



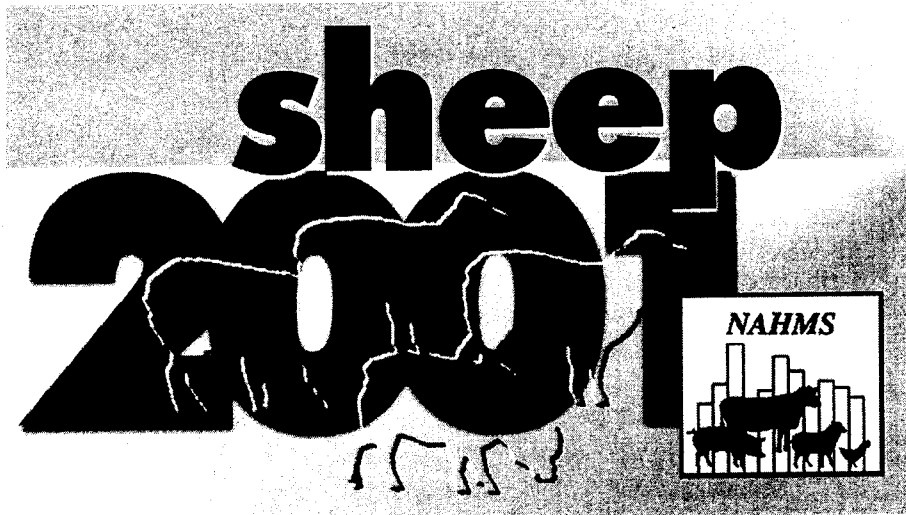
United States  
Department  
of Agriculture



Animal and  
Plant Health  
Inspection  
Service



Veterinary  
Services



# Part I: Reference of Sheep Management in the United States, 2001

National Animal Health Monitoring System

July 2002

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Thanks also to the National Agricultural Statistics Service (NASS) enumerators and State and Federal Veterinary Medical Officers (VMOs) and Animal Health Technicians (AHTs) who visited the operations and collected the data. Their hard work and dedication to the National Animal Health Monitoring System (NAHMS) is invaluable. The roles of the producer, Area Veterinarian in Charge (AVIC), NAHMS Coordinator, VMO, AHT, and NASS enumerator were critical in providing quality data for Sheep 2001 reports. Thanks also to the personnel at the Centers for Epidemiology and Animal Health (CEAH) for their efforts in generating and distributing valuable reports from Sheep 2001 data.

All participants are to be commended for their efforts, particularly the producers whose voluntary efforts made the Sheep 2001 study possible.



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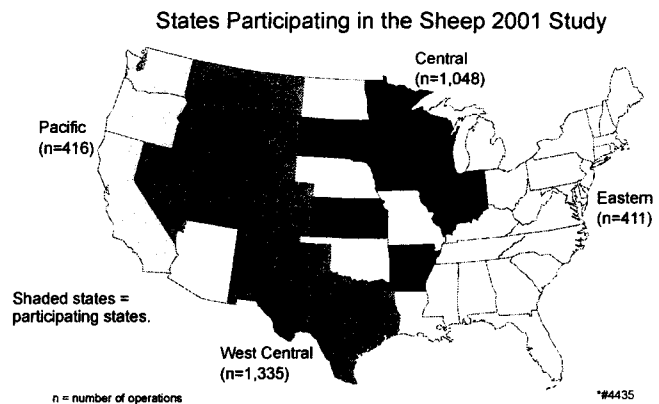
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## Introduction

As part of the National Animal Health Monitoring System (NAHMS), the USDA:APHIS:Veterinary Services (VS) conducted its first national study of the sheep industry with the 1996 NAHMS National Sheep Survey. This was a voluntary, mail-in survey developed through collaboration with the Research and Education Division of the American Sheep Industry Association (ASI), and focused on identifying health and productivity issues affecting America's sheep industry. The 1996 NAHMS study results provided an overview of sheep health, productivity, and management on 5,174 U.S. operations.

NAHMS' second national sheep study, NAHMS Sheep 2001, was designed to provide both participants and the industry with information on the U.S. sheep flock on operations with 1 or more sheep. Specific objectives of this study are described in Section II: Methodology. The USDA's National Agricultural Statistics Service (NASS) collaborated with VS to select a sample (of producers) statistically designed to provide inferences to the nation's sheep population in the 22 participating states (see map). These 22 states include the major sheep producing states, accounting for 87.4 percent of the January 1, 2001, U.S. sheep inventory and 72.3 percent of U.S. sheep producers.



Data for this report were collected from 3,210 operations in 22 participating states. NASS interviewers contacted producers and collected data for these reports via a questionnaire administered on-site from December 29, 2000, to January 26, 2001. Data for subsequent reports were collected on operations in the 22 participating states from February 5, 2001, to April 27, 2001, by State and Federal Veterinary Medical Officers (VMOs) and Animal Health Technicians (AHTs).

Informal comparisons between responses to similar questions in the 1996 and 2001 studies are made when available. However, these comparisons are made with caution, because the study populations and survey designs of the two studies are different. NAHMS results in this report are available at: [www.aphis.usda.gov/vs/ceah/cahm](http://www.aphis.usda.gov/vs/ceah/cahm). For questions about either report or additional copies, please contact the address shown below.

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**2150 Centre Avenue**  
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\* Identification numbers are assigned to each graph of this report for public reference.

## Terms Used in This Report

N/A: Not applicable.

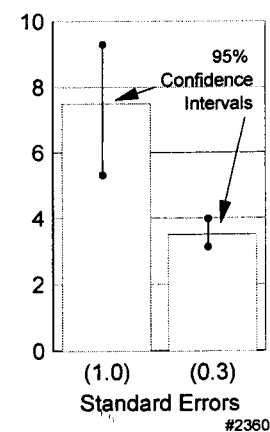
**Flock size:** Data throughout this report are often summarized by four size groupings or categories based on the total number of sheep and lambs reported for each operation on January 1, 2001. The four size groupings are: 1 to 24, 25 to 99, 100 to 999, and 1,000 or more.

**Flock Type:** Data throughout this report are often summarized by 3 or 4 flock types (self-classified by the producers). Flock types are: herded/open range; fenced range; farm flock; and feedlots.

**Operation average:** A single value for each operation is summed over all operations reporting divided by the number of operations reporting.

**Population estimates:** Estimates in this report are provided with a measure of precision called the *standard error*. A 95 percent confidence interval can be created with upper and lower bounds equal to the estimate plus or minus two standard errors, respectively. If the only error is sampling error, then confidence intervals created in this manner will contain the true population mean approximately 95 out of 100 times. In the example at right, an estimate of 7.5 with a standard error of 1.0 results in limits of 5.5 to 9.5 (two times the standard error above and below the estimate). The second estimate of 3.4 shows a standard error of 0.3 and results in limits of 2.8 and 4.0. Alternatively, the 90 percent confidence interval would be created by multiplying the standard error by 1.65 instead of two. Most estimates in this report are rounded to the nearest tenth. If rounded to 0, the standard error was reported. If there were no reports of the event, no standard error was reported.

Examples of a  
95% Confidence Interval



**Percentage:** Data in tables are reported by percentage of operations or by percentage of lambs or sheep. Using the NASS inventory data listed in Appendix II (page 78), the majority of tables in this report can be recalculated to determine the number of operations, or sheep and lambs, that are represented by the category in the table. For example, in table 1a (page 3), 48.2 percent of operations reported having crossbred sheep or lambs. The NASS inventory data in Appendix II indicates that there are 47,800 operations in the 22 participating states. Therefore, the number of operations that had crossbred sheep or lambs on January 1, 2001, was  $.482 \times 47,800$ , or 23,040 operations.

### Regions:

**Pacific:** California, Oregon, and Washington.

**West Central:** Colorado, Idaho, Montana, New Mexico, Nevada, Utah, Texas, and Wyoming.

**Central:** Arkansas, Iowa, Illinois, Indiana, Kansas, Minnesota, South Dakota, and Wisconsin.

**Eastern:** Ohio, Pennsylvania, and Virginia.

**Sample profile:** Information that describes characteristics of the sites where Sheep 2001 data were collected, such as operations responding by flock size. (See Appendix 1).

**Total inventory:** All sheep and lambs present on the operation January 1, 2001.



## Section I: Population Estimates

### A. Inventory

#### 1. Breed

While the greatest percentage (48.2 percent) of operations reported raising crossbred sheep (table 1a), the fine-wool, white-face breed category represented the largest percentage (34.3 percent) of sheep (table 1b). These results vary from the 1996 NAHMS sheep study, where the greatest percentage (32.3 percent) of operations reported raising black-face sheep, while the fine-wool, white-face breed category represented the largest percentage (41.8 percent) of sheep. Fine-wool, white-face breeds include the Rambouillet, Debouillet, Delaine Merino, Booroola Merino, and Cormo, all hardy breeds well suited to the range environments of the Western States where they are found commonly. In the West Central region, 46.2 percent of sheep and lambs were reported to be of the fine-wool, white-face breed category, while only 3.9 percent of sheep and lambs in the Eastern region were reported to be of this breed category (table 1b).

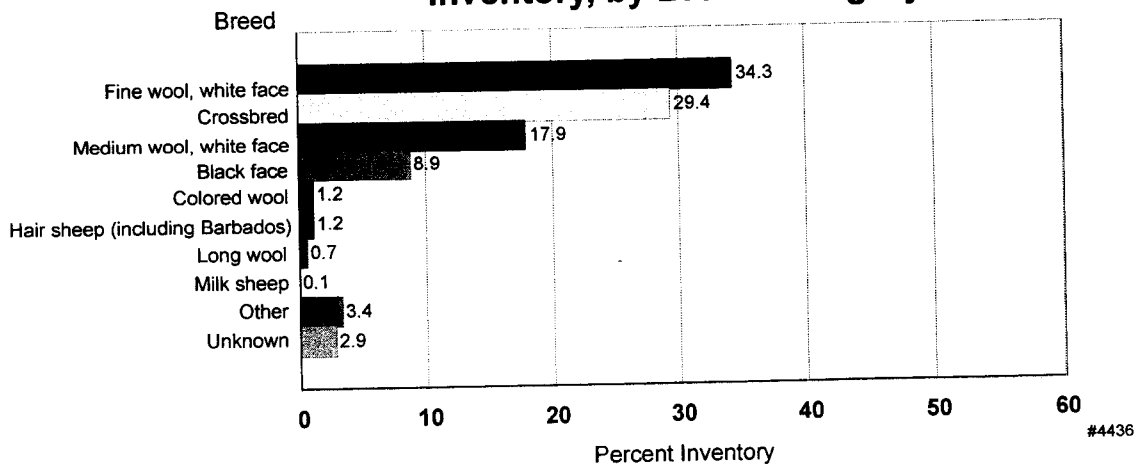
a. Percent of operations that had any sheep or lambs on January 1, 2001, in the following breed categories, by region:

Breed Category	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Crossbred	56.4	(4.5)	34.4	(2.9)	53.1	(2.5)	47.6	(3.7)	48.2	(1.6)
Colored wool	9.1	(2.5)	6.8	(1.6)	7.8	(1.4)	11.5	(2.5)	8.3	(0.9)
Fine wool white face	11.6	(2.5)	30.8	(2.6)	14.5	(1.7)	7.6	(2.1)	17.2	(1.1)
Medium wool white face	23.6	(3.7)	22.1	(2.4)	20.6	(1.9)	32.4	(3.6)	23.3	(1.3)
Long wool	5.6	(1.7)	3.3	(1.0)	3.0	(0.9)	4.4	(1.5)	3.8	(0.6)
Black face	47.6	(4.5)	36.1	(3.1)	35.0	(2.3)	42.7	(3.8)	38.8	(1.6)
Hair sheep (including Barbado)	3.8	(1.2)	6.7	(2.4)	4.0	(1.0)	3.4	(1.1)	4.6	(0.8)
Milk sheep	0.1	(0.1)	0.0	(0.0)	0.1	(0.0)	0.4	(0.4)	0.1	(0.1)
Other	6.1	(2.1)	5.5	(1.7)	10.0	(1.5)	5.2	(1.7)	7.4	(0.9)
Unknown - feedlot operations only	0.6	(0.5)	0.2	(0.1)	0.1	(0.0)	0.0	(--)	0.2	(0.1)

b. Percent of January 1, 2001, sheep and lamb inventory, by breed category and by region:

Breed Category	Percent Sheep and Lambs								All Sheep	
	Region									
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Crossbred	42.6	(5.0)	19.1	(1.8)	40.4	(2.3)	42.1	(2.5)	29.4	(1.5)
Colored wool	1.7	(1.0)	1.1	(0.3)	1.1	(0.3)	1.9	(0.5)	1.2	(0.3)
Fine wool white face	25.9	(4.2)	46.2	(1.8)	18.9	(1.5)	3.9	(0.9)	34.3	(1.3)
Medium wool white face	10.7	(2.5)	21.4	(1.3)	14.7	(1.2)	23.0	(2.3)	17.9	(0.9)
Long wool	1.7	(0.6)	0.4	(0.1)	0.6	(0.2)	1.5	(0.5)	0.7	(0.1)
Black face	10.0	(1.3)	5.5	(0.9)	13.3	(1.0)	23.3	(2.3)	8.9	(0.6)
Hair sheep (include Barbados)	1.4	(0.5)	0.9	(0.3)	1.5	(0.4)	1.8	(0.5)	1.2	(0.2)
Milk sheep	0.1	(0.0)	0.0	(0.0)	0.3	(0.1)	0.0	(0.0)	0.1	(0.0)
Other	2.8	(0.9)	1.6	(0.3)	8.1	(3.8)	2.5	(0.7)	3.4	(0.9)
Unknown - feedlot operations only	<u>3.1</u>	(1.5)	<u>3.8</u>	(1.0)	<u>1.1</u>	(0.6)	<u>0.0</u>	(--)	<u>2.9</u>	(0.6)
Total	100.0		100.0		100.0		100.0		100.0	

Percent of January 1, 2001, Sheep and Lamb Inventory, by Breed Category



## 2. Primary use

Raising of *some* sheep and lambs primarily for meat was reported by 60.7 percent of all operations. Meat was the primary use of the majority (64.8 percent) (table 2b) of *all* sheep and lambs. Seed stock was the primary use of sheep and lambs on 35.6 percent of operations and the second most common use (20.4 percent) (table 2b) reported for sheep and lambs.

a. Percent of *operations* that had any sheep or lambs on January 1, 2001, for the following primary use, by region:

Primary Use (or Intended Use of Young Sheep)	Percent Operations								All Operations	
	Region									
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
Milk (i.e., cheese)	0.7	(0.7)	0.0	(--)	0.2	(0.1)	0.4	(0.4)	0.3	(0.1)
Showing, competition, 4-H or club lambs	19.5	(3.8)	13.6	(2.3)	14.9	(1.7)	11.6	(1.9)	15.0	(1.2)
Seedstock - breeding	35.2	(4.3)	27.0	(2.6)	37.7	(2.4)	45.7	(3.8)	35.6	(1.6)
Wool	14.7	(3.1)	18.7	(1.9)	10.8	(1.7)	8.6	(2.3)	13.3	(1.1)
Meat	60.0	(4.6)	64.7	(3.2)	59.8	(2.5)	56.8	(3.8)	60.7	(1.7)
Other	10.5	(3.1)	11.8	(2.7)	10.2	(1.7)	11.6	(2.7)	10.9	(1.2)

b. Percent of January 1, 2001, sheep and lambs by the following primary uses and by region:

Primary Use (or Intended Use of Young Sheep)	Percent Sheep and Lambs								All Sheep and Lambs	
	Region									
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
Milk (i.e. cheese)	0.3	(0.3)	0.0	(--)	0.4	(0.2)	0.3	(0.3)	0.1	(0.1)
Showing, competition, 4-H or club lambs	2.3	(0.5)	1.6	(0.3)	5.0	(0.7)	7.6	(1.2)	2.8	(0.2)
Seedstock - breeding	12.4	(1.9)	21.4	(1.3)	22.8	(1.5)	29.5	(2.3)	20.4	(0.8)
Wool	9.5	(1.8)	13.9	(0.8)	3.8	(0.5)	3.8	(0.9)	10.3	(0.6)
Meat	74.5	(2.5)	62.0	(1.5)	65.3	(1.9)	54.7	(2.5)	64.8	(1.0)
Other	<u>1.0</u>	(0.3)	<u>1.1</u>	(0.3)	<u>2.7</u>	(0.5)	<u>4.1</u>	(1.2)	<u>1.6</u>	(0.2)
Total	100.0		100.0		100.0		100.0		100.0	

## B. Flock Management and Breeding Practices

### 1. Operator experience

The majority of herded/open range (69.5 percent) and fenced range (55.8 percent) operators reported being in the sheep business 21 years or longer, while only 36.5 percent of farm-flock and 31.6 percent of feedlot operators reported being in the sheep business for that length of time.

a. Percent of operations, by number of years since the primary operator first entered the sheep business and by flock type:

Number of Years	Percent Operations									
	Flock Type								All Operations	
	Herded/Open Range		Fenced Range		Farm		Feedlot		Percent	Standard Error
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
1 - 5	5.8	(3.7)	5.5	(1.9)	8.0	(1.0)	15.9	(12.7)	7.7	(0.9)
6 - 10	3.8	(0.9)	17.7	(3.8)	23.4	(1.7)	37.0	(17.4)	22.5	(1.5)
11 - 20	20.9	(4.0)	21.0	(2.7)	32.1	(1.7)	15.5	(5.1)	30.4	(1.5)
21 - 59	51.0	(7.7)	41.3	(3.8)	30.1	(1.6)	27.4	(9.3)	31.8	(1.5)
60 or more	<u>18.5</u>	(3.7)	<u>14.5</u>	(1.8)	<u>6.4</u>	(0.8)	<u>4.2</u>	(1.7)	<u>7.6</u>	(0.7)
Total	100.0		100.0		100.0		100.0		100.0	

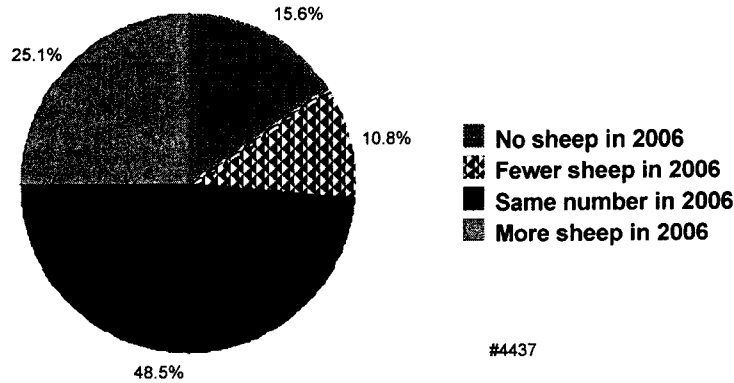
### 2. Inventory expectations in 2006

Nearly three-quarters (73.6 percent) of operations expected to have either the same amount or more sheep in 2006. This expectation was similar across all regions (ranging from 66.7 percent to 78.3 percent); all flock types (ranging from 70.6 percent to 80.2 percent); and all operation sizes (ranging from 70.3 percent to 79.5 percent). This is consistent with the 1996 NAHMS sheep study, where approximately three-quarters (78.7 percent) of operators expected to have either the same amount or more sheep in 2001. Only 11.8 percent of operators in the 1996 study reported expecting to have no sheep in 2001. There was a significant drop in the number of operations from 1995 to 2000. NASS reported 79,900 existing operations in 1995 and only 66,100 existing operations in 2000, a 17.3 percent decrease.

a. Percent of operations by number of sheep expected in 2006 compared to the January 1, 2001, inventory, by region:

Inventory Expectations	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
No sheep in 2006	18.9	(3.8)	16.5	(2.7)	13.0	(1.8)	17.0	(3.2)	15.6	(1.3)
Fewer sheep in 2006	14.4	(3.1)	11.8	(1.8)	8.7	(1.2)	10.2	(2.3)	10.8	(1.0)
Same number in 2006	42.5	(4.4)	47.4	(3.2)	51.6	(2.5)	49.9	(3.8)	48.5	(1.7)
More sheep in 2006	<u>24.2</u>	(3.9)	<u>24.3</u>	(2.7)	<u>26.7</u>	(2.2)	<u>22.9</u>	(2.8)	<u>25.1</u>	(1.4)
Total	100.0		100.0		100.0		100.0		100.0	

### Percent of Operations by Number of Sheep Expected in 2006, Compared to January 1, 2001, Inventory



b. Percent of operations by number of sheep expected in 2006 compared to the January 1, 2001, inventory, by flock type:

Inventory Expectations	Percent Operations							
	Flock Type							
	Herded/Open Range		Fenced Range		Farm		Feedlot	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
No sheep in 2006	18.1	(6.0)	16.8	(3.2)	15.4	(1.5)	13.2	(6.1)
Fewer sheep in 2006	5.9	(1.4)	12.6	(2.3)	10.6	(1.1)	6.6	(2.2)
Same number in 2006	57.0	(7.3)	49.0	(3.8)	48.2	(1.9)	66.1	(11.0)
More sheep in 2006	<u>19.0</u>	(4.4)	<u>21.6</u>	(3.1)	<u>25.8</u>	(1.6)	<u>14.1</u>	(5.3)
Total	100.0		100.0		100.0		100.0	

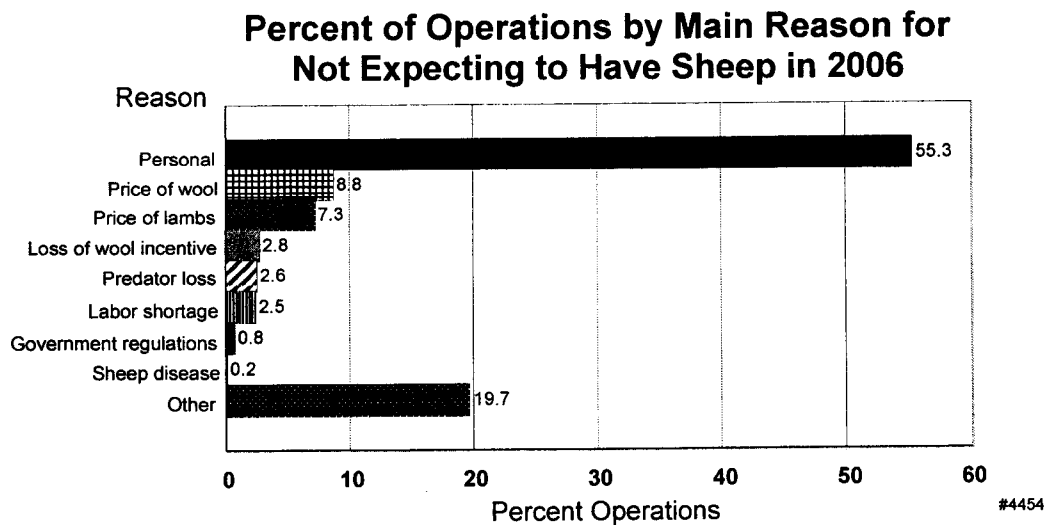
c. Percent of operations by number of sheep expected in 2006 compared to the January 1, 2001, inventory, by flock size:

Inventory Expectations	Percent Operations							
	Flock Size (Number Sheep and Lambs)							
	1-24		25-99		100-999		1,000 or More	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
No sheep in 2006	21.0	(2.3)	9.8	(1.5)	8.1	(0.8)	6.9	(0.7)
Fewer sheep in 2006	8.7	(1.5)	13.3	(1.5)	12.4	(0.9)	16.1	(1.1)
Same number in 2006	46.0	(2.7)	51.2	(2.3)	51.9	(1.6)	55.6	(1.5)
More sheep in 2006	<u>24.3</u>	(2.4)	<u>25.7</u>	(1.9)	<u>27.6</u>	(1.5)	<u>21.4</u>	(1.3)
Total	100.0		100.0		100.0		100.0	

About half (55.3 percent) of operations that expected to have no sheep in 2006 reported that the main reason was due to a personal or family situation (e.g., retirement, lack of successor, etc.). The majority of producers in the “other” category cited a combination of the reasons below as to why they expected not to have any sheep in 2006.

d. For operations that did not expect to have sheep in 2006, percent of operations by main reason for not expecting to have sheep in 2006:

Reason	Percent Operations	Standard Error
Sheep disease	0.2	(0.1)
Price of lambs	7.3	(2.1)
Price of wool	8.8	(2.9)
Predator loss	2.6	(0.6)
Labor shortage	2.5	(1.3)
Personal or family situation (e.g., retirement, lack of successor)	55.3	(4.7)
Loss of wool incentive	2.8	(1.6)
Government regulations	0.8	(0.5)
Other	<u>19.7</u>	(4.0)
Total	100.0	



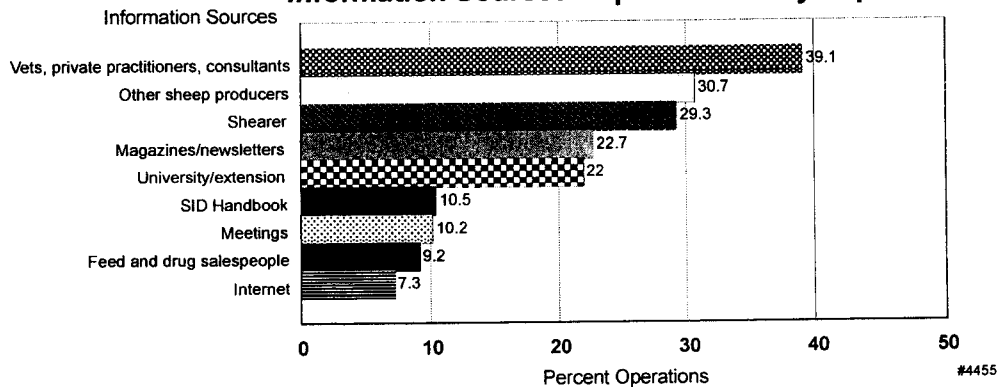
**3. Source of information on sheep health**

The top-3 sources of information cited by producers as 'very important' were: veterinarians, private practitioners, or consultants (39.1 percent); other sheep producers (30.7 percent); and shearers (29.3 percent). The Internet was considered a very important source of information by the least number of producers (7.3 percent), and was considered a "not important" source by 74.1 percent of producers. This represents a substantial increase over the 1996 NAHMS sheep study findings, where 2.7 percent of producers reported using the Internet. Producers participating in the 1996 NAHMS sheep study indicated that the top-3 sources of information used most commonly were: magazines/newsletters; other sheep producers; and veterinarians. These same 3 were reported as somewhat important or very important sources of information in the NAHMS 2001 sheep study.

a. Percent of operations by importance of the following sources of information about sheep health:

Information Source	Percent Operations						Total
	Importance			Importance			
	Very Important	Somewhat Important	Not Important	Very Important	Somewhat Important	Not Important	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error		
SID Sheep Production Handbook	10.5	(1.0)	21.2	(1.3)	68.3	(1.5)	100.0
Meetings	10.2	(1.0)	26.6	(1.3)	63.2	(1.5)	100.0
Internet	7.3	(0.9)	18.6	(1.2)	74.1	(1.4)	100.0
Magazines/newsletters	22.7	(1.3)	48.0	(1.7)	29.3	(1.6)	100.0
University/extension	22.0	(1.3)	36.5	(1.6)	41.5	(1.7)	100.0
Veterinarians, private practitioners, or consultants	39.1	(1.6)	33.0	(1.6)	27.9	(1.6)	100.0
Feed and drug salespeople	9.2	(0.9)	28.1	(1.5)	62.7	(1.6)	100.0
Shearer	29.3	(1.5)	26.9	(1.5)	43.8	(1.6)	100.0
Other sheep producers	30.7	(1.5)	42.0	(1.6)	27.3	(1.5)	100.0

**Percent of Operations by Sheep-Health Information Sources Reported as Very Important**



Veterinarians, private practitioners, or consultants were considered very important sources of information for the greatest percentage (varying from 34.5 percent to 60.7 percent) of producers in each flock-type category. Internet use remained low for most flock types.

b. Percent of operations that identified the following sources of information about sheep health as *very important*, by flock type:

Information Source	Percent Operations							
	Flock Type							
	Herded/Open Range		Fenced Range		Farm		Feedlot	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
SID Sheep Production Handbook	8.6	(2.4)	9.7	(2.6)	10.7	(1.1)	4.6	(1.8)
Meetings	17.8	(3.5)	15.0	(3.2)	9.4	(1.0)	4.7	(1.9)
Internet	3.0	(0.7)	5.7	(2.1)	7.5	(1.0)	19.3	(12.8)
Magazines/newsletters	22.1	(3.9)	32.1	(3.6)	21.2	(1.3)	39.5	(16.9)
University/extension	29.0	(4.9)	28.6	(3.7)	21.0	(1.4)	7.5	(2.7)
Veterinarians, private practitioner or consultants	45.3	(7.4)	34.5	(3.5)	39.6	(1.8)	60.7	(12.3)
Feed and drug salespeople	9.6	(1.7)	10.7	(1.6)	8.9	(1.0)	16.8	(6.4)
Shearer	30.1	(5.4)	28.3	(3.4)	29.6	(1.7)	14.8	(4.9)
Other sheep producers	40.0	(6.6)	30.7	(3.3)	30.7	(1.7)	14.9	(5.0)



Veterinarians, private practitioners, or consultants were considered very important sources of information for the greatest percentage (varying from 33.1 percent to 46.9 percent) of producers in each flock-size category. Flocks with 1,000 or more sheep were the exception, where veterinarians, private practitioners, or consultants were rated similarly to other sheep producers as very important information sources (42.2 percent compared to 44.8 percent, respectively).

i. Percent of operations that identified the following sources of information about sheep health as *very important*, by flock size

Information Source	Percent Operations							
	Flock Size (Number Sheep and Lambs)							
	1-24		25-99		100-999		1,000 or More	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
SID Sheep Production Handbook	9.2	(1.6)	12.0	(1.3)	12.1	(1.1)	10.5	(0.9)
Meetings	8.7	(1.6)	10.4	(1.3)	15.0	(1.2)	20.2	(1.2)
Internet	7.3	(1.5)	8.0	(1.2)	5.5	(0.6)	7.3	(0.8)
Magazines/newsletters	15.6	(1.9)	30.1	(2.0)	34.2	(1.6)	28.6	(1.3)
University/extension	19.4	(2.2)	23.8	(1.8)	27.5	(1.5)	29.7	(1.4)
Veterinarians, private practitioner or consultants	33.1	(2.6)	46.9	(2.3)	45.9	(1.6)	42.2	(1.5)
Feed and drug salespeople	6.6	(1.4)	11.4	(1.4)	13.8	(1.2)	16.3	(1.1)
Shearer	27.1	(2.4)	31.3	(2.0)	33.1	(1.6)	34.1	(1.4)
Other sheep producers	27.8	(2.4)	32.7	(2.1)	36.5	(1.6)	44.8	(1.5)

**4. Production records maintained or used**

Use of computers increased with size of operation. Overall, very few operations (10.2 percent) used computerized records. Only 2 out of 3 operations (67.9 percent) used either computerized or handwritten/typed production records.

a. Percent of operations, by type of production records maintained or used and by flock size:

Type of Production Records	Percent Operations									
	Flock Size (Number Sheep and Lambs)									
	1-24		25-99		100-999		1,000 or More		All Operations	
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
Computerized	7.1	(1.3)	12.1	(1.4)	16.3	(1.3)	26.5	(1.3)	10.2	(0.9)
Handwritten or typed	56.4	(2.7)	73.8	(2.1)	76.4	(1.3)	79.3	(1.2)	64.8	(1.6)
Either	59.3	(2.7)	76.5	(2.0)	80.7	(1.2)	85.4	(1.1)	67.9	(1.6)

## 5. Flock type

The majority of operations (86.0 percent) managed at least some of their sheep as a farm flock. Some operations managed sheep under feedlot and farm-flock conditions, or both feedlot and range-flock conditions (see also table 7a).

a. Percent of operations where any sheep were managed by the following flock types<sup>1</sup>:

Percent Operations		
Flock Type	Percent	Standard Error
Herded/open range	1.6	(0.2)
Fenced range	14.3	(1.0)
Farm	86.0	(0.9)
Feedlot	5.1	(0.6)

<sup>1</sup> Flock type based on how sheep were managed during 2000.

The majority of operations (85.1 percent) were described primarily as farm flocks. These operations were represented most heavily in the 1-24 sheep size category (92.7 percent), and represented least in the 1,000 or more sheep size category (6.8 percent). While only 14.1 percent of producers described their operations as either primarily herded/open or fenced range flocks, they represented 83.5 percent of operations with 1,000 or more sheep.

b. Percent of operations by *primary* flock type and by flock size:

Primary Flock Type	Percent Operations									
	Flock Size (Number Sheep and Lambs)									
	1-24		25-99		100-999		1,000 or More		All Operations	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Herded/open range	0.5	(0.3)	0.6	(0.2)	2.4	(0.3)	31.7	(1.2)	1.3	(0.2)
Fenced range	6.8	(1.5)	10.8	(1.4)	39.4	(1.5)	51.8	(1.4)	12.8	(0.9)
Farm	92.7	(1.5)	87.3	(1.5)	57.0	(1.5)	6.8	(0.8)	85.1	(1.0)
Feedlot	<u>0.0</u>	(0.0)	<u>1.3</u>	(0.7)	<u>1.2</u>	(0.2)	<u>9.7</u>	(0.9)	<u>0.8</u>	(0.2)
Total	100.0		100.0		100.0		100.0		100.0	

Farm flocks were the flock type most common in all regions (ranging from 65.1 percent to 95.0 percent). The West Central region had the greatest percentage (30.8 percent) of fenced range flocks and also the largest percentage (3.7 percent) of open range flocks.

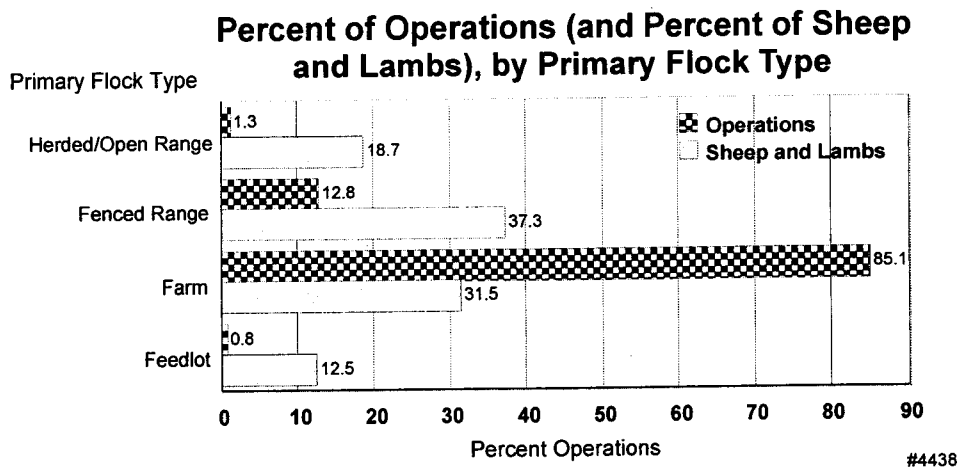
c. Percent of operations by *primary* flock type and by region:

Primary Flock Type	Percent Operations							
	Region							
	Pacific		West Central		Central		Eastern	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Herded/open range	0.9	(0.2)	3.7	(0.7)	0.4	(0.2)	0.0	(--)
Fenced range	7.2	(1.6)	30.8	(2.6)	7.1	(1.1)	4.7	(2.0)
Farm	91.1	(1.7)	65.1	(2.7)	91.4	(1.3)	95.0	(2.0)
Feedlot	<u>0.8</u>	(0.6)	<u>0.4</u>	(0.1)	<u>1.1</u>	(0.5)	<u>0.3</u>	(0.1)
Total	100.0		100.0		100.0		100.0	

Although only 14.1 percent of operations were either primarily fenced or open range flocks (table 5b), 56.0 percent of all sheep and lambs were on these operations. This is indicative of the large size of these operations compared to farm flocks, which are more numerous (85.1 percent of operations) but smaller in size (31.5 percent of sheep).

d. Percent of sheep and lambs by *primary* flock type and by region:

Primary Flock Type	Percent Sheep and Lambs								All Sheep and Lambs	
	Region									
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Herded/open range	15.7	(3.6)	28.8	(1.5)	0.9	(0.4)	0.0	(--)	18.7	(1.1)
Fenced range	53.2	(4.0)	43.4	(1.4)	16.6	(1.4)	4.7	(1.3)	37.3	(1.2)
Farm	30.6	(2.3)	11.1	(0.6)	68.0	(3.1)	94.2	(1.3)	31.5	(0.8)
Feedlot	<u>0.5</u>	(0.4)	<u>16.7</u>	(2.2)	<u>14.5</u>	(3.7)	<u>1.1</u>	(0.3)	<u>12.5</u>	(1.5)
Total	100.0		100.0		100.0		100.0		100.0	



## 6. Feed and pasture management

The majority (61.7 percent) of fenced and herded/open range flocks left animals on the range exclusively, although most of these (81.0 percent) provided some winter feed prior to lambing. Over one-third (37.2 percent) of operations that described themselves as primarily a range flock did not actually have their sheep on the range all the time.

a. Percent of *range* flock operations (primarily herded/open or fenced) by primary feed management practice:

Feed Management Practice	All Range Flocks		Flocks on Range Exclusively	
	Percent Operations	Standard Error	Percent Operations	Standard Error
On the range exclusively	61.7	(3.7)	—	—
-- Some winter feed prior to lambing	—	—	81.0	(4.3)
-- Little or no harvested feed	—	—	19.0	(4.3)
On range at times (otherwise pastured or given supplements)	37.2	(3.7)	—	—
Other	1.1	(0.3)	—	—
Total	100.0		100.0	

Only 2.4 percent of operations that described themselves as primarily a farm flock raised sheep in intensive confinement, with no access to pasture. The majority of farm flocks (60.9 percent) pastured sheep year round, with access to buildings for shelter. This type of management was most common in the Pacific region (84.2 percent) and least common in the Central region (47.6 percent). Most producers in the 'other' category reported keeping their sheep at pasture exclusively (no access to buildings for shelter).

b. Percent of *farm* flock operations by primary pasture access and by region:

Pasture Management Practice	Percent Farm Flock Operations									
	Region								All Farm Flocks	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Intensive confinement - no access to pasture	0.6	(0.6)	5.6	(2.1)	1.9	(0.7)	2.1	(1.0)	2.4	(0.5)
Pastured year round with access to buildings for shelter	84.2	(3.0)	63.8	(3.9)	47.6	(2.6)	63.9	(3.5)	60.9	(1.7)
Pastured during warmer months with intensive confinement during colder months	11.9	(2.8)	26.2	(3.4)	48.3	(2.6)	30.9	(3.3)	33.7	(1.6)
Other	<u>3.3</u>	(1.1)	<u>4.4</u>	(1.6)	<u>2.2</u>	(0.8)	<u>3.1</u>	(1.3)	<u>3.0</u>	(0.5)
Total	100.0		100.0		100.0		100.0		100.0	

7. Range and farm flocks that also managed sheep in a feedlot

Overall, 4.3 percent of range or farm operations managed at least some of their sheep as a feedlot. Only 1.7 percent of open or fenced range flocks managed some of their sheep as a feedlot, while 4.8 percent of farm flocks managed some of their sheep as a feedlot.

a. Percent of range flocks and farm flocks that managed at least some of their sheep as a feedlot<sup>1</sup>:

Flock Type	Percent	Standard Error
Range	1.7	(0.3)
Farm	4.8	(0.7)
Range or farm	4.3	(0.6)

<sup>1</sup>Feedlot-intensive confinement where the operation's primary purpose was to finish sheep on a high-energy diet for slaughter.

### 8. Individual animal or flock identification

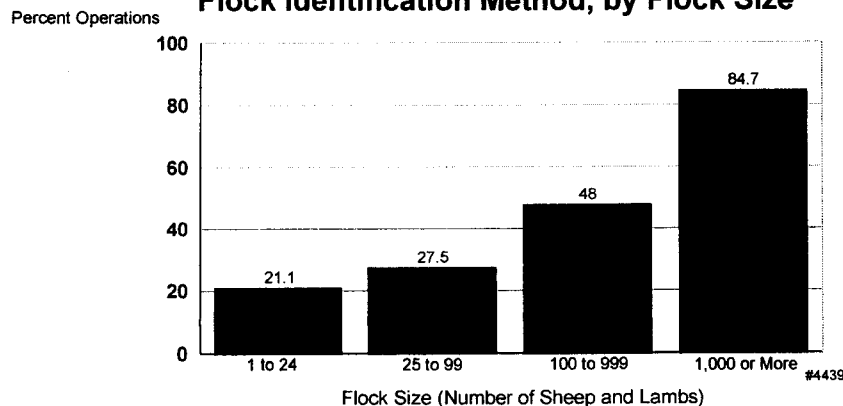
[Note: the data included in sections 8 through 12 are for operations identified as primarily range and farm flocks, thus excluding operations identified as primarily feedlots.]

Increasingly, flock and individual animal identification are becoming important parts of industry efforts to control disease. In November 2001, new identification requirements became effective for sheep that change ownership and/or enter interstate commerce. This data provides a baseline observation of sheep identification practices prior to the new requirements. Overall, ear tags were used most commonly for identifying animals as part of a flock (14.2 percent of operations). This was true for all operation sizes except the largest (1,000 or more head), where 58.1 percent of operations used paint brands for flock identification and 43.2 percent used ear marks. Overall, 27.4 percent of operations used some form of flock identification. The use of flock identification declined as the size of flock decreased. The majority of operations (84.7 percent) with 1,000 or more sheep used at least 1 flock identification method, compared to only 21.1 percent of operations with 1 to 24 sheep. Because the majority of operations with more than 1,000 animals consisted of range flocks, it is not surprising that 84.7 percent of large operations used flock identification methods.

a. Percent of operations that used the following *flock* identification methods (all animals have the same identification), by flock size:

Flock Identification Method	Percent Operations									
	Flock Size (Number Sheep and Lambs)									
	1-24		25-99		100-999		1,000 or More		All Operations	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Ear tag	10.8	(1.7)	16.0	(1.5)	21.6	(1.2)	37.3	(1.5)	14.2	(1.1)
Ear mark	0.8	(0.4)	4.5	(0.9)	19.5	(1.2)	43.2	(1.5)	4.9	(0.4)
Tattoo	1.4	(0.7)	2.9	(0.6)	2.6	(0.5)	1.6	(0.4)	2.0	(0.4)
Hot iron/freeze brand	0.0	(0.0)	0.1	(0.1)	0.7	(0.1)	4.1	(0.6)	0.2	(0.0)
Paint brand	1.6	(0.5)	5.2	(0.7)	20.2	(1.1)	58.1	(1.5)	5.9	(0.4)
Electronic chip	0.0	(0.0)	0.0	(0.0)	0.3	(0.1)	0.8	(0.4)	0.1	(0.0)
Physical traits	8.6	(1.6)	5.2	(1.4)	4.0	(0.9)	2.2	(0.5)	6.9	(1.0)
Other	1.6	(0.7)	0.7	(0.5)	0.7	(0.2)	0.7	(0.2)	1.2	(0.7)
At least 1 flock identification method used	21.1	(2.2)	27.5	(2.0)	48.0	(1.6)	84.7	(1.2)	27.4	(1.4)

**Percent of Operations that Used at Least One Flock Identification Method, by Flock Size**

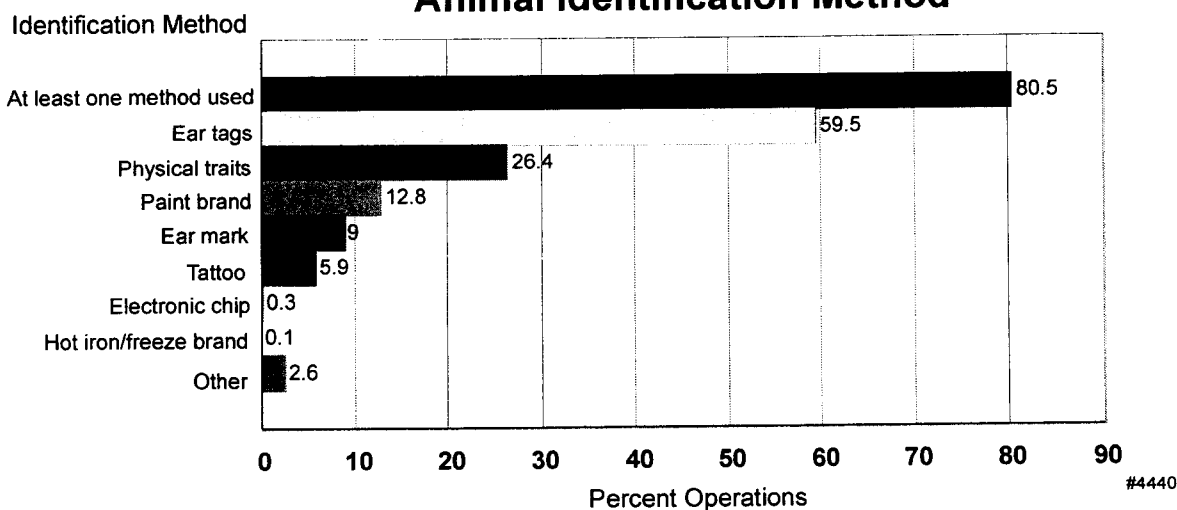


The percentage of operations using physical traits as a form of identification declined as the size of operation increased, while use of ear marks and paint brands increased as the size of the operation increased.

b. Percent of operations that used the following *individual* animal identification methods (individual animals have unique identification), by flock size:

Individual Identification Method	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Ear tag	51.5	(2.7)	73.6	(2.1)	61.3	(1.6)	41.3	(1.6)	59.5	(1.7)
Ear mark	3.9	(1.0)	10.9	(1.4)	23.3	(1.4)	35.0	(1.5)	9.0	(0.7)
Tattoo	4.6	(1.1)	7.9	(1.2)	6.7	(0.7)	4.9	(0.6)	5.9	(0.7)
Hot iron/freeze brand	0.0	(--)	0.1	(0.1)	0.6	(0.2)	2.4	(0.5)	0.1	(0.0)
Paint brand	5.4	(1.2)	18.0	(1.6)	29.6	(1.4)	34.7	(1.5)	12.8	(0.9)
Electronic chip	0.0	(--)	0.7	(.02)	0.7	(0.2)	0.4	(0.1)	0.3	(0.1)
Physical traits	33.8	(2.6)	20.3	(2.0)	12.5	(1.2)	3.3	(0.5)	26.4	(1.6)
Other	3.4	(1.0)	2.0	(0.7)	0.9	(0.3)	0.5	(0.2)	2.6	(0.6)
At least 1 animal identification method used	77.4	(2.3)	86.5	(1.5)	80.0	(1.3)	68.2	(1.5)	80.5	(1.4)

**Percent of Operations by Individual Animal Identification Method**



Ear tags were used more frequently on farm flocks (62.3 percent) than fenced range flocks (43.5 percent) or herded/open range flocks (36.3 percent).

c. Percent of operations that used the following *individual* animal identification methods, by flock type:

Individual Identification Method	Percent Operations					
	Flock Type					
	Herded/Open Range		Fenced Range		Farm	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
Ear tag	36.3	(6.2)	43.5	(3.6)	62.3	(1.9)
Ear mark	29.2	(4.8)	19.4	(2.1)	7.1	(0.8)
Tattoo	4.4	(2.1)	5.4	(1.4)	6.0	(0.8)
Hot iron/freeze brand	1.1	(0.4)	0.6	(0.1)	0.1	(0.0)
Paint brand	32.4	(5.2)	14.9	(1.5)	12.2	(1.0)
Electronic chip	1.9	(1.1)	0.1	(0.1)	0.3	(0.1)
Physical traits	8.2	(2.8)	10.1	(2.6)	29.2	(1.8)
Other	13.9	(11.2)	1.2	(0.4)	2.7	(0.7)
At least 1 animal identification method used	73.2	(6.0)	62.7	(4.1)	83.3	(1.4)

## 9. Breeding season and practices

Nearly all (94.8 percent) nonfeedlot operations bred 1 or more ewes in 2000.

a. Percent of operations (excluding feedlots) where 1 or more ewes were bred during 2000:

Percent Operations	Standard Error
94.8	(0.9)



For the operations that bred 1 or more ewes in 2000, 74.2 percent had 1 defined (<= 180 days) breeding season. Only 18.6 percent of operations had no set breeding season. These operations were distributed, with little variation, among the four regions. Even fewer operations (7.2 percent) had 2 or more defined seasons.

b. For operations where 1 or more ewes were bred during 2000, percent of operations by number of breeding seasons and by region:

Number Breeding Seasons	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
1 defined season	73.3	(4.1)	77.6	(3.0)	75.8	(2.1)	64.5	(3.7)	74.2	(1.5)
2 or more defined seasons	4.2	(1.6)	4.8	(0.9)	9.1	(1.2)	10.0	(1.7)	7.2	(0.7)
No set season	<u>22.5</u>	(4.0)	<u>17.6</u>	(3.0)	<u>15.1</u>	(1.9)	<u>25.5</u>	(3.7)	<u>18.6</u>	(1.4)
Total	100.0		100.0		100.0		100.0		100.0	

Only 38.8 percent of operations with 1 defined breeding season completed breeding within 59 days, which accounted for 35.4 percent of breeding ewes.

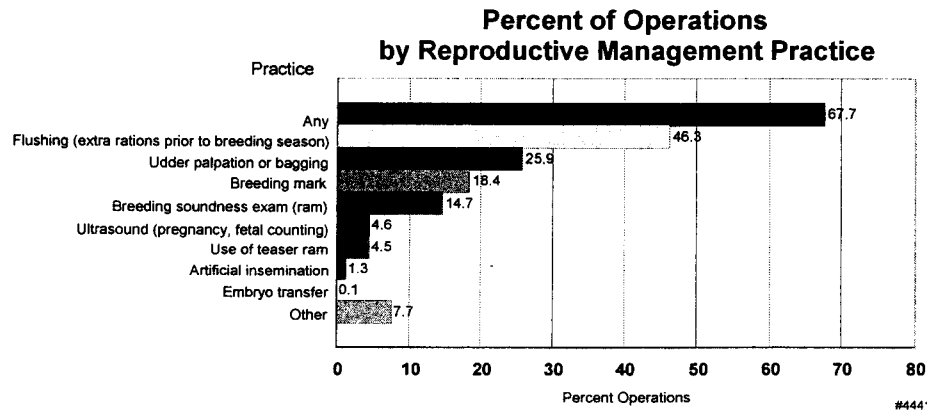
i. For operations with 1 defined breeding season, percent of operations (and percent of January 1, 2001, breeding ewes 1 year and older on these operations) by length of the last completed breeding season:

Length of Breeding Season (Days)	Percent Operations		Percent Breeding Ewes	
	Percent Operations	Standard Error	Percent Breeding Ewes	Standard Error
1-59	38.8	(1.9)	35.4	(1.2)
60-119	44.7	(1.9)	42.1	(1.4)
120-180	<u>16.5</u>	(1.3)	<u>22.5</u>	(1.2)
Total	100.0		100.0	

Overall, 67.7 percent of operations where 1 or more ewes were bred during 2000 used at least 1 reproductive management practice listed in the table below. The percentage of operations using ultrasound, bagging, or a breeding-soundness exam for rams increased as the size of the operation increased. Flushing was used most commonly as a reproductive management practice overall (46.3 percent of operations) and within each operation size category. The 1996 NAHMS Sheep study reported 54.7 percent of operations used flushing as a reproductive management practice. Flushing increases ovulation rates, which increases lambing rates, and can be easily accomplished by providing ewes with higher quality forage or adding a grain supplement to their diet.

c. For operations where 1 or more ewes were bred during 2000, percent of operations by reproductive management practice used during 2000 and by flock size:

Practice	Percent Operations									
	Flock Size (Number Sheep and Lambs)									
	1-24		25-99		100-999		1,000 or More		All Operations	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Flushing (ewes fed extra energy ration prior to breeding season)	34.4	(2.7)	56.6	(2.3)	66.8	(1.5)	58.5	(1.5)	46.3	(1.6)
Use of teaser ram	2.8	(0.9)	6.2	(1.2)	7.2	(0.9)	5.5	(0.8)	4.5	(0.6)
Breeding mark	14.8	(2.0)	24.8	(1.9)	18.4	(1.5)	5.8	(0.8)	18.4	(1.2)
Ultrasound (pregnancy diagnosis, fetal counting)	3.7	(1.2)	4.1	(0.9)	8.3	(1.2)	14.2	(1.2)	4.6	(0.7)
Breeding soundness exam (ram)	9.9	(1.7)	16.3	(1.5)	26.7	(1.4)	39.9	(1.5)	14.7	(1.1)
Udder palpation or bagging	17.4	(2.1)	32.0	(2.1)	41.0	(1.6)	54.8	(1.5)	25.9	(1.4)
Artificial insemination	1.0	(0.6)	1.8	(0.7)	0.9	(0.4)	0.9	(0.3)	1.3	(0.4)
Embryo transfer	0.0	(--)	0.2	(0.1)	0.4	(0.3)	0.3	(0.2)	0.1	(0.1)
Other	11.0	(1.8)	3.9	(0.8)	4.9	(0.9)	2.8	(0.5)	7.7	(1.0)
Any	60.1	(2.8)	73.5	(2.1)	81.5	(1.2)	83.4	(1.2)	67.7	(1.7)



## 10. Breeding management

Overall, 92.4 percent of operations that bred ewes in 2000 used natural breeding methods by utilizing rams present on the operation. Only 1.3 percent used artificial insemination (AI). Of those operations using AI, the majority (99.0 percent) used frozen semen, and 82.5 percent used semen collected from rams belonging to a different operation. AI usage in this study was similar to that in the 1996 NAHMS Sheep study, where a reported 1.2 percent of operations used AI. While AI permits the breeding of more ewes with genetically superior rams, it can also be a more expensive method, which may explain why it is still not used widely.

a. For operations where 1 or more ewes were bred naturally or by artificial insemination during 2000, percent of operations and percent of ewes bred, by breeding method:

Breeding Method	Percent Operations	Standard Error	Percent Ewes Bred	Standard Error
Artificial insemination (AI)	1.3	(0.4)	0.2	(0.0)
Naturally, by this operation's rams	92.4	(1.1)	97.3	(0.3)
Naturally, by another operation's rams	9.6	(1.1)	<u>2.5</u>	(0.3)
Total			100.0	

b. For operations where 1 or more ewes were bred by artificial insemination during 2000, percent of operations by use of fresh or frozen semen, and whether rams were from the same operation or another operation:

Practice	Percent Operations	
	Percent	Standard Error
Collected from rams belonging to operation	47.2	(15.4)
Collected from rams belonging to different operation	82.5	(8.0)
Fresh semen	32.1	(15.4)
Frozen semen	99.0	(0.6)

During 2000, most operations produced 1 lamb crop per year (92.6 percent). Fewer operations in the Pacific region followed the intensive reproductive management of 2 lamb crops per year (0.8 percent), compared with other regions (from 4.8 to 5.2 percent).

c. For operations where any ewes were bred during 2000, percent of operations by lambing practice and by region:

Lambing Practice	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern			
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
1 crop in 1 year	96.0	(1.7)	92.3	(1.8)	92.1	(1.3)	90.3	(2.0)	92.6	(0.8)
2 crops in 1 year	0.8	(0.3)	5.2	(1.6)	4.8	(1.1)	4.9	(1.4)	4.2	(0.6)
3 crops in 2 years	1.7	(1.0)	2.5	(0.9)	3.0	(0.8)	4.5	(1.5)	2.9	(0.5)
5 crops in 3 years	1.4	(1.4)	0.0	(0.0)	0.1	(0.0)	0.2	(0.1)	0.3	(0.3)
Other	0.1	(0.0)	0.0	(0.0)	0.0	(0.0)	0.1	(0.0)	0.0	(0.0)
Total	100.0		100.0		100.0		100.0		100.0	

Only 12.1 percent of all operations that bred 1 or more ewes used out-of-season breeding during 2000. Use of out-of-season breeding was relatively consistent from region to region. For this study, out-of-season breeding was defined as occurring during February through July. Out-of-season breeding can be advantageous to producers who want to benefit from better forage and weather conditions, decreased parasites, and improved markets for spring lambs. Success often depends on using 1 or more of the reproductive management techniques listed on table 10e.

d. For operations where any ewes were bred during 2000, percent of operations that used out-of-season breeding, by region:

Percent Operations									
Region								All Operations	
Pacific		West Central		Central		Eastern			
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
9.5	(2.9)	12.5	(1.9)	12.1	(1.6)	14.6	(2.5)	12.1	(1.1)

The two methods reported most commonly for out-of-season breeding in 2000 were: 1) putting rams with ewes (86.7 percent), and 2) selecting sheep with a genetic predisposition to breed out of season (31.4 percent). This was true for operations in each region. Putting a teaser (sterile) ram with anestrous ewes that have been kept from a ram for at least 30 days produces the "ram effect," which can induce estrous in ewes outside the normal breeding season. Genetically selecting rams and ewes for the ability to breed out of season also plays an important role. Many producers who reported using an 'other' method for breeding out of season did not use any method, and indicated that out-of-season breeding was accidental.

e. For operations that used out-of-season breeding, percent of operations by method(s) used and by region:

Method(s) Used	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Genetic selection for ability to breed out of season	38.5	(15.6)	19.9	(6.7)	35.2	(6.5)	34.3	(7.2)	31.4	(4.1)
Putting ram in with the ewes	73.8	(15.1)	92.5	(4.2)	85.6	(5.6)	90.7	(3.6)	86.7	(3.5)
Regulation of light	4.6	(4.4)	0.7	(0.4)	0.5	(0.3)	5.3	(5.0)	2.0	(1.1)
Hormone treatment	3.3	(1.4)	5.2	(2.6)	8.1	(4.0)	4.7	(3.2)	6.0	(1.9)
Other	18.2	(15.0)	7.3	(4.2)	6.1	(4.2)	4.8	(2.8)	8.0	(3.1)

## 11. Rams used for natural breeding

Overall, few operations (5.3 percent) reported using 1 ram with 40 or more ewes, although such ratios were reported in approximately one-third (28.0 percent) of operations with 1,000 or more sheep. Nearly 60 percent of flocks with 1 to 24 sheep had a high ram-to-ewe ratio of 1 ram with up to 9 ewes.

a. For operations that used natural breeding, percent of operations by ram-to-ewe ratio used during 2000 and by flock size:

Ratio	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
1 ram with up to 9 ewes	59.9	(2.7)	11.9	(1.7)	2.1	(0.5)	0.4	(0.2)	35.5	(1.8)
1 ram with 10-19 ewes	32.5	(2.6)	37.9	(2.3)	14.2	(1.2)	7.0	(0.8)	31.5	(1.6)
1 ram with 20-39 ewes	7.6	(1.3)	44.2	(2.2)	61.9	(1.6)	64.6	(1.5)	27.7	(1.2)
1 ram with 40-59 ewes	0.0	(--)	5.5	(0.8)	16.5	(1.0)	23.5	(1.4)	4.4	(0.3)
1 ram with 60 or more ewes	0.0	(--)	0.5	(0.1)	5.3	(0.8)	4.5	(0.7)	0.9	(0.1)
Total	100.0		100.0		100.0		100.0		100.0	

A greater percentage (37.9 percent) of farm flocks had a ram-to-ewe ratio of 1 ram with up to 9 ewes, compared with fenced range flocks (23.0 percent) and herded/open range flocks (6.7 percent). Range flocks are generally larger and need to use rams that can cover a greater number of ewes and a larger area.

b. For operations that used natural breeding, percent of operations by ram-to-ewe ratio used during 2000 and by flock type:

Ratio Category	Percent Operations					
	Flock Type					
	Herded/Open Range		Fenced Range		Farm	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
1 ram with up to 9 ewes	6.7	(4.3)	23.0	(4.8)	37.9	(2.0)
1 ram with 10-19 ewes	13.0	(5.8)	20.2	(3.1)	33.6	(1.8)
1 ram with 20-39 ewes	53.9	(7.5)	47.4	(3.8)	24.2	(1.3)
1 ram with 40-59 ewes	22.7	(3.8)	7.5	(0.9)	3.6	(0.4)
1 ram with 60 or more ewes	<u>3.7</u>	(1.1)	<u>1.9</u>	(0.4)	<u>0.7</u>	(0.1)
Total	100.0		100.0		100.0	

c. For operations that used natural breeding during 2000, percent of operations that used rams of the following age groups for natural breeding:

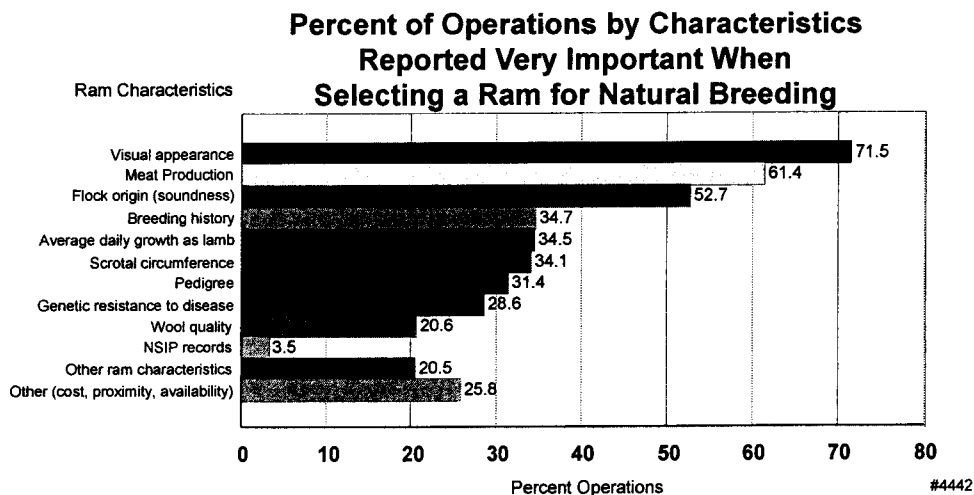
Ram Age Groups	Percent Operations	Standard Error
Ram lambs less than 1 year	17.8	(1.2)
Yearling rams 1 year but less than 18 months	27.7	(1.4)
Adult rams 18 months and older	82.2	(1.4)

## 12. Reproductive management practices

When selecting a ram for natural breeding, visual appearance (71.5 percent of operations) and meat production (61.4 percent of operations) were the two characteristics cited most frequently as very important to producers. Records from the National Sheep Improvement Program (NSIP) were cited least often (3.5 percent of operations) as very important for selecting a breeding ram. NSIP is a computerized genetic performance evaluation designed to improve hereditary characteristics for reproduction, wool production, and growth traits.

a. For operations that used natural breeding during 2000, percent of operations by importance of the following characteristics for selecting rams for naturally breeding ewes during 2000:

Ram Selection Characteristics	Percent Operations						Total
	Very Important		Somewhat Important		Not Important		
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
Ram's visual appearance	71.5	(1.6)	18.0	(1.3)	10.5	(1.2)	100.0
Scrotal circumference, semen quality	34.1	(1.5)	31.2	(1.6)	34.7	(1.7)	100.0
Wool quality	20.6	(1.3)	29.4	(1.5)	50.0	(1.7)	100.0
Meat production	61.4	(1.7)	19.2	(1.4)	19.4	(1.5)	100.0
Average daily gain (growth) as a ram lamb	34.5	(1.6)	30.4	(1.5)	35.1	(1.7)	100.0
Pedigree	31.4	(1.5)	30.3	(1.5)	38.3	(1.7)	100.0
Breeding history	34.7	(1.6)	29.3	(1.5)	36.0	(1.6)	100.0
National Sheep Improvement Program (NSIP) records (EPD)	3.5	(0.5)	18.4	(1.2)	78.1	(1.3)	100.0
Genetic resistance to diseases	28.6	(1.5)	26.0	(1.4)	45.4	(1.7)	100.0
Other ram characteristics	20.5	(1.3)	10.9	(1.0)	68.6	(1.5)	100.0
Flock origin of ram (soundness, health)	52.7	(1.7)	21.0	(1.4)	26.3	(1.5)	100.0
Other non-ram related reasons (cost, proximity, availability)	25.8	(1.5)	29.0	(1.5)	45.2	(1.7)	100.0

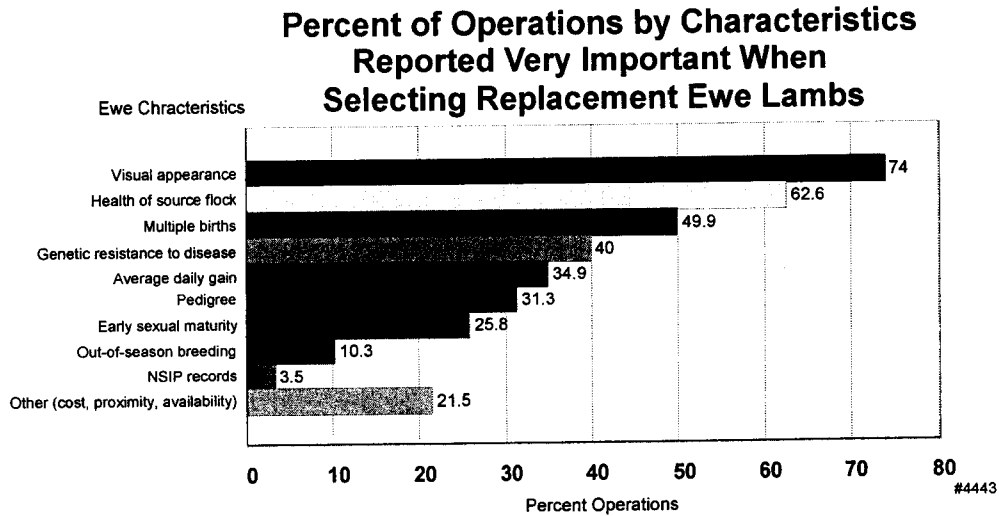


When selecting replacement ewe lambs, visual appearance (74.0 percent of operations) and health status of source flock (62.6 percent of operations) were the characteristics most frequently cited as very important. Multiple births were considered very important by 49.9 percent of operations. The National Sheep Improvement Program (NSIP) records were cited least often (3.5 percent of operations) as very important for selecting replacement ewe lambs.

b. For operations that bred ewes during 2000, percent of operations by importance of the following characteristics for selecting replacement ewe lambs during 2000:

Ewe Lamb Selection Characteristics	Percent Operations						Total
	Very Important		Somewhat Important		Not Important		
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
Visual appearance	74.0	(1.8)	17.9	(1.5)	8.1	(1.2)	100.0
Out-of-season breeding	10.3	(1.1)	17.6	(1.4)	72.1	(1.7)	100.0
National Sheep Improvement Program (NSIP) records (EPD)	3.5	(0.6)	14.5	(1.3)	82.0	(1.4)	100.0
Multiple births	49.9	(1.9)	27.9	(1.7)	22.2	(1.7)	100.0
Health status of source flock	62.6	(1.9)	17.5	(1.5)	19.9	(1.6)	100.0
Early sexual maturity	25.8	(1.6)	38.2	(1.9)	36.0	(1.9)	100.0
Pedigree	31.3	(1.8)	28.2	(1.8)	40.5	(1.9)	100.0
Average daily gain	34.9	(1.9)	33.1	(1.8)	32.0	(1.9)	100.0
Genetic resistance to diseases	40.0	(1.9)	28.2	(1.7)	31.8	(1.8)	100.0
Other non-ewe related reasons (cost, proximity, availability)	21.5	(1.6)	29.9	(1.8)	48.6	(1.9)	100.0





The majority of replacement ram lambs (73.2 percent) and replacement ewe lambs (83.8 percent) were born and raised on the operation. Few operations (7.3 percent) purchased bred ewes.

c. For operations that had replacement ram and ewe lambs in 2000, percent of replacement ram lambs and ewe lambs born and raised on the operation or acquired elsewhere:

Place	Percent Replacement Ram Lambs		Percent Replacement Ewe Lambs	
	Percent	Standard Error	Percent	Standard Error
Born and raised on the operation	73.2	(2.5)	83.8	(1.4)
Acquired elsewhere	26.8	(2.5)	16.2	(1.4)
Total	100.0		100.0	

d. Percent of operations that purchased or acquired bred ewes with the intention of lambing in 2000, by region:

Percent Operations									
Region									
Pacific		West Central		Central		Eastern		All Operations	
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
5.1	(1.7)	5.9	(1.1)	9.3	(1.4)	6.6	(1.9)	7.3	(0.8)

## C. Reproductive Outcomes

[Note: Data included in section "C" are for operations identified as primarily range and farm flocks, thus excluding operations identified as primarily feedlots.]

### 1. Outcome of ewes expected to lamb in 2000

a. For operations with ewes expected to lamb in 2000 (including ewes exposed or obtained already bred), percent of ewes (as of the January 1, 2001, inventory) by outcome:

Percent Ewes		
Outcome	Percent	Standard Error
Never became pregnant	5.3	(0.2)
Became pregnant, but were removed from the operation prior to lambing	0.9	(0.1)
Became pregnant, but died prior to or during lambing	1.6	(0.0)
Aborted (lamb small with off-color placental material)	0.9	(0.0)
Had multiple lambs, at least 1 live and 1 dead birth (full-term, normal size and development)	9.9	(0.4)
Had only dead births (full-term, normal size and development)	1.5	(0.1)
Had only live births	<u>79.9</u>	(0.4)
Total	100.0	

### 2. Outcome productivity measures

a. For operations with ewes expected to lamb in 2000 (including ewes exposed or obtained already bred), percent of ewes by outcome:

Percent Ewes*		
Outcome	Percent	Standard Error
Open (never became pregnant)	5.3	(0.2)
Became pregnant	94.7	(0.2)
Aborted	0.9	(0.0)
Died	1.6	(0.1)
Lambled	92.1	(0.2)

\*Excluding ewes that left the operation prior to lambing.

**3. Lambing season**

The average length (in days) of the lambing season for all operations was 55.8 days, which varied little across flock types.

a. Average length (in days) of lambing season, by flock type:

Average Number of Days							
Flock Type							
Herd/Open Range		Fenced Range		Farm		All Operations	
Days	Standard Error	Days	Standard Error	Days	Standard Error	Days	Standard Error
51.1	(3.0)	59.8	(3.6)	55.2	(1.7)	55.8	(1.5)

b. Percent of operations, by length (in days) of lambing season and by flock type:

Number Days	Percent Operations							
	Flock Type							
	Herd/Open Range		Fenced Range		Farm		All Operations	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Less than or equal to 14	0.0	(--)	4.9	(2.7)	7.3	(1.4)	6.9	(1.3)
15-42	59.6	(4.7)	39.5	(4.4)	45.6	(2.2)	45.1	(2.0)
43-84	31.4	(3.8)	40.7	(3.9)	33.6	(1.9)	34.4	(1.7)
85 or more	<u>9.0</u>	(1.4)	<u>14.9</u>	(2.5)	<u>13.5</u>	(1.4)	<u>13.6</u>	(1.3)
Total	100.0		100.0		100.0		100.0	

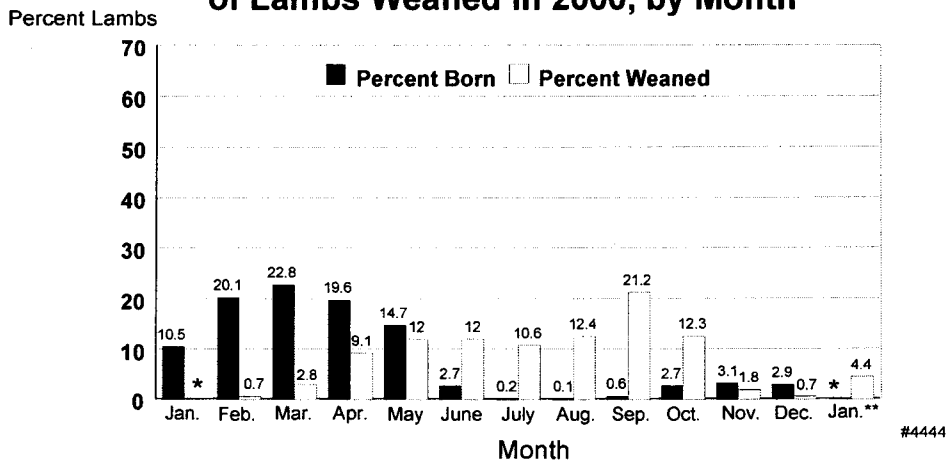
Overall, 77.2 percent of lambs born during 2000 were born in February, March, April, and May. The Pacific region reported the highest percentage (26.8 percent) of lambs born during the October to December period of any region. Only 8.7 percent of all lambs were born during October through December.

**4. Lambs born by month**

a. Percent lambs born in 2000, by month and by region:

Month	Percent Lambs Born									
	Region									
	Pacific		West Central		Central		Eastern		All Operations	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
January	18.6	(1.3)	6.6	(0.5)	12.5	(0.9)	14.1	(1.2)	10.5	(0.4)
February	25.9	(1.7)	13.6	(0.7)	28.1	(1.1)	25.8	(1.6)	20.1	(0.6)
March	16.9	(1.4)	22.6	(1.0)	26.0	(1.1)	25.5	(1.5)	22.8	(0.6)
April	8.6	(1.1)	24.5	(1.0)	17.5	(1.0)	15.1	(1.4)	19.6	(0.6)
May	1.8	(0.4)	22.0	(0.9)	10.0	(0.8)	6.8	(0.9)	14.7	(0.5)
June	0.6	(0.2)	4.2	(0.4)	1.2	(0.2)	2.2	(0.6)	2.7	(0.2)
July	0.2	(0.1)	0.2	(0.1)	0.2	(0.0)	0.5	(0.2)	0.2	(0.0)
August	0.1	(0.1)	0.1	(0.0)	0.2	(0.1)	0.4	(0.2)	0.1	(0.0)
September	0.5	(0.1)	0.3	(0.1)	0.7	(0.2)	2.0	(0.5)	0.6	(0.1)
October	8.0	(1.7)	1.7	(0.2)	1.5	(0.3)	2.2	(0.5)	2.7	(0.3)
November	10.1	(1.4)	2.3	(0.2)	0.9	(0.1)	1.8	(0.3)	3.1	(0.3)
December	<u>8.7</u>	(0.8)	<u>1.9</u>	(0.2)	<u>1.2</u>	(0.2)	<u>3.6</u>	(0.6)	<u>2.9</u>	(0.2)
Total	100.0		100.0		100.0		100.0		100.0	

**Percent of Lambs Born and Percent of Lambs Weaned in 2000, by Month**



\* Data not available

\*\*Lambs weaned January 2001 or later

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Over half of all operations had 1 or more lambs born in February (52.4 percent). The same was true for March (57.4 percent).

b. For operations where lambs were born in 2000, percent of operations with 1 or more lambs born in each of the following months, by region:

Month	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern			
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
January	46.4	(4.6)	21.5	(2.7)	32.1	(2.3)	36.0	(3.6)	32.5	(1.5)
February	66.6	(4.5)	38.1	(3.1)	52.2	(2.5)	60.5	(3.8)	52.4	(1.7)
March	57.8	(4.7)	51.4	(3.3)	60.6	(2.5)	62.7	(3.8)	57.4	(1.7)
April	27.0	(4.0)	35.4	(2.9)	38.8	(2.4)	33.1	(3.4)	34.9	(1.5)
May	14.2	(3.4)	18.7	(1.9)	17.9	(1.8)	14.2	(2.3)	16.7	(1.1)
June	6.7	(2.5)	6.8	(1.2)	4.5	(1.0)	6.6	(1.9)	5.8	(0.7)
July	4.4	(2.0)	0.9	(0.3)	2.7	(0.8)	2.0	(0.9)	2.4	(0.5)
August	1.8	(1.0)	1.2	(0.5)	2.5	(0.8)	1.7	(0.5)	1.9	(0.4)
September	1.9	(0.8)	2.3	(0.7)	4.7	(1.0)	5.5	1.4	3.7	(0.5)
October	2.4	(0.4)	7.4	(1.6)	5.9	(1.2)	5.3	(1.1)	5.6	(0.7)
November	3.6	(0.5)	11.3	(2.1)	5.2	(1.1)	5.3	(1.2)	6.5	(0.7)
December	9.6	(2.0)	13.9	(2.5)	4.5	(0.9)	7.4	(1.6)	8.3	(0.9)

## 5. Lambs born alive

a. For operations where lambs were born in 2000, percent of lambs born alive, by flock type:

Percent Lambs Born Alive							
Flock Type							
Herd Range		Fenced Range		Farm		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
96.6	(0.3)	95.9	(0.4)	95.1	(0.2)	95.7	(0.2)

## 6. Lamb crop

Lamb crop rate is defined as the number of lambs born (alive or dead) divided by the number of exposed ewes (minus the ewes removed from the operation prior to lambing). As expected, lamb crop rate was highest in farm flocks (1.5), as compared to either herded/open range flocks or fenced range flocks (1.2). The rate of lambs weaned is defined as the number of lambs weaned divided by the number of exposed ewes (minus the ewes removed from the operation prior to lambing).

a. For operations where lambs were born in 2000, birth and weaning rates by flock type:

Outcome	Rate							
	Flock Type							
	Herded/Open Range		Fenced Range		Farm		All Operations	
	Number	Stan. Error	Number	Stan. Error	Number	Stan. Error	Number	Stan. Error
Average number of lambs born per ewe exposed	1.2	(0.0)	1.2	(0.0)	1.5	(0.0)	1.4	(0.0)
Average number of lambs weaned per ewe exposed	1.1	(0.0)	1.0	(0.0)	1.3	(0.0)	1.2	(0.0)

## D. Lamb Management and Productivity

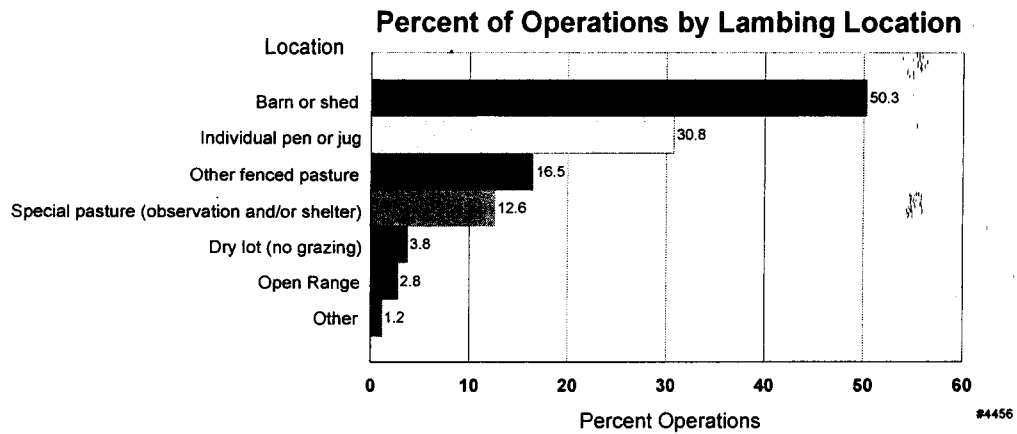
[Note: Data included in section "D" are for operations identified as primarily range and farm flocks, thus excluding operations identified as primarily feedlots.]

### 1. Lambing location

Half of operations (50.3 percent) had lambs born in a barn or shed, and nearly one-third of operations (30.8 percent) had lambs born in individual lambing pens. While only 2.8 percent of all operations allowed ewes to lamb on open range, over one-third (34.5 percent) of operations with 1,000 or more ewes lambled on open range. As a general practice, many operations allowed ewes to lamb in a group setting, such as in a large pen or shed, but moved ewe lamb pairs to individual jugs after lambing.

a. Percent of *operations* by lambing location and by flock size:

Location	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Individual lambing pen or jug	29.4	(2.6)	36.4	(2.1)	23.9	(1.4)	17.2	(1.1)	30.8	(1.5)
Barn or shed (covered without individual pens)	52.3	(2.8)	50.6	(2.3)	44.5	(1.6)	23.2	(1.3)	50.3	(1.7)
Special lambing pasture that allows increased observation and/or shelter	10.2	(1.7)	13.3	(1.4)	19.6	(1.3)	20.3	(1.3)	12.6	(1.0)
Other fenced pasture	14.8	(2.1)	16.4	(1.9)	22.9	(1.3)	26.6	(1.4)	16.5	(1.3)
Open range	0.3	(0.3)	2.3	(0.6)	10.3	(0.8)	34.5	(1.4)	2.8	(0.3)
Dry lot (pen which does not allow grazing)	2.5	(0.8)	4.7	(1.0)	6.1	(0.6)	6.1	(0.7)	3.8	(0.5)
Other	1.6	(0.8)	0.7	(0.4)	0.6	(0.3)	0.0	(--)	1.2	(0.5)



Over half the operations in the Central and Eastern regions used a barn or shed for lambing, while about one-third of operations in the Pacific and West Central regions used barns or sheds.

b. Percent of *operations* by lambing location and by region:

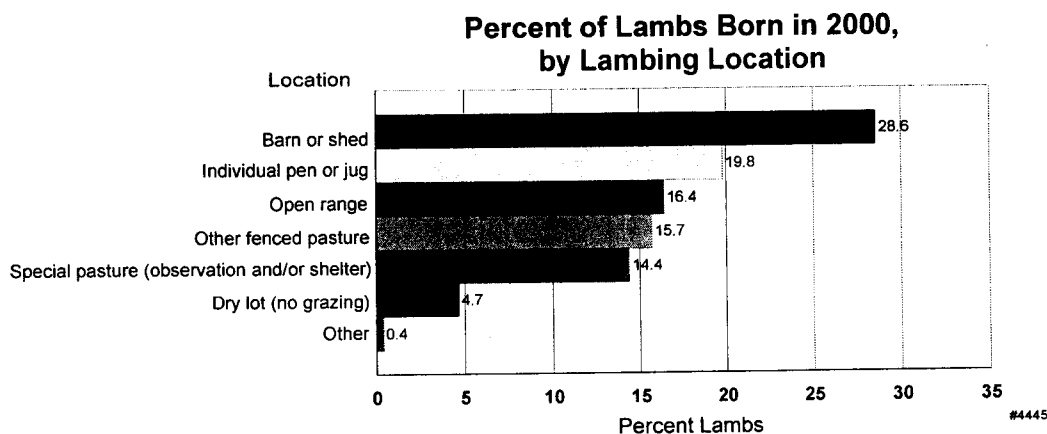
Location	Percent Operations							
	Region							
	Pacific		West Central		Central		Eastern	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Individual lambing pen or jug	29.3	(4.4)	25.3	(2.7)	38.6	(2.5)	20.5	(2.7)
Barn or shed (covered without individual pens)	37.7	(4.6)	38.3	(3.3)	56.7	(2.5)	69.6	(3.4)
Special lambing pasture that allows increased observation and/or shelter	23.2	(3.6)	17.6	(2.3)	6.0	(1.0)	8.7	(1.8)
Other fenced pasture	23.2	(3.8)	22.3	(2.7)	9.2	(1.5)	18.6	(3.0)
Open range	2.7	(0.8)	7.1	(0.7)	0.4	(0.1)	1.7	(1.1)
Dry lot (pen which does not allow grazing)	2.5	(1.0)	5.1	(1.2)	4.7	(1.0)	0.2	(0.1)
Other	4.5	(2.3)	0.1	(0.1)	0.7	(0.3)	0.3	(0.2)



Almost half (48.4 percent) of lambs born in 2000 were born in individual lambing pens, barns, or sheds. Almost one-third (31.2 percent) of lambs in flocks with 1,000 or more sheep were born on the open range.

c. Percent of *lambs born* in 2000, by lambing location and by flock size:

Location	Percent Lambs									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Individual lambing pen or jug	25.3	(2.4)	32.5	(1.8)	18.8	(1.0)	12.7	(1.4)	19.8	(0.8)
Barn or shed (covered without individual pens)	49.1	(3.0)	41.1	(1.9)	31.7	(1.2)	14.6	(1.2)	28.6	(0.8)
Special lambing pasture that allows increased observation and/or shelter	11.5	(2.2)	10.0	(1.1)	14.5	(0.9)	17.2	(1.8)	14.4	(0.8)
Other fenced pasture	10.1	(1.7)	9.4	(1.2)	17.9	(1.0)	18.4	(1.9)	15.7	(0.8)
Open range	0.1	(0.1)	2.7	(0.8)	12.0	(1.0)	31.2	(2.2)	16.4	(0.9)
Dry lot (pen which does not allow grazing)	2.8	(1.0)	3.8	(0.9)	4.4	(0.5)	5.9	(1.3)	4.7	(0.6)
Other	<u>1.1</u>	(0.6)	<u>0.5</u>	(0.3)	<u>0.7</u>	(0.4)	<u>0.0</u>	(--)	<u>0.4</u>	(0.1)
Total	100.0		100.0		100.0		100.0		100.0	



Approximately three-quarters of lambs born during 2000 in the Central and Eastern regions were born in pens, barns, or sheds. In comparison, about one-third of lambs were born in pens, barns, or sheds in the Pacific and West Central regions.

d. Percent of *lambs born* in 2000, by lambing location and by region:

Location	Percent Lambs							
	Region							
	Pacific		West Central		Central		Eastern	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Individual lambing pen or jug	14.9	(2.1)	14.5	(1.0)	33.7	(1.7)	18.8	(2.0)
Barn or shed (covered without individual pens)	16.4	(1.8)	18.3	(0.9)	50.2	(1.8)	55.2	(2.5)
Special lambing pasture that allows increased observation and/or shelter	24.1	(3.2)	16.2	(1.1)	5.7	(0.7)	11.0	(1.6)
Other fenced pasture	24.4	(3.3)	19.4	(1.2)	3.5	(0.5)	13.3	(2.0)
Open range	13.3	(3.4)	26.5	(1.4)	1.9	(0.5)	1.3	(0.5)
Dry lot (pen which does not allow grazing)	5.2	(1.9)	5.1	(0.9)	4.6	(0.7)	0.2	(0.1)
Other	<u>1.7</u>	(0.9)	<u>0.0</u>	(0.0)	<u>0.4</u>	(0.2)	<u>0.2</u>	(0.1)
Total	100.0		100.0		100.0		100.0	

## 2. Tail docking

Over 90 percent of lambs born alive had their tails docked. Lambs in the Eastern region were less likely to have tails docked.

a. For lambs born alive, percent that had tails docked, by region:

Percent Lambs									
Region									
Pacific		West Central		Central		Eastern		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
93.1	(1.1)	92.3	(0.6)	92.6	(0.8)	81.2	(2.1)	91.7	(0.4)

### 3. Castration

Ram lambs were castrated on over three-quarters (77.4 percent) of all operations. The percentage of operations that castrated ram lambs increased as flock size increased.

a. For operations that had 1 or more rams born alive in 2000, percent of operations that castrated ram lambs, by flock size:

Percent Operations									
Flock Size (Number Sheep and Lambs)									
1-24		25-99		100-999		1,000 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
70.8	(2.6)	81.6	(2.0)	91.7	(0.9)	95.2	(0.7)	77.4	(1.5)

Although the average age for ram lamb castration was 22.3 days, approximately one-third of rams lambs were castrated when older than this. The oldest age reported for castrating ram lambs was 180 days. The median age (middle value of reported ages) at castration was 14 days.

b. Operation average age (in days) of ram lambs at castration:

Operation Average Age (in Days)	Standard Error
22.3	(1.1)

c. Percent of operations that castrated ram lambs, by age:

Age Group (In Days)	Percent Operations	Standard Error
1-7	34.6	(1.7)
8-21	31.8	(1.8)
22 or more	<u>33.6</u>	(1.7)
Total	100.0	

#### 4. Monthly weaning distribution

Overall, lamb weaning peaked in May (30.5 percent of operations) and June (28.2 percent of operations). The West Central region had the largest percentage (36.7 percent) of operations that weaned lambs during fall (September through November).

a. For operations with lambs born during 2000, percent of operations with 1 or more lambs weaned, by month and by region:

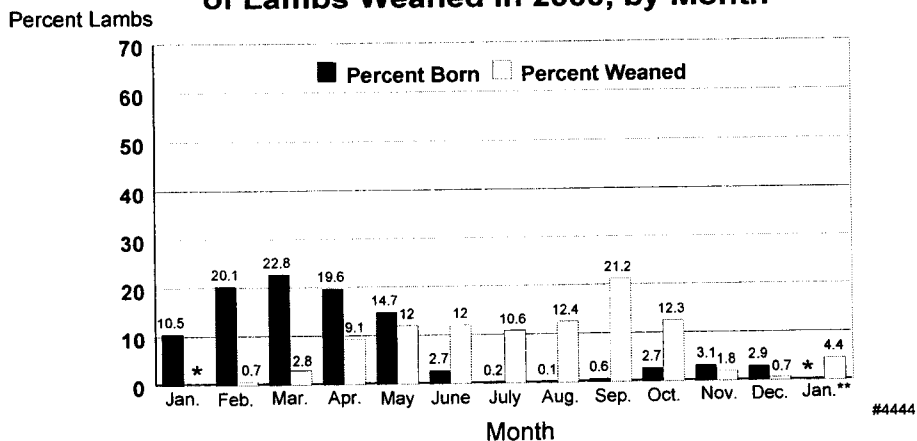
Month	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern			
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
February 2000	5.2	(2.1)	1.3	(0.7)	1.7	(0.6)	1.1	(0.8)	2.1	(0.5)
March	8.4	(2.9)	6.4	(1.7)	7.9	(1.1)	16.3	(2.8)	8.8	(0.9)
April	19.9	(3.7)	15.0	(2.8)	28.8	(2.1)	30.2	(3.3)	22.5	(1.4)
May	35.0	(4.5)	16.9	(2.5)	35.3	(2.4)	35.8	(3.6)	30.5	(1.5)
June	35.1	(4.5)	25.7	(3.1)	26.4	(2.2)	29.3	(3.5)	28.2	(1.6)
July	17.1	(3.3)	20.3	(2.8)	22.2	(2.2)	16.8	(2.5)	20.0	(1.4)
August	21.3	(4.0)	17.7	(2.4)	13.2	(1.7)	14.5	(2.7)	16.1	(1.3)
September	9.7	(2.7)	19.9	(2.4)	11.6	(1.6)	9.0	(2.1)	13.1	(1.1)
October	4.9	(2.2)	12.5	(1.7)	5.0	(1.1)	5.2	(1.5)	7.0	(0.8)
November	0.9	(0.3)	4.3	(1.5)	4.3	(1.0)	3.4	(0.8)	3.6	(0.6)
December	0.8	(0.3)	0.9	(0.2)	3.2	(0.8)	3.9	(0.9)	2.2	(0.4)
January 2001 or later	5.5	(1.7)	7.8	(2.0)	9.0	(1.5)	9.6	(2.1)	8.1	(0.9)

Although the greatest percentage of *operations* weaned lambs in May and June (table 4a), the highest percentage (21.2 percent) of lambs were weaned in September. This high percentage of weanings resulted from large West Central flocks weaning in September. More than half (53.1 percent) of lambs in the West Central region were weaned in September and October, compared to less than 15 percent in the other regions.

b. For lambs born in 2000, percent of lambs weaned, by month and by region:

Month	Percent Lambs									
	Region									
	Pacific		West Central		Central		Eastern		All Lambs	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
February	1.4	(0.9)	0.5	(0.1)	0.6	(0.2)	0.5	(0.2)	0.7	(0.2)
March	2.3	(1.0)	1.5	(0.2)	4.6	(0.7)	7.7	(1.1)	2.8	(0.3)
April	6.6	(1.2)	3.4	(0.4)	19.6	(1.2)	17.5	(1.6)	9.1	(0.4)
May	16.0	(2.0)	5.5	(0.6)	20.6	(1.1)	18.4	(1.7)	12.0	(0.5)
June	21.1	(1.9)	7.3	(0.6)	15.0	(1.1)	14.3	(1.7)	12.0	(0.5)
July	14.1	(2.2)	9.4	(0.8)	10.3	(0.9)	12.7	(1.6)	10.6	(0.6)
August	11.4	(2.1)	14.6	(1.0)	9.1	(0.9)	10.2	(1.6)	12.4	(0.7)
September	8.8	(1.9)	33.1	(1.5)	9.4	(1.0)	5.9	(1.1)	21.2	(0.9)
October	3.2	(0.9)	20.0	(1.2)	5.3	(0.8)	2.8	(0.6)	12.3	(0.7)
November	0.8	(0.4)	2.0	(0.3)	1.8	(0.4)	2.1	(0.5)	1.8	(0.2)
December	0.4	(0.2)	0.5	(0.1)	0.9	(0.2)	2.7	(0.8)	0.7	(0.1)
January 2001 or later	<u>13.9</u>	(2.7)	<u>2.2</u>	(0.3)	<u>2.8</u>	(0.4)	<u>5.2</u>	(0.9)	<u>4.4</u>	(0.5)
Total	100.0		100.0		100.0		100.0		100.0	

**Percent of Lambs Born and Percent of Lambs Weaned in 2000, by Month**



\* Data not available  
 \*\*Lambs weaned January 2001 or later

As the size of the operation increased, the age and weight of lambs at weaning tended to increase. Flocks with 1,000 or more sheep weaned lambs that averaged 3 weeks older and 8 pounds heavier, compared to the age and weight averages for all operations.

**5. Age and weight of lambs weaned**

a. Average age and weight of lambs weaned during 2000, by flock size:

Measure	Average									
	Flock Size (Number Sheep and Lambs)									
	1-24		25-99		100-999		1,000 or More		All Operations	
	Average	Standard Error	Average	Standard Error	Average	Standard Error	Average	Standard Error	Average	Standard Error
Age (weeks)	14.2	(0.3)	14.3	(0.3)	16.5	(0.2)	20.8	(0.2)	17.5	(0.1)
Weight (lbs.)	63.3	(1.3)	65.7	(0.9)	69.5	(0.6)	87.2	(0.8)	78.9	(0.4)

Lambs from the Pacific and West Central regions averaged over 7 weeks older and more than 20 pounds heavier at weaning than lambs from the Central and Eastern region.

b. Average age and weight of lambs weaned during 2000, by region:

Measure	Average							
	Region							
	Pacific		West Central		Central		Eastern	
	Average	Standard Error	Average	Standard Error	Average	Standard Error	Average	Standard Error
Age (weeks)	19.6	(0.4)	20.0	(0.2)	12.5	(0.2)	12.5	(0.3)
Weight (lbs.)	85.8	(1.5)	82.2	(0.5)	58.5	(0.7)	58.3	(1.0)

Weaning weights and ages varied widely among reported flock types. Weaning weights for herded/open range flocks averaged 20 pounds more than fenced range flocks, and over 30 pounds more than farm flocks. The average age at weaning on farm flocks was 8 and 6 weeks less than on herded/open and fenced range flocks, respectively.

c. Average age and weight of lambs weaned during 2000, by flock type:

Measure	Average					
	Flock Type					
	Herded/Open Range		Fenced Range		Farm	
	Average	Standard Error	Average	Standard Error	Average	Standard Error
Age (weeks)	21.8	(0.3)	19.4	(0.2)	13.7	(0.2)
Weight (lbs.)	95.2	(0.7)	75.4	(0.8)	64.0	(0.5)

d. Percent of lambs weaned during 2000, by age (in weeks):

Age (Weeks)	Percent Lambs	Standard Error
Less than 8	4.2	(0.3)
8-20	65.3	(1.1)
20 or more	<u>30.5</u>	(1.1)
Total	100.0	

In 2000, nearly half (46.0 percent) of all lambs weighed 80 pounds or more at weaning.

e. Percent of lambs weaned during 2000, by weight group (in lbs.):

Weight (Pounds)	Percent Lambs	Standard Error
Less than 60	23.1	(0.7)
60-79	30.9	(1.0)
80 or more	<u>46.0</u>	(1.0)
Total	100.0	

**E. Marketing**

**1. Operations that sold or moved lambs**

Less than 10 percent of all operations moved or sold lambs directly to a separate feedlot during 2000. In contrast, nearly half (42.1 percent) of herded/open range operations sold lambs to a separate feedlot.

a. Percent of operations that moved or sold lambs directly to a feedlot separate from the operation during 2000, by flock type:

Percent Operations									
Flock Type									
Herded/Open Range		Fenced Range		Farm		Feedlot		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
42.1	(7.0)	13.6	(1.7)	8.4	(0.9)	12.2	(5.4)	9.5	(0.8)

The majority (79.3 percent) of operations that sold lambs directly to a separate feedlot retained no ownership of these lambs.

i. For operations that sold or moved lambs directly to a separate feedlot during 2000, percent of operations by ownership arrangement (for the majority of lambs) and by flock type:

Ownership Arrangement	Percent Operations									
	Flock Type									
	Herded/Open Range		Fenced Range		Farm		Feedlot		All Operations	
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Retain complete ownership	12.9	(2.6)	22.6	(7.0)	13.1	(3.4)	38.0	(17.7)	15.1	(2.9)
Retain partial ownership	3.1	(1.2)	4.0	(1.5)	6.2	(3.6)	5.6	(4.3)	5.6	(2.7)
Retain no ownership	<u>84.0</u>	(3.1)	<u>73.4</u>	(6.8)	<u>80.7</u>	(4.6)	<u>56.4</u>	(17.8)	<u>79.3</u>	(3.7)
Total	100.0		100.0		100.0		100.0		100.0	



**2. Type of marketing**

Small operations (1-24 sheep) accounted for approximately half the operations that had sheep or lambs in 2000. Nearly one-fourth of these operations did not sell any sheep or lambs in 2000, which is the primary reason why just 86.0 percent of operations reported selling sheep or lambs in 2000.

a. Percent of operations that sold lambs (and percent operations that sold sheep) during 2000:

Percent Operations					
Sold Lambs		Sold Sheep		Sold Lambs or Sheep	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
84.5	(1.4)	51.9	(1.7)	86.0	(1.4)

The majority (56.8 percent) of nonfeedlot operations that sold weaned lambs reported selling lambs at an auction market or salebarn. However, auction/salebarn sales accounted for only 28.5 percent of all weaned lambs sold. Direct sales to slaughter/packer entities and direct sales to buyers/dealers each accounted for 22 percent of lambs sold. The majority (41.8 percent) of feedlot operations also sold market lambs at auction markets or salebarns. Not surprisingly, the majority of market lambs were sold direct to slaughter/packer entities.

b. For operations that *sold lambs*, percent of operations (and percent of lambs sold), by method sold:

Method Sold	Nonfeedlot Operations				Feedlot Operations			
	Percent Operations	Stan. Error	Percent Weaned Lambs	Stan. Error	Percent Operations	Stan. Error	Percent Market Lambs	Stan. Error
Direct sales to slaughter/packer	15.1	(1.2)	22.0	(1.5)	38.7	(12.6)	95.1	(1.8)
Direct sales to a feedlot separate from this operation	5.5	(0.7)	16.7	(0.9)	1.4	(0.8)	0.4	(0.3)
Direct sales to backgrounder (nonfeedlot feeders)	1.4	(0.3)	3.4	(0.4)	16.2	(13.2)	0.3	(0.2)
Direct sales to consumer or ethnic market	13.9	(1.3)	3.5	(0.5)	5.5	(2.8)	0.7	(0.6)
Sales at auction market/salebarn	56.8	(1.7)	28.5	(0.9)	41.8	(17.3)	0.7	(0.2)
Direct sales to buyer/dealer	18.0	(1.3)	22.0	(1.0)	19.6	(13.2)	2.6	(1.5)
Other	13.4	(1.2)	3.9	(0.5)	2.0	(1.2)	0.2	(0.2)
Total			100.0				100.0	

Similar to operations selling lambs, the majority (68.1 percent) of nonfeedlot operations selling sheep reported selling them to an auction market or salebarn. This method of sale accounted for the highest percentage (45.0 percent) of sheep sales. Direct sales to buyers or dealers were reported by 13.5 percent of operations but accounted for a high percentage (31.0 percent) of overall sheep sales. Feedlots reported a similar percentage (13.4 percent of operations) of direct sales to buyers or dealers but also a much higher percentage (67.5 percent of operations) of sheep sold from feedlots. This indicates that for both types of operations, direct sales to buyers or dealers involve markedly larger sheep lots on average than other methods of sale.

c. For operations that *sold sheep*, percent of operations (and percent of sheep sold), by method sold:

Method Sold	Nonfeedlot Operations				Feedlot Operations			
	Percent Operations	Stan. Error	Percent Sheep	Stan. Error	Percent Operations	Stan. Error	Percent Sheep	Stan. Error
Direct sales to slaughter/packer	12.8	(1.4)	12.2	(1.7)	11.3	(5.4)	14.6	(9.7)
Direct sales to a feedlot separate from this operation	1.4	(0.4)	1.8	(0.7)	0.0	(--)	0.0	(--)
Direct sales to backrounder (nonfeedlot feeders)	0.6	(0.1)	0.8	(0.2)	38.2	(23.9)	0.9	(1.0)
Direct sales to consumer or ethnic market	4.7	(1.0)	1.6	(0.3)	13.5	(9.3)	1.8	(1.4)
Sales at auction market/salebarn	68.1	(1.9)	45.0	(1.9)	34.0	(15.4)	15.2	(10.1)
Direct sales to buyer/dealer	13.5	(1.2)	31.0	(1.9)	13.4	(6.3)	67.5	(17.7)
Other	8.4	(1.2)	7.6	(1.3)	2.2	(1.9)	0.0	(0.0)
Total			100.0				100.0	

### 3. Weaned lambs sold

Lambs from herded/open range flocks were sold 2 weeks later than lambs from farm flocks. Herded/open range flock lambs were also the heaviest sold.

a. Average age and weight of lambs when sold during 2000, by flock type:

Measure	Average Flock Type							
	Herded/Open Range		Fenced Range		Farm		All Operations	
	Average	Standard Error	Average	Standard Error	Average	Standard Error	Average	Standard Error
Age (weeks)	24.2	(0.4)	24.2	(0.4)	21.8	(0.2)	23.2	(0.2)
Weight (lbs.)	103.9	(1.6)	89.9	(1.0)	98.4	(0.8)	96.8	(0.6)

The majority of lambs (50.2 percent) were sold between 20 to 26 weeks of age.

b. Percent of lambs sold during 2000, by age group (in weeks):

Age (Weeks)	Percent Lambs	Standard Error
Less than 20 weeks	24.0	(1.1)
20-26 weeks	50.2	(1.3)
27 or more weeks	<u>25.8</u>	(1.1)
Total	100.0	

Over three-fourths of all lambs sold at the operations where they were weaned were sold at 80 pounds or above (excluding feedlots).

c. Percent of lambs sold during 2000, by weight (pounds):

Weight (Pounds)	Percent Lambs	Standard Error
Less than 80 lbs.	22.6	(0.8)
80-99 lbs.	32.3	(1.2)
100 lbs. or more	<u>45.1</u>	(1.2)
Total	100.0	

**4. Weaned lambs sold by quarter**

Most operations (56.4 percent) sold lambs during the third quarter of 2000 (July - Sept.). Relatively few operations sold lambs in the first quarter of 2000 (Jan.- Mar.). This finding is consistent with seasonal breeding patterns and lambing dates in the U.S.

a. Percent *operations* that sold weaned lambs during each quarter of 2000, by region:

Quarter	Percent Operations								All Operations	
	Region									
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
Jan. - Mar.	8.5	(3.1)	7.8	(1.8)	7.1	(1.1)	10.0	(2.0)	7.9	(0.9)
April - June	46.4	(5.0)	25.9	(2.9)	34.4	(2.5)	47.6	(4.1)	35.9	(1.7)
July - Sept.	55.9	(5.0)	59.2	(3.2)	56.8	(2.7)	49.8	(4.1)	56.4	(1.8)
Oct. - Dec.	27.2	(4.5)	27.4	(2.5)	38.1	(2.7)	28.5	(3.5)	32.0	(1.6)

Overall, the highest percentage (43.3 percent) of lambs was sold during the third quarter of 2000, due to primarily the West Central and Central regions. The Pacific and Eastern regions sold their highest percentage of lambs during the second quarter.

b. Percent of weaned *lambs* sold during each quarter of 2000, by region:

Quarter	Percent Lambs								All Operations	
	Region									
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
Jan. - Mar.	4.1	(1.0)	3.5	(0.4)	5.3	(0.6)	9.3	(1.6)	4.4	(0.3)
April - June	45.5	(4.0)	11.5	(0.8)	24.8	(1.4)	37.3	(2.8)	21.5	(0.9)
July - Sept.	32.7	(3.0)	47.0	(1.5)	44.6	(1.7)	31.4	(2.8)	43.3	(1.1)
Oct. - Dec.	<u>17.7</u>	(2.4)	<u>38.0</u>	(1.5)	<u>25.3</u>	(1.5)	<u>22.0</u>	(2.5)	<u>30.8</u>	(1.0)
Total	100.0		100.0		100.0		100.0		100.0	

## 5. Culling

Nearly one-quarter (23.8 percent) of rams were culled and sold in 2000. Approximately one-fifth (18.3 percent) of ewes were culled and sold.

a. Percent of rams\* and percent of ewes\* that were culled and sold from breeding flocks during 2000, by region:

Gender	Percent								All Operations	
	Region									
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
Rams	30.3	(4.6)	20.3	(1.0)	26.1	(2.4)	33.7	(3.7)	23.8	(1.0)
Ewes	13.3	(0.9)	19.4	(0.7)	19.9	(1.2)	15.1	(1.3)	18.3	(0.5)

\*The number of culled rams and ewes sold during 2000, as a percent of the January 1, 2001, inventory, respectively.

During 2000, the highest percentage of culled rams and culled ewes was sold in July through September. The lowest percentage of culled rams and culled ewes was sold in January through March.

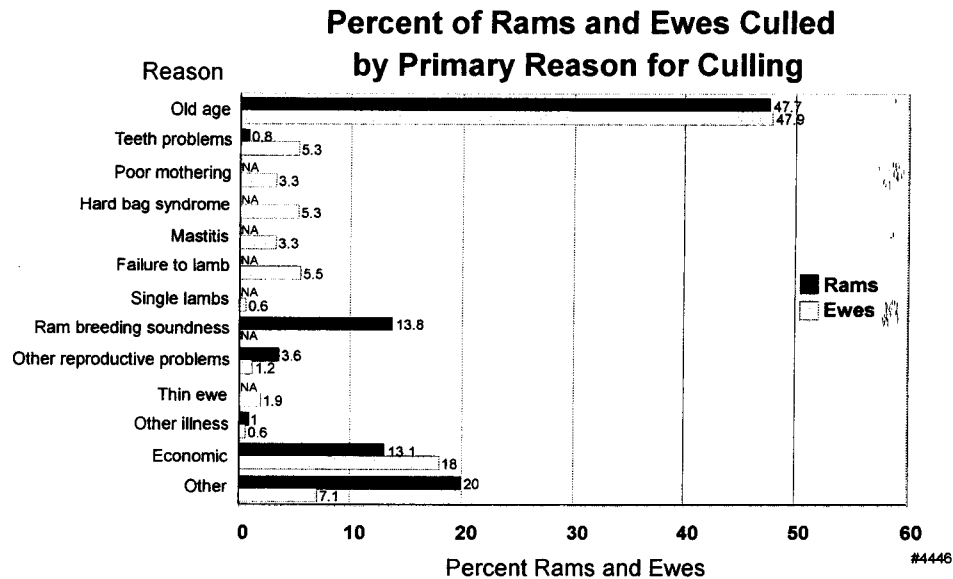
b. For rams and ewes culled and sold in 2000, percent of culled rams and culled ewes sold during 2000, by quarter:

Quarter	Percent			
	Culled Rams		Culled Ewes	
	Percent	Standard Error	Percent	Standard Error
Jan. - Mar.	9.1	(0.9)	8.1	(0.6)
April - June	24.3	(1.7)	25.9	(1.2)
July - Sept.	36.6	(2.1)	38.3	(1.6)
Oct. - Dec.	<u>30.0</u>	(1.9)	<u>27.7</u>	(1.3)
Total	100.0		100.0	

Nearly half of all culled rams (47.7 percent) and culled ewes (47.9 percent) were culled due to old age. Economics was the second most common reason (18.0 percent) for culling ewes. Twenty-percent of culled rams were culled because of other reasons, such as to improve flock quality or reduce flock size.

c. For rams and ewes culled and sold in 2000, percent of culled rams and ewes, by *primary* reason for culling:

Reason for Culling	Percent Rams	Standard Error	Percent Ewes	Standard Error
Old age	47.7	(2.1)	47.9	(1.8)
Teeth problems	0.8	(0.3)	5.3	(0.5)
Poor mothering	N/A	N/A	3.3	(0.3)
Hard bag syndrome	N/A	N/A	5.3	(0.3)
Mastitis	N/A	N/A	3.3	(0.2)
Failure to lamb (open or aborted)	N/A	N/A	5.5	(0.4)
Single lambs	N/A	N/A	0.6	(0.1)
Ram breeding soundness	13.8	(1.4)	N/A	N/A
Other reproductive problems	3.6	(1.1)	1.2	(0.4)
Thin ewe	N/A	N/A	1.9	(0.2)
Other illness	1.0	(0.3)	0.6	(0.1)
Economic (drought, herd reduction, market conditions)	13.1	(2.0)	18.0	(2.1)
Other	<u>20.0</u>	(1.8)	<u>7.1</u>	(1.1)
Total	100.0		100.0	



Rams were culled at an earlier age (4.6 years) than ewes (5.9 years) during 2000.

d. For operations that culled at least 1 ram or ewe during 2000, average age of rams and ewes at culling, by flock size:

Gender	Average Age (Years)									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Years	Stan. Error
Rams	4.4	(0.4)	4.1	(0.3)	4.8	(0.1)	4.9	(0.1)	4.6	(0.1)
Ewes	5.1	(0.3)	5.9	(0.1)	5.9	(0.1)	6.2	(0.1)	5.9	(0.1)

As flock size increased, so did the percentage of culled ewes that had a flock identification when they left the operation.

e. For operations that culled at least 1 ewe during 2000, percent of culled ewes that had a flock identification when they left the operation, by flock size:

Percent Culled Ewes									
Flock Size (Number Sheep and Lambs)								All Operations	
1-24		25-99		100-999		1,000 or More		Percent	Standard Error
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
27.9	(5.7)	35.3	(3.3)	55.0	(2.7)	66.5	(3.7)	54.9	(2.0)

**F. Death Loss**

**1. Sheep and lamb deaths—range and farm flocks**

Five-percent of adult sheep in range and farm flocks either died or were lost in 2000. A marginally higher percentage of sheep in farm flocks either died or were lost, compared to sheep in herded or fenced range flocks. The opposite was reported for lambs (table 1b). One out of every 10 lambs born alive during 2000 (on nonfeedlot operations) died during 2000.

a. For sheep in range and farm flock operations, percent of adult sheep\* that died or were lost in 2000, by flock type:

Percent Sheep							
Flock Type							
Herded/Open Range		Fenced Range		Farm		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
4.5	(0.1)	4.7	(0.1)	5.6	(0.2)	5.0	(0.1)

\*Number of adult sheep that died or were lost from all causes during 2000, as a percentage of the January 1, 2000, inventory.

The percentage of sheep that died or were lost in 2000 (on nonfeedlot operations) was fairly similar across the regions.

i. For sheep in range and farm flock operations, percent of sheep\* that died or were lost in 2000, by region:

Percent Sheep							
Region							
Pacific		West Central		Central		Eastern	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
5.5	(0.4)	4.7	(0.1)	5.1	(0.3)	5.3	(0.4)

\*Number of adult sheep that died or were lost from all causes during 2000, as a percentage of the January 1, 2000, inventory.

The percentage of lambs in range and farm flocks that either died or were lost in 2000 was highest in the West Central region. This might be because range flocks are found primarily in the West Central region, and range flocks typically have more problems with predators than farm flocks.

b. Percent of lambs\* that died or were lost in 2000, by flock type:

Percent Lambs							
Flock Type							
Herded/Open Range		Fenced Range		Farm		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
10.9	(0.2)	11.3	(0.5)	8.9	(0.5)	10.0	(0.3)

\*Number of lambs that died or were lost from all causes during 2000, as a percentage of lambs born alive in 2000:

i. For lambs in range or farm flock operations, percent of lambs\* that died or were lost in 2000, by region:

Percent Lambs							
Region							
Pacific		West Central		Central		Eastern	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
8.4	(0.5)	12.0	(0.4)	8.4	(0.4)	8.2	(0.5)

\*Number of lambs that died or were lost from all causes during 2000 as a percentage of lambs born alive in 2000.

## 2. Sheep and lamb deaths—feedlots

Only 2.2 percent of lambs and 4.4 percent of sheep placed in feedlots during 2000 either died or were lost.

a. For sheep and lambs in feedlots, percent of sheep\* and lambs that died or were lost in 2000:

Percent Sheep and Lambs		
Died	Percent	Standard Error
Sheep	4.4	(0.5)
Lambs	2.2	(0.2)

\*Number of sheep and lambs that died or were lost from all causes during 2000 as a percentage of the number placed on feed during 2000, respectively.



**G. Cause of Loss—All Flocks**

**1. Sheep**

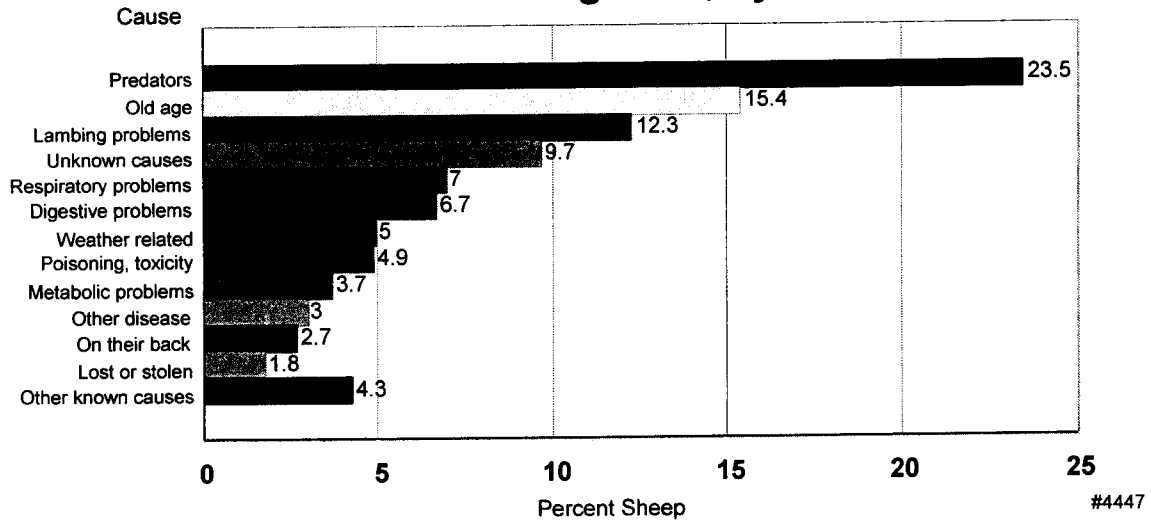
Predators, lambing problems, and old age accounted for over half (51.2 percent) of all adult sheep that died or were lost in 2000. Sheep in feedlots, however, were more likely to have died due to digestive (33.5 percent) or respiratory (54.4 percent) problems. Many losses reported in the 'other known cause' category were due to starvation.

a. Percent of sheep that died or were lost from the following causes during 2000, by flock type:

Cause	Percent Sheep									
	Flock Type									
	Herded/Open Range		Fenced Range		Farm		Feedlots		All Operations	
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
Predators	37.1	(1.9)	24.8	(1.2)	16.6	(2.0)	4.8	(3.8)	23.5	(1.0)
Digestive problems <sup>1</sup>	5.3	(1.0)	3.6	(0.5)	8.5	(0.9)	33.5	(3.4)	6.7	(0.6)
Respiratory problems <sup>2</sup>	3.4	(0.5)	3.8	(0.5)	8.5	(0.9)	54.4	(2.9)	7.0	(0.8)
Metabolic problems <sup>3</sup>	2.5	(0.3)	3.2	(0.6)	5.1	(0.8)	0.2	(0.1)	3.7	(0.4)
Other disease <sup>4</sup>	4.3	(0.4)	2.4	(0.3)	3.1	(0.5)	0.3	(0.1)	3.0	(0.2)
Weather-related causes <sup>5</sup>	1.7	(0.3)	10.3	(1.1)	1.9	(0.4)	0.6	(0.4)	5.0	(0.5)
Lambing problems	12.6	(1.0)	9.4	(0.6)	15.5	(1.1)	2.5	(1.3)	12.3	(0.5)
Old age	8.2	(0.7)	14.2	(1.1)	21.1	(1.3)	1.9	(1.0)	15.4	(0.8)
Being on their back	1.9	(0.2)	3.4	(0.2)	2.7	(0.3)	0.2	(0.1)	2.7	(0.2)
Poisoning/toxicity <sup>6</sup>	6.9	(0.7)	5.7	(0.6)	3.6	(0.9)	0.0	(--)	4.9	(0.5)
Lost or stolen	3.0	(0.7)	3.0	(1.0)	0.1	(0.0)	0.0	(--)	1.8	(0.4)
Other known causes	3.8	(1.1)	4.5	(1.0)	4.8	(0.7)	0.0	(--)	4.3	(0.5)
Unknown causes	<u>9.3</u>	(1.0)	<u>11.7</u>	(0.8)	<u>8.5</u>	(0.8)	<u>1.6</u>	(1.1)	<u>9.7</u>	(0.5)
Total	100.0		100.0		100.0		100.0		100.0	

<sup>1</sup> Bloat, scours, parasites, enterotoxemia, acidosis, etc.  
<sup>2</sup> Pneumonia, shipping fever, etc.  
<sup>3</sup> Milk fever, twin lamb disease, pregnancy toxemia, etc.  
<sup>4</sup> Mastitis, footrot, boils, etc.  
<sup>5</sup> Chilling, drowning, lightning, etc.  
<sup>6</sup> Nitrate poisoning, noxious feed/weeds, etc.

### Percent of Sheep that Died or Were Lost During 2000, by Cause



The most common cause of adult sheep deaths or losses in the Pacific and West Central regions was predators (21.6 percent and 28.8 percent, respectively). The Central and Eastern regions reported the most common cause of sheep deaths or losses as old age (22.2 percent and 18.1 percent, respectively).

b. Percent of sheep that died or were lost from the following causes in 2000, by region:

Cause	Percent Sheep							
	Region							
	Pacific		West Central		Central		Eastern	
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
Predators	21.6	(2.1)	28.8	(1.2)	14.3	(3.0)	15.2	(3.8)
Digestive problems <sup>1</sup>	7.9	(1.5)	5.2	(0.9)	8.6	(1.1)	10.4	(2.3)
Respiratory problems <sup>2</sup>	7.4	(1.2)	5.6	(1.3)	10.4	(1.2)	5.2	(1.1)
Metabolic problems <sup>3</sup>	6.9	(1.7)	2.3	(0.3)	5.1	(0.9)	2.2	(0.6)
Other disease <sup>4</sup>	4.0	(0.6)	2.6	(0.2)	3.4	(0.8)	2.4	(0.6)
Weather-related causes <sup>5</sup>	0.8	(0.2)	8.1	(0.9)	2.1	(0.4)	0.6	(0.3)
Lambing problems	11.2	(1.4)	10.9	(0.6)	15.2	(1.3)	17.0	(2.7)
Old age	18.0	(2.3)	11.3	(0.7)	22.2	(1.7)	18.1	(3.4)
Being on their back	3.5	(0.4)	2.6	(0.2)	2.6	(0.4)	1.8	(0.6)
Poisoning/toxicity <sup>6</sup>	0.6	(0.4)	6.4	(0.5)	4.4	(1.3)	5.8	(3.5)
Lost or stolen	5.7	(2.0)	1.3	(0.2)	0.3	(0.2)	0.1	(0.1)
Other known causes	4.8	(1.3)	4.4	(0.8)	3.0	(0.7)	7.4	(1.7)
Unknown causes	<u>7.6</u>	(1.4)	<u>10.5</u>	(0.6)	<u>8.4</u>	(0.9)	<u>13.8</u>	(0.2)
Total	100.0		100.0		100.0		100.0	

<sup>1</sup> Bloat, scours, parasites, enterotoxemia, acidosis, etc.

<sup>2</sup> Pneumonia, shipping fever, etc.

<sup>3</sup> Milk fever, twin lamb disease, pregnancy toxemia, etc.

<sup>4</sup> Mastitis, footrot, boils, etc.

<sup>5</sup> Chilling, drowning, lightning, etc.

<sup>6</sup> Nitrate poisoning, noxious feed/weeds, etc.

## 2. Lambs

Predators accounted for the highest percentage of lamb deaths or losses in open range flocks, fenced range flocks, and farm flocks. Lambs in feedlots died or were lost most commonly due to respiratory problems (39.3 percent) or digestive problems (28.3 percent). Only 4.2 percent of lambs in feedlots died or were lost due to predators.

a. Percent of lambs that died or were lost from the following causes during 2000, by flock type:

Cause	Percent Lambs									
	Flock Type									
	Herded/Open Range		Fenced Range		Farm		Feedlots		All Operations	
Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	
Predators	62.0	(1.8)	60.5	(1.4)	25.5	(2.2)	4.2	(0.8)	44.1	(1.1)
Digestive problems <sup>1</sup>	3.3	(0.3)	4.1	(0.4)	15.3	(1.0)	28.3	(4.7)	9.9	(0.6)
Respiratory problems <sup>2</sup>	4.1	(0.4)	4.5	(0.6)	16.5	(0.9)	39.3	(3.6)	11.7	(0.7)
Metabolic problems <sup>3</sup>	0.5	(0.1)	0.4	(0.1)	2.2	(0.4)	0.4	(0.1)	1.0	(0.1)
Other disease <sup>4</sup>	2.2	(0.4)	0.9	(0.1)	1.9	(0.4)	6.4	(2.1)	2.0	(0.3)
Weather-related causes <sup>5</sup>	8.2	(0.6)	15.4	(0.9)	11.4	(0.9)	1.6	(0.3)	11.2	(0.5)
Being on their back	0.1	(0.1)	0.1	(0.0)	0.1	(0.0)	0.0	(0.0)	0.1	(0.0)
Poisoning/toxicity <sup>6</sup>	1.6	(0.2)	0.9	(0.1)	0.9	(0.2)	0.1	(0.0)	1.0	(0.1)
Lost or stolen	2.0	(0.4)	0.6	(0.2)	0.2	(0.1)	0.0	(--)	0.7	(0.1)
Other known causes	5.5	(0.8)	3.4	(0.3)	12.3	(1.0)	9.3	(2.6)	7.3	(0.5)
Unknown causes	<u>10.5</u>	(1.2)	<u>9.2</u>	(1.0)	<u>13.7</u>	(1.0)	<u>10.4</u>	(2.8)	<u>11.0</u>	(0.6)
Total	100.0		100.0		100.0		100.0		100.0	

<sup>1</sup> Bloat, scours, parasites, enterotoxemia, acidosis, etc.

<sup>2</sup> Pneumonia, shipping fever, etc.

<sup>3</sup> Milk fever, twin lamb disease, pregnancy toxemia, etc.

<sup>4</sup> Mastitis, footrot, boils, etc.

<sup>5</sup> Chilling, drowning, lightning, etc.

<sup>6</sup> Nitrate poisoning, noxious feed/weeds, etc.

Predators accounted for the highest percentage of lamb deaths and losses in the Pacific (43.9 percent) and West Central (54.6 percent) regions. Lambs in the Central region died or were lost most commonly from respiratory or digestive problems as well as predators, while lambs in the Eastern region died or were lost most commonly from unknown causes, predators, or respiratory problems.

b. Percent of lambs that died or were lost from the following causes, by region:

Cause	Percent Lambs							
	Region							
	Pacific		West Central		Central		Eastern	
	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
Predators	43.9	(2.4)	54.6	(1.4)	16.9	(2.9)	18.5	(3.3)
Digestive problem <sup>1</sup>	9.4	(1.7)	6.3	(0.7)	21.4	(1.6)	10.0	(1.4)
Respiratory problem <sup>2</sup>	12.8	(1.7)	8.3	(1.0)	20.8	(1.3)	16.3	(2.3)
Metabolic problem <sup>3</sup>	0.5	(0.2)	0.6	(0.1)	1.9	(0.4)	3.7	(1.2)
Other disease <sup>4</sup>	1.3	(0.4)	2.3	(0.4)	1.8	(0.5)	2.2	(1.0)
Weather-related cause <sup>5</sup>	11.7	(1.5)	11.0	(0.6)	11.6	(1.1)	11.6	(2.3)
Being on their back	0.0	(0.0)	0.1	(0.0)	0.2	(0.1)	0.0	(--)
Poisoning/toxicity <sup>6</sup>	0.9	(0.3)	1.0	(0.1)	0.8	(0.3)	1.2	(0.7)
Lost or stolen	1.3	(0.4)	0.7	(0.1)	0.3	(0.1)	0.5	(0.3)
Other known cause	4.5	(0.8)	5.9	(0.5)	12.0	(1.5)	12.6	(2.2)
Unknown cause	<u>13.7</u>	(2.0)	<u>9.2</u>	(0.8)	<u>12.3</u>	(1.0)	<u>23.4</u>	(3.3)
Total	100.0		100.0		100.0		100.0	

<sup>1</sup> Bloat, scours, parasites, enterotoxemia, acidosis, etc.  
<sup>2</sup> Pneumonia, shipping fever, etc.  
<sup>3</sup> Milk fever, twin lamb disease, pregnancy toxemia, etc.  
<sup>4</sup> Mastitis, footrot, boils, etc.  
<sup>5</sup> Chilling, drowning, lightning, etc.  
<sup>6</sup> Nitrate poisoning, noxious feeds/weeds, etc.

## H. Carcass Disposal

### 1. Methods

Burial was the most common method of carcass disposal in the Pacific (52.2 percent), Central (60.2 percent), and Eastern (64.7 percent) regions. Operations in the West Central region left carcasses for scavengers most commonly (47.1 percent).

a. Percent of operations that used the following methods of carcass disposal during 2000, by region:

Method	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Landfill or municipal dump	10.8	(3.3)	15.0	(2.2)	2.7	(0.8)	3.5	(1.6)	7.5	(1.0)
Incineration (burned)	5.8	(1.7)	9.3	(1.5)	18.5	(1.5)	11.8	(2.6)	12.9	(1.0)
Burial (other than landfill or municipal dump)	52.2	(5.0)	30.3	(3.1)	60.2	(2.5)	64.7	(3.8)	51.7	(1.7)
Rendering	6.9	(2.7)	1.5	(0.9)	1.0	(0.4)	1.4	(1.2)	2.3	(0.6)
Composting	2.0	(0.8)	4.0	(1.4)	9.1	(1.4)	12.0	(2.4)	6.9	(0.8)
Leaving for scavengers (i.e., coyote, bears, vultures)	27.4	(4.3)	47.1	(3.1)	15.1	(1.8)	13.2	(2.4)	25.3	(1.4)
Other	5.8	(2.4)	1.2	(0.2)	2.1	(0.9)	2.4	(0.9)	2.6	(0.6)

Although operations reported burial as the most frequent means of carcass disposal (table 1a), this method accounted for just over one-fourth (27.1 percent) of disposed sheep and lambs. Almost half (47.4 percent) of all sheep and lamb carcasses were left for scavengers.

b. Percent of sheep and lambs disposed of during 2000, by method of disposal and by region:

Method	Percent Sheep and Lambs									
	Region								All Operations	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Landfill or municipal dump	7.8	(2.0)	8.4	(1.0)	2.8	(0.5)	1.9	(0.7)	6.9	(0.7)
Incineration (burned)	8.2	(2.3)	4.0	(0.6)	16.4	(1.5)	11.0	(2.6)	7.5	(0.6)
Burial (other than landfill or municipal dump)	42.5	(3.8)	15.2	(1.0)	45.3	(2.3)	55.2	(3.6)	27.1	(1.0)
Rendering	1.9	(0.8)	6.2	(1.9)	0.8	(0.4)	0.3	(0.2)	4.2	(1.2)
Composting	4.0	(1.1)	2.5	(0.6)	11.1	(1.4)	13.3	(2.5)	5.0	(0.5)
Leaving for scavengers (i.e., coyote, bears, vultures)	30.4	(2.8)	62.2	(1.8)	22.5	(2.5)	15.8	(2.6)	47.4	(1.3)
Other	5.2	(2.1)	1.5	(0.3)	1.1	(0.4)	2.5	(1.0)	1.9	(0.4)
Total	100.0		100.0		100.0		100.0		100.0	

## I. Management of Sheep and Lambs on Feed

### 1. Operations using high-energy diets

Overall, 26.2 percent of operations fed at least some of their animals a high-energy diet to ensure that they reached acceptable slaughter weight.

a. Percent of operations that fed any sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight, by flock size:

Percent Operations									
Flock Size (Number Sheep and Lambs)								All Operations	
1-24		25-99		100-999		1,000 or More		Percent	Standard Error
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error		
20.2	(2.1)	33.9	(2.1)	32.6	(1.6)	24.2	(1.3)	26.2	(1.3)

Almost all, (97.7 percent) feedlot operations reported feeding animals a high-energy diet for the purpose of reaching acceptable slaughter weight. The remaining 2.3 percent, many of which grass-fed animals to slaughter weight, did not report supplying a high-energy diet. Over one-fourth (28.6 percent) of farm flocks reported feeding sheep or lambs high-energy rations to reach slaughter weight.

b. Percent of operations that fed any sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight, by flock type:

Percent Operations							
Farmer Feeders						Commercial, Custom Feeders	
Herded/Open Range		Fenced Range		Farm		Feedlot	
Percent Operations	Standard Error	Percent Operations	Standard Error	Percent Operations	Standard Error	Percent Operations	Standard Error
7.0	(2.1)	7.6	(1.4)	28.6	(1.5)	97.7	(1.1)

**2. Source of sheep and lambs**

The majority of operations (96.1 percent) that fed sheep or lambs a high-energy diet fed animals that came from their own operation. Slightly over half of feedlots (56.6 percent) reported obtaining sheep and lambs from their own operation. This may be due to the fact that many of the operations that defined themselves as primarily feedlots also had farm or range flocks that lamb ed ewes. Feedlots also tended to obtain sheep or lambs from auctions, salebarns, or directly from other producers.

a. For operations that fed sheep or lambs a high-energy diet to reach acceptable slaughter weight, percent of operations that obtained lambs and sheep during 2000 from the following sources, by flock type:

Source	Percent Operations									
	Farmer Feeders						Commercial, Custom Feeders		All Operations	
	Herded/Open Range		Fenced Range		Farm		Feedlot			
Percent Operations	Stan. Error	Percent Operations	Stan. Error	Percent Operations	Stan. Error	Percent Operations	Stan. Error	Percent Operations	Stan. Error	
The operation	96.2	(1.8)	97.9	(1.0)	97.2	(1.1)	56.6	(13.7)	96.1	(1.1)
Auction or salebarn	11.4	(4.1)	7.3	(2.1)	2.7	(0.9)	36.9	(11.8)	3.9	(0.8)
Direct from the producer	3.4	(2.2)	3.7	(1.4)	3.5	(1.1)	24.4	(8.2)	4.1	(1.0)
Direct from buyer	0.0	(--)	1.5	(0.5)	2.0	(0.9)	13.4	(4.4)	2.3	(0.8)
Other known sources	0.0	(--)	0.0	(--)	0.0	(0.0)	1.1	(0.9)	0.1	(0.0)
Unknown sources	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)	0.0	(--)

Lambs fed a high-energy diet during 2000 to reach acceptable slaughter weight were most likely to come directly from producers (31.4 percent). However, other major sources included the operation itself (23.7 percent), auctions or salebarns (22.6 percent), and directly from buyers (22.2 percent). Sheep specifically fed to reach acceptable slaughter weight came from auctions/salebarns or were purchased directly from producers 80.1 percent of the time.

b. For operations that fed sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight, percent of sheep and lambs placed on feed during 2000 that were obtained from the following sources:

Source	Percent Sheep and Lambs			
	Lambs		Sheep	
	Percent	Standard Error	Percent	Standard Error
The operation	23.7	(1.8)	13.0	(4.0)
Auction or salebarn	22.6	(2.5)	33.4	(7.2)
Direct from the producer	31.4	(1.8)	46.7	(5.0)
Direct from buyer	22.2	(2.6)	3.6	(2.3)
Other known sources	0.1	(0.1)	3.3	(2.6)
Unknown sources	0.0	(0.0)	0.0	(0.0)
Total	100.0		100.0	



**3. Identification on arrival**

Only 8.1 percent of operations that fed sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight reported having any animals identified to their flock of origin upon arrival at the operation.

a. For operations that fed sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight, percent of operations where any sheep or lambs were identified upon arrival, by type of identification:

Type of Identification	Percent Operations	Standard Error
Individually identified (all individual animals have a unique ID)	44.4	(2.9)
Identified by flock of origin (all animals have the same or a flock ID)	8.1	(1.3)

For animals that were placed in feedlots during 2000, a similar percentage of sheep and lambs was identified individually (13.2 percent) and to their flock of origin (14.0 percent) upon arrival.

b. For operations that fed sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight, percent of sheep and lambs that were identified upon arrival, by type of identification used:

Type of Identification	Percent Sheep and Lambs	Standard Error
Individually identified	13.2	(2.2)
Identified by flock of origin	14.0	(3.2)

#### 4. Ownership

Overall, 95.6 percent of feedlots (farmer feeders and commercial feeders) owned the sheep or lambs placed on their feedlots during 2000. This accounted for approximately two-thirds (67.4 percent) of the sheep and lambs placed. Although feeder buyers owned 19.8 percent of sheep and lambs placed on feedlots in 2000, this arrangement accounted for animals placed in only 0.1 percent of feedlots.

a. For operations that fed sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight, percent of operations that placed any sheep or lambs in a feedlot in 2000 (and percent of sheep and lambs that were placed in those feedlots), by type of ownership.

Type of Ownership	Percent Operations	Standard Error	Percent Sheep and Lambs	Standard Error
Owned by feedlot	95.6	(1.2)	67.4	(5.5)
Partially or fully owned by a producer	4.7	(1.2)	10.6	(2.4)
Partially or fully owned by feeder buyers	0.1	(--)	19.8	(5.3)
Partially or fully owned by packer buyers	0.2	(0.1)	<u>2.2</u>	(1.1)
Total			100.0	

#### 5. Weight of placements

About two-thirds (65.0 percent) of operations that fed sheep or lambs a high-energy diet for slaughter placed animals at less than 65 pounds. However, nearly half the sheep or lambs (49.5 percent) were placed at 85 pounds or more.

a. For operations that fed sheep or lambs a high-energy diet for the purpose of reaching acceptable slaughter weight, percent of operations (and percent of lambs placed) by weight (in pounds) of market lambs when placed on feed:

Weight (in Pounds) When Placed	Percent Operations	Standard Error	Percent Lambs	Standard Error
Less than 65 lbs.	65.0	(2.8)	20.0	(2.1)
65-84 lbs.	28.9	(2.6)	30.5	(2.9)
85-105 lbs.	10.7	(1.7)	37.1	(3.2)
Greater than 105 lbs.	6.6	(1.5)	<u>12.4</u>	(2.6)
Total			100.0	

#### 6. Weight of market lambs

a. Average weight (in pounds) of market lambs sent to slaughter during 2000, by flock type:

Average Weight									
Farmer Feeders						Commercial, Custom Feeders		All Operations	
Herded/Open Range		Fenced Range		Farm		Feedlot			
Average Weight (lbs.)	Standard Error	Average Weight (lbs.)	Standard Error	Average Weight (lbs.)	Standard Error	Average Weight (lbs.)	Standard Error	Average Weight (lbs.)	Standard Error
130.0	(1.6)	123.8	(2.1)	122.6	(0.9)	139.5	(1.1)	134.7	(1.0)

## J. Grazing and Sheep Movement

[Note: Data included in section “J” are for operations identified as primarily range and farm flocks, thus excluding operations identified as primarily feedlots]

### 1. Grazing land

While only 2.0 percent of all range and farm flock operations used public land for grazing, over half (51.7 percent) of operations with 1,000 or more sheep did so. In addition, over three-fourths (77.4 percent) of these large operations leased private land.

a. Percent of range and farm flock operations that grazed sheep or lambs on the following types of land, by flock size:

Type of Land	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Public (PLGA)	0.3	(0.3)	0.5	(0.1)	6.4	(0.5)	51.7	(1.4)	2.0	(0.2)
Grazing association	0.0	(--)	0.4	(0.3)	0.8	(0.1)	10.9	(0.8)	0.4	(0.1)
Leased, private	25.4	(2.3)	35.0	(2.2)	47.7	(1.6)	77.4	(1.4)	32.0	(1.5)
Fed on crop “residue” or byproducts	4.6	(1.2)	7.6	(1.0)	21.2	(1.3)	37.3	(1.5)	8.1	(0.7)

### 2. Trucking

Only 9.3 percent of range and farm flock operations used a livestock trucking company to transport sheep or lambs. Of these, 48.0 percent did not know if the trucks/trailers were disinfected prior to transporting their sheep or lambs. Less than 1 in 10 operations reported that trucks/trailers were always disinfected prior to transporting their sheep or lambs.

a. Percent of range and farm flock operations that used a livestock trucking company to transport sheep or lambs in 2000:

Percent Operations	Standard Error
9.3	(0.8)

b. For range and farm flock operations that used a livestock trucking company to transport sheep or lambs in 2000, percent of operations by perceived frequency that the trucks/trailers were disinfected before transporting the operations’ sheep or lambs:

Percent Operations								
Frequency								Total
Always		Sometimes		Never		Don't Know		
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent
8.9	(2.7)	15.4	(2.7)	27.7	(3.7)	48.0	(4.3)	100.0

**K. Biosecurity**

**1. Herd additions**

Over half of range and farm flock operations with 100 or more animals added sheep or lambs (other than those born on the operation) during 2000. Operations with less than 100 animals were less likely to add sheep or lambs.

a. Percent of range and farm flock operations that added sheep or lambs in 2000 (other than those born on the operations), by flock size:

Percent Operations									
Flock Size (Number Sheep and Lambs)								All Operations	
1-24		25-99		100-999		1,000 or More			
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
24.8	(2.4)	38.8	(2.2)	53.2	(1.6)	56.5	(1.6)	33.2	(1.5)

Approximately one-third of all range and farm flock operations that added sheep or lambs reported adding replacement rams and ewes in each age category. Operations with 1,000 or more sheep and lambs were more likely to add replacement rams 1 year or older (57.5 percent) and less likely to add replacement ewe lambs (13.7 percent).

b. For range and farm flock operations that added any sheep or lambs in 2000, percent of operations that added sheep or lambs (other than those born on the operation), by age and gender category and by flock size:

Age and Gender Category	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More			
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Replacement ewe lambs less than 1 year old	33.7	(5.4)	41.0	(3.6)	26.3	(2.5)	13.7	(1.5)	34.4	(2.6)
Replacement ewes 1 year or older	26.9	(4.8)	25.3	(3.0)	36.5	(2.3)	34.1	(2.0)	28.4	(2.3)
Replacement ram lambs less than 1 year old	26.5	(5.0)	38.4	(3.4)	46.8	(2.4)	36.2	(1.9)	35.1	(2.4)
Replacement rams 1 year or older	33.7	(5.0)	38.8	(3.5)	43.5	(2.3)	57.5	(2.1)	38.2	(2.5)
All other sheep or lambs	17.1	(4.4)	5.3	(1.5)	10.7	(2.2)	15.2	(1.5)	11.4	(2.0)

Only 4.5 percent of sheep and lambs added to range and farm flock operations in 2000 were replacement rams, while 42.2 percent were replacement ewes. The remaining 53.3 percent of animals added were most likely fed and sold to slaughter.

c. For range and farm flock operations that added sheep or lambs in 2000, percent of sheep and lambs added, by age and gender category:

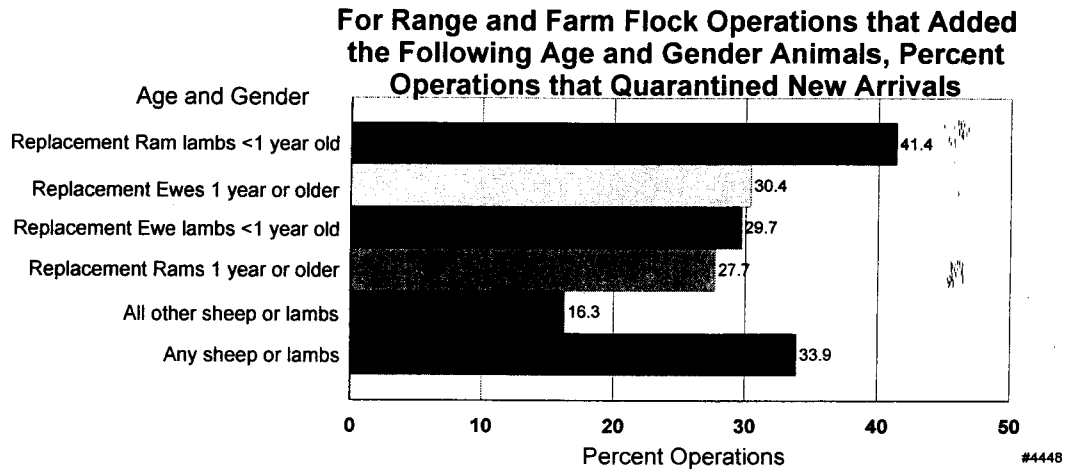
Age and Gender Category	Percent Sheep and Lambs	Standard Error
Replacement ewe lambs less than 1 year old	14.4	(2.1)
Replacement ewes 1 year or older	27.8	(2.9)
Replacement ram lambs less than 1 year old	2.1	(0.3)
Replacement rams 1 year or older	2.4	(0.3)
All other sheep or lambs	<u>53.3</u>	(4.7)
Total	100.0	

**2. Quarantine**

Adding new animals to the flock can present a health risk to resident animals, since new disease agents might be introduced. Only 33.9 percent of range and farm flock operations that added sheep or lambs in 2000 quarantined any new arrivals. This accounted for only 16.4 percent of new arrivals going through quarantine.

a. For range and farm flock operations that added sheep or lambs in 2000 of the following age and gender categories, percent of operations that quarantined any new arrivals (and percent of additions quarantined) by age and gender category:

Age and Gender Category	Percent Operations	Standard Error	Percent Additions	Standard Error
Replacement ewe lambs less than 1 year old	29.7	(4.2)	29.0	(6.0)
Replacement ewes 1 year or older	30.4	(4.2)	15.2	(2.1)
Replacement ram lambs less than 1 year old	41.4	(4.0)	39.8	(4.3)
Replacement rams 1 year or older	27.7	(3.4)	27.6	(2.4)
All other sheep or lambs	16.3	(7.1)	12.1	(3.3)
Any sheep or lambs	33.9	(2.4)	16.4	(2.4)



Of operations that added sheep or lambs and quarantined these new arrivals, the majority of operations quarantined replacement ewes and rams, regardless of age, for 7 to 30 days. Operations that quarantined all other sheep and lambs tended to quarantine them longer than 30 days (58.4 percent of operations).

b. For operations that added sheep or lambs (other than those born on the operation) of the following age and gender categories and that quarantined these new arrivals, percent of operations by average length of quarantine:

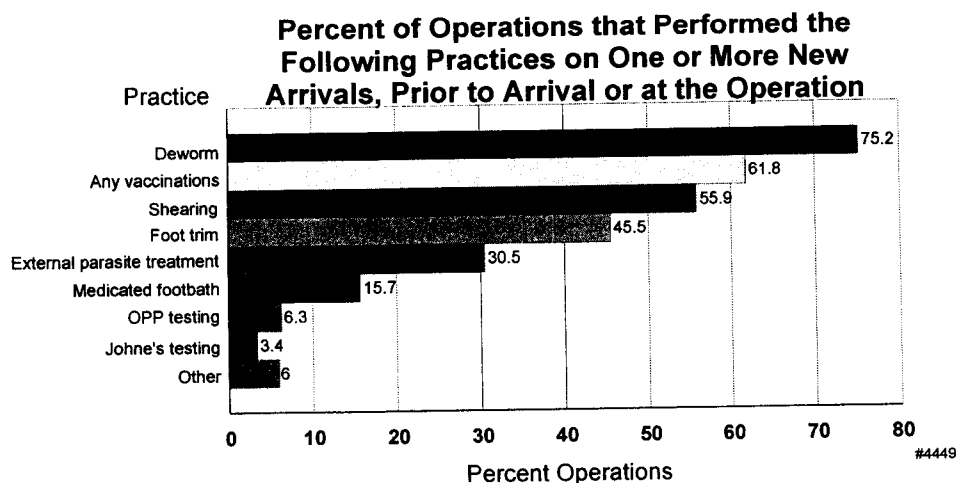
Age and Gender Category	Percent Operations						Total Percent
	Average Length of Quarantine						
	Less than 7 Days		7 to 30 Days		31 Days or More		
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	
Replacement ewe lambs less than 1 year old	2.7	(1.4)	83.6	(5.1)	13.7	(4.9)	100.0
Replacement ewes 1 year or older	6.1	(2.4)	65.6	(7.3)	28.3	(7.0)	100.0
Replacement ram lambs less than 1 year old	12.1	(5.5)	67.7	(6.0)	20.2	(4.2)	100.0
Replacement rams 1 year or older	8.7	(4.7)	64.3	(6.7)	27.0	(5.9)	100.0
All other sheep or lambs	1.1	(0.7)	40.5	(21.4)	58.4	(21.8)	100.0

### 3. Health management practices

On most operations, the following practices were performed on added sheep or lambs either prior to arrival at the operation or at the operation: deworming (75.2 percent); vaccination (61.8 percent); and shearing (55.9 percent). Few operations performed Ovine Progressive Pneumonia (OPP) testing (6.3 percent) or Johne's testing (3.4 percent) either before or after the animals arrived at the operation. However, if OPP tests were done, they were usually done prior to arrival at the operation. This was not the case for medicated footbaths, deworming, and external parasite treatments, where a larger percentage of operations performed these after the animals arrived at the operation.

a. For operations that added sheep or lambs in 2000 (other than those born on the operation), percent of operations where the following health management practices were performed on 1 or more of the new arrivals, by time frame:

Practice	Percent Operations					
	Time Frame					
	Prior to Arrival		At the Operation		Either Prior to Arrival or at the Operation	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
Any vaccinations	35.6	(2.5)	37.9	(2.5)	61.8	(2.5)
Shearing	32.2	(2.5)	29.1	(2.4)	55.9	(2.6)
Foot trim	21.4	(2.1)	31.7	(2.5)	45.5	(2.6)
Medicated footbath	6.1	(1.4)	12.0	(1.9)	15.7	(2.0)
Deworm	33.1	(2.5)	57.5	(2.6)	75.2	(2.3)
External parasite treatment	13.6	(1.8)	21.7	(2.0)	30.5	(2.3)
OPP (Ovine progressive pneumonia) testing	6.0	(1.2)	0.5	(0.1)	6.3	(1.2)
Johne's testing	3.3	(0.9)	0.2	(0.1)	3.4	(0.9)
Other	3.8	(0.9)	3.3	(0.7)	6.0	(1.0)



Numerous wild and domestic species had access to sheep raising areas (e.g., any grazing areas, sheds, holding pens, food, or water). The most common species reported, by percentage of operations, were: cats (78.2 percent); dogs (77.4 percent); predators (66.2 percent); deer, elk, or moose (58.3 percent); cattle (42.7 percent); and horses or donkeys (38.1 percent).

b. Percent of operations where the following species had access to sheep raising areas<sup>6</sup> (i.e., any grazing areas, sheds, holding pens, food, or water) during 2000, by region:

Species	Percent Operations									
	Region								All Operations	
	Pacific		West Central		Central		Eastern		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Bighorn sheep	0.7	(0.6)	1.3	(0.2)	0.1	(0.1)	0.2	(0.1)	0.5	(0.1)
Goats (domestic or wild)	24.9	(4.0)	26.4	(2.6)	16.7	(1.8)	20.4	(3.1)	21.3	(1.3)
Deer, elk, moose	55.3	(4.5)	62.7	(3.3)	57.1	(2.5)	57.9	(3.8)	58.3	(1.7)
Cattle	37.5	(4.3)	58.9	(3.2)	39.6	(2.4)	29.4	(3.3)	42.7	(1.6)
Horses, donkeys	33.7	(4.3)	58.0	(3.2)	31.9	(2.4)	25.5	(3.2)	38.1	(1.6)
Llamas, alpacas	15.4	(2.9)	12.5	(1.6)	7.4	(1.2)	4.2	(1.2)	9.8	(0.9)
Pigs (domestic or feral)	5.4	(1.9)	11.4	(2.0)	4.3	(1.0)	6.4	(1.7)	6.6	(0.8)
Poultry (chickens, etc.)	32.5	(4.3)	24.0	(2.8)	25.1	(2.2)	17.2	(3.0)	25.1	(1.5)
Dogs	82.6	(3.6)	78.5	(2.7)	76.9	(2.1)	70.0	(3.6)	77.4	(1.4)
Cats	79.8	(3.8)	70.1	(2.8)	83.5	(1.9)	75.7	(3.3)	78.2	(1.4)
Predators (i.e., coyotes, bears, wolves)	71.1	(4.3)	72.6	(3.1)	64.6	(2.4)	52.7	(3.8)	66.2	(1.6)



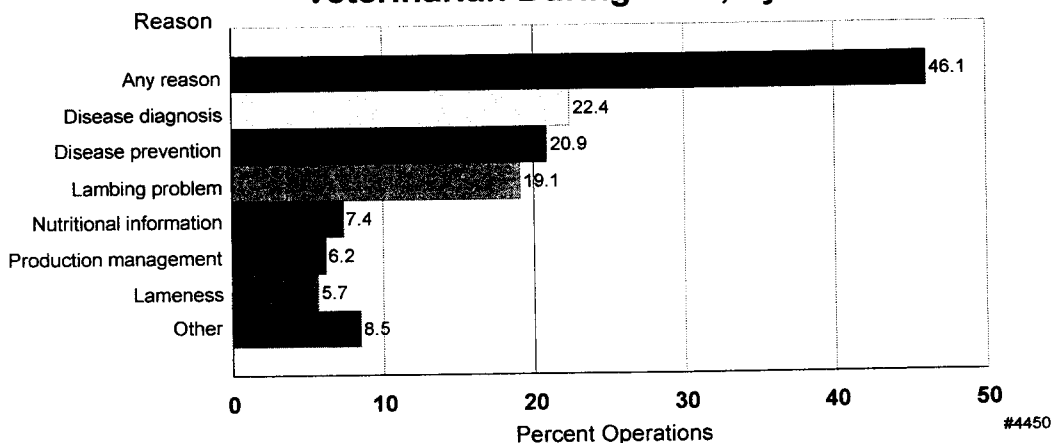
#### 4. Use of veterinarian or other professional

Disease diagnosis, disease prevention, and lambing problems were the top reasons given for veterinary consultation. Fewer operations with less than 25 sheep and lambs consulted a veterinarian for any reason than did larger operations. Overall, just 46.1 percent of operations consulted a veterinarian during 2000. Previous NAHMS studies of other commodities show significantly higher percentages of veterinary consultation: Swine 2000, 78.0 percent; Equine '98, 73.8 percent; Dairy '96, 98.1 percent; Feedlot '99, 97.4 percent; and Beef '97, 55.0 percent.

a. Percent of operations that consulted a veterinarian for the following reasons during 2000, by flock size:

Reason	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Sheep disease diagnosis	15.6	(1.9)	28.6	(2.0)	33.3	(1.6)	39.6	(1.5)	22.4	(1.3)
Sheep disease prevention	14.3	(1.8)	27.6	(2.0)	30.1	(1.5)	36.1	(1.4)	20.9	(1.2)
Sheep nutritional information	4.7	(1.1)	9.7	(1.3)	11.9	(1.1)	16.9	(1.1)	7.4	(0.7)
Sheep production management practices	3.2	(0.9)	8.9	(1.2)	11.7	(1.3)	12.5	(0.9)	6.2	(0.6)
Lambing problem	12.9	(1.7)	27.6	(1.9)	24.7	(1.5)	15.4	(1.0)	19.1	(1.2)
Lameness	3.9	(1.0)	7.8	(1.3)	7.7	(1.0)	9.9	(0.8)	5.7	(0.7)
Other	7.2	(1.5)	9.5	(1.3)	11.1	(1.0)	11.7	(0.9)	8.5	(0.9)
Any reason	36.8	(2.6)	57.9	(2.2)	54.5	(1.6)	58.9	(1.5)	46.1	(1.6)

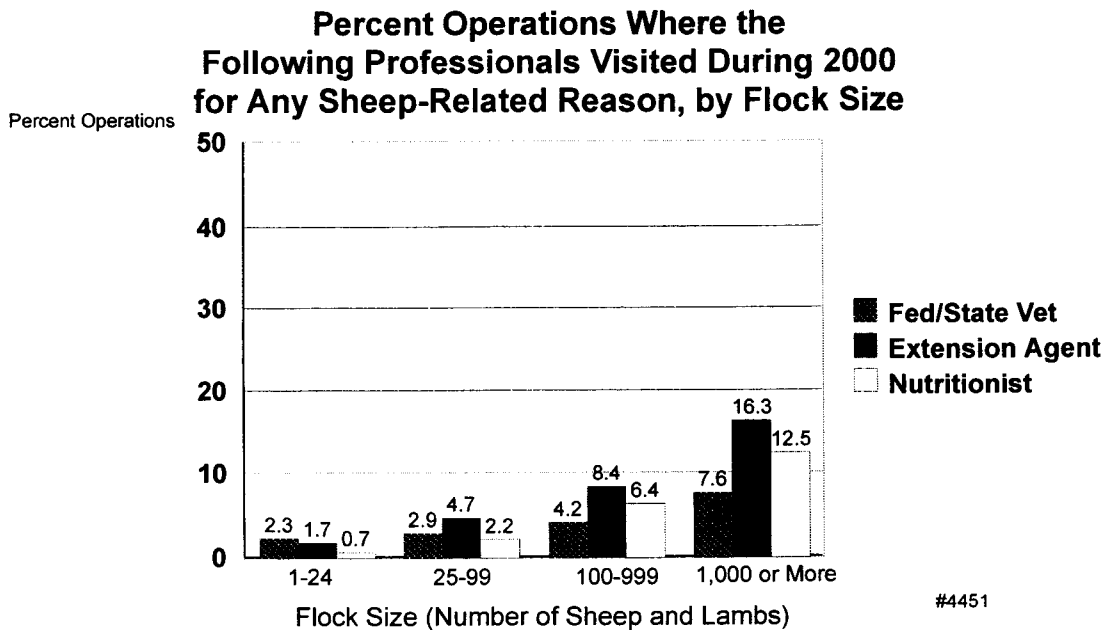
**Percent of Operations that Consulted a Veterinarian During 2000, by Reason**



Few operations were visited by Federal or State veterinarians, extension agents, or nutritionists for sheep-related reasons in 2000. Operations with 1,000 or more sheep reported a larger percentage of visits from extension agents (16.3 percent), nutritionists (12.5 percent), and Federal/State veterinarians (7.6 percent) than did smaller operations. Overall, the percentage of operations visited by any of the listed professions increased as the size of operation increased.

d. Percent of operations where the following professionals visited for any sheep-related reason during 2000, by flock size:

Professional	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Federal/State veterinarian	2.3	(0.9)	2.9	(0.6)	4.2	(0.6)	7.6	(0.8)	2.9	(0.5)
Extension agent	1.7	(0.7)	4.7	(0.9)	8.4	(0.8)	16.3	(1.1)	3.7	(0.5)
Nutritionist	0.7	(0.4)	2.2	(0.6)	6.4	(0.8)	12.5	(0.9)	2.1	(0.3)



## L. Shearing

### 1. Shearing management

a. Percent of operations that sheared any sheep or lambs destined for breeding and/or marketing during 2000:

Purpose	Percent Operations	Standard Error
Breeding	89.5	(1.2)
Marketing	22.3	(1.4)
Either breeding or marketing	90.4	(1.1)

Shearing was performed typically by a hired individual (65.3 percent of operations) rather than employees (21.2 percent of operations) or contracted shearing crews (15.1 percent of operations). This was true for all operations, except those with 1,000 or more sheep. As expected, the majority (89.6 percent) of large operations used contracted shearing crews.

b. For operations that sheared sheep in 2000, percent of operations by type of shearer used on the operation and by size of site:

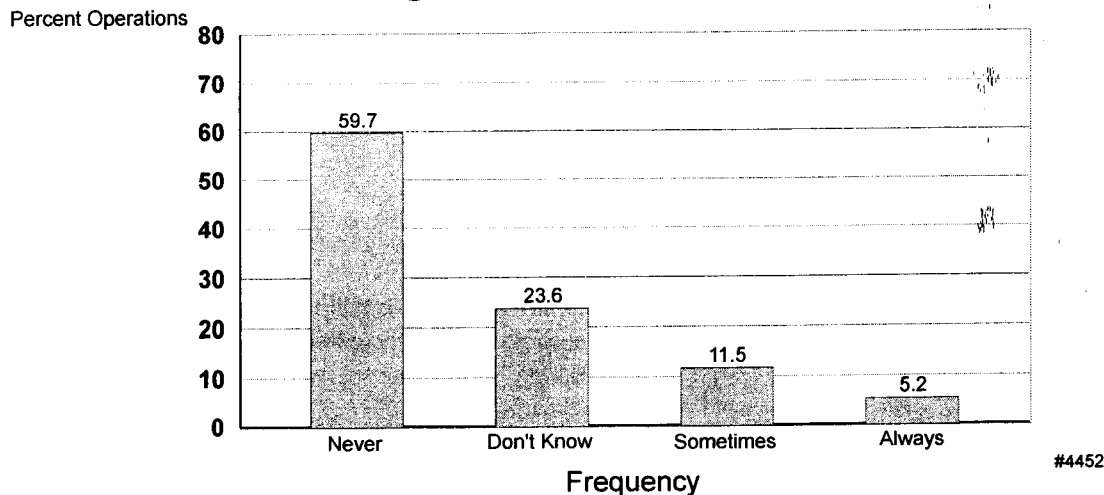
Type of Shearer	Percent Operations								All Operations	
	Flock Size (Number Sheep and Lambs)									
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
Employees of operation (including owners)	21.6	(2.4)	24.6	(2.0)	13.2	(1.1)	6.0	(0.9)	21.2	(1.4)
Contracted shearing crew	6.7	(1.4)	12.6	(1.4)	44.4	(1.6)	89.6	(1.0)	15.1	(0.9)
Hired individual	71.0	(2.6)	66.9	(2.1)	46.3	(1.7)	10.6	(1.0)	65.3	(1.6)
Other	4.5	(1.3)	2.0	(0.7)	1.3	(0.2)	0.5	(0.2)	3.2	(0.7)

New infections (e.g., caseous lymphadenitis) can be introduced into a flock during shearing, especially when shears are not disinfected between sheep. Only 5.2 percent of operations reported that shears were always disinfected between sheep. More than half the operations (59.7 percent) reported that shears were never disinfected between sheep.

c. For operations that sheared sheep in 2000, percent of operations by the frequency of disinfecting shears between individual sheep:

Percent Operations							Total	
Frequency								
Always		Sometimes		Never		Don't Know		
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	
5.2	(0.8)	11.5	(1.1)	59.7	(1.7)	23.6	(1.5)	100.0

### Percent of Operations by Frequency of Disinfecting Shears Between Individual Sheep



Shearing the youngest animals first and working toward the oldest can reduce the spread of infections from sheep to sheep within a flock. Only 2.3 percent of operations reported shearing the youngest sheep first, while 4.1 percent reported shearing purposely from the oldest to the youngest sheep. In general, as the size of the operations increased so did the percentage that sheared from youngest to oldest.

d. For operations that sheared sheep in 2000, percent of operations by order of shearing sheep and by size of site:

Order	Percent Operations									
	Flock Size (Number Sheep and Lambs)								All Operations	
	1-24		25-99		100-999		1,000 or More		Percent	Stan. Error
	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error	Percent	Stan. Error
From youngest to oldest	1.7	(0.7)	2.5	(0.6)	3.6	(0.4)	7.0	(0.7)	2.3	(1.4)
From oldest to youngest	3.8	(1.1)	3.6	(0.8)	5.2	(0.7)	13.4	(1.0)	4.1	(0.9)
In no particular age order	94.5	(1.3)	93.1	(1.1)	90.3	(0.8)	74.6	(1.3)	93.1	(1.6)
Based on time on feed (feedlots)	<u>0.0</u>	(--)	<u>0.8</u>	(0.4)	<u>0.9</u>	(0.2)	<u>5.0</u>	(0.6)	<u>0.5</u>	(0.7)
Total	100.0		100.0		100.0		100.0		100.0	

## M. Wool Management

### 1. Management practices

Wool from operations that sheared sheep was managed in numerous ways. The most common practices reported were: selling on a greasy basis (44.2 percent); storing in bags (38.4 percent); throwing away (21.6 percent); and giving away (19.9 percent).

a. For operations that sheared sheep, percent of operations by wool management practices during 2000:

Practice	Percent Operations	Standard Error
Analyzed by a laboratory	3.8	(0.4)
Sold on a clean basis	10.8	(1.0)
Sold on a greasy basis	44.2	(1.6)
Given away	19.9	(1.5)
Spun	7.9	(1.0)
Used for animal bedding	2.3	(0.5)
Used for mulch	3.8	(0.7)
Used for insulation	1.1	(0.4)
Stored in bags	38.4	(1.6)
Thrown away	21.6	(1.5)
Other	4.4	(0.7)

b. For operations that sold wool on a greasy basis or on a clean basis, percent of operations by primary marketing arrangement for the wool during 2000:

Marketing Arrangement	Percent Operations	Standard Error
Cooperative pools	28.3	(1.9)
Direct sales	43.6	(2.1)
Warehouses	21.1	(1.6)
Other	7.0	(1.2)
Total	100.0	

## N. External Parasite Treatment

### 1. Treatment

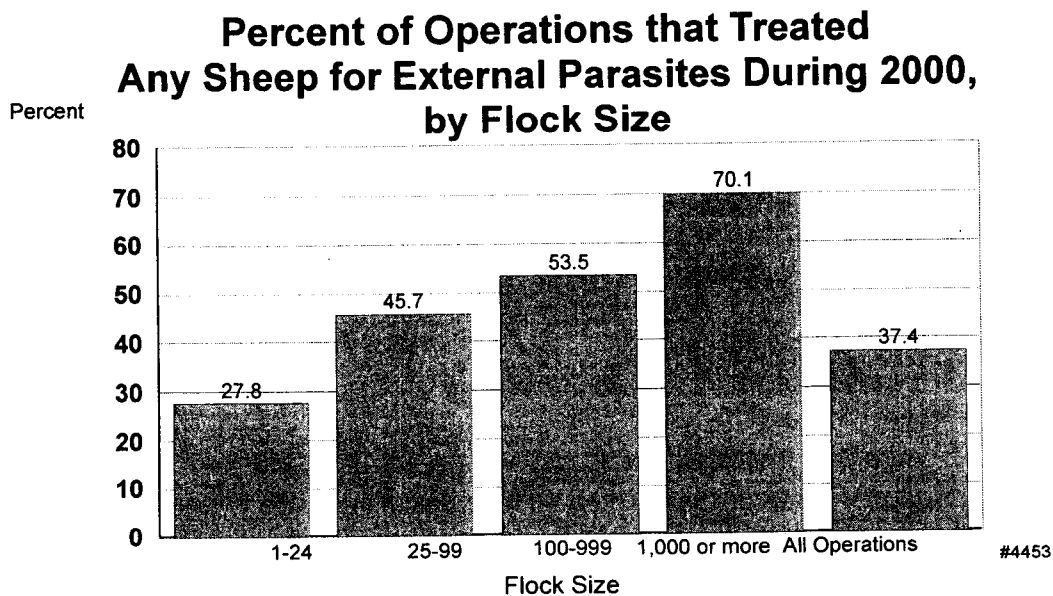
About one-third (37.4 percent) of operations treated any sheep for external parasites such as keds, ticks, or lice during 2000. As operation size increased, so did the percentage of operations that reported treating for external parasites.

a. Percent of operations that treated any sheep for external parasites (such as keds, ticks, or lice) during 2000, by flock size:

Percent Operations									
Flock Size (Number Sheep and Lambs)									
1-24		25-99		100-999		1,000 or More		All Operations	
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error
27.8	(2.4)	45.7	(2.2)	53.5	(1.6)	70.1	(1.4)	37.4	(1.5)

b. Percent of operations that treated any sheep for external parasites (such as keds, ticks, or lice) during 2000, by region:

Percent Operations									
Region									
Pacific		West Central		Central		Eastern			
Percent	Standard Error	Percent	Standard Error	Percent	Standard Error	Percent	Standard Error		
38.3	(4.1)	44.1	(3.0)	35.8	(2.3)	28.6	(3.1)		



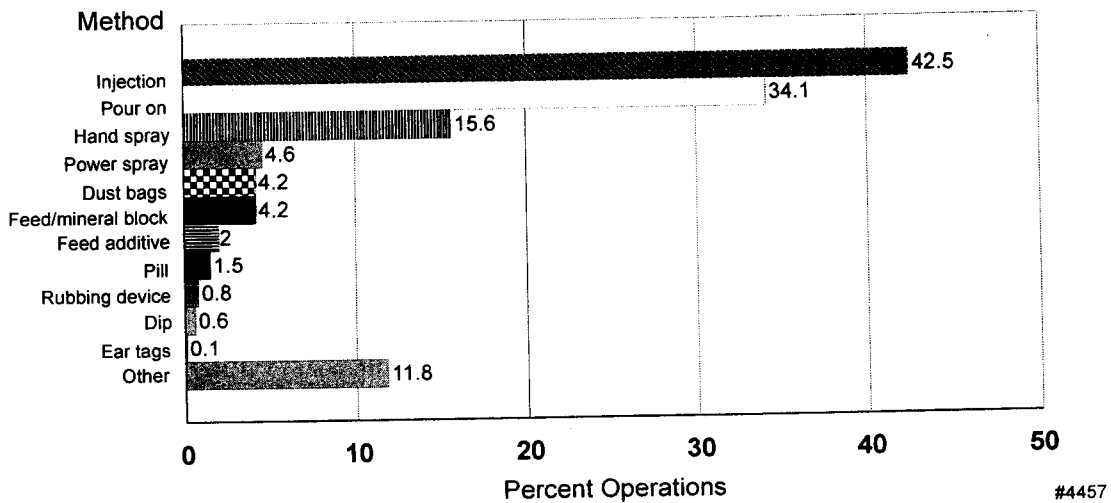
**2. Treatment methods**

External parasite treatment methods reported most frequently were: injections (42.5 percent of operations); pour on treatments (34.1 percent of operations); and hand sprays (15.6 percent of operations).

a. For operations that treated any sheep for external parasites during 2000, percent of operations by treatment method used:

Treatment Method	Percent Operations	Standard Error
Hand spray	15.6	(1.9)
Power spray	4.6	(0.6)
Injection	42.5	(2.4)
Feed additive	2.0	(0.8)
Pour on	34.1	(2.1)
Dust bags	4.2	(1.3)
Ear tags	0.1	(0.1)
Dip	0.6	(0.2)
Feed/mineral block	4.2	(1.1)
Rubbing device	0.8	(0.5)
Pill	1.5	(0.5)
Other	11.8	(1.6)

**Percent of Operations by Treatment Method Used for External Parasites**



## Section II: Methodology

### A. Needs Assessment

NAHMS develops study objectives by exploring existing literature and contacting industry members about their informational needs and priorities during a needs assessment phase. The needs assessment for the NAHMS Sheep 2001 study afforded producers and others affiliated with the sheep industry the opportunity to prioritize sheep health and productivity issues so the study could focus on the areas of greatest importance. The objective of the needs assessment for the NAHMS Sheep 2001 study was to conduct a national survey to collect information from U.S. sheep producers and other commodity specialists about what they perceived to be the most important sheep health and productivity issues. A driving force of the needs assessment was the desire of NAHMS to obtain as much input as possible from a variety of sheep producers, as well as from industry experts and representatives, veterinarians, sheep extension specialists, universities, and sheep organizations.

A population survey entitled "Sheep Health Study Survey," was the primary data collection method used to collect qualitative data for the NAHMS Sheep 2001 study needs assessment. The survey was accessible in 1 of 2 ways: by linking to the USDA:APHIS:VS website; or by calling a toll free telephone number. The survey was available beginning February 15, 2000. Initially it was to end March 31, 2000. However, in order to capture as many responses as possible, and because there was a fairly high response rate, the data collection period was extended to April 30, 2000. Web and phone responses were automatically put into a database for later summarization. Surveys were also distributed to all state veterinarians, as well as to a number of sheep extension specialists, sheep organization leaders, and university agriculture researchers in every state. The survey was also advertised in American Sheep Industry Association (ASI) newsletters, major sheep magazines such as *The Shepherd*, and other sheep association publications and bulletins. A total of 459 surveys were completed, either on the Internet, telephone, or via a mailed hard copy. Conference calls and five focus group meetings (USAHA 1998, American Sheep Industry 1999 and 2000, and the American Farm Bureau Federation in 1999 and 2000) with industry leaders were conducted to gain a more balanced perspective of current sheep health concerns.

**Based on the needs assessment, the following were developed as specific objectives for the NAHMS Sheep 2001 study:**

1. Estimate the regional and national prevalence of specific diseases and conditions of sheep, including Johne's disease, intestinal parasitism, abortion, and ovine progressive pneumonia.
2. Identify genetic factors that may be related to the expression of clinical signs of scrapie. Describe the prevalence of potential risk factors believed to be associated with scrapie.
3. Describe management practices used by U.S. sheep producers affecting morbidity (e.g., footrot) and mortality. This would include: animal movement and identification; feeding practices; biosecurity procedures; use of veterinary services; vaccination; and treatment practices.
4. Describe nutritional practices and micro nutrient intake levels that may impact sheep health by region.



## B. Sampling and Estimation

### 1. State selection

The preliminary selection of States to be included in the study was done in January 2000, using the National Agricultural Statistics Service (NASS) USDA January 29, 1999, Sheep and Goat Report. A goal for NAHMS national studies is to include States that account for at least 70 percent of the sheep inventory and producer population in the U.S. The initial review of States identified 16 major States with 82 percent of the nation's sheep inventory but only 62 percent of U.S. sheep operations. A review in January 2000 suggested increasing the number of participating States in the Central and Eastern regions.

In February 2000, a workload memo identifying 19 States in relation to all States in terms of size (inventory and operations) was provided to the USDA: APHIS: VS regional directors. Each of the regional directors sought input from their respective States regarding whether or not they should be included in the study. These 19 States\* accounted for 86 percent of the sheep in the U.S. and 70 percent of the operations. By midyear three additional States were included based on the States' interest: Arkansas, Nevada and Washington. As of January 1, 2001, a total of 22 States had been selected, accounting for 87.4 percent (6,089,000 head) of all U.S. sheep and lambs and 72.3 percent (47,800) of U.S. operations with sheep or lambs. (See appendix II for respective data on individual States' sheep operations.)

### 2. Operation selection

Data from the 1997 Census of Agriculture showed a large proportion of small farms (54.1 percent of the 65,790 U.S. farms with sheep or lambs had 1 to 24 head). For this reason the reference population was chosen to be operations with 1 or more head.

The list frame for sampling was provided by the NASS. Within each State a stratified random sample was selected. Total sheep and lamb inventory for each operation was used as the measure of operation size. As shown in Appendix II, the number of sheep producers has declined at a fast pace. Consequently, the results from the list frame sample might produce a large number of sampled units that were no longer in the sheep business, deceased, etc. To preserve sampling efficiency a screening sample concept was applied. NASS selects a sample of sheep producers in each State when compiling its January 1 sheep inventory estimates. The list sample from the January 2000 survey was used as the screening sample (n=12,258). Producers reporting 1 or more sheep or lambs on January 1, 2000, were included in the sample for contact in January 2001. Because of the anticipated large workload, the sample was reduced in some States by excluding a group of operations, as necessary, for a final screening sample of 9,964 operations.

\*California, Colorado, Iowa, Idaho, Illinois, Indiana, Kansas, Minnesota, Montana, New Mexico, Ohio, Oregon, Pennsylvania, South Dakota, Texas, Utah, Virginia, Wisconsin and Wyoming

### 3. Population inferences

Inferences from Phase I data collection in this report may be extended to the population of sheep producers with at least 1 sheep in the 22 participating States. All respondent data were statistically weighted to reflect the population from which they were selected. The inverse of the probability of selection for each operation was the initial selection weight. This selection weight was adjusted for non-response within each State and size group to allow for inferences back to the original population from which the sample was selected.

## C. Data Collection

Phase I: General Sheep Management Report, December 29, 2000 -- January 26, 2001, NASS enumerators administered the General Sheep Management Report. The interview took slightly over 1 hour and was administered via personal interview conducted by NASS enumerators.

## D. Data Analysis

### 1. Validation and estimation

Initial data entry and validation of data collected from the General Sheep Management Report were performed in individual NASS State offices. Data were entered into a SAS data set. NAHMS national staff performed additional data validation on the entire data set after data from all States were combined.

### 2. Response rates

Of the 9,964 operations in the screening sample, 4,884 had no sheep or lambs on January 1, 2000, and were therefore ineligible for the NAHMS Sheep '01 study. This left NASS a total of 5,080 sheep operations to contact by January 2001 (see table below). Of these 5,080 operations, 3,210 participated in the initial phase of the Sheep 2001 study. This phase occurred from December 29, 2000, to January 26, 2001, and included the administration of a questionnaire by NASS enumerators. If an operation that completed the General Sheep Management Report had 20 or more breeding ewes or 500 or more market sheep or lambs, they were considered eligible for the second phase of data collection to be conducted by Veterinary Medical Officers (VMOs). If these operations were interested in learning more about the second phase, they signed a consent form. Their names were then provided to the VMOs for further study participation.

Response Category	Number Operations	Percent Operations
No sheep on Jan. 1, 2001	468	9.2
Out of business	159	3.1
Refusal	870	17.1
Survey complete and VMO consent	1,785	35.1
Survey complete, refused VMO consent	983	19.4
Survey complete, ineligible for VMO	442	8.7
Out of scope (prison, research farm, etc.)	51	1.0
Inaccessible	<u>322</u>	<u>6.4</u>
Total	5,080	100.0

## Appendix I: Sample Profile

### A. Responding Operations

#### 1. Total number sheep

Flock Size (Number Sheep and Lambs)	Number Responding Operations
1-24	448
25-99	956
100-999	1,370
1,000 or more	<u>436</u>
Total	3,210

#### 2. Region

Region	Number Responding Operations
Pacific	416
West Central	1,335
Central	1,048
Eastern	<u>411</u>
Total	3,210

#### 3. Primary Flock Type

Flock Type	Number Responding Operations
Herded/Open Range	219
Fenced Range	938
Farm	1,975
Feedlot	<u>78</u>
Total	3,210

## Appendix II: U.S. Sheep and Lamb Inventory and Operations

### A. Regional Summary

Region	State	NASS <sup>1</sup>		Census <sup>2</sup>	
		Number All Sheep and Lambs (Thousand Head)	Number of Operations with Sheep	Number Sheep and Lambs (Thousand Head)	Number of Farms with Sheep or Lambs
		January 1, 2001	2000	December 31, 1997	
Pacific	California	840	3,000	784	3,014
	Oregon	245	3,000	283	3,070
	Washington	<u>54</u>	<u>1,200</u>	<u>52</u>	<u>1,189</u>
	Total	1,139	7,200	1,119	7,273
West Central	Colorado	420	1,900	594	1,628
	Idaho	275	1,000	274	1,097
	Montana	360	2,000	416	1,981
	Nevada	95	300	96	272
	New Mexico	255	900	292	917
	Texas	1,150	6,800	1,532	6,959
	Utah	390	1,500	439	1,438
	Wyoming	<u>530</u>	<u>900</u>	<u>713</u>	<u>1,112</u>
Total	3,475	15,300	4,356	15,404	
Central	Arkansas	N/A	N/A	8	400
	Illinois	75	2,400	73	2,263
	Indiana	66	2,200	54	1,927
	Iowa	270	4,700	265	4,431
	Kansas	110	1,500	119	1,478
	Minnesota	170	2,600	161	2,627
	South Dakota	420	2,300	417	2,354
	Wisconsin	<u>80</u>	<u>2,200</u>	<u>76</u>	<u>2,100</u>
	Total	1,191	17,900	1,173	17,580
Eastern	Ohio	142	3,600	135	3,549
	Pennsylvania	81	2,500	86	2,541
	Virginia	<u>61</u>	<u>1,300</u>	<u>74</u>	<u>1,456</u>
	Total	284	7,400	295	7,546
Total (22 states)	6,089 (87.4% of U.S.)	47,800 (72.3% of U.S.)	6,943 (88.8% of U.S.)	47,803 (72.7% of U.S.)	
Total U.S. (50 states)	6,965	66,100	7,822	65,790	

N/A = not available

<sup>1</sup> Source: National Agricultural Statistics Service (NASS), USDA; NASS Sheep and Goats, February 1, 2002

<sup>2</sup> Source: United States Census of Agriculture, U.S. Department Of Commerce, 1997

**B. Size Group Summary<sup>1</sup>**

Sheep and Lamb Size Groups	Sheep and Lamb Inventory Dec. 1, 1997(1,000 Head)	Farms (Operations) with Sheep and Lambs 1997
1-24	349	35,584
25-99	959	20,461
100-299	963	6,010
300-999	1,237	2,429
1,000-2,499	1,255	820
2,500-4,999	1,000	297
5,000 or more	<u>2,059</u>	<u>189</u>
Total	7,822	65,790

<sup>1</sup> Source: United States Census of Agriculture, U.S. Department Of Commerce, 1997



## Sheep 2001 Study: Completed and Expected Outputs and Related Study Objectives

- 1) Estimate the regional and national prevalence of specific diseases and conditions of sheep, such as Johne's disease, intestinal parasitism, abortions, and ovine progressive pneumonia.
  - Johne's and the U.S. Sheep Industry (info sheet), expected fall 2002
  - Intestinal Parasitism in U.S. Sheep (info sheet), expected summer 2002
  - Seroprevalence of Ovine Progressive Pneumonia in U.S. sheep (info sheet), expected fall 2002
  
- 2) Identify genetic factors that may be related to the expression of clinical signs of scrapie. Describe the prevalence of potential risk factors believed to be associated with scrapie.
  - PrP Genotype distributions of U.S. Sheep, expected fall 2002
  - Scrapie associated risk factors and related management practices in the U.S., expected summer 2002
  
- 3) Describe management practices used by U.S. sheep producers affecting morbidity (e.g., footrot) and mortality. This would include: animal movement and identification; feeding practices; biosecurity procedures; use of veterinary services; source of health information; vaccination; and treatment practices.
  - **Part I: Reference of Sheep Management in the United States 2001, July 2002**
  - Highlights of NAHMS Sheep 2001: Part I, July 2002
  - Part II: Baseline Reference of 2001 Sheep Health and Management, expected summer 2002
  - Highlights of NAHMS Sheep 2001: Part II, expected summer 2002
  - Lamb Marketing Patterns in the United States 2000 (info sheet) expected summer 2002
  - Part III: Baseline Reference of 2001 Sheep Feedlot Health and Management, expected fall 2002
  - Highlights of NAHMS Sheep 2001: Part III, expected fall 2002
  - Quality Assurance and Biosecurity Practices on U.S. Sheep Operations, expected fall 2002
  - Vaccination and Treatment Practices on U.S. Sheep Operations, expected fall 2002
  
- 4) Describe feeding practices and micro-nutrient intake levels that may impact sheep health, by region.
  - Composition of Forage Analyzed as part of the Sheep 2001 study, expected fall 2002
  - Feeding Practices of U.S. Sheep Producers, expected fall 2002

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