

State of Wyoming Sheep Industry



Lane Gardiner • Benjamin Rashford • John Hewlett • Brenda Alexander

The State of Wyoming Sheep Industry

By Lane Gardiner • Benjamin Rashford
John Hewlett • Brenda Alexander

College of Agriculture and Natural Resources

Department of Agricultural and Applied Economics &
Department of Animal Science

Supported by: USDA-NRI 2007-55618-18176



Senior Editor: Steven L. Miller, College of Agriculture and Natural Resources, Office of Communications and Technology

Graphic Designer: Amanda Lynn Stith, Intern, College of Agriculture and Natural Resources, Office of Communications and Technology

Issued in furtherance of extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Glen Whipple, director, University of Wyoming Extension, University of Wyoming, Laramie, Wyoming 82071.

Persons seeking admission, employment, or access to programs of the University of Wyoming shall be considered without regard to race, color, religion, sex, national origin, disability, age, political belief, veteran status, sexual orientation, and marital or familial status. Persons with disabilities who require alternative means for communication or program information (Braille, large print, audiotape, etc.) should contact their local UW Extension office. To file a complaint, write to the UW Employment Practices/Affirmative Action Office, University of Wyoming, Department 3434, 1000 E. University Avenue, Laramie, WY 82071.

Be aware that due to the dynamic nature of the World Wide Web, Internet sources may be difficult to find. Addresses change and pages can disappear over time. If you find problems with any of the listed Web sites in this publication, please contact Brenda Alexander, University of Wyoming, (307) 766-6278, balex@uwyo.edu.

Table of Contents

Wyoming sheep producers	3
Where sheep operations are located	6
Farming and ranch practices on sheep operations	8
Production tasks and management techniques	10
Expenses sheep producers incur	12
How producers acquire and market their sheep	13
Producer opinions on ram management	14
Which predators pose the largest threat	16
What predator control practices are effective	17
Summary	18
Literature cited	19

State of Wyoming Sheep Industry

The number of sheep in Wyoming has declined steadily since the early 1940's and recent data suggest this trend may continue. Although there are only 10% as many sheep in Wyoming as there were in 1940, the Wyoming sheep industry is alive and well. Predation as well as changing tastes and preferences caused a marked decrease in sheep numbers historically, but the sheep industry in Wyoming is strong and many ranchers still make a large part of their entire household income from sheep production.

Flock sizes, types of land utilized, management practices, and producer demographics are very diverse across the state. There are some producers who own over 1,000 head of ewes and many who own less than 30 ewes and raise sheep for reasons other than income. Ranchers that graze their sheep on public land have different management objectives than small flocks on private property. Despite vast differences in ranch sizes, a producer's production practices, marketing strategies and predator management are important to each flock.

This publication highlights:

- Who Wyoming sheep producers are and where they operate
- What other farming and ranch practices occur on their land
- What production tasks they complete
- What expenses they incur
- How they acquire and sell their animals
- Their opinions on ram management
- How they attempt to control predators

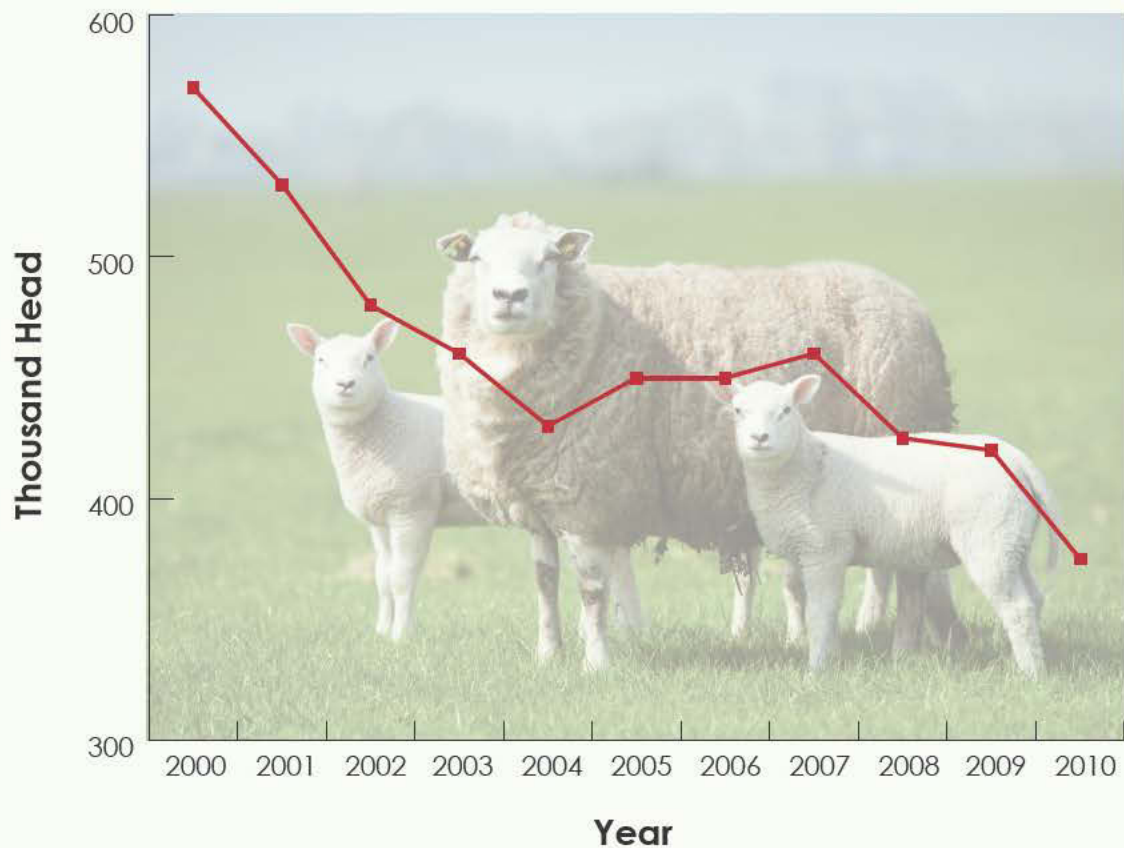
Wyoming Sheep Fast Facts

In 2008, 390 producers reported (from 719 total):

- an average sale weight for fat lambs of 133 lbs;
- having an average of 31 years of experience;
- using over 2.1 million acres of public land;
- using, on average, one ram to breed 27 ewes;
- that hay is typically the largest expenditure to sheep production;
- losing 11,286 sheep to predators;
- average 6,250 acres of private land.



All Sheep and Lambs in Wyoming



Who are Wyoming sheep producers?

The College of Agriculture administered a survey to Wyoming sheep producers in 2008. The survey included five strata of sheep producers: small operations (less than 30 ewes), small to medium (30-49 ewes), medium (50-99 ewes), medium to large (100-299 ewes), and large operations (more than 300 ewes). The survey's respondents represent over 40 percent of all Wyoming sheep producers.

Sixty-five percent of the respondents to the survey were male. For small flocks of sheep, the numbers of male and female primary operators is evenly split, whereas large operations have a higher percentage of male operators.

Table 1. Gender of primary operator						
		Number of bred ewes				
	All Ranches	<30	30-49	50-99	100-299	>299
Male	65%	50%	63%	69%	73%	93%
Female	35%	50%	37%	31%	27%	7%

A surprising number of sheep producers in Wyoming are over the age of 65. A quarter or more of producers in nearly every size class are above retirement age. The significant majority of sheep producers (84%) are over 45. If sheep production is to remain vital, younger producers are needed.

Table 2. Age of primary operator						
		Number of bred ewes				
	All Ranches	<30	30-49	50-99	100-299	>299
25-34	6%	6%	10%	4%	0%	3%
35-44	11%	8%	7%	16%	17%	10%
45-54	31%	35%	19%	27%	33%	30%
55-64	28%	25%	39%	26%	29%	32%
65+	25%	26%	25%	27%	22%	25%

Sheep producers from every size class of operation have diverse levels of education. Almost one-third of all producers reported “High School” as their highest level of education. The largest ranches (more than 299 ewes) have the highest percentage of primary operators with a bachelor’s degree or higher.

Table 3. Primary operator’s highest level of education						
		Number of bred ewes				
	All Ranches	<30	30-49	50-99	100-299	>299
High school	32%	33%	32%	30%	33%	33%
Some college	27%	27%	32%	36%	25%	25%
Vocational / tech degree	7%	6%	12%	9%	4%	3%
Bachelor’s degree	21%	21%	17%	14%	25%	35%
Some graduate education	4%	2%	5%	5%	4%	2%
Graduate degree	9%	10%	2%	5%	9%	3%

The vast majority of sheep producers have over 20 years of experience in the industry – on average, Wyoming producers have 31 years of experience. Producers with large flocks generally have more experience than producers with small flocks.

Table 4. Primary operator’s average years of experience					
	Number of bred ewes				
All Ranches	<30	30-49	50-99	100-299	>299
31	25	32	34	38	41

The sheep industry is not immune to the trend of disappearing small family farms. It appears that ranches with fewer than 100 breeding ewes do not make the majority of their income from ranching or farming. However, the largest ranches still make enough income to support the primary operator and his or her family.

Table 5. Average percentage of household income from ranching or farming					
	Number of bred ewes				
All Ranches	<30	30-49	50-99	100-299	>299
45%	28%	27%	44%	61%	83%

Where are sheep operations located?

Land used by Wyoming sheep producers varies by ownership, topography, and forage base. Suitable land for sheep production in Wyoming ranges from 3,200 to more than 10,000 feet in elevation. The average elevation of sheep operations represented by the survey is 5,384 feet.

The ownership and type of land that sheep are placed on is very important to the ranch. Public and private land leases are a large expense to producers. Private and public land varies in carrying capacity, but, on average, private land supports more sheep per acre. Wyoming sheep operations use an average of 6,520 acres of private land – primarily pastureland and rangeland.

The use of federal and state owned lands is critical to many sheep producers. Of the 390 respondents, 108 leased Forest Service, Bureau of Land Management, or state owned land. Many producers with more than 100 ewes use all three public land types. These 108 sheep producers use 619,557 acres of U.S. Forest Service land, 1,275,853 acres of BLM land, and 231,004 acres of State owned land. Although BLM leases have nearly twice the acreage as Forest Service leases, Forest Service leases are more common.

All size classes of ranches use both public and private land. Small sheep producers (less than 100 ewes) often have mixed sheep and cattle operations, which may explain why they use public land.

Table 6. Percent private and public land						
		Number of bred ewes				
	All Ranches	<30	30-49	50-99	100-299	>299
Percent private land	47%	55%	35%	95%	52%	43%
Percent public land	53%	45%	65%	5%	48%	57%

Producers who generate income from livestock grazing enterprises require a large amount of land. Land owned or leased by a sheep producer may also be used for other livestock or farming enterprises. In most cases, sheep producers with more than 299 bred ewes use significantly more land than other size classes. In these cases much of the grazing land is marginal range land and unsuitable for alternative usages.

Large deviations in the average number of acres used across size classes are due to a large range of responses. For example, producers that graze their animals on Forest Service land report leasing from 100 to 400,000 acres.



Table 7. Average number of acres owned and leased					
	Number of bred ewes				
	<30	30-49	50-99	100-299	>299
Private pastureland, rangeland	2,800	1,580	2,302	2,138	19,691
Harvested cropland for grain	88	297	174	152	147
Harvested cropland for silage	47	40	125	138	77
Irrigated and sub-irrigated hay	117	140	105	179	459
Dry land hay	199	205	329	191	829
Other	40	2	94	116	3,462
U.S. Forest Service	640	40,000	-	103	32,632
BLM	19,305	2,661	589	6,501	23,896
State lands	3,731	1,738	445	1,522	3,634

What other farming and ranch practices occur on sheep operations?

Many ranches in the state generate income from more than one livestock or farming enterprise. Ranches that make a family-supporting household income may have sheep, cattle, and hay sale enterprises. Survey respondents, however, make at least 35 percent of their gross annual sales from sheep and wool production.

Wyoming sheep operations represented in the survey generate 62 percent of all gross annual sales from lamb production and cow-calf enterprises. Cow-calf and lamb production enterprises share many of the same inputs for production and management practices. The large majority of sales for all ranches are from lamb production. Beef cattle enterprises account for 33 percent of the remaining sales. All other enterprises account for less than 16 percent of sales.

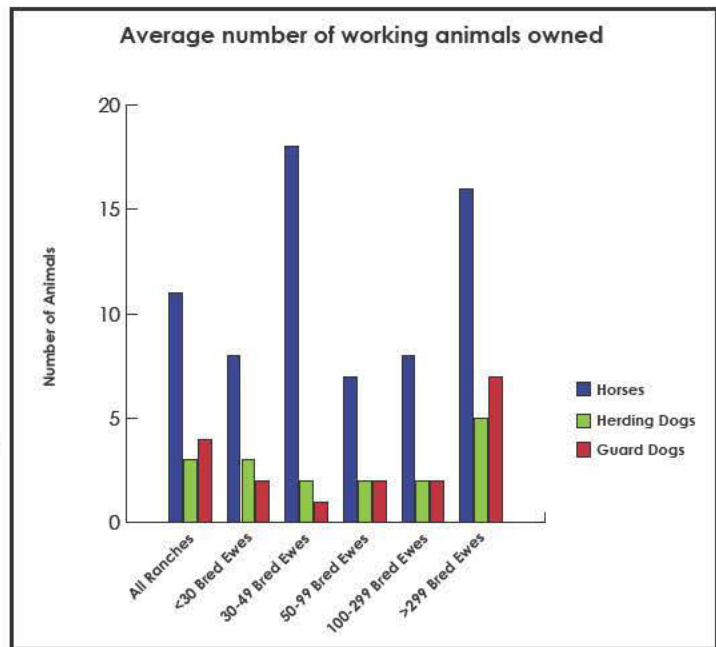
Table 8. Average percentage of gross annual sales from each ranch enterprise or practice

	Number of bred ewes					
	All Ranches	<30	30-49	50-99	100-299	>299
Lamb production	35%	39%	36%	37%	38%	39%
Replacement rams/ewes	4%	3%	3%	9%	3%	3%
Feedlot sheep	2%	<0.5%	1%	<0.5%	2%	2%
Club-lambs	5%	8%	9%	3%	2%	<0.5%
Wool	5%	4%	6%	4%	3%	6%
Cow-calf	27%	19%	22%	29%	36%	37%
Cow-yearling	4%	3%	5%	<0.5%	4%	6%
Replacement heifers	1%	<0.5%	<0.5%	1%	<0.5%	1%
Club-calf	<0.5%	1%	<0.5%	1%	<0.5%	<0.5%
Non-beef/Non-sheep livestock*	3%	3%	5%	4%	1%	<0.5%
Hay sales	5%	8%	2%	4%	5%	3%
Pasture lease	2%	2%	3%	1%	3%	<0.5%
Other	7%	9%	7%	6%	2%	8%

* Includes horses, goats, dairy cattle and bison.

Lamb production for wool and meat is the most common sheep enterprise in the state. However, many small-sized operations raise club-lambs, dairy sheep, and specialty breeds of sheep for wool.

Larger sheep ranches tend to have more cattle. While some large sheep ranches with greater than 1,000 breeding ewes only generate sales from sheep, the majority of ranches with greater than 100 bred ewes also have cattle. Most operations also use other working animals to support sheep production. Horses, herding dogs, and guard dogs are a fundamental part of many sheep operations. Sixty-five percent of sheep producers own at least one horse and 46 percent own at least one herding dog.



What production tasks and management techniques do sheep producers complete?

General flock management practices vary by size, location, and producer traditions. Sheep production requires intensive care of the animals' health and their environment.

It is clear that nearly all producers practice shearing and castration as part of their annual management strategy. Shearing is probably the most common management task because it adds revenue to a sheep operation from the sale of wool. The numbers of producers castrating and shearing is consistent across all size classes

Approximately three-quarters of all producers deworm and vaccinate their sheep. Ram breeding soundness exams and multiple sire matings to improve conception, however, are much more common on larger ranches than on ranches with less than 50 breeding ewes.



Producers were also asked if they would consider these management tasks if they are not currently performing them. More than half of all producers report they have not considered or will not consider pregnancy checking, synchronizing estrus, practicing out of season breeding, or artificially inseminating their sheep.

Table 9. Management tasks practiced by sheep producers						
	All Ranches	Number of bred ewes				
		<30	30-49	50-99	100-299	>299
Vaccinate	78%	69%	81%	82%	83%	85%
De-worm	74%	71%	83%	89%	72%	64%
Insect control	59%	52%	68%	55%	56%	80%
Shearing	95%	95%	95%	98%	100%	98%
Castrate	93%	94%	93%	96%	100%	98%
Animal ID system	65%	61%	68%	77%	70%	61%
Body condition scoring	21%	15%	17%	25%	15%	41%
Pregnancy check	11%	7%	12%	9%	6%	23%
Veterinarian consultation	45%	45%	49%	50%	37%	54%
Synchronization of estrus	7%	7%	7%	5%	9%	7%
Out of season breeding	6%	5%	7%	7%	11%	5%
Artificial insemination	2%	1%	0%	2%	2%	3%
Scrapie genotyping of rams	31%	25%	32%	38%	35%	38%
Scrapie genotyping of ewes	22%	22%	27%	25%	22%	18%
Ram breeding soundness exams	32%	25%	29%	43%	26%	56%
Multiple sire matings	36%	20%	29%	48%	48%	59%

What expenses do sheep producers incur?

The profits of sheep producers rely extensively on the price and efficient use of inputs. The price of lambs, sheep, and wool cannot be controlled by sheep producers, so profit maximization is a problem of cost minimization – increasing the pounds of sheep and wool sold per dollar expended.

Feed sources account for 40 percent of all expenses, with an average of 20 percent of all ranch expenses being allocated to alfalfa hay. As expected, labor costs increase with the size of the ranch.

Table 10. Annual percentage of total ranch expenses						
		Number of bred ewes				
	All Ranches	<30	30-49	50-99	100-299	>299
Purchased livestock	10%	10%	9%	6%	11%	9%
Veterinarian / health supplies	6%	7%	7%	6%	6%	4%
Alfalfa hay	20%	24%	22%	26%	16%	11%
Other hay	6%	10%	9%	5%	3%	4%
Grain	10%	12%	13%	11%	6%	7%
Feed concentrates	4%	4%	5%	3%	4%	5%
Salt and mineral	4%	3%	5%	4%	4%	5%
Hired labor / contract labor	5%	3%	3%	4%	6%	13%
Diesel, gas, natural gas fuels	14%	12%	13%	16%	16%	17%
Professional services	3%	2%	3%	4%	2%	4%
Machinery repair services	5%	4%	3%	5%	9%	5%
Fertilizer, chemicals, seeds	4%	3%	4%	3%	7%	2%
Interest expense	3%	1%	2%	3%	4%	5%
Other	5%	5%	1%	3%	5%	8%

How do producers acquire and market their sheep?

Sale barns, video auctions, and private sales/treaties are the most common marketing methods for acquiring and selling sheep. The vast majority of sheep producers use one of these three methods, but some operators use more than one marketing strategy. Private sales are the most common method of marketing, accounting for 44 percent of all sales. Private sales increase in percentage with ranch size. Fifty-six percent of ranches with 300 or more breeding ewes use private sales to market their sheep.

Sale barns account for 38 percent of sheep sales. Except for the largest size class of ranches (more than 299 bred ewes), more than 40 percent of producers report using sale barns to buy or sell sheep.

An average of only 2 percent of all ranches report using video auctions as marketing methods; however, larger ranches use video auctions more than smaller ranches.

Sheep that are not sold by sale barns, video auctions, and private sales are marketed through market institutions such as 4-H auctions or cooperatives. Many sheep from smaller ranches are retained and used by the ranch itself for meat, wool, or breeding stock.

Most ranches sell weaned wether lambs, weaned ewe lambs, and feeder lambs in late August or September. Producers report selling fat lambs various times between June and October. Replacement ewes and flock rams are typically sold from late July to September. Month of sale is consistent across different operation sizes.



Typical market weights of sheep sold are shown in the following table. The data does not account for sheep breed or flock location. The large sample of the data allows for reasonable average sale weights of different types of sheep. Size of ranch does not seem to be a significant variable in the sale weight of most types of sheep. However, weights for fat lambs increase with the ranch size and the smallest class of ranches report lighter fattened ewes.

Table 11. Typical sale or maintenance weights for sheep (pounds)						
		Number of bred ewes				
	All Ranches	<30	30-49	50-99	100-299	>299
Weaned ram / wether lambs	101	100	97	114	102	93
Weaned ewe lambs	93	92	90	99	96	86
Feeder lambs	94	100	86	100	97	89
Fat lambs	134	124	131	132	138	144
Replacement ewes	139	128	128	164	131	138
Bred ewes	168	178	158	165	176	163
Fattened ewes	161	103	210	-	178	151
Flock rams	239	256	230	236	247	227

What are producer opinions on ram management?

The most influential driver of profits for a sheep operation is reproduction (Snowder et al., 2002). Sheep are very prolific animals, but rams provide most of the propensity for increases in lamb crops. The revenues of sheep producers therefore rely on the genetic characteristics and sexual performance of rams (Stellflug et al., 2006).

Sheep producers from all sizes of ranches agree that breeding performance (i.e. libido) is important to flock productivity. Producers also agree that rams with proven breeding competence are worth more than rams with unknown breeding competence. However, the statement “Performance tested rams are proven breeders when added to a flock” received only a moderate level of agreement. Since performance tests do not include any evaluation of sexual performance, this may suggest that a measure of breeding competence may be a viable addition to the evaluation of gain performance.

Producers state that the primary reason for culling rams from a flock is age. The second most common reason for culling rams is that they lack body condition. Lack of libido was listed as the last reason for culling rams from a flock.

Although producers seem to recognize the importance of libido, they do not believe it is a critical reason to cull rams. This may be due to the difficulty in identifying rams with high libido. Survey results indicate that producers with small numbers of rams cull more rams because of lack of libido than producers with large flocks. Identification of high performing rams may be easier in small flocks because of limited numbers of rams and the usual close proximity of the animals to the producer's headquarters.

Replacement rams are selected based on many different characteristics. Breed is the most important selection criterion for producers. Overall, libido was ranked last for the most



important ram selection criterion and nearly last for the second most important criterion. However, nearly half of the producers from the largest ranches (more than 299 ewes) ranked libido as the most important selection criterion. Overall, this survey indicates although producers are aware of differences in ram libido that would affect flock performance, they have not incorporated breeding performance as an important criteria for ram selection.

Other than libido, the rankings in Table 12 are consistent when producers are divided by ranch sizes. Producers from larger ranches also ranked “Breeding Soundness Exam Results” higher as an important selection criterion.

Table 12. Ranking percentage for the three most important criteria in selecting rams			
	Rank 1	Rank 2	Rank 3
Breed	63%	14%	22%
Scrapie genotype	31%	34%	34%
Muscling	25%	44%	31%
Structural soundness	30%	41%	29%
Wool characteristics	27%	38%	35%
Breeding soundness exam results	28%	31%	41%
Libido	18%	23%	59%
Feedlot test performance	22%	22%	56%
Pedigree / genetics	20%	29%	51%
Other	33%	11%	56%

Which predators pose the largest threat to sheep?

Predator control is a large expense for Wyoming sheep producers. Predators including bears, bobcats, coyotes, dogs, wolves, foxes, mountain lions, and predatory birds kill all types of marketable sheep. Many of the largest operations spend over \$10,000 annually to control predators. Still, lost revenues due to predation far exceed control expenditures.

Table 13. Estimated annual expenses on predator control (average dollars spent per year)					
	Number of bred ewes				
All Ranches	<30	30-49	50-99	100-299	>299
\$1,942	\$737	\$443	\$373	\$1,066	\$7,216

Ranchers believe coyotes, dogs, and wolves present the largest threat to sheep. Bears, bobcats, and ravens were listed as low threat species. Responses to level of threat by predator species are consistent across all sizes of ranch. Responses about threat levels are predictably dependent on ranch location (e.g., wolves are a much larger threat to herds in the Western half of the state than in the Eastern half).

In 2008, the total number of sheep lost to coyotes in Wyoming exceeded 14,400 head. This represents 70 percent of the total 20,500 head lost due to predation. The total sheep lost to predation was valued at \$1.4 million (USDA NASS, 2009). The 390 producers that responded to the survey reported losing 6,739 head of sheep to coyotes and 4,547 head to other predator species.



What predator control practices are effective?

Shooting predators is the most widely used predator control practice, and most producers believe it is a highly effective means of predator control. Ranches with more than 100 breeding ewes use trapping more than smaller ranches. Eighty-two percent of producers from the largest size class of ranches believe that trapping is highly effective. Larger ranches also report using other control techniques, including government trappers, air patrol and M-44 devices. The majority of operators with small flocks believe fencing and confinement practices are effective. Survey data reflects that the least effective predator control technique is repellents. Only 8 percent of producers have used or are currently using repellents. Sixty percent of producers state that they will not consider or will never use repellents. Repellents are considered effective by only 5 percent of the sample.

Table 14. Usage and effectiveness of predator control practices: all ranches			
	Currently Doing	Effective	Not Effective
Trapping	38%	45%	10%
Guard dogs	33%	44%	7%
Llamas / donkeys	28%	28%	15%
Shooting	73%	70%	2%
Repellents	3%	5%	15%
Fencing	52%	42%	15%
Confinement	57%	53%	7%
Other	14%	16%	<0.5%

Summary

Although faced with challenges, the Wyoming sheep industry remains strong. Current sheep prices are high and numbers of sheep are likely to increase. With continually changing consumer preferences, the industry will have to adapt to meet demand. However, land use in Wyoming is well suited for extensive range sheep operations, and it is likely that sheep will remain a vital part of Wyoming's agriculture economy for the foreseeable future.

Literature cited

Hewlett, J. (2008, February 11). Wyoming Sheep Producer Survey. Laramie, Wyoming, USA.

Snowder, G.D., J.N. Stellflug, and L.D. Van Vleck. 2002. "Heritability and repeatability of sexual performance scores of rams." *Journal of Animal Science* 80(6):1508-1511.

Stellflug, J.N., N.E. Cockett, and G.S. Lewis. 2006. "Relationship between sexual behavior classifications of rams and lambs sired in a competitive breeding environment." *Journal of Animal Science* 84:463-468

USDA NASS, Wyoming Field Office. 2009. "Wyoming Agricultural Statistics." http://www.nass.usda.gov/Statistics_by_State/Wyoming/Publications/Annual_Statistical_Bulletin/bulletin2009.pdf

USDA NASS, Wyoming Field Office. 2010. "Wyoming Agricultural Statistics." http://www.nass.usda.gov/Statistics_by_State/Wyoming/Publications/Annual_Statistical_Bulletin/bulletin2010.pdf

Issued in furtherance of State Agricultural Experiment Station work of the 1887 Hatch Act, as amended through public law 107-293, November 13, 2002, in cooperation with the U.S. Department of Agriculture, Bret Hess, Director, Wyoming Agricultural Experiment Station, University of Wyoming, Laramie, Wyoming 82071.

Persons seeking admission, employment, or access to programs of the University of Wyoming shall be considered without regard to race, color, religion, sex, national origin, disability, age, political belief, veteran status, sexual orientation, and marital or familial status. Persons with disabilities who require alternative means for communication or program information (Braille, large print, audiotape, etc.) should contact their local UW AES Office. To file a complaint, write the UW Employment Practices/Affirmative Action Office, University of Wyoming, Dept. 3434, 1000 E. University Avenue, Laramie, Wyoming 82071.

