses to haul water?	
(3) Materials to maintain and clean wells, stock ponds and springs?	
(4) Cost of bulldozers, backhoes, and other equipment used for water maintenance?	
(5) Other costs in maintaining stock ponds, wells and springs on the lease?	
Fence Maintenance	
(5) What was the cost of materials and equipment to maintain fences on the lease during the last grazing season?	
Other Costs	
(6) Did you have any costs in implementing or maintaining improvements other than those we have for the 1992 grazing season	

VI. OTHER CASH COSTS

This section of the questionnaire will be used to list the cash costs expended in grazing livestock on this lese.

A. What were your cash expenditures for the following items that were used while livestock were on this lease in 2018?

Description	Units	Dollars
(1) Salt		
(2) Veterinary and Medicine		
(3) Protein Supplements. Grain. Hay		
(4) Conn-acted Feed		
(6) Predator Control (Poisons.		
(7) Other items not previously mentioned		

B. Miscellaneous Costs

What were the cash and non-cash expenditures for the following items pertaining to this lease during 2018? (Paperwork, stockmen's grazing meetings, vandalism, 137 rounding up stray stock after gates are left open, meetings with federal personnel etc.)

	Transportation					
	Vehicle Type	Mileage	Manager Operated (hrs)	Family (hrs)	Regular Hired (hrs)	Day (hrs)
Paper work						
Meetings						
Vandalism						

Stray roundup						

VII. DEATH LOSS

A. What was the average 2018 livestock sale weights?

_____Steer calves
_____Heifer calves
_____Yearling steers
_____Yearling heifers
_____Cull cows Lambs
_____Cull Ewes
_____Cull bucks
_____ Wool per ewe

C. How many livestock died or disappeared on this allotment in 2018?

Cows_____
Yearling Steers_____Yearling Heifers_____
Steer Calves_____Heifer Calves_____
Bulls_____
Rams_____Ewes_____
Lambs_____

VIII. LABOR

This section of the questionnaire asks about the labor requirements (number of people and the hours required) to move livestock to the lease, to herd and distribute livestock on the lease, to gather and move livestock from the lease, to maintain the physical requirements of the (fences. water tanks. dams. etc.) and the labor requirements for animal health an
maintain (herd checking, doctoring, salting, feeding, watering, etc.) throughout 2018.

A. Hired Labor information

	Pay Unit* (code)	Wage rate per unit time	Approx. monthly cost for social security, unemployment, insurance room and board and benefits.
Hired Manager			
labor			
Day labor			

•paid by: hour= I day=2 week= 3 month =4 unpaid = 5 exchange=6

B. Labor numbers and hours worked for 2018 year

	Livestock to lease (A)		Herding, distribution, grazing mgt. (B)		Maintain lease (C)		Animal health and inspection (D)		Gathering & moving livestock (E)	
	no.	hrs.	no.	hrs.	no.	hrs.	no.	hrs.	no.	hrs.
Yourself/manager										
Family members										
Regular hired labor										
Day Labor										
Exchange Labor										

IX. TRANSPORTATION

This section of the questionnaire asks about the vehicle requirements to move livestock to lease, vehicle requirements to herd and distribute livestock on lease, gather and move livestock from lease, maintain the physical requirement of the lease (fences. water tanks. dams. etc.) and the vehicles requirements for animal health and maintenance (herd checking, doctoring, salting, feeding, watering, etc.) throughout 2018.

(Please: use hours on farm and industrial equipment instead of miles)

This section of the questionnaire will ask about the transportation of livestock to and from the lease.

A. What is the distance from your ranch headquarters to this lease?

_____ miles

B.If livestock were not taken directly from the ranch headquarters, give the distance from the last lease, lease or owned pasture used.

_____miles

C. How were the livestock moved on to this allotment?

_____ Hired trucks$_____Total Cost

_____ Owned trucks

_____ Trailed

_____ Other (specify _____)

D. What was the distance to remove livestock from this lease or owned pasture?

_____ miles

E. How were the livestock moved off of this allotment?

_____ Hired trucks$_____Total Cost

_____ Owned trucks

_____ Trailed

_____ Other (specify _____)

If hired trucks were used, what was the total cost in transporting livestock from the allotment? $

Please fill out the following table with as much detail as possible:

	Livestock to allotment		Herding and Distribution in lease		Gathering and moving livestock in lease		Lease Maintenance		Animal Health and Maintenance	
Vehicle type used*	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)	No. Used	Miles (hrs.)

*Some vehicles that might be used: Pickup, Pickup-stock trailer, Stock truck, Semi-tractor trailer, All-terrain vehicle (ATV), Water-tank truck, Tractors, Implements.

Of the total costs for equipment (to maintain this lease) what percentage was done by:

_____%Rented/Contracted

_____%Owned equipment

X.Horse Use

This section of the questionnaire will ask you about the horse requirements to operate and maintain this lease throughout 2018.

A. Horse requirements to operate and maintain this lease

Horse Requirements		
	Average number of horses used	Average days horses used
Livestock to lease		
Livestock distribution/herding/grazing management		
Livestock gathering		
Livestock off		
Maintenance of lase		
Animal health and maintenance		

B. What percent• of the total horse requirements were used by the following:

_____% Owned horses _____ % Rented Horses

_____% Horses provided by hired range riders

_____% Horses provided by friend or neighbor

_____% other (specify_____)

*Sum should equal 100%

X. Technology

This section will ask questions in the use of technology to maintain allotments throughout 2018.

A. Is there use of any subscriptions to local weather, roads or other apps?

App: _____

Cost: _____

App: _____

Cost: _____

App: _____

Cost: _____

B. Was any mobile technology purchased to use on this allotment? (Ex: laptop, ipad, GPS)

Device:_____

Cost:_____

Device:_____

Cost:_____

Device:_____

Cost:_____

END (Thank you)

APPENDIX D

University of Wyoming Consent Form

Evaluating Non-fee Grazing Permit Costs in the Context of Social and Economic Characteristics of Public Land Ranchers

University of Wyoming

Project Researchers: John Tanaka, Kristie Maczko

Graduate Research Assistant: Kasey Dollerschell

I.General purpose of the study:

In order for a rancher to graze their livestock on public land they are required to pay a grazing fee. The federal grazing fee has long been a controversial subject. Research on this topic started in the 1960's and continued into the 1990's where they found the difference between private and public leased livestock grazing. The study from the 1990's discovered that public lease grazing costs $0.89/AUM less than private lease grazing for cattle and $5.41/AUM more for sheep. This project will aim to update that research by comparing the non-fee costs of livestock grazing on privately and publically leased land. A non-fee cost is any cost associated with grazing not involving the permit price itself such as labor or routine maintenance. The total non-fee costs of both permit types will be added up and compared to each other and to past research.

II.Procedure:

Information gained from ranchers will be obtained through in-person interviews in Wyoming, Idaho, and California. The questions for this project replicate those used in the 1990's study. Kasey Dollerschell (University of Wyoming graduate student) will contact individual ranchers to set up interview times and lead the interviews.

The interviews will take a half day at most on the day of the interview. The participants will be asked to obtain financial information from the 2018 year. During the interview, those costs will be allocated to grazing on public lands, privately leased lands, and state lands as appropriate.

III.Disclosure of risks

This study requires specific financial and personal information to be obtained from each rancher. Financial information will be used for statistical analysis but will be done in a way that protects the identity of the participants. Results will only be reported in aggregate and lists that identify specific ranchers and their responses will be destroyed at the conclusion of the interviews. We believe there is no personal risk to individual ranchers.

IV.Description of benefits:

There is no personal benefit to participating in this project. Participation will provide some information that assists the future federal grazing fee determinations and that can be used by the livestock industry and others in discussing the federal grazing fee.

V.Confidentiality:

Personal information tied to this project will be kept confidential and will not be shared beyond the research team. The information for this project will be compiled for statistical analysis and no release of specific allotments, ranchers, or locations will be given. Each ranch will be assigned a code that will be used for the statistical analysis done during the project. Only compiled information will be shared and published. A list of ranchers interviewed will be kept indefinitely by the project researcher, co-investigator, and researcher advisory for future use. Codes will be removed from that list so that there will be no way to relate interviewees to specific responses.

VI.Freedom of consent:

Participation in this study is voluntary, refusal to participate will involve no penalty or disclosure of information. It will not affect the participants association with any of the programs involved in the study or their ability to obtain a grazing lease. Participation can be discontinued at any time during the course of the project.

If a participant chooses to withdraw from the study contact must be made with the project researcher, co-investigator, or research advisor.

VII.Questions about the research:

If there are any questions pertaining to the project, risks, benefits, or confidentiality of this project. Please contact:

- Kasey Dollerschell
  Graduate Research Assistant, Ecosystem Science and Management
  University of Wyoming, Dept. 3354.
  1000 E. University Ave
  Laramie, WY 82071
  Phone number: kdoller1@uwyo.edu

Note: If you have questions about your rights as a research subject, please contact the University of Wyoming Institutional Review Board Administrator at 307-766-5320.

VIII.Consent to participate:

_____

Printed name of participant

_____ _____

Participant signature Date

Department of Ecosystem Science and Management
University of Wyoming
1000 E. Ave
Laramie 82071

To whom it may concern,

This letter is being written on behalf of researchers at the University of Wyoming, Wyoming Stock Growers Association, Idaho Cattle Association, and the Public Lands Council. This is in regards to research being conducted on non-fee grazing costs of public land grazing. The goal of this project is find the total cost of livestock grazing on federally leased land and compare it to that of privately leased land.

Research on this study started back in the 1960's and extended into the 1990's, and it has now been over 20 years since any research like this has been conducted in the West. The current project will serve to update the information obtained from the 1990's study and in turn compare changes that have occurred over the years. It will provide an update on differences in total cost of grazing livestock on private and public land through the purchase of a permit, or note if no real change has occurred. The information gained from this research could potentially be used to develop a trend in total cost fees that can be used for future research and policy.

During the 1990's study the three states that were studied were Wyoming, Idaho, and New Mexico. The current study will utilize two of the past three states: Wyoming and Idaho. This will aid in a more consistent comparison between the two studies. A new state, California, has been selected and study there will commence after Wyoming and Idaho.

You have been randomly selected from a list of all USFS and BLM permittees in your state to participate in an in-person interview. Your participation in this project would be greatly appreciated and beneficial to the research on this topic. However, there will be no penalties for not participating in this study.

If you choose to participate, a researcher from the University will visit you to conduct an interview for approximately 2-3 hours; there will be no need for travel on your part. We understand your schedules are very busy and are happy to accommodate the best time to conduct an interview.

Attached please find a consent form that must be filled out and signed before the interview begins. The consent form outlines the general process of this research and gives the contact information for the researchers if you have any questions. The survey itself is also attached and provides information on what questions we will be asking so you can be prepared.

If you are interested in participating reach out to Kasey Dollerschell, the graduate student on this project (contact information is listed below). Since we do not have contact information for all potential participants we ask that you please contact us. We really appreciate your consideration and look forward to talking to you soon!

Thank you for your time and consideration,

Kasey Dollerschell

Graduate Student, University of Wyoming

Phone: (970) 589-9339

Email: kdoller1@uwyo.edu

Dear Idaho Livestock Industry Member,

This letter is being written to you on behalf of the Public Lands Council (PLC) and the Idaho Cattle Association (ICA) regarding a study taking place on the non-fee costs of public land livestock grazing. The grazing fee for federal and state land grazing has, for a long time, been misrepresented by extreme environmental organizations and politicians with radical agendas. Over the years, this misrepresentation has been used to confuse lawmakers with little or no knowledge of the value which grazing provides in the rural West.

Often, the grazing fee is compared to the price of private land leases. However, the federal or state lands grazing fee itself does not account for all the costs associated with running on public land. There are numerous non-fee costs, such as labor, regulatory compliance, and routine maintenance, which are most often is significantly higher on public land. Research on this topic started in the 1960s when the federal grazing fee was set at the difference between the total cost of private land leases and the non-fee costs of grazing on public land resulting in a fee of $1.23 per AUM. The current grazing fee formula was established in the Public Rangeland Improvement Act of 1978 and continued by Executive Order 12548 in 1986. A study conducted in the 1990s ventured further in this research by again comparing the total cost of leased public and private livestock grazing. The study discovered that grazing on leased public land was $0.89/AUM less than leased private land for cattle and $5.41/AUM more for sheep.

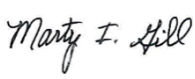
No research on this topic has been conducted since the 1990s study, and since that time a number of new federal regulations and technologies have immensely changed the type of non-fee costs realized by federal land ranchers. A new project has been formed by researchers at the University of Wyoming, in cooperation with the Public Lands Council, to once again compare the total cost of livestock grazing on federal and private land and to take into account these new regulations and costs. Information gained from this study will provide current information about the federal and state grazing fee issue by accounting for the non-fee costs.

Both PLC and ICA strive to represent, support, and defend the livestock producers of the western United States in legislative and administrative decisions. This research will aid greatly in the mission of our groups by producing data that that can be used to defend the livestock industry. This is particularly important and timely in Idaho, where the Idaho Department of Lands has been considering a significant raise to the state lands grazing rate closer to the private lands grazing lease rate. It is only because of our efforts that the increase has been delayed in order to allow time for the results of this study to be published. Establishing a science-based analysis of the non-fee costs of grazing on state land will arm us with the necessary tools to prevent your grazing fee from being raised to a disproportionately high rate. It will also aid in the education of the general public on the role of federal and state grazing permits and clear up some of the confusion around the grazing fee.

You are receiving this letter because you are being asked to participate in this study. Information gained from the study will greatly aid our efforts in both Boise and Washington, DC. It is important for studies like this one to be conducted so current numbers and data can be compared.

Thank you for taking the time to read this letter. This letter was written as an introduction to the project and to Kasey Dollerschell, a graduate student at the University of Wyoming, who will follow-up with you to see about interviewing you for this study. We urge you to participate. If you have questions for the PLC or ICA please do not hesitate to contact us.

Thank you for your time,



Marty Gill, President

Idaho Cattle Association

Bob Skinner, President

Public Lands Council

Dear Wyoming Livestock Industry Member,

This letter is being written to you on behalf of the Public Lands Council and the Wyoming Stock Growers Association in regards to a study taking place on the non-fee costs of public land livestock grazing. The grazing fee for federal land grazing has for a long time been misrepresented by extreme environmental organizations and politicians with radical agendas. Over the years, this misrepresentation has been used to confuse lawmakers with little or no knowledge of the value which grazing provides in the rural West. Many organizations focus on the fee itself and compare it to the price of private land leases. The problem with this is that it overlooks the impact of non-fee costs, such as labor, regulatory compliance, and routine maintenance, which most often is significantly higher on federal land. Research on this topic started in the 1960's when the grazing fee was set at the difference between the total cost of private land leases and the non-fee costs of grazing on public land resulting in a fee of $1.23 per AUM. The current grazing fee formula was established in the Public Rangeland Improvement Act of 1978 and continued by Executive Order 12548 in 1986. A study conducted in the 1990's ventured further in this research by again comparing the total cost of leased public and private livestock grazing. The study discovered that grazing on leased public land was $0.89/AUM less than leased private land for cattle and $5.41/AUM more for sheep.

No research on this topic has been conducted since the 1990's study, and since that time a number of new federal regulations (Range Reform '94, WOTUS, etc.) and technologies have immensely changed the type of non-fee costs realized by federal land ranchers. A new project has been formed by researchers at the University of Wyoming, in cooperation with the Public Lands Council and the Wyoming Stock Growers Association, to once again compare the total cost of livestock grazing on federal and private land and to take into account these new regulations and costs. Information gained from this study will provide current information about the federal grazing fee issue by accounting for the non-fee costs.

Both the Public Lands Council (PLC) and the Wyoming Stock Growers Association (WSGA) strive to represent, support, and defend the livestock producers of the western United States in legislative and administrative decisions. This research will aid greatly in the mission of our groups by producing data that that can be used to defend the livestock industry. It will also aid in the education of the general public on the role of federal grazing permits and clear up some of the confusion around the grazing fee.

You are receiving this letter because you are being asked to participate in this study. Information gained from the study will greatly aid our efforts in both Cheyenne and Washington, DC. It is important for studies like this one to be conducted so current numbers and data can be compared.

Thank you for taking the time to read this letter. This letter was written as an introduction to the project and to Kasey Dollerschell, a graduate student at the University of Wyoming, who will follow-up with you to see about interviewing you for this study. We urge you to participate. If you have questions for the PLC or WSGA please do not hesitate to contact us.

Thank you for your time,

Ethan Lane **Jim Magagna**
Public Lands Council **Wyoming Stock Growers Association**
elane@beef.org **jim@wysga.org**

Dear California Livestock Industry Member,

The California Cattlemen's Association (CCA), California Public Lands Council (CalPLC), and the Public Lands Council (PLC) request your participation in a study by the University of Wyoming examining the non-fee costs of grazing livestock on federal lands within California. The grazing fee that public lands ranchers pay to graze on federal lands is often intentionally misrepresented by radical environmental organizations and politicians with anti-grazing agendas to brand our federal lands' stewards as "welfare ranchers." Over the years, this intentional misrepresentation has been used to mislead lawmakers and the public regarding the valuable role grazing plays on our public lands throughout the West—and especially in California.

Opponents of public lands grazing often misleadingly compare the grazing fee to the price of private land leases, failing to factor in the significant costs associated with ranching on public lands, such as labor, regulatory compliance, and routine maintenance. Research seeking to quantify these non-grazing-fee costs of ranching on public lands most recently occurred in the 1990s, and discovered that permitted grazing on public land was $0.89/AUM less expensive than leased private land for cattle and $5.41/AUM more expensive for sheep. No research on this topic has been conducted since the 1990s.

Over the past thirty years, several new federal regulations and technologies have altered the non-fee costs incurred by federal lands ranchers. Researchers at the University of Wyoming, in cooperation with PLC, are now undertaking new research to compare the cost of livestock grazing on federal and private land and to account for these new regulations and costs.

Research regarding the non-fee costs associated with federal lands grazing will greatly aid PLC, CalPLC, and CCA in promoting and defending federal lands grazing in California. Radical environmental groups and politicians misrepresent the economics of federal lands grazing in court filings and in front of legislators and regulators in Sacramento and Washington, DC; the data developed by this study will allow PLC, CalPLC, and CCA to correct the record and better safeguard your livelihood.

In the coming weeks, you can expect a follow-up from Kasey Dollerschell, a graduate student at the University of Wyoming, who will work with you to set up an interview for this study. We urge you to participate. If you have any questions regarding the study, don't hesitate to contact Kirk Wilbur in the CCA office at (916) 444-0845.

Thank you for your time,

Mark Lacey, President
California Cattlemen's Association

Dave Daley, Chair
California Public Lands Council

Bob Skinner, President
Public Lands Council

APPENDIX E

Livestock Prices 2018

State	Steer Calves	Heifer Calves	Yearling Steers	Yearling Heifers	Cull Cows	Cull Bulls	Lambs	Cull Ewes	Cull Bucks	Wool per Ewe	Wool per Yearling
Wyoming											
MLRA 34a	207.94	204.78	173.07	173.07	82.07	101.87	250.90	131.98	131.98	2.50	2.50
MLRA 58b	207.94	186.34	146.12	146.12	82.07	101.87	250.90	131.98	131.98	2.50	2.50
MLRA 32	207.94	204.78	139.12	139.12	82.07	101.87	250.90	131.98	131.98	2.50	2.50
Idaho											
Average	186.37	174.39	160.82	160.82	78.36	91.45	250.90	131.98	131.98	2.02	2.02
MLRA 25	192.17	181.94	161.85	161.85	77.98	91.73	250.90	131.98	131.98	2.02	2.02
MLRA 12	180.56	166.83	159.78	159.78	78.74	91.16	250.90	131.98	131.98	2.02	2.02
California											
San Joaquin Valley	132.92	134.58	-	-	62.73	72.50	250.90	131.98	131.98	2.00	2.00
North Sacromento Valley	132.92	123.90	-	-	62.73	72.50	250.90	131.98	131.98	2.00	2.00
Sacromento Valley	132.92	129.24	-	-	62.73	72.50	250.90	131.98	131.98	2.00	2.00
Central Coast	134.31	126.41	-	-	69.36	80.16	250.90	131.98	131.98	2.00	2.00

[1]Wyoming and Idaho cattle pricesgathered from MRLA information from University of Wyoming Research Team (Dyer et al., 2018).

[2] Idaho Average category is an average between MLRA 25 and MLRA 12 for catle only since no MLRA was available.

[3] Beef prices for San Joaquin Valley gathered from a project by UC Davies and indexed to match 2018 dollars (Finzel et al., 2017).

[4] Beef prices for Central Coast fathered from study conducted by UC Davies for the year 2018 (Rao et al., 2018).

[5] Beeff Prices for Northern Sacramento Valley fathered from a study conducted by UC Davies and indexed to match 2018 dollars (Forero et al., 2017).

[6] Sheep prices for all three states gathered from USDA Economics, Statistics, and Market Information (ESMIS, 2018).

Lamb prices for all three states gathered from Agriculture Marketing Service (AMS) and indexed to match the year 2018 (AMS, 2017)

8 All indices gathered from USDA-NASS (Ag. Prices, January, 2019).