

RANGE BEEF CATTLE TECHNOLOGIES, COSTS, AND RETURNS
IN THE WESTERN AND GREAT PLAINS STATES: 1980-82

AE-92-3

by

W. Gordon Karl

Department of Agricultural Economics

Agricultural Experiment Station

College of Agriculture

University of Wyoming

CONTENTS

	<u>Page</u>
INTRODUCTION.....	1
ERS Budgets - Source of Basic Data.....	2
Objectives of this Part of the IR-6 Study.....	2
Regions Included in the Study.....	3
THE NORTHWESTERN GREAT PLAINS -- WESTERN REGION 3.....	3
Location and Climate.....	3
Planning Unit Budgets.....	6
Animal Units.....	6
Cattle Inventories, Sales, Physical Inputs, and Prices Paid.....	8
Enterprise Costs.....	14
Summary of Net Returns.....	16
Investment.....	17
EASTERN UTAH, WESTERN WYOMING, AND WESTERN COLORADO -- WESTERN REGION 6... 17	17
W-6 Location and Climate.....	17
W-6 Enterprise Operations.....	20
THE COASTAL REGIONS OF WASHINGTON, OREGON, AND CALIFORNIA --	
WESTERN REGION 1.....	21
Location and Climate.....	21
Enterprise Operations.....	23
E. WASHINGTON, N. OREGON, IDAHO, AND W. MONTANA -- WESTERN REGION 2.....	25
Location and Climate.....	25
Enterprise Operations.....	27
THE CENTRAL VALLEY, FOOTHILLS, AND NORTHERN CALIFORNIA AREAS --	
WESTERN REGION 4.....	29
Location and Climate.....	29
Enterprise Operations.....	29
SOUTHEAST OREGON, NORTHEAST CALIFORNIA, NORTHERN NEVADA,	
AND WESTERN UTAH -- WESTERN REGION 5.....	31
Location and Climate.....	31
Enterprise Operations.....	32
SOUTHERN CALIFORNIA, SOUTHERN NEVADA, ARIZONA, AND WESTERN	
AND SOUTHERN NEW MEXICO -- WESTERN REGION 7.....	34
Location and Climate.....	34
Enterprise Operations.....	36
SUMMARY.....	37

TABLES

<u>Number</u>		<u>Page</u>
1	Cattle inventories for 100-cow planning units in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-82 (W-3).....	7
2	Summary of cattle and calf sales for 100-cow planning units in the eastern Montana, eastern Wyoming, western South Dakota and northern Nebraska areas, 1980-82 (W-3).....	10
3	Physical inputs used for cattle ranches in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-82 (W-3).....	12
4	Average cost or prices paid for inputs on cattle ranches of the western regions, 1980-82.....	13
5	Estimated average costs for cattle ranches in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-82 (W-3).....	15
6	Estimated average returns for cattle ranches in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-82 (W-3).....	16
7	Summary of current investments for 100-cow planning units in western regions 1 through 7, 1980-82.....	18
8	Summary of cattle and calf sales for 100-cow planning units for medium-sized operations in seven regions, 1980-82.....	39
9	Physical inputs used per animal unit for medium-sized ranches in the seven western regions.....	41
10	Estimated 1980-82 average costs per animal unit for medium-sized ranches in seven western regions.....	42
11	Estimated 1980-82 average returns per animal unit for medium-sized ranches in seven western regions.....	43

FIGURES

<u>Number</u>		<u>Page</u>
1	Meat animal production regions.....	4

APPENDIX FIGURES

<u>Figure</u>	<u>Page</u>
A1 Montana -- western region 2 and western region 3.....	A1
A2 South Dakota -- western region 3 and great plains region 1.....	A2
A3 Wyoming -- western region 3 and western region 6.....	A3
A4 Nebraska -- western region 3 and great plains region 3.....	A4
A5 Utah -- western region 5 and western region 6.....	A5
A6 Colorado -- western region 6 and great plains region 3.....	A6
A7 Washington -- western region 1 and western region 2.....	A7
A8 Oregon -- western region 1, western region 2, and western region 5.....	A8
A9 California -- western region 1, western region 4, western region 5, and western region 7.....	A9
A10 Idaho -- western region 2.....	A10
A11 Nevada -- western region 5 and western region 7.....	A11
A12 Arizona -- western region 7.....	A12
A13 New Mexico -- western region 7 and great plains region 4.....	A13

APPENDIX TABLES

<u>Table</u>	<u>Page</u>
W1-1 Cattle inventories for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-82 (W-1).....	A14
W2-1 Cattle inventories for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-82 (W-2).....	A14
W4-1 Cattle inventories for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-82 (W-4).....	A15
W5-1 Cattle inventories for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-82 (W-5).....	A15

<u>Table</u>	<u>Page</u>
W6-1 Cattle inventories for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-82 (W-6).....	A16
W7-1 Cattle inventories for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-82 (W-7).....	A16
W1-2 Summary of cattle and calf sales for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-82 (W-1).....	A17
W2-2 Summary of cattle and calf sales for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-82 (W-2).....	A17
W4-2 Summary of cattle and calf sales for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-82 (W-4).....	A18
W5-2 Summary of cattle and calf sales for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-82 (W-5).....	A18
W6-2 Summary of cattle and calf sales for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-82 (W-6).....	A19
W7-2 Summary of cattle and calf sales for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-82 (W-7).....	A19
W1-3 Physical inputs used for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-82 (W-1).....	A20
W2-3 Physical inputs used for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-82 (W-2).....	A20
W4-3 Physical inputs used for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-82 (W-4).....	A21
W5-3 Physical inputs used for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-82 (W-5).....	A21
W6-3 Physical inputs used for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-82 (W-6).....	A22

<u>Table</u>	<u>Page</u>
W7-3 Physical inputs used for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-82 (W-7).....	A22
W1-4 Estimated average enterprise costs for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-82 (W-1).....	A23
W2-4 Estimated average costs for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-82 (W-2).....	A24
W4-4 Estimated average costs for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-82 (W-4).....	A25
W5-4 Estimated average costs for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-82 (W-5).....	A26
W6-4 Estimated average costs for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-82 (W-6).....	A27
W7-4 Estimated average costs for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-82 (W-7).....	A28
W1-5 Estimated average returns for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-82 (W-1).....	A29
W2-5 Estimated average returns for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-82 (W-2).....	A29
W4-5 Estimated average returns for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-82 (W-4).....	A30
W5-5 Estimated average returns for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-82 (W-5).....	A30
W6-5 Estimated average returns for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-82 (W-6).....	A31
W7-5 Estimated average returns for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-82 (W-7).....	A31

RANGE BEEF CATTLE TECHNOLOGIES, COSTS, AND RETURNS
IN THE WESTERN AND GREAT PLAINS STATES: 1980-82

by W. Gordon Kearn¹

INTRODUCTION

The objective of Interregional Research Project Six (IR-6) was:

"To enhance and assist State Agricultural Experiment Stations (SAES) participation in national and regional research planning, evaluation, analysis, and coordination in a system that will provide the information needed by individual SAES, the Joint Council, the Users Advisory Board, United States Department of Agriculture (USDA), and other agencies to develop the most efficient and responsive food and agricultural research system possible."²

The objectives of Wyoming's participation in IR-6 were:

- A. To identify opportunities for intra- and interstate transferability of technology in rangelands management and livestock production in the Western region and adjoining Plains states, extending to about the 100th meridian, and by the process of exclusion also identify non-transferability.
- B. As needed, to develop statements on current and emerging issues of concern related to livestock and rangelands in the region specified and articulate these issues and results of analyses to appropriate groups.

¹Professor Emeritus of Agricultural Economics, University of Wyoming.

²The objectives as stated pertain to the time the work was initiated and mostly completed.

A number of sub-objectives to be accomplished included:

1. To characterize and describe the rangeland and supplementary feed production resources of the region and group and classify sub-units of the region for homogeneity.
2. To describe or characterize the range livestock production technologies and practices used throughout the region, and group and classify for homogeneity.
3. To review planned future, current, and past research in areas of rangeland management and range livestock production and identify a number of the most significant technological developments which have been research subjects at various experiment stations of the region.
4. To draw conclusions about transferability of technologies.

The study was specifically limited to feeder cattle production stages, associated rangelands, and supplemental feed production. It did not extend to fed to finish stages.

ERS Budgets - Source of Basic Data

The Farm Economics Division (FED), Economic Research Service, U.S. Department of Agriculture has for a number of years prepared budgets to represent results for livestock operations in the different regions of the United States, including the western, great plains, and southwestern regions. These budgets are presumably on a logically consistent basis and usable as primary data sources to help identify and illustrate similarities and differences in the cattle production industry in the western and great plains states.

Objectives of this Part of the IR-6 Study

Objectives of this portion of the IR-6 study for the western region were to:

1. Convert sets of budget data to a basis allowing for direct comparisons among regions.
2. Draw conclusions about comparability or differences of technologies, costs, and returns among different regions.

Regions Included in the Study

Meat animal production sub-regions for which budget data are available within the regions are shown in figure 1, and listed as follows:

- W-1 The Pacific coastal regions of Washington, Oregon, and California
- W-2 The Pacific inland region--eastern Washington, northeast Oregon, all of Idaho, and western Montana
- W-3 Northwestern great plains--eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska
- W-4 The central valley, foothills, and northern California
- W-5 Northeast California, southeast Oregon, northern Nevada, and western Utah
- W-6 Western Wyoming, eastern Utah, and western Colorado
- W-7 Southeast California, southern Nevada, Arizona, and western New Mexico

The 11 western states comprise about 753 million acres, or almost 40 percent of the lower 48 states.³ Areas of South Dakota and Nebraska included in Region W-3 would be approximately offset by excluded areas in Colorado and New Mexico, so the total area considered is approximately that of the 11 western states.

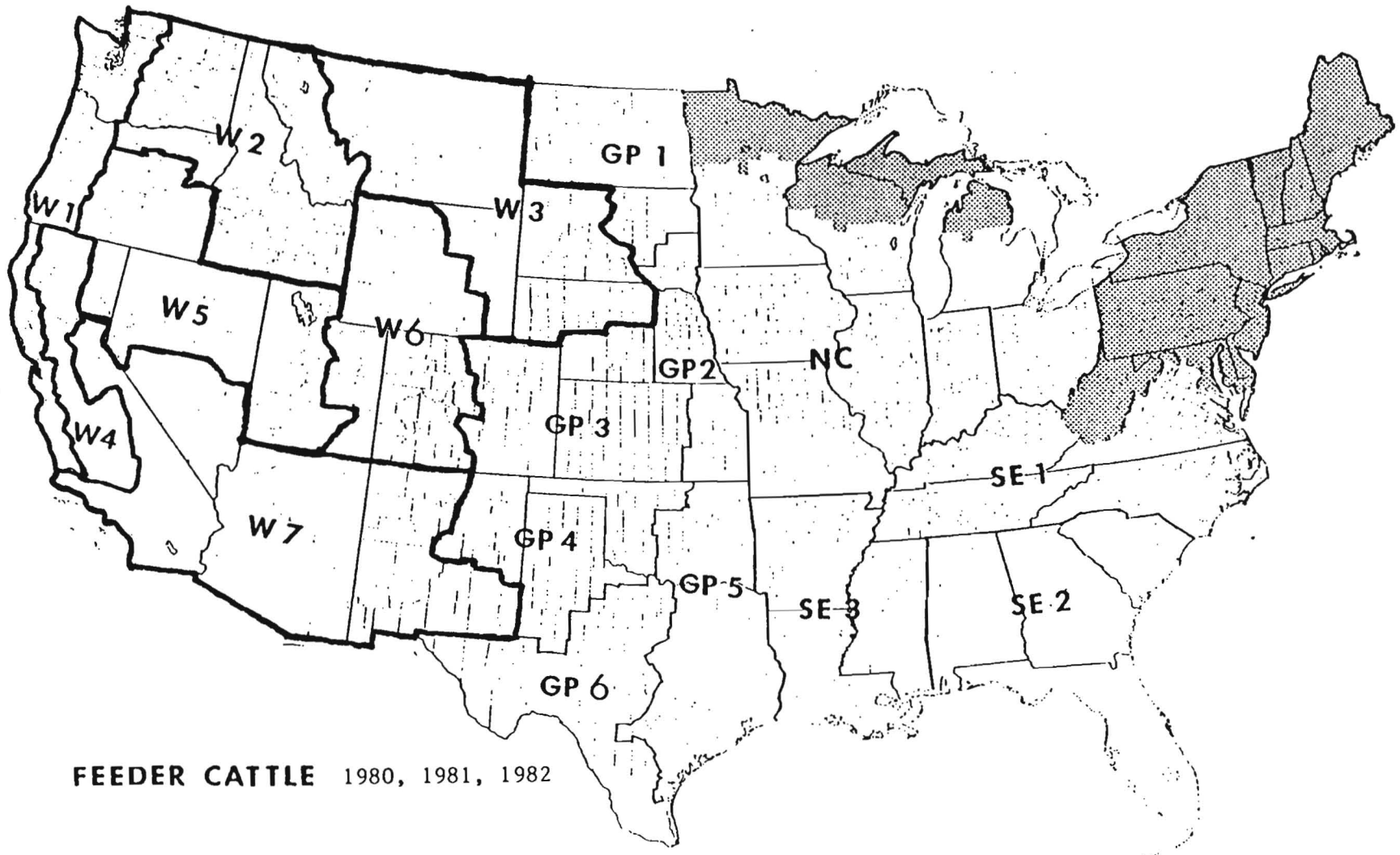
THE NORTHWESTERN GREAT PLAINS -- WESTERN REGION 3

Location and Climate

Western Region 3 includes almost all of Montana east of the continental divide; South Dakota west of the Missouri River; Wyoming east of the Big Horn Mountains in the north and the Laramie Range in the southeast; and a large part of northwest Nebraska including Kimball, Cheyenne, Deuel, Arthur, McPherson, Logan, Blaine, Loup, Garfield, and Wheeler counties, and counties north and west of them (appendix A, figure A1, A2, A3, and A4).

Average annual precipitation is in the 12 to 14 inch range over much of the area of Montana east of the continental divide. Nearly half of this long-term average precipitation falls from May through July and two-thirds or more falls in the warm season April to September inclusive. This is very

³Public Land Statistics - 1987. Bureau of Land Management, U.S. Department of the Interior. March 1988.



FEEDER CATTLE 1980, 1981, 1982

Figure 1. Meat animal production regions

Prepared by Bureau of the Census, U.S. Department of Commerce

beneficial for dryland crop production and for producing range forages. The precipitation does vary depending upon topographic influences (mountains) and is higher at the extreme western and southwestern parts of the areas where the east slope of the Rocky Mountains have an influence. There are a few other small mountain ranges in this area where precipitation is a little higher than is common over the plains.

The climate in the included portion of Wyoming is basically an extension of that described for Montana. Occasional cold waves move southward from Montana on the east side the Big Horn Mountains and the Laramie Range. Average annual precipitation over much of the area is in the 12 to 15 inch range and two-thirds to three-fourths of that occurs in the April through September period. Higher precipitation occurs along the mountains that form the west border of the area and on the Black Hills, which are on the South Dakota-Wyoming border in northeast Wyoming. Occasional severe winter blizzards occur, but because most of the precipitation occurs in the warm season, average snowfalls are not great and severe winter storms are not frequent.

The Black Hills are the only significant weather-modifying topographic feature in the included portions of South Dakota and Nebraska. The average January temperatures in South Dakota range from 10°F in the north to 20°F in the south. The temperature gradients extend into Nebraska and generally are in the range of 20°F to 24°F in the affected areas of Nebraska. July temperatures can be quite warm, averaging from 70°F to 78°F in the included portions of these two states.

Except for the Black Hills area, there are precipitation gradients in both South Dakota and Nebraska that vary from west to east, just as the temperature gradients change from north to south. Average annual precipitation ranges from about 16 to 24 inches in the included portions in Nebraska and from about 14 to 20 inches in the affected portions of South Dakota. As is typical of the northern plains, two-thirds to three-fourths of the total annual precipitation occurs in the months of April through September. Winters are usually cold, but have few extended extreme cold spells.

Planning Unit Budgets

ERS budgets were converted to a uniform planning unit basis of 100 head of cows in the calving inventory. The source budgets presented number of cows, percentage calf crop and replacement requirements, and sometimes death losses. Sales data were presented in detail. Reconciliation of inventories generates data implicit, but not presented explicitly, in the ERS livestock budgets. Planning unit inventories for three sizes of operation in W-3 are illustrated in table 1.

The beginning inventory represents the calving inventory of 100 cows. It includes yearling heifers being held for replacements, some yearling heifers and steers being held for sales, and bulls. Steer and heifer calves shown are those that are born to the calving inventory, or weaned, depending upon whether a death loss is shown. The beginning inventory minus death loss and sales results in the number still on the ranch, which is added to the number in the next older age class of cattle to obtain the ending inventory or beginning inventory for the next production cycle. The inventory reconciliation presents this information in a manner to facilitate examination of the budgets for internal consistency and allow easy comparisons among various sizes of operations and regions.

Animal Units

Calculation of animal-unit-months (AUMs) and animal units (AUs) provides further standardization. Kilocalories of basal metabolism for adult animals is predicted by a regression equation:

$$\text{Kcal of basal metabolism} = 70 (W_{\text{kg}})^{.75}.$$

This has been accepted by nutritionists as a biologic constant (Crampton and Harris).⁴ The information was adapted to use in deriving coefficients for an AUM, which would be related to basal metabolic requirements (Lewis, et al.).⁵

$$\text{AUM coefficient} = \frac{W^{.75}}{1,000^{.75}}$$

⁴Crampton, E.W. and L.E. Harris, *Applied Animal Nutrition*, W.H. Freeman and Co., 2nd ed.

⁵Lewis, James K., George M. Van Dyne, Leslie R. Albee, and Frank W. Whetzel, "Intensity of Grazing--Its Effect on Livestock and Forage Production," South Dakota Experiment Station Bulletin 459.

Table 1. Cattle inventories for 100-cow planning units in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-81-82 (W-3).

Size and item	Beginning inventory	Death loss	Sales	Still on ranch	Ending inventory	AUMs	
						No.	Coeff.
Represents 53-cow size							
Cows	100.0	1.5	7.5	91.0	100.0	1,182	0.985
Yearling heifers	18.8	0.4	9.4	9.0	18.8	129	0.622
Heifer calves	(46.9) ^{a/}	1.7	26.4	18.8	0.0	116	0.352
Steer calves	(45.3) ^{a/}	1.6	28.3	15.4	0.0	118	0.372
Yearling steers	15.4	0.3	15.1	0.0	15.4	111	0.654
Bulls	<u>5.7</u>	<u>0.2</u>	<u>1.4</u>	<u>5.7^{b/}</u>	<u>5.7</u>	<u>85</u>	1.250
Total	139.9	5.6	88.2	139.9	139.9	1,741	
Represents 197-cow size							
Cows	100.0	1.5	11.2	87.3	100.0	1,182	0.985
Yearling heifers	22.2	0.4	9.1	12.7	22.2	152	0.622
Heifer calves	(46.0) ^{a/}	1.9	21.8	22.2	0.0	114	0.352
Steer calves	(45.4) ^{a/}	1.9	26.9	16.6	0.0	118	0.372
Yearling steers	16.6	.3	16.2	0.0	16.6	119	0.654
Bulls	<u>4.1</u>	<u>0.1</u>	<u>1.0</u>	<u>4.1^{b/}</u>	<u>4.1</u>	<u>61</u>	1.250
Total	142.9	6.2	86.3	142.9	142.9	1,746	
Represents 903-cow size							
Cows	100.0	1.0	12.6	86.4	100.0	1,182	0.985
Yearling heifers	36.3	0.7	21.9	13.6	36.3	248	0.622
Heifer calves	(43.1) ^{a/}	1.5	5.3	36.3	0.0	106	0.352
Steer calves	(42.8) ^{a/}	1.5	13.8	27.4	0.0	112	0.372
Yearling steers	27.4	0.5	26.9	0.0	27.4	197	0.654
Bulls	<u>5.0</u>	<u>0.1</u>	<u>1.2</u>	<u>5.0^{b/}</u>	<u>5.0</u>	<u>75</u>	1.250
Total	168.7	5.3	81.9	168.7	168.7	1,920	

^{a/} Calves born, not in beginning inventory.

^{b/} Presumably, bulls are purchased to replace death loss and sales.

W is the average of monthly weights, or of the beginning and ending weights of the animal. The constant (70 when weights are expressed in kg.) occurs in both numerator and denominator, and cancels out, as does the unit designation, leaving a pure number coefficient. The exponent, 0.75, remains the same regardless of units used. The denominator defines one animal-unit-month as the maintenance requirement for a 1,000 pound animal. The AUM coefficients vary among budgets because they were calculated on the average of beginning and ending weights for various classes of animals, as indicated by sale weights.

Total AUMs indicated for a particular class of stock was calculated by multiplying the number of animals in beginning inventory, the AUM coefficient, and number of months that the animals were in the inventory, whether year-long, or less, depending upon time of sales. One AU is the requirement for the equivalent of one animal for a full year, or AUMs divided by 12. Because use of AUs provides an additional refinement in standardization for comparisons, budgets will all be compared on an AU basis.

Cattle Inventories, Sales, Physical Inputs, and Prices Paid

Inventories

Data for these budgets were collected by the Statistical Reporting Service (SRS) in a special survey. The data apparently were not normalized or standardized to represent the typical ranch operations over a longer time span. In some cases the lack of normalization may have resulted in significant errors or problems. In other cases the degree of error may not be serious, but the reader should be aware of the possibility of problems. For example, in table 1 sales of cull cows on the smallest size operation were significantly below the long-time average and only nine yearling heifers were retained for replacements. That rate of replacement heifer retention indicates a useful life for a breeding cow of 11 years and an average age at culling of 13 years given a two-year-old starting age.

The rate of replacement heifer retention on the medium and larger-sized operations are probably also below the long-time average. They suggest an average age at culling of nine to ten years given a two-year-old starting age, and indicate about a seven to eight-year useful life for a breeding cow. Some cows will be culled as early as three and four-year-olds and other cows may

continue to be productive well into their teens, but an eight-year average useful life is probably longer than normal. This type of problem was also a common occurrence in budgets for other regions.

The inventory reconciliation indicates the percentage calf crops weaned were about 87 to 89 percent on the two smaller-sized operations and about 83 percent on the largest-size operation, probably better than average for the area.

Sales

Cattle sales summarized in table 2 were predominantly calves on the smallest and medium-sized operations, while yearling sales predominate on the largest. Some ranches throughout the area might sell mostly steer and heifer calves and others sell mostly yearling steers and heifers. The numbers sold are presented as a composite or an amalgamation for the different types of operations. This also is common to budgets for all other areas. This perhaps represents some ranches that sell both calves and yearlings.

Weights reported are influenced by the combination of types sold. Steer and heifer calf sales quite likely represent sales of the heaviest of those animals produced or represent sales from ranches with a capability of producing heavy steer and heifer calves.

Given the likelihood that heavy calves have been sold, then the weights of yearling steers and heifers sold are influenced by the fact that lighter weight of calves have been retained to be carried to yearling age. The weight differentials between calves and yearlings thus are reduced. If data were available, typical ranches selling all or mostly all calves could be compared with typical ranches of the same area selling all or mostly all yearlings. Calf weights would likely be lighter than those represented and yearling sale weights would likely be significantly heavier than indicated in table 2.

Yearling sales peak in September, calf sales in October, and cull cow sales in November. The peak calving time was in March, thus calves are about seven months of age by the sale date.

Gross income for the smallest operation may be distorted by insufficient sale of cull cows and low retention of heifers accompanied by an increased sale of heifers. Cull cows have a sale value of \$372 per head and yearling heifers on the small-sized operation have an average sale value of \$403 per head. Thus, there would be net reduction in total value of sales of about \$31 per head for each additional cull cow sold and corresponding reduction in

Table 2. Summary of cattle and calf sales for 100-cow planning units in the eastern Montana, eastern Wyoming, western South Dakota and northern Nebraska areas, 1980-82 (W-3).

Size and item	Number (No)	Weight		Price (Dols/Cwt)	Value	
		Per head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 53-cow size						
Cull cows	7.55	9.80	74	37.93	2,806	19.35
Yearling heifers	9.43	6.38	60	63.09	3,798	26.19
Heifer calves	26.42	4.23	112	63.66	7,113	49.06
Steer calves	28.30	4.61	130	73.08	9,535	65.76
Yearling steers	<u>15.09</u>	<u>6.75</u>	<u>102</u>	<u>69.90</u>	<u>7,122</u>	<u>49.12</u>
Total	86.79		478	63.51 ^{a/}	30,373	209.47
Weight per AU			3.30			
Represents 197-cow size						
Cull cows	11.17	9.80	109	37.93	4,151	28.43
Yearling heifers	9.14	6.38	58	63.09	3,678	25.19
Heifer calves	21.83	4.23	92	63.66	5,877	40.25
Steer calves	26.90	4.61	124	73.08	9,064	62.08
Yearling steers	<u>16.24</u>	<u>6.75</u>	<u>110</u>	<u>69.90</u>	<u>7,664</u>	<u>52.49</u>
Total	85.28		494	61.64 ^{a/}	30,435	208.46
Weight per AU			3.38			
Represents 903-cow size						
Cull cows	12.62	9.80	124	37.93	4,693	29.33
Yearling heifers	21.93	6.38	140	63.09	8,826	55.16
Heifer calves	5.32	4.23	23	63.66	1,431	8.94
Steer calves	13.84	4.61	64	73.08	4,664	29.15
Yearling steers	<u>26.91</u>	<u>6.75</u>	<u>182</u>	<u>69.90</u>	<u>12,697</u>	<u>79.36</u>
Total	80.62		532	60.79 ^{a/}	32,311	201.94
Weight per AU			3.38			

^{a/} Weighted average price.

yearling heifer sales. The normal sale of about six or seven more cull cows per 100 cow planning unit would make a rather insignificant difference of about \$200 in total value of sales.

Physical Inputs

Physical inputs used per planning unit and per animal unit are summarized in table 3. About two-thirds of the year-long feed supply resource for the medium-sized operation comes from range forage with the majority of that from owned resources. Larger proportions of the feed supply on the smaller and the large-sized ranches come from range, pasture, and crop residue. Significant amounts of the total feed supply are obtained by renting on all sizes of operations.

Total AUMs and AUM equivalents from various sources are also shown in table 3. The AUM equivalents from harvested feeds were calculated based on the assumption that mature cow would require 20 lb. of hay per day or 600 lb. per month. At 50 percent TDN, that would amount to 300 lb. of TDN per month or per AUM equivalent without an allowance for waste. An AUM equivalent could also be provided by 396 lb. of grain at 80 percent TDN. Total AUMs and AUM equivalents from various sources shown in table 3 closely approximate 12 AUM equivalents per animal unit, which would be the theoretical requirement.

Seasonality of input use varies to some degree with size of operation. Owned rangelands were used from February through December on the smallest operation and throughout the year on the medium and larger-sized operations. Heaviest use is from April-May through October. Rented pasture use was reported for the largest operation on a year-long basis and April through October on the small or medium-sized operations. Use of state lands was generally less than year-long, and use of federal lands was mostly through the growing season and into the fall. Irrigated pasture use occurs during the May-September growing season and crop residue use occurs from September through December, and on through the winter even on medium-sized operations.

Supplemental feed use occurs mostly from November through April. Some feed use was reported through the summer also. It may be used for bulls or other classes of stock, or perhaps because of drought or temporary feed shortages.

Table 3. Physical inputs used for cattle ranches in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-82 (W-3)

Item	Unit	100 cow planning units			Per animal unit		
		Ranch size			Ranch size		
		Small	Medium	Large	Small	Medium	Large
Private range	AUMS	736	668	944	5.07	4.57	5.90
Public grazing							
BLM	AM	--	12	26	--	0.08	0.16
Forest	AM	--	9	--	--	0.06	--
State	AUMS	71	45	104	0.49	0.31	0.65
Pasture rent	AUMS	315	313	456	2.17	2.14	2.85
Irrigated pasture	AUMS	--	33	19	--	0.23	0.12
Crop residue	AUMS	156	80	34	<u>1.07</u>	<u>0.55</u>	<u>0.21</u>
Sub-total	AUMS				8.80	7.94	9.89
Hay							
Produced	Ton	144	115	91	1.00	0.79	0.57
Purchased	Ton	16	17	11	0.11	0.12	0.07
Protein supplement	Ton	--	8	8	--	0.06	0.05
Corn	Bu.	398	936	120	2.75	6.41	0.75
Silage	Ton	--	40	--	--	0.27	--
Barley	Bu.	--	--	116	--	--	0.72
AUM equiv. feeds ^{a/}	AUMs				3.70	4.15	2.34
AUM equiv. total	AUMs				12.50	12.09	12.23
Salt and minerals	Cwt.	36	36	36	0.25	0.25	0.23
Hired labor	Hour	130	327	792	0.90	2.24	4.95

^{a/} Based on 1,000 lb. total digestible nutrients (TDN) per ton of hay, 333 lb. TDN per ton of corn silage, 0.8 lb. TDN per lb. of grains or protein supplement, and a requirement of 333 lb. of TDN per AUM equivalent, including waste.

Prices Paid

Average prices paid for inputs on cattle ranches in all of the western regions are summarized in table 4. Prices were usually quoted the same for the three different sized operations in any one region. Irrigated pasture and hay produced on the ranch were shown at their variable cost of production. The cost (price) did not include any prorated portion of fixed costs on machinery, nor charges for unpaid labor or land. However, those costs were included in the enterprise costs.

Table 4. Average cost or prices paid for inputs on cattle ranches of the western regions, 1980-81-82 (dollars per unit)

Item	Unit	W-1	W-2	W-3	W-4	W-5	W-6	W-7
Public grazing								
BLM	AM	--	2.18	2.18	2.18	2.18	2.18	2.18
Forest	AM	--	2.20	2.20	2.20	2.20	2.20	2.20
State	AM	--	2.52	2.59	--	1.83	2.52	2.04
Past. rent	AUMs	8.95	8.67	10.28	9.39	7.96	8.97	7.77
Irrig. pasture ^{a/}	AUMs	5.82	8.18	7.65	6.61	11.23	6.43	13.52
Hay produced								
Small ^{a/}	Ton	14.23	15.84	15.59	16.22	20.97	19.49	18.08
Medium ^{a/}	Ton	14.86	16.43	16.00	17.44	23.77	20.08	18.55
Large ^{a/}	Ton	16.57	17.89	16.83	20.10	25.98	21.89	21.42
Average ^{a/}	Ton	15.19	17.49	16.58	19.42	25.16	21.38	20.66
Hay purchased	Ton	81.82	65.35	59.60	81.00	69.33	59.07	73.64
Protein suppl.	Ton	--	228.50	245.84	244.45	211.60	204.02	215.07
Oats	Bu.	1.83	--	--	--	--	2.22	--
Barley	Bu.	--	2.68	2.84	--	2.91	2.77	3.69
Corn	Bu.	--	--	2.94	3.73	2.95	--	--
Corn silage	Ton	--	19.00	19.00	--	--	--	--
Salt and mins.	Cwt.	6.08	5.02	4.24	6.00	5.05	4.17	5.12
Hired labor	Hour	4.60	3.91	3.82	4.52	4.03	4.03	4.60
Interest rates ^{b/}								

^{a/} Cost of production, not a price paid.

^{b/} Interest rates for 1980, 1981, and 1982 were 11.4, 13.8 and 11.1 percent for short-term (variable costs) and 4.4 percent "real rate" was used for land charges, uniformly across all regions.

Enterprise Costs

Costs are summarized in table 5. Variable costs are cash costs and are associated directly with the number of animals involved, the technology, and intensity of input use. There are a number of significant differences in costs between the three different sizes of operation. For instance, the pasture rent is small for the smallest size and increases for the medium and the large-sized operations. That follows from the differences in amount of physical inputs used. Conversely, the cost for hay produced and for oats and hay purchased are high on the smallest size and decrease on medium or large-sized operations.

The costs for hired labor are directly related to size of operation. Conversely, the unpaid labor cost is inversely related to size of operation and declines sharply from smaller to larger sizes of operation. These same relationships are also true of all other regions, which will be discussed later. The combined hired and unpaid labor also decreases as size of operation increases in W-3, though there are variations among regions.

Interest on variable costs (operating capital) was calculated on one-half of variable costs for the year at 11.4, 13.8, and 11.1 percent in 1980, 1981 and 1982, uniformly among all regions.

Total variable costs per AU are somewhat larger for the medium-sized and for the large-sized operation as compared with the small.

Ownership costs, which include depreciation, interest, taxes and insurance, and repairs not included in the variable costs, and general farm overhead are much higher on the small-sized operation than on the larger-sized operation.

The "land charge" is based on a longer term "real" rate of interest of 4.4 percent per annum. This rate allows for the difference between rate of inflation and the nominal interest rate, which is approximately represented by the short-term rate as used on variable costs. The land charge is much higher on the small-sized operation than on either the medium or large-sized operation. The variations in the land charge are consistent with the fact that a larger proportion of the total carrying capacity is owned on the smaller and the medium-sized operations as compared with the large. If the pasture rent paid is added to the land charge, then differences between the small, medium, and large-sized operations are not particularly great.

Table 5. Estimated average costs for cattle ranches in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-82 (W-3) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Public grazing						
BLM	--	27	57	--	0.18	0.36
Forest	--	19	--	--	0.13	--
State	184	117	268	1.27	0.80	1.68
Pasture rent	3,234	3,213	4,687	22.30	22.01	29.29
Sub-total leased	(3,418)	(3,376)	(5,012)	(23.57)	(23.12)	(31.33)
Irrigated pasture	--	251	149	--	1.72	0.93
Hay (produced)	2,250	1,843	1,540	15.52	12.62	9.63
Hay (purchased)	933	1,029	653	6.43	7.05	4.08
Protein supplement	--	2,166	2,054	--	14.84	12.84
Corn	1,172	2,753	449	8.08	18.86	2.81
Silage	--	752	--	--	5.15	--
Barley	--	--	329	--	--	2.06
Salt and minerals	152	152	153	1.05	1.04	0.96
Veterinary medicine	591	559	507	4.08	3.83	3.17
Trucking	197	251	235	1.36	1.72	1.47
Marketing	344	293	212	2.37	2.01	1.33
Hired labor	497	1,251	3,026	3.43	8.57	18.91
Machinery fuel and lube	1,847	1,847	1,107	12.74	12.65	6.92
Machinery repair	968	966	740	6.68	6.62	4.63
Equipment fuel and lube	271	127	87	1.87	0.87	0.54
Equipment repair	503	478	702	3.47	3.27	4.39
Interest on oper. capital	1,925	1,495	1,017	13.28	10.24	6.36
Total variable costs	15,069	19,591	17,972	103.92	134.18	112.32
Machinery	2,540	2,538	2,061	17.52	17.38	12.88
Machinery (forage)	956	770	610	6.59	5.27	3.81
Equipment	2,546	2,287	2,807	17.56	15.66	17.54
Livestock	4,150	3,786	4,042	28.62	25.93	25.26
Land taxes	846	771	843	5.83	5.28	5.27
General farm overhead	2,013	1,468	695	13.88	10.05	4.34
Total ownership costs	13,051	11,620	11,058	90.00	79.57	69.10
Unpaid labor (forage)	377	261	94	2.60	1.79	0.59
Unpaid labor (livestock)	12,757	5,375	1,796	87.98	36.82	11.23
Total unpaid labor	13,134	5,636	1,890	90.58	38.61	11.82
Total of above costs	41,254	36,847	30,920	284.50	252.36	193.25
Land charge	7,791	7,101	7,764	53.73	48.64	48.53

Summary of Net Returns

Net returns are summarized in table 6. The presentation follows the farm management approach of deducting the variable costs (mostly cash costs) from cash receipts to calculate a return over variable costs. It cannot really be called a net cash income because ownership costs do include some cash costs in the form of taxes and general overhead expense.

Table 6. Estimated average returns for cattle ranches in the eastern Montana, eastern Wyoming, western South Dakota, and northern Nebraska areas, 1980-82 (W-3) (dollars)

Item	Per 100 cows			Per AU		
	Small	Medium	Large	Small	Medium	Large
Cash receipts	30,373	30,435	32,311	209.47	208.46	201.94
Variable costs	<u>15,069</u>	<u>19,591</u>	<u>17,972</u>	<u>103.92</u>	<u>134.18</u>	<u>112.32</u>
Return over variable costs	15,305	10,844	14,340	105.55	74.27	89.62
Ownership costs	<u>13,051</u>	<u>11,620</u>	<u>11,058</u>	<u>90.00</u>	<u>79.57</u>	<u>69.11</u>
Return to labor, land, and management	2,253	-776	3,281	15.55	-5.29	20.51
Unpaid labor	<u>13,134</u>	<u>5,636</u>	<u>1,890</u>	<u>90.58</u>	<u>38.61</u>	<u>11.82</u>
Return to owned land and management	-10,881	-6,412	1,391	-75.03	-43.90	8.69
Return to landlord ^{a/}	<u>3,076</u>	<u>3,038</u>	<u>4,511</u>	<u>21.21</u>	<u>20.81</u>	<u>28.19</u>
Return to all land and management-total ^{b/}	-7,805	-3,374	5,901	-53.82	-23.09	36.88
Per AUM				-4.48	-1.92	3.07

^{a/} Assumes landlord's costs are 10 percent of rent paid, and 90 percent of rent paid is then a return to the landlord.

^{b/} Return to owned land and management plus return to the landlord.

Deduction of ownership costs results in a return to the operator for his unpaid labor, management, and land. This does not correspond exactly to the traditional measure of net farm or net ranch income because the return to the operator's non-land capital has been deducted in ownership costs. Deduction of the charge for unpaid labor then results in return to owned land and management.

A significant portion of rent paid is a return to land owned by the landlord. Landlords expenses, which include taxes and some minor maintenance expenses on improvements, were arbitrarily and conservatively set at 10 percent of gross rent. The 90 percent residual return to the landlord for the land is added onto the return to owned land to calculate a return to total land and management. The return is negative for the smallest and medium-sized operations. Returns per AU were also divided by 12 to obtain return to total land per AUM equivalent, which is negative for the smallest and medium-sized operation, and only \$3.07 per AUM equivalent on the largest size. The procedure may overstate these returns.

Investment

The investment at current prices or costs is summarized in table 7. Investment in land was not given directly, but was obtained by capitalizing the land charge at 4.4 percent interest. Only the livestock and land investment are exclusively associated with the cattle operation. Because of the standardization to 100-cow planning units, the livestock investment tends to be very uniform among sizes and regions. Slight variations are produced by variations in inventory composition and prices. The land investment is more variable among sizes and regions due to variations in productivity, amounts deeded or leased, and values per acre. Regions 2, 3, 5, and 6 have land investments that are reasonably consistent across sizes and among the regions.

The investment in other items is for the entire operation and includes full investment in items used for enterprises other than the cattle. Consequently, there is a great deal of variation among sizes and regions in the equipment investment, which also results in considerable variation in the total investment.

EASTERN UTAH, WESTERN WYOMING, AND WESTERN COLORADO -- WESTERN REGION 6

W-6 Location and Climate

The portion of Utah included in Region 6 extends from Summit County in the north to San Juan County in the southeast and includes those counties in between and to the east of them (figure A-5). Most of this area drains into the Green and Colorado rivers. The Uinta Mountains, which are at the north

Table 7. Summary of current investments ^{a/} for 100-cow planning units in western regions 1 through 7, 1980-82 (dollars)

Region and item	100 cow planning unit			Per animal unit		
	Small	Medium	Large	Small	Medium	Large
<u>Western region 1</u>						
Livestock	56,692	58,199	56,708	361	375	381
Equipment	62,782	30,215	21,257	400	195	143
Tractors and trucks	17,945	4,867	6,380	114	31	43
Other equipment	--	--	2,105	--	--	14
Land	<u>336,439</u>	<u>210,205</u>	<u>97,015</u>	<u>2,143</u>	<u>1,356</u>	<u>651</u>
Total	473,858	303,486	183,465	3,018	1,957	1,232
<u>Western region 2</u>						
Livestock	58,110	57,136	56,575	368	359	356
Equipment	94,543	39,171	25,600	598	246	161
Tractors and trucks	129,310	29,538	7,237	818	186	46
Other equipment	33,682	7,694	2,654	213	48	17
Land	<u>200,773</u>	<u>228,462</u>	<u>181,121</u>	<u>1,271</u>	<u>1,437</u>	<u>1,139</u>
Total	516,418	362,001	273,187	3,268	2,276	1,719
<u>Western region 3</u>						
Livestock	59,113	57,775	59,428	408	396	371
Equipment	39,358	37,065	25,032	271	254	156
Tractors and trucks	71,869	19,335	4,218	496	132	26
Other equipment	97,788	26,309	6,870	674	180	43
Land	<u>177,061</u>	<u>161,394</u>	<u>176,455</u>	<u>1,221</u>	<u>1,105</u>	<u>1,103</u>
Total	445,189	301,878	272,003	3,070	2,067	1,699
<u>Western region 4</u>						
Livestock	58,904	57,944	58,014	409	397	377
Equipment	95,535	33,290	27,975	663	228	182
Tractors and trucks	149,204	5,061	11,569	1,036	35	75
Other equipment	51,962	7,116	1,467	361	49	10
Land	<u>288,242</u>	<u>274,386</u>	<u>177,053</u>	<u>2,002</u>	<u>1,879</u>	<u>1,150</u>
Total	643,847	377,797	276,078	4,471	2,588	1,794
<u>Western region 5</u>						
Livestock	57,549	57,607	57,834	414	395	371
Equipment	113,901	30,348	125,212	819	208	803
Tractors and trucks	85,573	25,634	4,292	616	176	28
Other equipment	22,290	7,952	2,701	160	54	17
Land	<u>206,242</u>	<u>205,295</u>	<u>156,129</u>	<u>1,484</u>	<u>1,406</u>	<u>1,001</u>
Total	485,555	326,836	346,168	3,493	2,239	2,220
<u>Western region 6</u>						
Livestock	58,844	51,117	57,695	406	355	370
Equipment	36,851	46,784	38,965	254	325	250
Tractors and trucks	66,826	18,313	4,470	461	127	29
Other equipment	101,706	27,871	7,683	701	194	49
Land	<u>205,977</u>	<u>193,553</u>	<u>182,356</u>	<u>1,421</u>	<u>1,344</u>	<u>1,169</u>
Total	470,204	337,638	291,169	3,243	2,345	1,867
<u>Western region 7</u>						
Livestock	61,436	60,467	59,919	476	438	441
Equipment	66,177	49,084	32,118	513	356	236
Tractors and trucks	67,378	23,209	5,967	522	168	44
Other equipment	14,632	3,435	2,352	113	25	17
Land	<u>133,273</u>	<u>116,803</u>	<u>122,417</u>	<u>1,033</u>	<u>846</u>	<u>900</u>
Total	342,896	252,998	222,773	2,657	1,833	1,638

^{a/} Total investment for the ranch, not just that associated with cattle.

end, and the Wasatch Mountains along some of the western part have peaks of 10,000 to 13,000 feet elevation. Much of the area is a rough topography desert and canyonland type with 4,000 to 7,000 feet elevation. Average annual precipitation ranges from less than 6 inches in the driest desert areas to over 20 inches in the mountains. Much of the area is in the 6 to 12 inch range, with about half of that through April-September. Temperatures can be above 100° in the summer, and below zero in the winter. The heavy snowpack in the mountains supplies irrigation water for basins and valleys near the mountains.

The part of Colorado that is included borders the Utah area and extends eastward to include most of the mountains of Colorado, including portions east of the continental divide (figure A-6). It includes the "North Park," "Middle Park," "South Park," and San Luis valleys and mountains surrounding them, as well as mountains and deserts to the west. The topography is so varied that it defies description. The climate of the western part is an extension of that described for Utah. Precipitation increases with elevation moving into mountains in the east and ranges from 12 inches at lower elevations up to 20 to 30 inches at higher elevations. Precipitation in the mountains tends to be heaviest during the winter and spring months. June tends to be the driest month in this area.

The area in Wyoming includes the counties west of the Big Horn Mountains in the north and the Laramie Range in the south (figure A-3). The Big Horn, Wind River, and the Great Divide Basin, or the Red Desert as it is commonly called, are included in this area. The Absaroka, Teton, Wind River, Wyoming and Medicine Bow Mountain ranges are also included. The mixture of desert basins and mountain ranges creates wide climatic variations. The mountain ranges trend generally on a north-south axis.

Precipitation varies from 6 inches in the basins and deserts to over 20 inches in the mountains, and is fairly evenly distributed between the warm season and winter. However, light rainstorms during the summer do not tend to be very effective, while winter precipitation provides snow for irrigation water supplies.

W-6 Enterprise Operations

Inventories and Sales

As was true of area W-3, sales of cull cows on all sizes of operations appear to be significantly below the long-time average (appendix table W6-1). Only about 10-11 yearling heifers are shown as retained for replacements, which indicates a useful life for a breeding cow of approximately 9-10 years and implies an average age at culling of 11-12 years given a two-year-old starting age. This problem and the effects were explained previously.

The inventory reconciliations indicate 83 to 86 percent calf crops born and 76 to 81 percent calf crops weaned, after death losses.

Cattle sales are summarized in appendix table W6-2. The implications and effects of showing sales as a composite or an amalgamation for the different types of operations was mentioned previously. Calf sales exceed yearling sales on the smallest and medium-sized operations in terms of numbers. Weight of yearlings sold is somewhat greater than weight of calf sales on the smallest-sized operation and calf and yearling weight sales are about equal for the medium-sized operation. Yearling sales predominate in both numbers and weights on the largest-sized operation.

Peak marketing months are October for yearlings and December for calves and cull cows. April is the peak calving month. Thus, calves average about seven to eight months old at marketing.

Physical Inputs

Physical inputs used per planning and per animal unit are summarized in appendix table W6-3.

Over 75 percent of the year-long feed supply resource for these operations came from range and pasture or crop residue. A surprisingly small portion is reported from public grazing. Significant use of supplemental feeding extends from November into May. Use of various kinds of rangelands occurs from February into October on the smallest units and year-long on the largest units. Irrigated pasture use occurs during the growing season and crop residue use after the season. The area is very diverse and input use by season reflects the diversity of ranches in western Colorado and eastern Utah using ranges for long periods, while those in the higher elevations of Colorado and Wyoming use shorter grazing seasons and more supplemental feed.

Although some range use is reported throughout the year, the heaviest use occurs from May through October.

Average prices paid for inputs on cattle ranches in all of the western regions were summarized in table 4.

Costs and Net Returns

Costs are summarized in appendix table W6-4. There are a number of rather significant differences in costs among the three different sizes of operation. For example, the pasture rent is less for the smallest size than for the medium and the large-sized operations. Conversely, irrigated pasture costs are higher on the small than on the medium and large-sized operations. Ranch-produced and purchased feed costs do not differ greatly among the different-sized operations.

Hired labor and unpaid labor costs vary with size of operation, as expected. Total hired and unpaid labor costs are about 300 percent more on the small than on the large-sized operation. Ownership costs including depreciation, interest, taxes and insurance, and general farm overhead are not greatly different among the operations.

The land charges are also quite similar when pasture rent is combined with the charge on owned land.

Net returns are summarized in appendix table W6-5. The steps in the calculation were explained previously. The return to total land is negative for the smallest and medium-sized operations, and only a positive \$.98 per AUM for the largest size.

THE COASTAL REGIONS OF WASHINGTON, OREGON, AND CALIFORNIA -- WESTERN REGION 1

Location and Climate

Western Region 1 represents the coastal regions of Washington, Oregon and California (figures A-7, A-8, and A-9). It includes Whatcom County, Washington and extends south to Skamania County, Washington and west to the Pacific Ocean. Counties in Oregon included extend from Multnomah on the Columbia River to Jackson County at the California border and counties between and to the west of them. Counties included in California extend from Del Norte on the north to San Luis Obispo County on the south along the Pacific

Coast and a few inland counties including Lake, Napa, Contra Costa, Alameda, Santa Clara, and San Benito.

The climate of the area is influenced greatly by the Pacific Ocean, the Coastal Range, and Cascade Mountains which parallel the ocean. The Coastal Range and Cascade Mountains are separate in Washington and most of the way across Oregon. They merge in southern Oregon and extend into northern California as the Coastal Range(s).

The eastern boundary of the area W-1 follows the crest of the Cascade Range through Washington and Oregon. The area includes most of the coastal range through California.

The climate in western Washington is described as follows:

West of the Cascade Mountains in Washington, summers are cool and comparatively dry, winters are mild, wet, and cloudy. The average number of clear or only partly cloudy days each month varies from 4 to 8 in winter, 8 to 15 in spring and fall, and 15 to 20 in summer. The percent of possible sunshine received each month ranges from approximately 25 percent in winter to 60 percent in summer. In the interior valleys, measurable rainfall is recorded on 150 days each year and on 190 days in the mountains and along the coast. During July and August, the driest months, it is not unusual for two to four weeks to pass with only a few showers. However, in December and January, the wettest months, precipitation is frequently recorded on 20 to 25 days or more each month. The range in annual precipitation is from approximately 20 inches in an area northeast of the Olympic Mountains to 150 inches along the southwestern slopes of these mountains. Snowfall is light in the lower elevations and heavy in the mountains.

During the wet season, rainfall is usually of light to moderate intensity and continuous over a period of time rather than heavy downpours for brief periods...

The rain potential of the marine air, however, was greatly reduced by passage over the Coast Range; therefore, the rainfall on the west slopes of the Cascades at a corresponding elevation is only about one-half to two-thirds as great as on the Coast Range. Precipitation amounts decrease rapidly once the crest is crossed and descent down the eastward side begins."⁶

The climate west of the Cascades in Oregon is quite similar to that in Washington and the effect also extends through the northern third of the W-1

⁶NOAA. 1962. "Climate of Washington." Climatography of the United States No. 60, Environmental Data Service, National Oceanic and Atmospheric Administration, National Climatic Center, Asheville, N.C. June 1982.

region in California. Further south, and particularly south of San Francisco Bay, annual precipitation is much less than in northern California, Oregon, and Washington. The pattern of relatively high winter rainfall and much less warm season rainfall holds throughout the region.

The Washington, Oregon, and northern California areas are quite mountainous and heavily timbered. The southern extent in California is less so.

Enterprise Operations

Cattle Inventories and Sales

Cattle inventories are presented in appendix table W1-1. Sales of cull cows on the smallest and the largest-size operations were significantly below the long-time average. Only 9.5 yearling heifers are shown as retained for replacements on those two sizes of operation, which implies an unrealistic average age at culling of 12 years given a two-year-old starting age. This is the common problem previously mentioned.

Culling and replacement indicated for the medium-sized operation is more likely representative of a longer-term culling and replacement rate for cows. It indicates about a six-year useful life for a breeding cow and about an eight-year average age at culling. Some cows will be culled as early as three and four-year-olds and other cows may continue to be productive well into their teens, thus an eight-year average age at culling is reasonable.

The inventory reconciliations indicate an 86.5 percent calf crop born on the smallest and medium-sized operations and an 81.4 percent calf crop born on the largest-size operations. After death losses, the percentage calf crops weaned are about 83 percent on the two smaller-sized operations and about 80 percent on the largest-sized operation. This is quite reasonable for the area, or perhaps just slightly better than average. Death losses, also shown in appendix table W1-1, range from 2 percent to 4 percent for most classes.

Cattle sales for the Pacific Coastal regions are summarized in appendix table W1-2. The numbers presented are a composite or an amalgamation for the different types of operations, as explained previously. Weights reported are influenced by the combination of sales. Calf sales predominate in numbers. Total weight of calf and yearling sales are nearly the same on the smallest and medium-sized operations. Weight of calf sales is significantly more than yearlings on the largest-sized operation.

The ERS budgets indicated calf sales in June, and yearling and cull cow sales in July. Calving time was not specified, nor apparent from other data. However, late fall calving is indicated by the sale date on calves, perhaps at about seven months of age.

Physical Inputs

Physical inputs used per planning unit and per animal unit are summarized in appendix table W1-3. About two-thirds of the year-long feed supply resource for the smallest-sized operation comes from forage with the majority of that being from owned resources. Larger proportions of the feed supply on the medium and the large-sized ranches come from range, pasture, and crop residue. Significant amounts of the total feed supply are obtained by renting on the medium and larger-sized operations.

Seasonality of input use varies to some degree with size of operation. Rangelands, whether owned or leased, are used from February through October on the smallest operations and throughout the year on the medium and larger-sized operations. Heaviest use is from April-May through September-October. Seasonality for irrigated pasture use is about the same as for rangelands. Crop residue use occurs in the months of July or August through October on the small and medium-sizes, and July through December on the larger size. October through February are months of significant supplemental feed use, with some use as early as August or as late as April. Compositing differing types of ranches has an effect on seasonality of input use shown. Even though less feed is used per cow, or per 100 cows, the supplemental feeding season is longer on the large-sized operations than on the small.

Costs and Net Returns

Costs are summarized in appendix table W 1-4. There are a number of significant differences in costs among the three different sizes of operation. For example, the pasture rent is low for the smallest size and increases for the medium and the large-sized operations. That follows from the differences in amount of physical inputs used. Conversely, the cost for hay produced and for oats and hay purchased are high on the smallest size and decrease on medium or large-sized operations.

Total labor costs, including unpaid labor, are not greatly different between the small and the medium-sized operations, but are less for the large-sized operation.

Total variable costs are somewhat larger for the medium-sized and for the large-sized operation as compared with the small.

Ownership costs, unpaid labor, and the "land charge" all tend to be much higher on the small-sized operation than on either the medium or large-sized operation. The variations in the land charge are consistent with the fact that a larger proportion of the total carrying capacity is owned on the smaller and the medium-sized operations as compared with the large. If the pasture rent paid is added to the land charge, then differences between the small, medium, and large-sized operations are not particularly great.

Net returns are summarized in appendix table W1-5, and the steps in calculation were explained in discussing region W-3. Returns to total land and management were negative for the small and medium-sized operations.

EASTERN WASHINGTON, NORTHERN OREGON, IDAHO, AND WESTERN MONTANA -- WESTERN REGION 2

Location and Climate

Western Region 2 includes eastern Washington and northern Oregon east of the Cascade Mountains, all of Idaho, and Montana west of the continental divide (figures A7, A8, A10, and A1).

The crest of the Cascade Mountains, an area of high average annual precipitation, forms the western boundary of Region 2 in Washington. However, the precipitation gradient drops very rapidly as the warming and drying air descends along the eastern slopes. Large parts of the Columbia Basin are in the 10 to 20 inch rainfall zones with smaller areas as low as 6 to 8 inches. Mountainous areas in northeast Washington have precipitation in the 20 to 30 inch rainfall range. A similar situation exists for the extreme southeast, except the precipitation in this area rises as high as 40 inches annually in the hills along the far southeast border.

The winter precipitation is generally greater than the summer precipitation throughout the area, particularly along the eastern slopes of the Cascades. One-third or a little more of the total precipitation occurs in the summer throughout much of the basin, while as little as 20 percent of the annual precipitation occurs during the warm season at the higher elevations of the Cascades.

The portions of Oregon included in Region 2 are in the Columbia and Snake River Basins. The Columbia Basin part of Oregon includes Gilliam, Hood River, Morrow, Sherman, Umatilla, and Wasco Counties. The Snake River Basin counties include Baker, Union, and Wallowa. The climatic features of these counties tend to be an extension of that described for the state of Washington with the high precipitation typical of the Cascade Mountains in Hood River County and with an extension of the drier climates of Washington extending into the counties in Oregon. There is an area of relatively higher precipitation in the Wallowa Mountains in eastern Oregon and it extends into Washington, also reaching the 40 inch precipitation zone.

Idaho lies entirely west of the continental divide and is included with the Western Region 2. The extreme range of elevation in the state is from 738 feet at the confluence of the Clearwater and Snake rivers to 12,655 feet at Mt. Borah in Custer County. Mountains, canyons, valleys at higher and lower elevations, and desert-type areas create a wide range of climates. Nevertheless, Idaho is influenced most strongly by maritime air borne eastward on the prevailing westerly winds. Particularly in winter, and from central Idaho north, the maritime influence is most noticeable in the greater frequency of precipitation and higher temperatures than those at the same latitude and altitude east of the continental divide. In the central mountains and northward through the panhandle, 20 to 30 inches of precipitation is common, and over 30 inches annually occurs at higher elevations.

Southern and eastern Idaho's climate has a more continental and desert character than the west and north. There is a greater range between winter and summer temperatures and a reversal of the wet winter-dry summer pattern. Large areas in the east and much of the Upper and Central Snake River Plains and the southwestern valleys receive less than 12 inches annually, and only small areas of the higher mountains receive 20 inches or more. Annual precipitation is more equally divided between winter and summer in much of the eastern and southern parts of the state.

The part of Montana in Region 2 includes Flathead, Powell, Jefferson, and Gallatin counties and the counties west of these. Most of the area is west of the continental divide, though some of the counties to the south are headwater counties for the Missouri River. The continental divide exerts a

strong influence on the climate of western Montana. West of the divide the climate is similar to that described previously for the central mountains and panhandle areas of Idaho. Annual precipitation along the Bitterroot Mountains bordering Idaho ranges from 30 to 40 inches. Precipitation is up to 20 inches or more along the mountains forming much of the continental divide. The valley areas between these mountains are mostly in the 12 to 16 inch range. Precipitation over the general area tends to be evenly distributed throughout the year.

The continental divide forms a mountain barrier that holds cold continental air masses to the east, thus keeping the winters somewhat milder than those east of the continental divide and making them more similar to the winters in northern Idaho, Washington, and eastern Oregon area. At the same time, however, the summers also are somewhat cooler.

Enterprise Operations

Cattle Inventories and Sales

Cattle inventories for region W-2 are summarized in appendix table W2-1.

Sales of cull cows on all sizes of operations are significantly below the long-time average. This problem and the effects were explained previously. The inventory reconciliations indicate 90-92 percent calf crops born and 85-87 percent calf crops weaned after death losses.

Cattle sales are summarized in appendix table W2-2. Calf and yearling sales are about equal on the smallest operation in terms of numbers. On the medium and large-sized operations, yearling sales exceed calf sales in both numbers and weights. Peak marketing months are September for yearlings and November for calves and cull cows. March is the peak calving month. Thus, calves average about seven to eight months old at marketing, which contributes to the weight.

Physical Inputs

Physical inputs used per planning and per animal unit are summarized in appendix table W2-3. About 60 to 65 percent of the year-long feed supply resource for these operations come from forage, with the majority of that coming from owned resources. Slightly larger proportions of the feed supply on the medium and the large-sized ranches come from range, pasture, and crop residue. Unlike the Pacific coastal regions, the smallest operation shows

greatest use of rented lands, about 25 percent of total resource use, compared with 16 to 19 percent for the larger-sized operations. November, December, and January are the months for peak supplemental feeding, with some feed use in October and extending into March and April.

Rangelands, whether owned or leased, are used mostly from May through November on the smallest and medium-sized operations. There is slight use of owned lands in March, April, and December. Larger-sized operation show use of leased lands from April through October and extend the use of owned lands from March through December. Irrigated pasture is also used April through October on the small and medium-sized operations and only May through August on the largest size of operation. Crop residue use occurs from September through December on the small and medium-sized operations and from September into the following April on the large size. Significant supplemental feed use commences in November and extends into May for all sizes of operation.

Costs and Net Returns

Costs are summarized in appendix table W2-4. There are a number of rather significant differences in variable costs between the three different sizes of operation. For example, the pasture rent is greater for the smallest size and less for the medium and the large-sized operations. That is a reversal of the relationship in the Pacific Coastal region. Irrigated pasture and costs of purchased and ranch produced feeds are also higher on the small and medium sizes than on large-sized operations.

The costs for unpaid and hired labor combined were about 20 percent more for the small-sized operation than for the large-sized operation, and were much higher on the medium size than on either of the other sizes.⁷ Total variable costs are about the same for the small and medium-sized operations, and somewhat less for large-sized operations.

The land charge based on a longer term "real" rate of interest of 4.4 percent per annum is not greatly different among the three sizes of operation.

Net returns are summarized in appendix W2-5. The steps in the calculation were explained previously. The return is negative for the smallest and medium-sized operations, as they were in the Pacific Coastal Region, and positive for largest size, but only a modest \$2.74 per AUM.

⁷The data shown are as reported. One may suspect an error in the data.

**THE CENTRAL VALLEY, FOOTHILLS, AND NORTHERN
CALIFORNIA AREAS -- WESTERN REGION 4**

Location and Climate

Western Region 4 consists of the Central Valley, foothills, and northern part of California (figure A-9) from Siskiyou County in the north to Kern County in the south and including the counties between. Region 4 is bounded on the west by the Coast Range and on the east by the Sierra Nevada Range, which joins the Techachapi Mountain Range to form the southern boundary of the valley. The area is approximately 500 miles long and averages 120 miles wide when the foothills are included. The central valley ranges from about sea level to 400 feet in elevation. Elevations increase gradually through the foothills and reach 10,000 to 14,000 feet in places at the crest of the Sierra Nevadas.

Approximately 83 percent of the yearly rainfall occurs from October through April. Precipitation ranges from around 10 inches in the southern San Joaquin Valley to 15 to 20 inches in the Sacramento Valley. The precipitation gradients increase to 20 to 30 inch range in the coast ranges and 50 inches or more at higher elevations. Snow may be reported at elevations as low as 2,000 feet but does not stay. Snowfall is heavy at higher elevations and snowmelt then supports the flow of many rivers and streams that drain the west slopes of the Sierra Nevadas.

Summers are hot in the valley areas and gradually cooler at higher elevations of the foothills or mountains. The growing season in most of the farming areas averages 225 to 300 days, conducive to growing crops under irrigation. However, the pattern of winter precipitation and summer heat produces a period of native range vegetation growth in winter and spring and dormancy in the summer and fall over much of the range area. This results in some unique characteristics in cattle ranching in the area.

Enterprise Operations

Cattle Inventories and Sales

Cattle inventories and sales for the region are summarized in appendix tables W4-1 and W4-2. Cow death loss on the smallest-sized operation seems unusually high. The rate of replacement heifer retention seems low for all sizes of operation. That has been the case for other regions as well. Calf

crops born are about 83 to 85 percent and calf crop weaned is under 80 percent for the small and large sizes and only a little over 80 percent for the medium-sized operation.

The numbers sold reflect the composite or an amalgamation for the different types of operations selling calves, yearlings, or both. The effect of the "mixed marketing" on calf and yearling weights and the differentials between calves and yearlings were discussed previously.

The budgets indicate calf sales in July and yearling and cull cow sales in September. Calving time was not specified, nor deducible by looking at other data. However, late fall and winter calving is indicated by the sale date on calves, perhaps at about seven months of age.

Physical Inputs

About 75 to 87 percent of the year-long feed supply resource for the different sized operations comes from rangelands or pasture forage (appendix table W4-3). Slightly larger proportions of the feed supply on the medium and the large-sized ranches come from range, pasture and crop residue than on the small-sized operations. Significant amounts of the total feed supply are obtained by renting, particularly on the medium and large-sized operations. Range and pasture use occurs all year; supplemental feeding of hay and concentrates is also year long, but with most significant use starting in October and extending into March and April.

Costs and Net Returns

Costs and net returns are summarized in appendix tables W4-4 and W4-5. There are a number of rather significant differences in costs among the three different sizes of operation. For example, the pasture rent is small for the smallest size and increases for the medium and the large-sized operations. Conversely, the costs for hay produced and purchased and for protein supplements are high on the smallest size and decrease on medium or large-sized operations. Total labor costs, considering both hired and unpaid labor, do not differ greatly among the different sizes. Total variable costs are lowest for the medium-sized operation. Ownership costs are much higher on the small than on the large-sized operation.

The land charge is much higher on the small-sized operation than on the medium or large-sized operation. The variations in the land charge are consistent with the fact that a larger proportion of the total carrying

capacity is owned on the smaller and medium-sized operations as compared with the large. If the pasture rent paid is added to the land charge, then the total land charge is almost the same for all sized operations.

Returns over variable costs are positive for all three sizes of operation. Deduction of ownership costs results in negative returns to the operator for his unpaid labor, management, and land for all sizes of operation. Deduction of the charge for unpaid labor then results in larger negative returns to owned land and management. After adding a return to the landlord on rented land to the return on owned land, the result is negative for the smallest and medium-sized operations, and only \$2.62 per AUM equivalent for the largest-sized operation.

**SOUTHEAST OREGON, NORTHEAST CALIFORNIA, NORTHERN NEVADA,
AND WESTERN UTAH--WESTERN REGION 5**

Location and Climate

Western Region 5 contains parts of Oregon, California, Nevada, and Utah (figures A8, A9, A11, and A5).

The area of California included in this region is in the extreme northeast corner of the state, east of the Sierra Nevada Mountains, and includes Modoc, Lassen, and Plumas counties. Unlike areas west of the Sierra Nevadas, precipitation on the east side of the range is light, from 10 to 15 inches per year over most of the area. Temperatures are of a more continental type with cold winters and warm summers. The growing season ranges from 100 to 125 days.

The southeastern one-third of Oregon is included in this region and extends from Jefferson to Grant counties and those south of them. The other major feature is the Columbia Plateau, which ranges from 4,000 to 6,000 feet in elevation. This plateau is arid with scant vegetation and is used primarily for livestock grazing. Winters tend to be cold in this area. Most of the precipitation falls during the winter months.

Northern Nevada is included in this area, with portions extending from Douglas County on the west to White Pine County on the east and including areas mostly north of that general line. It is predominantly a desert region with much of the lower elevations ranging from 5,000 to 6,000 feet in the east to an elevation of 3,800 to 5,000 feet in the west near Pyramid Lake. The

numerous small mountain ranges rise to as much as 10,000 feet and separate the desert areas. These mountain ranges and desert areas produce wide variations in rainfall and temperatures within relatively short distances.

The area in Utah includes the Wasatch Mountains and land west of them. Rich County at the Utah-Idaho-Wyoming border in the north and Kane County on the Arizona border and counties between these two form the east boundary of the area.

Because Nevada lies on the lee-side of the Sierra Nevadas it is under the influence of air dried by condensation and precipitation of moisture on the California slopes of the mountains. The dry air prevails over Nevada and western Utah, and climate in these areas is mostly of a desert or steppe type.

The Wasatch Mountains in Utah serve to accumulate snow or rain from moisture that is present. Precipitation varies from less than five inches in the Great Salt Lake Desert to 11-15 inches over the cultivated areas nearer to the Wasatch Mountains, and to more than 40 inches in some parts of the mountain areas. The Wasatch Mountains also provide a barrier of sorts to cold continental air masses. Thus, winter temperatures are a little more moderate than might be expected, given the elevation and latitude of the area.

Enterprise Operations

Cattle Inventories and Sales

Cattle inventories and sales are summarized in appendix tables W5-1 and W5-2. As has been true of other regions, sales of cull cows on all sizes of operations are significantly below the long-time average. The inventory reconciliations indicate only about 70 percent calf crop born on the smallest size, and one may suspect errors in the budget. The medium and large-sized operations report 87 percent and 83 percent calf crops born, shrinking to about 83 percent and 80 percent after death losses.

Yearling sales are slightly more than calf sales on the smallest and medium-sized operation in terms of numbers, but are much greater than calves in terms of weight. Yearling sales predominate in both number and weights on the large-sized operations. Peak marketing months are September for yearlings and November for calves and cull cows. April is the peak calving month. Thus, calves average about seven-months-old at marketing.

Physical Inputs

About 72-83 percent of the year-long feed supply resource for these operations comes from forage with the majority of that from owned resources or rent of privately owned land. Only .32 to .39 AUMs per animal unit, or only around 3 percent of the total is reported from state or federal public lands. That is rather surprising, considering the area represented.

There is some rangeland use year-long, but most rangeland use, whether owned or leased, occurs from April through October. Irrigated pasture use is in May through September. Significant supplemental feed use commences in November and extends into May for all sizes of operation, with highest use from December through April.

Costs and Net Returns

Costs and net returns are summarized in appendix tables W5-4 and W5-5. There are a number of rather significant differences in costs between the three different sizes of operation. For example, the pasture rent is greater for the largest size and less for the medium and the small-sized operations. Conversely, irrigated pasture and costs of purchased and ranch-produced feeds are higher on the small and medium sizes than on large-sized operations.

When costs for unpaid labor are combined with the costs for hired labor, total labor costs are considerably more on the small and medium sizes than on the large-sized operation. Total variable costs are about the same for the medium and large-sized operations, and somewhat more for small-sized operations.

General farm overhead costs are much higher on the small and larger-sized operations than on the medium sized. That is contrary to the usual pattern. The land charge is not greatly different between the small and medium-sized operations. It is somewhat less on the largest size, but the difference is offset if differences in lease costs are considered.

Net ranch incomes and returns to land and management are negative for all sizes of operation. Return to total land is negative for all sizes, even after adding a return to landlord for leased land to the operator's return.

**SOUTHERN CALIFORNIA, SOUTHERN NEVADA, ARIZONA, AND
WESTERN AND SOUTHERN NEW MEXICO--WESTERN REGION 7**

Location and Climate

This area includes a few California counties on the west side of the Sierra Nevada Mountains from Sierra to Mariposa counties, and counties of southeastern and southern California, the southern part of Nevada, all of Arizona, and western and southern New Mexico (figures A9, A11, A12, and A13).

The counties on the west slopes of the Sierra Nevada mountains have relatively high precipitation (20 to 60 inches) and heavy snowpack typical of that area. Most of the California area is in the southeast, consisting of deserts and mountains within the Great Basin Desert and Death Valley and the Imperial Valley. These are the hottest and driest portions of the state. Much of this area receives less than 8 inches of rain annually. Coastal areas from Santa Barbara to San Diego Counties receive 16 to 30 inches of precipitation. The entire included area of California is one of predominantly winter rainfall, winter season growth of native vegetation, and spring-fall drought and dormancy.

The climate of southern Nevada is similar to that of the desert areas of southeastern California, as annual average precipitation ranges from 4 to 10 inches, mostly less than 6 inches. Winter precipitation predominates. Summers tend to be long and hot, and temperatures greater than 100° are common. Evenings during the summer are often cool.

Arizona has three main topographical areas: (1) a high plateau averaging between 5,000 and 7,000 feet in elevation in the northeast; (2) a mountainous region oriented southeast to northwest with maximum elevations between 9,000 and 12,000 feet; and (3) low mountain ranges and desert valleys in southwestern Arizona, which are extensions of the Mohave Desert of California and Nevada and the Sonora Desert of Mexico.

Average annual precipitation in the southwest is similar to that described for southeast California and Nevada. The higher elevations of the state, running diagonally from the southeast to the northwest, average between 25 and 30 inches of precipitation annually. The plateau in the northeastern corner of the state receives approximately 10 inches of precipitation annually. Vegetation in this area consists of sagebrush and native grasses with junipers and pinon trees on higher ridges.

Throughout Arizona high temperatures are common through the summer months at the lower elevations. Great variations occur between day and night temperatures, sometimes as much as 50° to 60° F during the drier portions of the year. The length of the growing season varies greatly, averaging less than three months in some of the higher areas in the northern and eastern portions of the state to eight to 10 months, or even year-long in areas of the southwest.

Precipitation is governed to a great extent by elevation and season. From November through March, storm systems from the Pacific Ocean cross the state. These winter storms occur frequently in the higher mountains of the central and northern parts of the state and sometimes bring heavy snows. Melting of this snow during the spring serves to maintain a supply of water in the main rivers and reservoirs of the state. Summer rainfall begins early in July and usually lasts until mid-September. Moisture-bearing winds sweep into southeast and southern Arizona from the Gulf of Mexico or the Gulf of California to produce the summer rainfall effect.

New Mexico is divided into three major areas by mountain ranges and highlands. The portions included in Western Region 7 are the Central Mountains in the north and the Rio Grande River, which flows through them to the lower elevation Rio Grande Valley areas from Santa Fe to El Paso, Texas. Region 7 also includes the mountain ranges and desert plateaus that form the continental divide, and areas west of them. Principal tributaries flowing westward into the Colorado River include the San Juan and Little Colorado rivers in the north and northwest and the Gila and the San Francisco tributary of the Gila in the south. There are also some closed basins in southwestern New Mexico.

As is true of other mountainous western states, average annual precipitation ranges from less than 10 inches over much of the southern desert and the Rio Grande and San Juan Valleys to more than 20 inches at higher elevations in the state. Wide variation in annual totals is also characteristic of arid and semiarid climates such as New Mexico.

Summer rains fall almost entirely during brief, but frequently intense, thunderstorms as moisture from the Gulf of Mexico brings these storms into the state. July and August are the rainiest months over most of the state, with from 30 to 40 percent of the year's total moisture falling at that time. The

San Juan Valley area in the northwest is the main exception, receiving only about 25 percent of its annual rainfall during July and August. May through October total precipitation averages from 60 percent of the annual total in the Northwestern Plateau to 80 percent of the annual total in the Eastern Plains.

Winter precipitation, to the extent it occurs, is caused mainly by the general movement of Pacific Ocean storms across the country from west to east. Significant winter precipitation falls on the western slope of the continental divide and other northern and high central mountain ranges. Much of the winter precipitation falls as snow in the mountain areas, but it may occur as either rain or snow in the valleys or desert areas.

Enterprise Operations

Cattle Inventories and Sales

Cattle inventories and sales are summarized in appendix tables W7-1 and W7-2. Again, sale of cull cows is relatively low. The inventory reconciliations indicate 78 to 85 percent calf crops born and 76 to 80 percent calf crops weaned after death losses. Highest calf crops are projected on the smallest operations.

Calf sales predominate in numbers for all three sizes, and in weight sold on the smallest and medium-sized operations. Weight of yearling sales exceeds weight of calf sales on the largest size. Marketing is reported in October for all classes of cattle and all sizes of operation. March is the peak calving month. Thus, calves average about seven-months-old at marketing, which contributes to the weight.

Physical Inputs

From 80 to 90 percent of the year-long feed supply resource for these operations come from forage, with the majority of that from private range or pasture rented (appendix table W7-3). Larger proportions of the feed supply on the medium and large-sized ranches come from privately owned range and less from rented or irrigated pasture than on the smallest size. Obviously, use of rangelands and pasture occurs year long. Supplemental feeding to the extent it is used is distributed throughout the year, but most use is from December through March.

Costs and Returns

Total variable costs are not greatly different between the small and medium-sized operations, but are much less on the large-sized operations. Total labor costs, including hired and unpaid, are almost 400 percent more per AU on the small than on the large-sized operation (appendix table W7-4).

Ownership and general farm overhead costs are considerably higher on the small than on the medium or large-sized operations.

The land charge based on a longer term "real" rate of interest of 4.4 percent per annum is not greatly different among the three sizes of operation, particularly after making allowances for the costs of leasing.

Returns over variable costs are positive for all three sizes of operation (appendix table W7-5). Deduction of ownership costs and unpaid labor results in negative returns to owned land and management for all sizes. When a return to the landlord on rented land is added to return on owned land the return is negative for the smallest and medium-sized operations, and only \$1.91 per AUM equivalent for the largest-sized operation.

SUMMARY

The area considered in this study includes all of the 11 western states, except for approximately the eastern half of Colorado and the northeastern quarter of New Mexico. Those excluded portions of the 11 western states are offset in part by the inclusion of a little more than the western half of South Dakota and the northwestern portion of Nebraska, amounting to perhaps 40 percent of that state. Total area included probably equals or exceeds the 753 million acres for the 11 western states in total, or about 40 percent of the "lower" 48 states.

The data presented was derived from livestock operations budgets prepared by the Farm Economics Division (FED), Economic Research Service, U.S. Department of Agriculture for the years 1980, 1981, and 1982. Those were the last years for which such data were available at the time the major analyses were initiated and mostly completed.

The budgets used as source data were presented for three sizes of operation in each of seven different regions of the United States, extending from regions on the north, central, and south Pacific coasts through the Rocky Mountain and great plains regions to the east. Needless to say, there is

extreme geographic and climatic diversity across the seven regions. Even within each region significant mountain ranges, valleys, arid basins, or plains-type rangelands occur. Because of the influence of the mountains, there are fairly wide ranges in precipitation and growing season, with consequent influences on vegetation within most of the seven regions. Very brief descriptions of the geoclimatic features in each of the seven regions has been provided in the text and it seems futile to attempt a more concise summarization at this point.

With seven regions involved and three sizes of operation per region, there are, in total, 21 operations characterized. It becomes extremely difficult to make comparisons among this number of operations and all the different characteristics that are relevant. Previously, some data problems--particularly an unusually low replacement rate among breeding herds--was mentioned. These problems seem to be slightly less for the medium-sized than for the other sizes of operation. Also, one might argue that the medium-sized operation perhaps represents the more typical family-type of commercial operation rather than a part-time or supplemental enterprise of the smallest size or the infrequently occurring larger-sized operation. For that reason, comparisons for only the medium-sized operations are summarized in a series of tables presented in the following section.

Cattle and Calf Sales

Cattle and calf sales are summarized in table 8. The data are presented based on the 100-cow planning unit and per animal unit in order to achieve standardization and comparability among data. In examining the data presented in table 8, one finds a remarkable uniformity in number of cattle and calves sold across regions and also in total weight sold and value sold per animal unit.

Physical Inputs Used

Resource use is divided between that provided by pasture, range, and crop residues, and that provided by harvested feeds or purchased supplements (table 9). As one might expect, the areas representing predominately desert, or the warmer, longer-growing-season areas, which are the southwest desert areas (W-7), the central valley and Sierra foothills of California (W-4), and the

Table 8. Summary of cattle and calf sales for 100-cow planning units from medium-sized operations in seven regions, 1980-82

Item and region represented	Number (No)	Weight		Price (Dols/Cwt)	Value	
		Per head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 177-cow size - W1						
Cull cows	15.25	10.20	156	38.25	5,951	38.39
Yearling heifers	7.91	6.49	51	55.83	2,866	18.49
Heifer calves	15.82	5.00	79	57.59	4,555	29.39
Steer calves	22.03	5.10	112	66.58	7,482	48.27
Yearling steers	<u>19.21</u>	<u>7.02</u>	<u>135</u>	<u>62.08</u>	<u>8,372</u>	<u>54.01</u>
Total	80.23		533	54.81 ^{a/}	29,226	188.55
Weight per AU			3.44			
Represents 197-cow size - W2						
Cull cows	9.14	10.00	91	37.93	3,466	21.80
Yearling heifers	20.30	6.74	137	58.92	8,063	50.71
Heifer calves	11.17	4.96	55	57.87	3,206	20.16
Steer calves	21.83	5.18	113	68.08	7,698	48.42
Yearling steers	<u>20.30</u>	<u>7.45</u>	<u>151</u>	<u>64.75</u>	<u>9,795</u>	<u>61.60</u>
Total	82.74		548	58.81 ^{a/}	32,227	202.69
Weight per AU			3.45			
Represents 197-cow size - W3						
Cull cows	11.17	9.80	109	37.93	4,151	28.43
Yearling heifers	9.14	6.38	58	63.09	3,678	25.19
Heifer calves	21.83	4.23	92	63.66	5,877	40.25
Steer calves	26.90	4.61	124	73.08	9,064	62.08
Yearling steers	<u>16.24</u>	<u>6.75</u>	<u>110</u>	<u>69.90</u>	<u>7,664</u>	<u>52.49</u>
Total	85.28		494	61.64 ^{a/}	30,435	208.46
Weight per AU			3.38			
Represents 213-cow size - W4						
Cull cows	10.33	9.83	102	38.25	3,884	26.60
Yearling heifers	11.74	6.96	82	56.50	4,615	31.61
Heifer calves	15.96	4.21	67	59.39	3,991	27.34
Steer calves	20.66	4.47	92	69.92	6,456	44.22
Yearling steers	<u>19.72</u>	<u>7.16</u>	<u>141</u>	<u>61.50</u>	<u>8,683</u>	<u>59.47</u>
Total	78.40		484	57.09 ^{a/}	27,629	189.24
Weight per AU			3.31			
Represents 227-cow size - W5						
Cull cows	7.93	9.60	76	37.93	2,888	19.78
Yearling heifers	15.42	6.49	100	58.92	5,896	40.38
Heifer calves	15.86	4.10	65	57.58	3,744	25.64
Steer calves	19.82	4.52	90	69.50	6,227	42.65
Yearling steers	<u>21.15</u>	<u>6.93</u>	<u>147</u>	<u>65.75</u>	<u>9,635</u>	<u>65.99</u>
Total	80.18		477	59.47 ^{a/}	28,390	194.45
Weight per AU			3.27			
Represents 208-cow size - W6						
Cull cows	7.69	9.76	75	36.00	2,703	18.77
Yearling heifers	11.06	6.60	73	61.63	4,498	31.24
Heifer calves	17.79	4.12	73	61.38	4,499	31.24
Steer calves	23.56	4.45	105	70.86	7,429	51.59
Yearling steers	<u>15.38</u>	<u>7.30</u>	<u>112</u>	<u>66.81</u>	<u>7,503</u>	<u>52.10</u>
Total	75.48		438	60.73 ^{a/}	26,631	184.94
Weight per AU			3.05			
Represents 213-cow size - W7						
Cull cows	9.39	9.12	86	39.03	3,343	24.22
Yearling heifers	7.04	6.06	43	60.83	2,596	18.81
Heifer calves	21.13	3.98	84	61.56	5,177	37.51
Steer calves	26.29	4.20	110	69.75	7,702	55.81
Yearling steers	<u>13.62</u>	<u>6.32</u>	<u>86</u>	<u>66.08</u>	<u>5,686</u>	<u>41.20</u>
Total	77.46		409	59.93 ^{a/}	24,503	177.56
Weight per AU			2.96			
Simple averages for all regions	79.97		3.27		28,434	192.27

^{a/} Weighted average price.

Table 9. Physical inputs used per animal unit for medium-sized ranches in the seven western regions

Item	Unit	W-1	W-2	W-3	W-4	W-5	W-6	W-7
Private range	AUMs	5.01	3.58	4.57	5.59	4.25	5.54	6.34
Public grazing								
BLM	AM	--	0.09	0.08	--	0.22	0.27	0.27
Forest	AM	--	0.03	0.06	0.02	0.05	0.16	0.35
State	AUMs	--	0.25	0.31	--	0.12	0.37	0.31
Pasture rent	AUMs	4.10	1.54	2.14	2.41	2.05	1.67	3.55
Irrigated pasture	AUMs	0.56	1.74	0.23	2.51	1.55	1.16	0.22
Crop residue	AUMs	0.13	0.38	0.55	0.24	0.43	0.21	0.15
Sub-total	AUMs	9.80	7.61	7.94	10.77	8.67	9.38	11.19
Hay								
Produced	Ton	0.45	1.16	0.79	0.38	0.89	0.93	0.11
Purchased	Ton	0.22	0.19	0.12	0.21	0.28	0.11	0.23
Protein supplement	Ton	--	0.01	0.06	0.02	0.02	0.02	0.16
Corn	Bu.	--	--	6.41	--	--	--	--
Silage	Ton	--	--	0.27	--	0.65	--	--
Barley	Bu.	--	1.34	--	--	--	--	--
Oats	Bu.	0.29	--	--	--	--	1.01	--
AUM equiv. feeds ^{a/}		2.03	4.25	4.15	1.87	3.68	3.34	1.79
AUM equiv. total		11.83	11.86	12.09	12.64	12.35	12.72	12.98
Salt and minerals	Cwt.	0.23	0.23	0.25	0.25	0.25	0.25	0.26
Hired labor	Hour	2.61	5.50	2.24	3.57	5.93	2.73	4.63

^{a/} Based on 1,000 lb. total digestible nutrients (TDN) per ton of hay, 0.8 lb. TDN per lb. of grains, and a requirement of 333 lb. of TDN per AUM equivalent, including waste.

coastal ranges of Washington, Oregon, and California (W-1), have the greatest reliance on non-harvested forage. The greatest reliance on harvested feeds occurs in the northern Pacific inland areas, the northern plains, and the northern great basin area (W-5) (W-2) (W-3).

Costs of Operation

There is a great deal of variation among regions in individual cost items, however, there is a rather surprising uniformity of all cost categories (table 10). For instance, variable costs among six of the seven regions deviate by less than 9 percent from the overall average. The same is true of total ownership costs. Unpaid labor costs and total labor costs are relatively high in regions W-2 and W-7, and are rather variable among other regions. Disregarding those two regions, total costs excluding the land charge are also quite uniform among the other five regions. The land charge is quite variable across regions. Total costs for all regions are also within about 10 percent of the seven-region average, and would be considerably closer excluding the outlier regions W-2 and W-7.

Net Returns

Net returns per animal-unit are summarized in table 11. Returns over variable costs were positive in all regions. However, after allowing for ownership costs, returns to labor, land, and management were negative in all regions, and most negative in W-7.

The calculation of return to all land, by adding an estimated return to the landlord on leased land to return to owned land was explained previously. This return was also negative. Return to all land per animal-unit-month is also calculated and is in the range of about \$2 to \$5 per AUM for five of seven regions.

Conclusion

The general uniformity in receipts, costs, and returns among regions is quite surprising. It is perhaps indicative of the effectiveness of: (1) calculations on a 100-cow planning unit and animal-unit basis; and (2) the operation of competitive economic forces that tend to force uniformity in performance.

Table 10. Estimated 1980-82 average costs per animal unit for medium-sized ranches in seven western regions

Item	W-1	W-2	W-3	W-4	W-5	W-6	W-7	All ^{a/} regions
Public grazing								
BLM	--	0.19	0.18	--	0.48	0.60	0.58	
Forest	--	0.06	0.13	0.03	0.11	0.36	0.77	
State	--	0.62	0.80	--	0.22	0.94	0.64	
Pasture rent	36.64	13.33	22.01	22.64	16.30	15.00	27.58	
Sub-total leased	(36.64)	(14.20)	(23.12)	22.67	(17.11)	(16.90)	(29.57)	(22.89)
Irrigated pasture	3.26	13.96	1.72	15.46	16.92	7.41	2.92	
Hay (produced)	6.64	19.08	12.62	6.61	21.16	18.64	2.02	
Hay (purchased)	18.04	12.43	7.05	17.24	19.46	6.31	16.78	
Protein supplement	--	3.08	14.84	5.29	4.79	4.09	39.42	
Corn	--	--	18.86	--	--	--	--	
Silage	--	--	5.15	--	--	--	--	
Barley or oats	0.54 ^{b/}	3.59	--	--	3.95	2.81	--	
Salt and minerals	1.41	1.14	1.04	1.48	1.25	1.04	1.34	
Veterinary medicine	3.97	6.11	3.83	3.73	2.68	4.49	2.12	
Trucking	1.17	0.98	1.72	3.21	1.82	2.65	0.92	
Marketing	3.32	2.45	2.01	2.84	1.79	1.53	2.22	
Hired labor	12.01	21.54	8.57	16.45	15.61	11.02	21.31	
Machinery fuel and lube	18.90	10.08	12.65	8.36	7.90	16.40	10.08	
Machinery repair	6.69	5.87	6.62	5.63	4.52	11.14	4.63	
Equipment fuel and lube	0.06	0.24	0.87	0.04	0.21	3.10	0.04	
Equipment repair	2.97	3.21	3.27	3.01	2.85	5.38	3.70	
Interest on oper. capital	5.96	13.87	10.24	8.93	10.87	6.63	12.20	
Total variable costs	121.59	131.85	134.18	120.95	132.89	119.53	149.26	130.04
Machinery	15.63	11.82	17.38	12.17	9.54	22.26	9.84	
Machinery (forage)	3.35	8.13	5.27	4.14	8.47	5.40	0.93	
Equipment	11.83	15.94	15.66	14.29	13.34	23.61	22.28	
Livestock	24.04	23.25	25.93	25.82	25.99	18.56	30.77	
Land taxes	6.16	5.17	5.28	8.49	2.72	4.72	4.09	
General farm overhead	9.44	9.75	10.05	9.02	8.85	9.17	8.80	
Total ownership costs	70.45	74.06	79.57	73.93	68.91	83.72	76.71	75.34
Unpaid labor (forage)	1.42	5.14	1.79	4.27	4.55	3.91	0.65	
Unpaid labor (livestock)	29.15	68.31	36.82	43.62	34.32	40.70	78.43	
Total unpaid labor	30.57	73.45	38.61	47.89	38.87	44.61	79.08	50.44
Total of above costs	222.61	279.36	252.36	242.77	240.67	247.86	305.05	255.82
Land charge	59.67	63.22	48.64	82.69	61.87	59.15	37.24	58.93
Total	282.28	342.58	307.00	325.46	302.54	307.01	342.29	315.59

^{a/} Simple averages.
^{b/} Oats.

Table 11. Estimated 1980-82 average returns per animal unit for medium-sized ranches in seven western regions

Item	W-1	W-2	W-3	W-4	W-5	W-6	W-7	All ^{a/} regions
Cash receipts	188.55	202.69	208.46	189.24	194.45	184.94	177.56	192.27
Variable costs	<u>121.59</u>	<u>131.85</u>	<u>134.18</u>	<u>120.95</u>	<u>132.89</u>	<u>119.53</u>	<u>149.26</u>	<u>130.04</u>
Return over variable costs	66.97	70.84	74.27	68.29	61.56	65.40	28.30	62.23
Ownership costs	<u>70.45</u>	<u>74.06</u>	<u>79.57</u>	<u>73.93</u>	<u>68.91</u>	<u>83.72</u>	<u>76.71</u>	<u>75.34</u>
Return to labor, land and management	-3.49	-3.22	-5.29	-5.64	-7.35	-18.31	-48.41	-13.10
Unpaid labor	<u>30.57</u>	<u>73.45</u>	<u>38.61</u>	<u>47.89</u>	<u>38.87</u>	<u>44.61</u>	<u>79.08</u>	<u>50.44</u>
Return to owned land and management	-34.06	-76.67	-43.90	-53.53	-46.22	-62.92	-127.49	-63.54
Return to landlord ^{b/}	<u>32.98</u>	<u>12.78</u>	<u>20.81</u>	<u>20.40</u>	<u>15.40</u>	<u>15.21</u>	<u>26.34</u>	<u>20.56</u>
Return to all land								
Total	-1.08	-63.89	-23.09	-33.13	-30.82	-47.71	-101.15	-42.98
Per AUM	-0.09	-5.33	-1.92	-2.76	-2.57	-3.98	-8.43	-3.58

^{a/} Simple averages.

^{b/} Based on 90 percent of rent paid.

In spite of the general consistency and uniformity of results, it is obvious that there are great geoclimatic differences among and within regions, and limited transferability of research results at a micro-level.

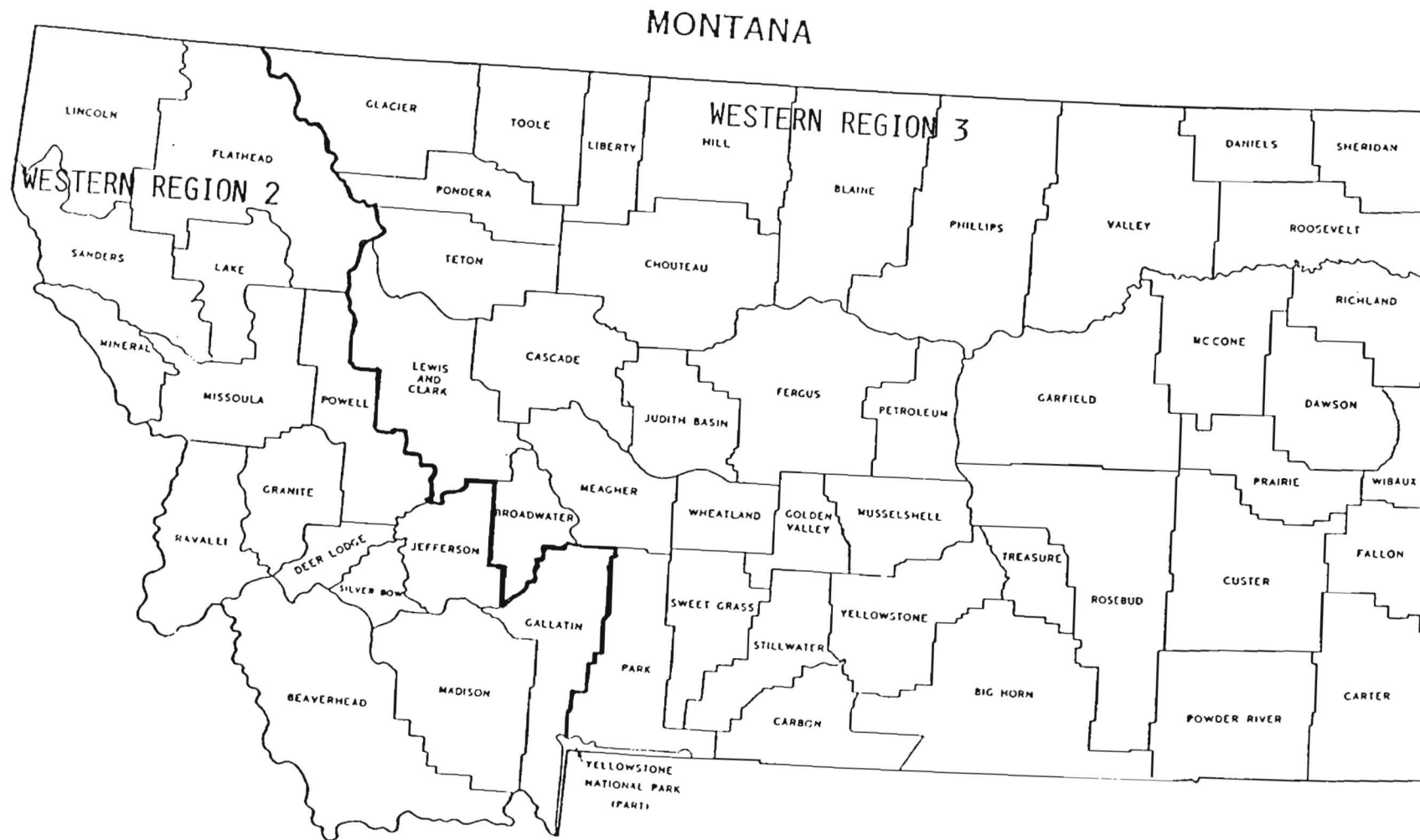


Figure A1.

SCALE
 0 10 20 30 40 50 MILES

U. S. DEPARTMENT OF COMMERCE
 BUREAU OF THE CENSUS

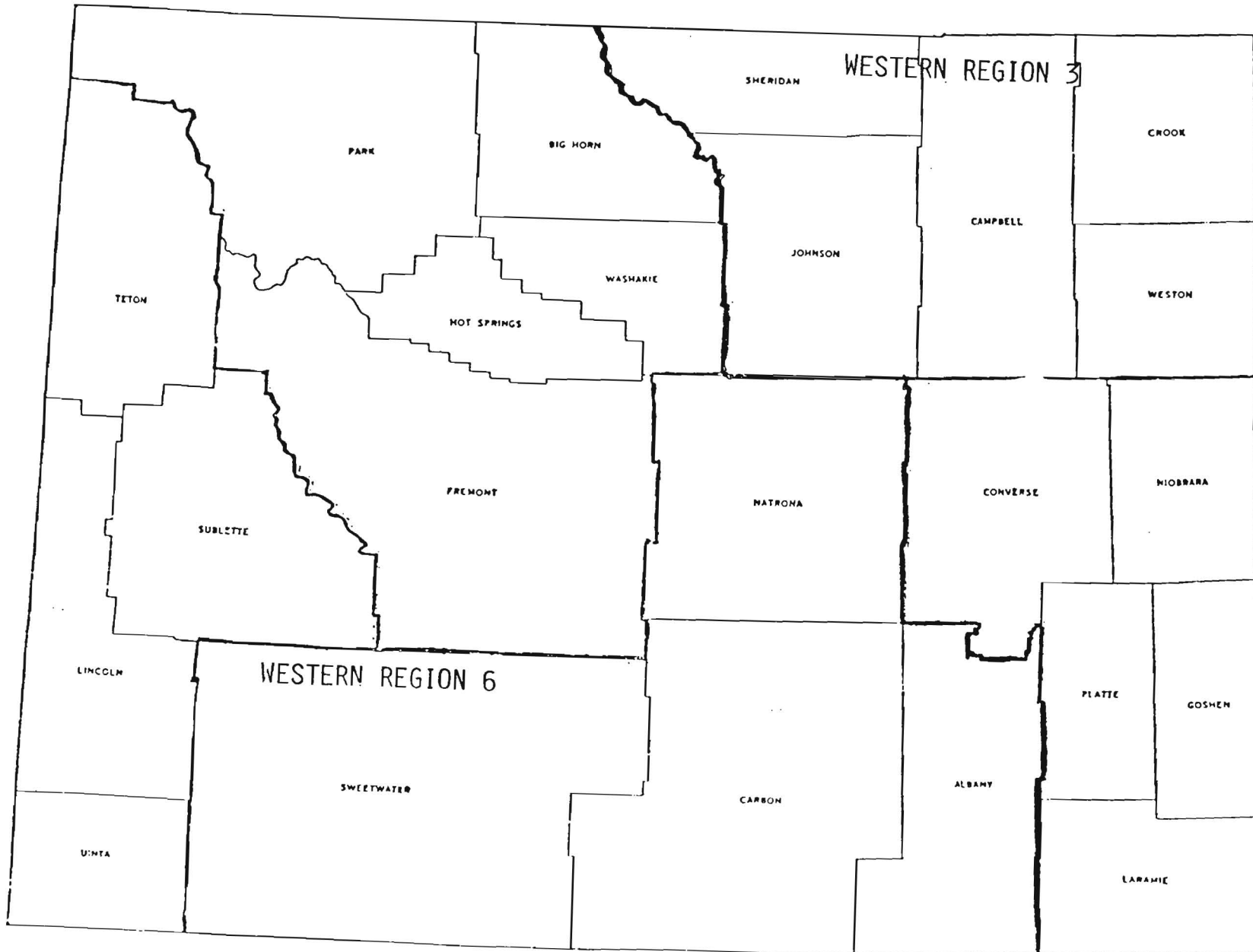
SOUTH DAKOTA



Figure A2.

All political boundaries are as of January 1, 1980

WYOMING



-A3-

Figure A3.

SCALE
0 10 20 30 40 50 MILES

U. S. DEPARTMENT OF COMMERCE

NEBRASKA



Figure A4.

UTAH

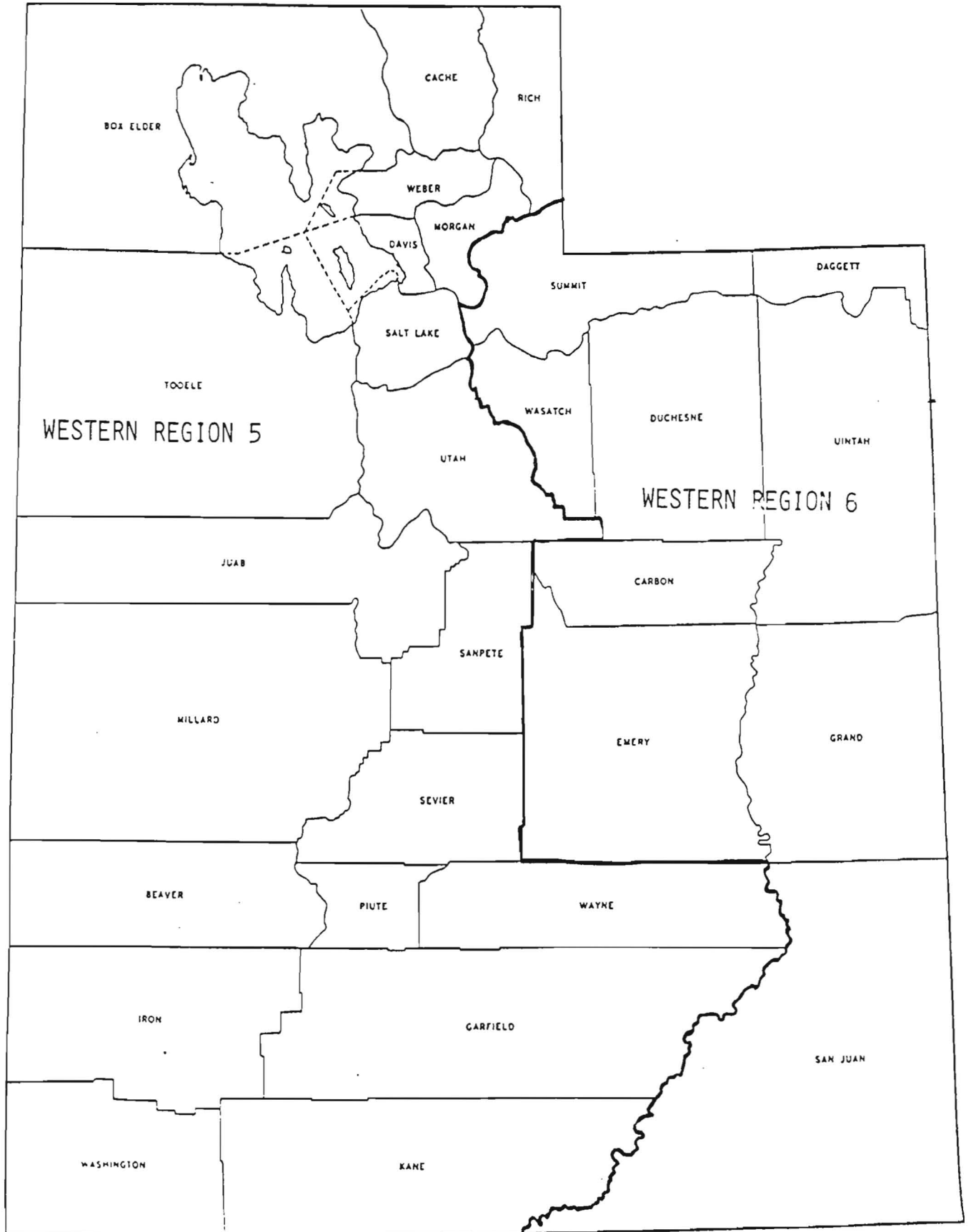
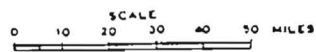


Figure A5.



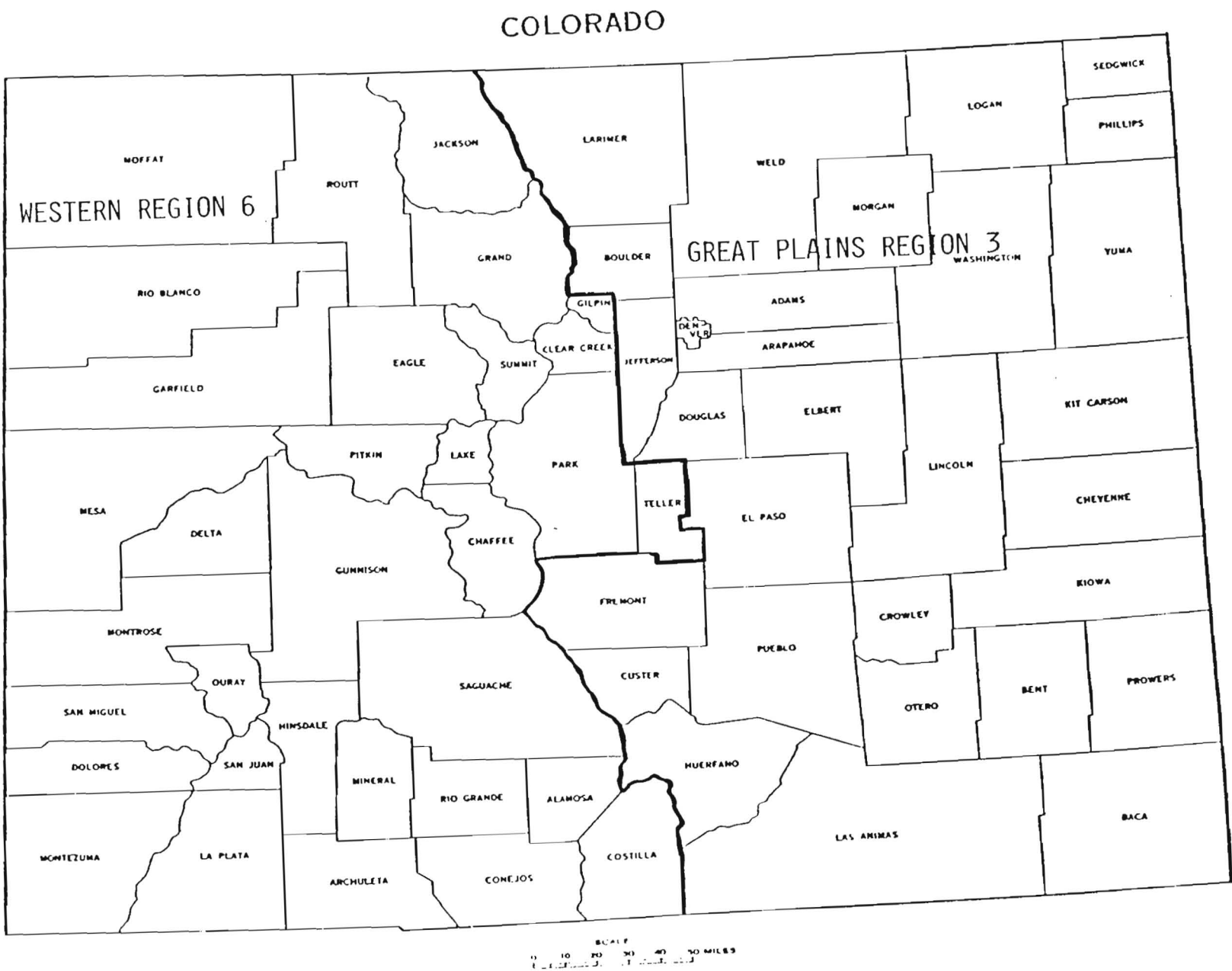


Figure A6.

U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

WASHINGTON

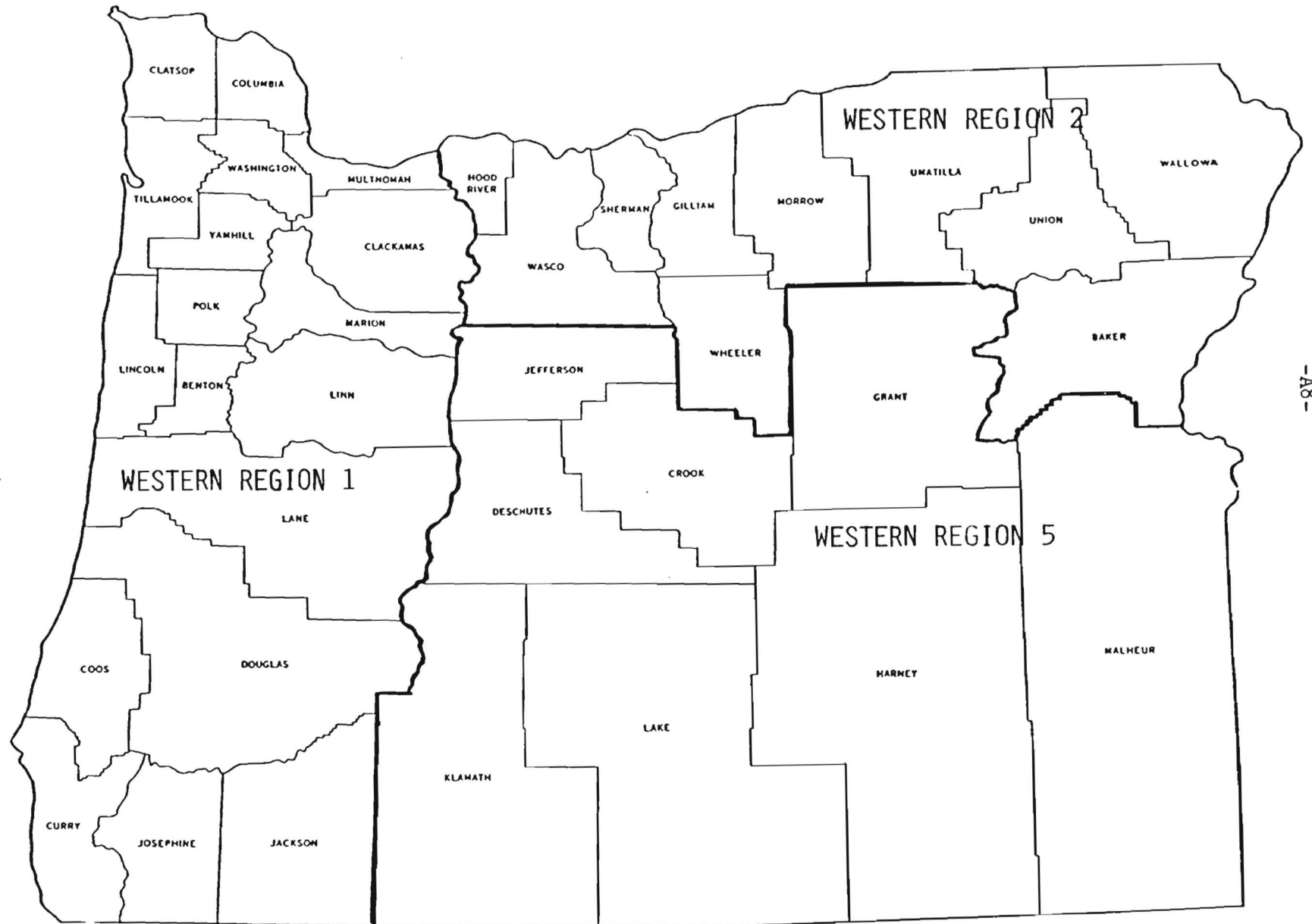


-A7-

Figure A7.

U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

OREGON



-A8-

Figure A8.



CALIFORNIA

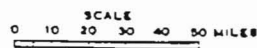


Figure A9.

IDAHO



Figure A10.

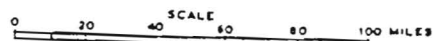


NEVADA



Figure A11.

U. S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS



ARIZONA

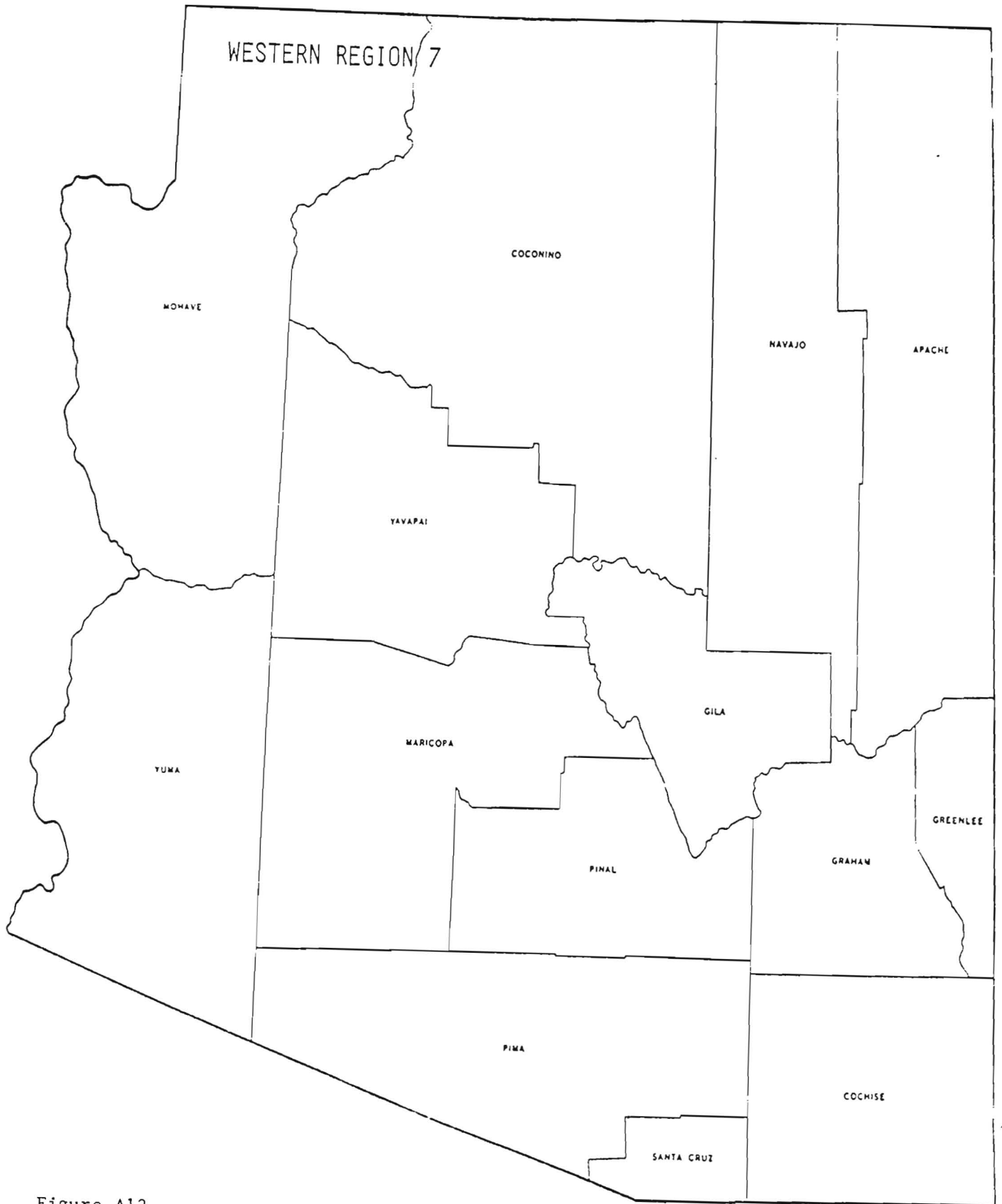


Figure A12.

0 20 40 60 80 100 MILES

NEW MEXICO

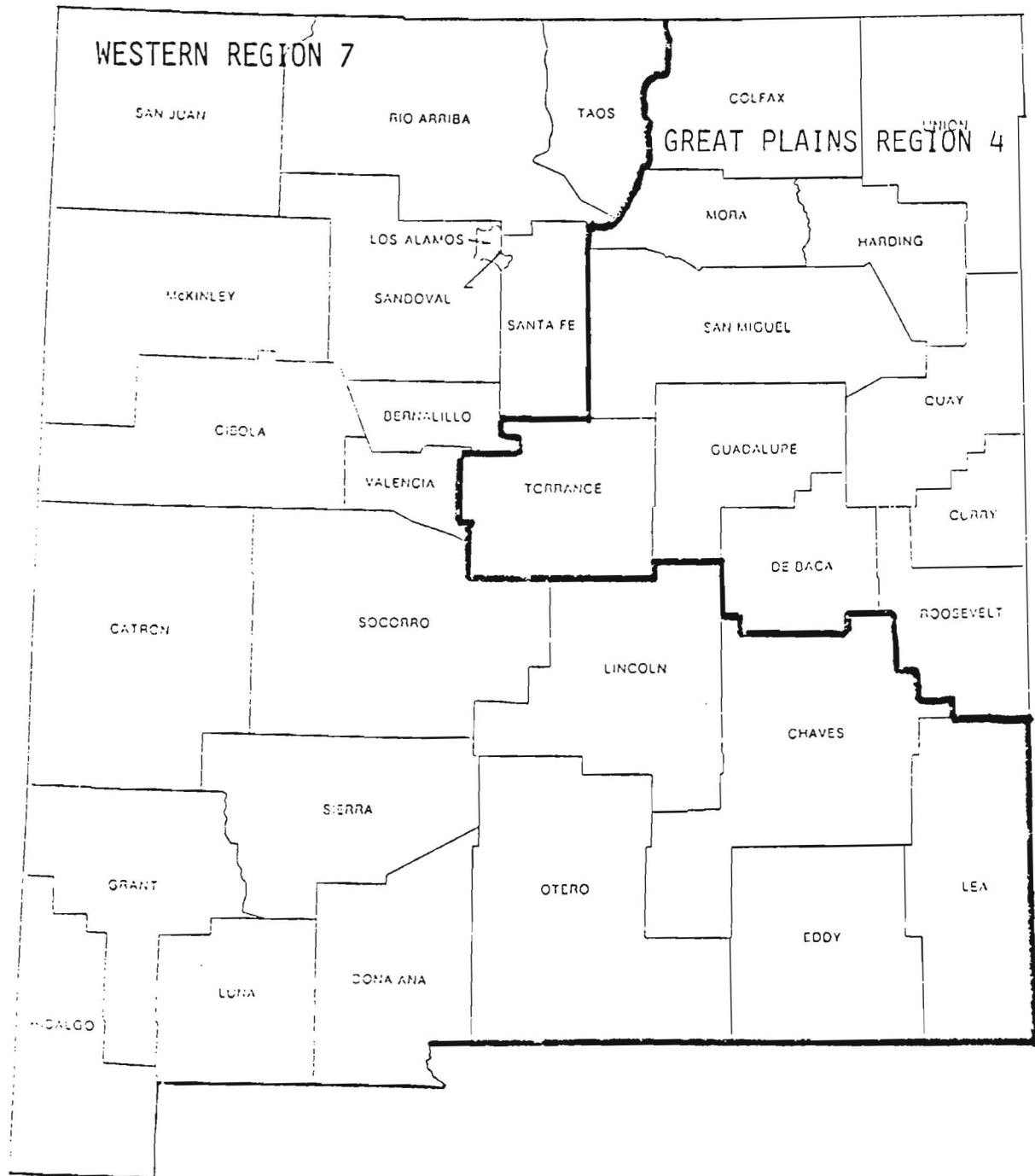
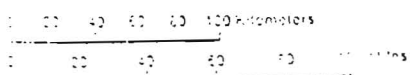


Figure A13.

SCALE



All political boundaries are as of June 19, 1951

Appendix Table W1-1. Cattle inventories for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-82 (W-1)

	Beginning inventory	Death loss	Sales	Still on ranch	Ending inventory	AUMs	
						No.	Coeff.
Represents 48-cow size							
Cows	100.0	3.2	6.3	90.6	100.0	1,218	1.015
Yearling heifers	24.5	0.4	14.6	9.5	24.5	161	.660
Heifer calves	(42.8) ^{a/}	1.6	16.7	24.5	0.0	134	.393
Steer calves	(43.7) ^{a/}	1.7	22.9	19.1	0.0	139	.398
Yearling steers	19.1	0.3	18.8	-	19.1	131	.687
Bulls	6.3	0.4	1.6	6.3 ^{b/}	6.3	94	1.250
Total	149.9	7.7	80.7	150.0	149.9	1,878	
Represents 177-cow size							
Cows	100.0	2.1	15.3	82.6	100.0	1,218	1.015
Yearling heifers	25.7	0.5	7.9	17.4	25.7	170	.660
Heifer calves	(43.2) ^{a/}	1.7	15.8	25.7	0.0	136	.393
Steer calves	(43.3) ^{a/}	1.7	22.0	19.6	0.0	138	.398
Yearling steers	19.6	0.3	19.2	-	19.6	134	.687
Bulls	4.0	0.2	1.0	4.0 ^{b/}	4.0	59	1.250
Total	149.3	6.4	81.2	149.3	149.3	1,855	
Represents 912-cow size							
Cows	100.0	2.4	7.1	90.5	100.0	1,218	1.015
Yearling heifers	18.0	0.3	8.1	9.5	18.0	119	.660
Heifer calves	(40.8) ^{a/}	0.9	21.9	18.0	0.0	128	.393
Steer calves	(40.6) ^{a/}	0.9	22.7	17.0	0.0	129	.398
Yearling steers	17.0	0.3	16.7	-	17.0	117	.687
Bulls	4.8	0.2	1.2	4.8 ^{b/}	4.8	72	1.250
Total	139.8	5.1	77.7	139.8	139.8	1,783	

^{a/} Calves born, not in beginning inventory.

^{b/} Replacements equal to death loss plus sales are purchased.

Appendix Table W2-1. Cattle inventories for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-82 (W-2)

Item and Size Represented	Beginning Inventory	Death Loss	Sales	Still on Ranch	Ending Inventory	AUMs	
						No.	Coeff.
Represents 45-cow size							
Cows	100.0	2.0	8.9	89.1	100.0	1,200	1.000
Yearling heifers	29.2	0.5	17.8	10.9	29.2	195	.669
Heifer calves	(47.4) ^{a/}	2.7	15.6	29.2	0.0	148	.391
Steer calves	(45.1) ^{a/}	2.6	22.2	20.4	0.0	145	.402
Yearling steers	20.4	0.4	20.0	-	20.4	144	.708
Bulls	4.4	0.2	1.1	4.4 ^{b/}	4.4	67	1.250
Total	154.0	8.3	85.6	154.0	154.0	1,899	
Represents 197-cow size							
Cows	100.0	1.7	9.1	89.2	100.0	1,200	1.000
Yearling heifers	31.7	0.6	20.3	10.8	31.7	212	.669
Heifer calves	(45.7) ^{a/}	2.8	11.2	31.7	0.0	143	.391
Steer calves	(45.3) ^{a/}	2.8	21.8	20.7	0.0	146	.402
Yearling steers	20.7	0.4	20.3	-	20.7	146	.708
Bulls	4.1	0.1	1.0	4.1 ^{b/}	4.1	61	1.250
Total	156.5	8.3	83.8	156.5	156.5	1,908	
Represents 916-cow size							
Cows	100.0	2.0	8.3	89.7	100.0	1,200	1.000
Yearling heifers	29.7	0.5	18.9	10.3	29.7	199	.669
Heifer calves	(45.2) ^{a/}	2.0	13.5	29.7	0.0	141	.391
Steer calves	(45.0) ^{a/}	2.0	21.7	21.3	0.0	145	.402
Yearling steers	21.3	0.4	21.0	-	21.3	151	.708
Bulls	4.4	0.2	1.1	4.4 ^{b/}	4.4	66	1.250
Total	155.4	7.0	84.5	155.4	155.4	1,902	

^{a/} Calves born, not in beginning inventory.

^{b/} Presumable replacements are purchased.

Appendix Table W4-1. Cattle inventories for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-81-82 (W-4)

	Beginning inventory	Death loss	Sales	Still on ranch	Ending inventory	ACMs	
						No.	Coeff.
Represents 39-cow size							
Cows	100.0	5.1	5.1	89.8	100.0	1,184	.987
Yearling heifers	20.9	0.4	10.3	10.2	20.9	135	.646
Heifer calves	(41.8) ^{a/}	3.0	17.9	20.9	0.0	103	.351
Steer calves	(41.8) ^{a/}	3.0	20.5	18.3	0.0	107	.365
Yearling steers	18.3	0.3	17.9	-	18.3	122	.666
Bulls	5.1	0.5	1.3	5.1 ^{b/}	5.1	77	1.250
Total	144.3	12.3	73.1	144.3	144.3	1,727	
Represents 213-cow size							
Cows	100.0	2.3	10.3	87.4	100.0	1,184	.987
Yearling heifers	24.8	0.4	11.7	12.6	24.8	160	.646
Heifer calves	(42.8) ^{a/}	2.0	16.0	24.8	0.0	105	.351
Steer calves	(42.8) ^{a/}	2.0	20.7	20.1	0.0	109	.365
Yearling steers	20.1	0.4	19.7	-	20.1	134	.666
Bulls	4.2	0.2	1.1	4.2 ^{b/}	4.2	63	1.250
Total	149.1	7.4	79.5	149.1	149.1	1,756	
Represents 1,033-cow size							
Cows	100.0	1.9	10.1	88.0	100.0	1,184	.987
Yearling heifers	30.3	0.5	17.8	12.0	30.3	196	.646
Heifer calves	(41.3) ^{a/}	1.5	9.5	30.3	0.0	102	.351
Steer calves	(41.3) ^{a/}	1.5	12.8	27.0	0.0	109	.377
Yearling steers	27.0	0.5	26.5	-	27.0	182	.676
Bulls	4.5	0.2	1.1	4.5 ^{b/}	4.5	68	1.250
Total	161.8	6.0	77.8	161.8	161.8	1,841	

^{a/} Calves born, not in beginning inventory.

^{b/} Replacements equal to death loss plus sales are purchased.

Appendix Table W5-1. Cattle inventories for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-81-82 (W-5)

Size and kind	Beginning inventory	Death loss	Sales	Still on ranch	Ending inventory	ACMs	
						No.	Coeff.
Represents 68-cow size							
Cows	100.0	2.7	7.4	89.9	100.0	1,164	.970
Yearling heifers	23.7	0.4	13.2	10.1	23.7	147	.621
Heifer calves	(35.8) ^{a/}	1.8	10.3	23.7	0.0	87	.346
Steer calves	(34.4) ^{a/}	1.8	14.7	18.0	0.0	89	.368
Yearling steers	18.0	0.3	17.6	-	18.0	118	.658
Bulls	4.4	0.2	1.1	4.4 ^{b/}	4.4	66	1.250
Total	146.1	7.3	64.3	146.1	146.1	1,671	
Represents 227-cow size							
Cows	100.0	2.4	7.9	89.7	100.0	1,164	.970
Yearling heifers	26.2	0.5	15.4	10.3	26.2	163	.621
Heifer calves	(44.0) ^{a/}	1.9	15.9	26.2	0.0	106	.346
Steer calves	(43.2) ^{a/}	1.9	19.8	21.5	0.0	111	.368
Yearling steers	21.5	0.4	21.1	-	21.5	142	.658
Bulls	4.4	0.2	1.1	4.4 ^{b/}	4.4	66	1.250
Total	152.1	7.2	81.3	152.1	152.1	1,752	
Represents 900-cow size							
Cows	100.0	1.7	9.8	88.5	100.0	1,164	.970
Yearling heifers	35.2	0.6	23.1	11.5	35.2	219	.621
Heifer calves	(41.9) ^{a/}	1.7	5.0	35.2	0.0	101	.346
Steer calves	(41.7) ^{a/}	1.7	8.4	31.6	0.0	107	.368
Yearling steers	31.6	0.6	31.0	-	31.6	208	.658
Bulls	4.6	0.2	1.1	4.6 ^{b/}	4.6	68	1.250
Total	171.4	6.4	78.5	171.4	171.4	1,867	

^{a/} Calves born, not in beginning inventory.

^{b/} Replacements equal to death loss plus sales are purchased.

Appendix Table W6-1. Cattle inventories for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-81-82 (W-6)

Size and item	Beginning inventory	Death loss	Sales	Still on ranch	Ending inventory	AUMs	
						No.	Coeff.
Represents 57-cow size							
Cows	100.0	2.8	7.0	90.2	100.0	1,178	.982
Yearling heifers	26.1	0.5	15.8	9.8	26.1	163	.626
Heifer calves	(42.2) ^{a/}	3.8	12.3	26.1	0.0	117	.347
Steer calves	(40.8) ^{a/}	3.7	24.6	12.5	0.0	119	.364
Yearling steers	12.5	0.2	12.3	-	12.5	84	.671
Bulls	5.3	0.3	1.3	5.3 ^{b/}	5.3	79	1.250
Total	226.8	11.3	73.2	143.9	143.9	1,740	
Represents 208-cow size							
Cows	100.0	2.4	7.7	89.9	100.0	1,178	.982
Yearling heifers	21.5	0.4	11.1	10.1	21.5	135	.626
Heifer calves	(42.5) ^{a/}	3.2	17.8	21.5	0.0	118	.347
Steer calves	(42.4) ^{a/}	3.2	23.6	15.7	0.0	124	.364
Yearling steers	15.7	0.3	15.4	-	15.7	105	.671
Bulls	4.3	0.2	1.1	4.3 ^{b/}	4.3	65	1.250
Total	226.4	9.6	76.6	141.5	141.5	1,725	
Represents 852-cow size							
Cows	100.0	2.0	8.5	89.5	100.0	1,178	.982
Yearling heifers	31.1	0.5	20.1	10.5	31.1	195	.626
Heifer calves	(43.3) ^{a/}	2.6	9.6	31.1	0.0	120	.347
Steer calves	(43.1) ^{a/}	2.6	12.9	27.6	0.0	125	.364
Yearling steers	27.6	0.5	27.1	-	27.6	185	.671
Bulls	4.6	0.2	1.1	4.6 ^{b/}	4.6	69	1.250
Total	249.6	8.3	79.3	163.3	163.3	1,872	

a/ Calves born, not in beginning inventory.

b/ Presumably replacements are purchased.

Appendix Table W7-1. Cattle inventories for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-81-82 (W-7)

Size and item	Beginning inventory	Death loss	Sales	Still on ranch	Ending inventory	AUMs	
						No.	Coeff.
Represents 50-cow size							
Cows	100.0	3.1	12.0	84.9	100.0	1,120	.933
Yearling heifers	15.4	0.3	0.0	15.1	15.4	55	.298
Heifer calves	(42.1) ^{a/}	2.6	24.0	15.4	0.0	100	.339
Steer calves	(42.9) ^{a/}	2.7	30.0	10.2	0.0	105	.351
Yearling steers	10.2	0.2	10.0	-	10.2	76	.618
Bulls	6.0	0.4	1.5	6.0 ^{b/}	6.0	90	1.250
Total	216.6	9.4	77.5	131.6	131.6	1,546	
Represents 213-cow size							
Cows	100.0	3.0	9.4	87.6	100.0	1,120	.933
Yearling heifers	19.9	0.4	7.0	12.4	19.9	142	.596
Heifer calves	(42.8) ^{a/}	1.8	21.1	19.9	0.0	102	.339
Steer calves	(42.0) ^{a/}	1.8	26.3	13.9	0.0	103	.351
Yearling steers	13.9	0.3	13.6	-	13.9	103	.618
Bulls	6.1	0.4	1.5	6.1 ^{b/}	6.1	91	1.250
Total	224.6	7.7	79.0	139.9	139.9	1,661	
Represents 1,068 cow-size							
Cows	100.0	2.1	8.3	89.6	100.0	1,120	.933
Yearling heifers	21.9	0.5	11.0	10.4	21.9	156	.596
Heifer calves	(39.3) ^{a/}	1.3	16.2	21.9	0.0	93	.339
Steer calves	(39.0) ^{a/}	1.3	20.2	17.4	0.0	96	.351
Yearling steers	17.4	0.2	17.2	-	17.4	75	.618
Bulls	6.3	0.3	1.6	6.3 ^{b/}	6.3	94	1.250
Total	223.9	5.6	74.5	145.6	145.6	1,635	

a/ Calves born, not in beginning inventory.

b/ Replacements equal to death loss plus sales are purchased.

Appendix Table W1-2. Summary of cattle and calf sales for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-81-82 (W-1)

Item and size represented	Number (No)	Weight		Price (Dols/Cwt)	Value	
		per head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 48-cow size						
Cull cows	6.25	10.20	64	38.25	2,438	15.53
Yearling heifers	14.58	6.49	95	55.83	5,284	33.66
Heifer calves	16.67	5.00	83	57.59	4,799	30.57
Steer calves	22.92	5.10	117	66.58	7,782	49.57
Yearling steers	18.75	7.02	132	62.08	8,172	52.05
Total	79.17		490	58.09 ^{a/}	28,475	181.37
Weight per AU			3.12			
Represents 177-cow size						
Cull cows	15.25	10.20	156	38.25	5,951	38.39
Yearling heifers	7.91	6.49	51	55.83	2,866	18.49
Heifer calves	15.82	5.00	79	57.59	4,555	29.39
Steer calves	22.03	5.10	112	66.58	7,482	48.27
Yearling steers	19.21	7.02	135	62.08	8,372	54.01
Total	80.23		533	54.81 ^{a/}	29,226	188.55
Weight per AU			3.44			
Represents 912 cow-size						
Cull cows	7.13	10.20	73	38.25	2,781	18.66
Yearling heifers	8.11	6.49	53	55.83	2,940	19.73
Heifer calves	21.93	5.00	110	57.59	6,314	42.38
Steer calves	22.70	5.10	116	66.58	7,707	51.72
Yearling steers	16.67	7.02	117	62.08	7,264	48.75
Total	76.54		468	57.74 ^{a/}	27,006	181.25
Weight per AU			3.14			

a/ Weighted average price.

Appendix Table W2-2. Summary of cattle and calf sales for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-81-82 (W-2)

Item	Number (No)	Weight		Price (Dols/Cwt)	Value	
		per head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 45-cow size						
Cull cows	8.89	10.00	89	37.93	3,372	21.34
Yearling heifers	17.78	6.74	120	58.92	7,060	44.68
Heifer calves	15.56	4.96	77	57.87	4,465	28.26
Steer calves	22.22	5.18	115	68.08	7,837	49.60
Yearling steers	20.00	7.45	149	64.75	9,648	61.06
Total	84.44		550	58.88 ^{a/}	32,382	204.95
Weight per AU			3.42			
Represents 197-cow size						
Cull cows	9.14	10.00	91	37.93	3,466	21.80
Yearling heifers	20.30	6.74	137	58.92	8,063	50.71
Heifer calves	11.17	4.96	55	57.87	3,206	20.16
Steer calves	21.83	5.18	113	68.08	7,698	48.42
Yearling steers	20.30	7.45	151	64.75	9,795	61.60
Total	82.74		548	58.81 ^{a/}	32,227	202.69
Weight per AU			3.45			
Represents 916-cow size						
Cull cows	8.30	10.00	83	37.93	3,147	19.79
Yearling heifers	18.89	6.74	127	58.92	7,500	47.17
Heifer calves	13.54	4.96	67	57.87	3,886	24.44
Steer calves	21.72	5.18	113	68.08	7,662	48.19
Yearling steers	20.96	7.45	156	64.75	10,111	63.59
Total	83.41		546	59.16 ^{a/}	32,306	203.18
Weight per AU			3.43			

a/ Weighted average price.

Appendix Table W4-2. Summary of cattle and calf sales for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-81-82 (W-4)

Item	Number (No)	Weight		Price (Dols/Cwt)	Value	
		Per Head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 39-cow size						
Cull cows	5.13	9.83	50	38.25	1,928	13.39
Yearling heifers	10.26	6.96	71	56.50	4,033	28.01
Heifer calves	17.95	4.21	76	59.39	4,488	31.17
Steer calves	20.51	4.47	92	69.92	6,411	44.52
Yearling steers	17.95	7.16	129	61.50	7,904	54.89
Total	71.79		418	59.30 ^{a/}	24,764	171.97
Weight per AU			2.90			
Represents 213-cow size						
Cull cows	10.33	9.83	102	38.25	3,884	26.60
Yearling heifers	11.74	6.96	82	56.50	4,615	31.61
Heifer calves	15.96	4.21	67	59.39	3,991	27.34
Steer calves	20.66	4.47	92	69.92	6,456	44.22
Yearling steers	19.72	7.16	141	61.50	8,683	59.47
Total	78.40		484	57.09 ^{a/}	27,629	189.24
Weight per AU			3.31			
Represents 1,033-cow size						
Cull cows	10.07	9.83	99	38.25	3,785	24.58
Yearling heifers	17.81	6.96	124	56.50	7,004	45.48
Heifer calves	9.49	4.21	40	59.39	2,372	15.40
Steer calves	12.78	4.70	60	69.92	4,199	27.27
Yearling steers	26.52	7.16	190	61.50	11,680	75.84
Total	76.67		513	56.63 ^{a/}	29,041	188.58
Weight per AU			3.33			

^{a/} Weighted average price.

Appendix Table W5-2. Summary of cattle and calf sales for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-81-82 (W-5)

Item	Number (No)	Weight		Price (Dols/Cwt)	Value	
		per head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 68-cow size						
Cull cows	7.35	9.60	71	37.93	2,678	19.27
Yearling heifers	13.24	6.49	86	58.92	5,061	36.41
Heifer calves	10.29	4.10	42	57.58	2,430	17.48
Steer calves	14.71	4.52	66	69.50	4,620	33.24
Yearling steers	17.65	6.93	122	65.75	8,041	57.85
Total	63.24		387	58.92 ^{a/}	22,829	164.24
Weight per AU			2.79			
Represents 227-cow size						
Cull cows	7.93	9.60	76	37.93	2,888	19.78
Yearling heifers	15.42	6.49	100	58.92	5,896	40.38
Heifer calves	15.86	4.10	65	57.58	3,744	25.64
Steer calves	19.82	4.52	90	69.50	6,227	42.65
Yearling steers	21.15	6.93	147	65.75	9,635	65.99
Total	80.18		477	59.47 ^{a/}	28,390	194.45
Weight per AU			3.27			
Represents 900-cow size						
Cull cows	9.78	9.60	94	37.93	3,561	22.83
Yearling heifers	23.11	6.49	150	58.92	8,837	56.65
Heifer calves	5.00	4.10	21	57.58	1,180	7.56
Steer calves	8.44	4.52	38	69.50	2,653	17.01
Yearling steers	31.00	6.93	215	65.75	14,125	90.54
Total	77.33		517	58.66 ^{a/}	30,356	194.59
Weight per AU			3.32			

^{a/} Weighted average price.

Appendix Table W6-2. Summary of cattle and calf sales for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-81-82 (W-6)

Size and item	Number (No)	Weight		Price (Dols/Cwt)	Value	
		per head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 57-cow size						
Cull cows	7.02	9.76	69	36.00	2,466	17.01
Yearling heifers	15.79	6.60	10	61.63	6,422	44.29
Heifer calves	12.28	4.12	51	61.38	3,106	21.42
Steer calves	24.56	4.45	10	70.86	7,745	53.41
Yearling steers	12.28	7.30	90	66.81 ^{a/}	5,989	41.30
Total	71.93		422	60.93 ^{a/}	25,728	177.43
Weight per AU			2.91			
Represents 208-cow size						
Cull cows	7.69	9.76	75	36.00	2,703	18.77
Yearling heifers	11.06	6.60	73	61.63	4,498	31.24
Heifer calves	17.79	4.12	73	61.38	4,499	31.24
Steer calves	23.56	4.45	105	70.86	7,429	51.59
Yearling steers	15.38	7.30	112	66.81 ^{a/}	7,503	52.10
Total	75.48		438	60.73 ^{a/}	26,631	184.94
Weight per AU			3.05			
Represents 852-cow size						
Cull cows	8.45	9.76	82	36.00	2,969	19.03
Yearling heifers	20.07	6.60	132	61.63	8,163	52.33
Heifer calves	9.62	4.12	40	61.38	2,434	15.60
Steer calves	12.91	4.45	57	70.86	4,071	26.10
Yearling steers	27.11	7.30	198	66.81 ^{a/}	13,223	84.76
Total	78.17		510	60.52 ^{a/}	30,861	197.83
Weight per AU		3.27	3.27			

^{a/} Weighted average price.

Appendix Table W7-2. Summary of cattle and calf sales for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-81-82 (W-7)

Item	Number (No)	Weight		Price (Dols/Cwt)	Value	
		per head (Cwt)	Total (Cwt)		Total (Dols)	Per AU (Dols)
Represents 50-cow size						
Cull cows	12.00	9.12	109	39.03	4,272	33.12
Yearling heifers	0.00	0.00	0	0.00	0	0.00
Heifer calves	24.00	3.98	96	61.56	5,881	45.59
Steer calves	30.00	4.20	126	69.75	8,788	68.12
Yearling steers	10.00	6.32	63	66.08 ^{a/}	4,176	32.37
Total	76.00		394	58.65 ^{a/}	23,117	179.20
Weight per AU			3.06			
Represents 213-cow size						
Cull cows	9.39	9.12	86	39.03	3,343	24.22
Yearling heifers	7.04	6.06	43	60.83	2,596	18.81
Heifer calves	21.13	3.98	84	61.56	5,177	37.51
Steer calves	26.29	4.20	110	69.75	7,702	55.81
Yearling steers	13.62	6.32	86	66.08 ^{a/}	5,686	41.20
Total	77.46		409	59.93 ^{a/}	24,503	177.56
Weight per AU			2.96			
Represents 1,068-cow size						
Cull cows	8.33	9.12	76	39.03	2,967	21.82
Yearling heifers	10.96	6.06	66	60.83	4,038	29.69
Heifer calves	16.20	3.98	64	61.56	3,969	29.18
Steer calves	20.22	4.20	85	69.75	5,925	43.57
Yearling steers	17.23	6.32	109	66.08 ^{a/}	7,195	52.90
Total	72.94		401	60.13 ^{a/}	24,094	177.16
Weight per AU			2.95			

^{a/} Weighted average price.

Appendix Table W1-3. Physical inputs used for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-81-82 (W-1)

Item	Unit	100-cow planning units			Per animal unit		
		Ranch size			Ranch size		
		Small	Medium	Large	Small	Medium	Large
Private range	AUMs	1,109	776	475	7.06	5.01	3.19
Pasture rent	AUMs	84	635	1,057	0.53	4.10	7.10
Irrigated pasture	AUMs	34	87	34	0.22	0.56	0.23
Crop residue	AUMs	31	20	167	0.20	0.13	1.12
Sub-total	AUMs				8.01	9.80	11.64
Hay							
Produced	Ton	118	69	7	0.75	0.45	0.05
Purchased	Ton	72	34	15	0.46	0.22	0.10
Oats	Bu.	244	45	2	1.55	0.29	0.02
AUM equiv. feeds ^{a/}	AUMs				3.75	2.03	0.45
AUM equiv. total ^{b/}	AUMs				11.76	11.83	12.09
Salt and minerals	Cwt.	36	36	36	0.23	0.23	0.24
Hired labor	Hour	202	405	564	1.29	2.61	3.79

a/ Based on 1,000 lb. total digestible nutrients (TDN) per ton of hay, 0.8 lb. TDN per lb. of grains, and a requirement of 333 lb. of TDN per AUM equivalent, including waste.

b/ There should be 12 total AUM equivalents per animal unit.

Appendix Table W2-3. Physical inputs used for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-81-82 (W-2)

Item	Unit	100-cow planning units			Per animal unit		
		Ranch size			Ranch size		
		Small	Medium	Large	Small	Medium	Large
Private range	AUMs	351	569	755	2.22	3.58	4.75
Public grazing							
BLM	AM	16	14	28	0.10	0.09	0.18
Forest	AM	--	4	4	--	0.03	0.03
State	AUMs	138	39	37	0.87	0.25	0.24
Pasture rent	AUMs	314	245	270	1.99	1.54	1.70
Irrigated pasture	AUMs	231	277	139	1.46	1.74	0.87
Crop residue	AUMs	87	60	12	0.55	0.38	0.07
Subtotal	AUMs				7.19	7.61	7.84
Hay							
Produced	Ton	206	185	146	1.30	1.16	0.92
Purchased	Ton	20	30	22	0.13	0.19	0.14
Protein supplement	Ton	4	2	--	0.02	0.01	--
Barley	Bu.	187	213	279	1.18	1.34	1.75
Silage	Ton	--	--	47	--	--	0.29
AUM equiv. feeds ^{a/}	AUMs				4.52	4.25	3.67
AUM equiv. total ^{b/}	AUMs				11.71	11.86	11.51
Salt and minerals	Cwt.	36	36	36	0.23	0.23	0.23
Hired labor	Hour	198	875	983	1.25	5.50	6.18

a/ b/ See footnotes to appendix table W1-3.

Appendix Table W4-3. Physical inputs used for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-81-82 (W-4)

Item	Unit	100-cow planning units			Per animal unit		
		Ranch size			Ranch size		
		Small	Medium	Large	Small	Medium	Large
Private range	AUMS	728	816	418	5.06	5.59	2.72
Public grazing							
BLM	AM	--	--	6	--	--	0.04
Forest	AM	--	2	12	--	0.02	0.08
Pasture rent	AUMs	215	352	847	1.50	2.41	5.50
Irrigated pasture	AUMs	492	366	364	3.42	2.51	2.36
Crop residue	AUMs	--	35	61	--	0.24	0.39
Sub-total					9.98	10.77	11.09
Hay							
Produced	Ton	66	55	45	0.46	0.38	0.29
Purchased	Ton	43	31	14	0.30	0.21	0.09
Protein supplement	Ton	16	3	6	0.11	0.02	0.04
Corn	Bu.	--	--	196	--	--	1.27
AUM equiv. feeds ^{a/}	AUMs				2.81	1.87	1.50
AUM equiv. total	AUMs				12.79	12.64	12.59
Salt and minerals	Cwt.	36	36	36	0.25	0.25	0.23
Hired labor	Hour	285	522	629	1.98	3.57	4.09

a/ See footnote on appendix table W1-3.

Appendix Table W5-3. Physical inputs used for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-81-82 (W-5)

Item	Unit	100-cow planning units			Per animal unit		
		Ranch size			Ranch size		
		Small	Medium	Large	Small	Medium	Large
Private range	AUMs	437	620	716	3.14	4.25	4.59
Public grazing							
BLM	AM	19	32	25	0.14	0.22	0.16
Forest	AM	15	7	9	0.11	0.05	0.06
State	AM	10	18	13	0.07	0.12	0.08
Pasture rent	AUMs	285	299	527	2.05	2.05	3.38
Irrigated pasture	AUMs	390	227	188	2.80	1.55	1.21
Crop residue	AUMs	106	63	96	0.76	0.43	0.62
Sub-total					9.07	8.67	10.10
Hay							
Produced	Ton	139	130	109	1.00	0.89	0.70
Purchased	Ton	27	41	10	0.19	0.28	0.06
Protein supplement	Ton	2	3	5	0.01	0.02	0.03
Corn	Bu.	100	--	--	0.72	--	--
Barley	Bu.	203	102	--	1.39	0.65	--
AUM equiv. feeds ^{a/}	AUMs				3.88	3.68	2.42
AUM equiv. total	AUMs				12.95	12.35	12.52
Salt and minerals	Cwt.	36	36	36	0.26	0.25	0.23
Hired labor	Hour	34	566	866	0.24	5.93	5.55

a/ See footnote on appendix table W1-3.

Appendix Table W6-3. Physical inputs used for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-81-82 (W-6)

Item	Unit	100-cow planning units			Per animal unit		
		Ranch size			Ranch size		
		Small	Medium	Large	Small	Medium	Large
Private range	AUMs	286	797	995	1.97	5.54	6.38
Public grazing							
BLM	AM	--	39	44	--	0.27	0.29
Forest	AM	14	24	5	0.10	0.16	0.03
State	AUMs	16	54	90	0.11	0.37	0.58
Pasture rent	AUMs	123	241	207	0.85	1.67	1.32
Irrigated pasture	AUMs	660	167	30	4.55	1.16	0.19
Crop residue	AUMs	216	30	54	1.49	0.21	0.35
Subtotal	AUMs				9.07	9.38	9.14
Hay							
Produced	Ton	134	134	117	0.92	0.93	0.75
Purchased	Ton	21	15	29	0.15	0.11	0.19
Protein supplement	Ton	5	3	4	0.03	0.02	0.03
Oats	Bu.	291	--	--	2.01	--	--
Barley	Bu.	--	146	112	--	1.01	0.72
AUM equiv. feeds ^{a/}	AUMs				3.51	3.34	3.05
AUM equiv. total	AUMs				12.58	12.72	12.19
Salt and minerals	Cwt.	36	36	36	0.25	0.25	0.23
Hired labor	Hour	200	394	682	1.38	2.73	4.37

a/ See footnote on appendix table W1-3.

Appendix Table W7-3. Physical inputs used for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-81-82 (W-7)

Item	Unit	100-cow planning units			Per animal unit		
		Ranch size			Ranch size		
		Small	Medium	Large	Small	Medium	Large
Private range	AUMs	736	876	1,127	5.71	6.34	8.29
Public grazing							
BLM	AM	34	37	44	0.26	0.27	0.32
Forest	AM	36	48	13	0.28	0.35	0.10
State	AUMs	30	43	141	0.23	0.31	1.04
Pasture rent	AUMs	582	490	493	4.51	3.55	3.63
Irrigated pasture	AUMs	124	31	22	0.96	0.22	0.16
Crop residue	AUMs	--	20	--	--	0.15	--
Subtotal	AUMs				11.95	11.19	13.54
Hay							
Produced	Ton	40	15	15	0.31	0.11	0.11
Purchased	Ton	15	31	4	0.12	0.23	0.03
Protein supplement	Ton	9	22	3	0.07	0.16	0.02
Barley	Bu.	--	--	17	--	--	0.13
AUM equiv. feeds ^{a/}	AUMs				1.63	1.79	0.52
AUM equiv. total	AUMs				13.58	12.98	14.06
Salt and minerals	Cwt.	36	36	36	0.28	0.26	0.26
Hired labor	Hour	424	639	915	3.29	4.63	6.73

a/ See footnote on appendix table W1-3.

Appendix Table W1-4. Estimated average enterprise costs for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-81-82 (W-1) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Pasture rent	748	5,679	9,459	4.76	36.64	63.48
Irrigated pasture	195	505	198	1.24	3.26	1.33
Hay (produced)	1,678	1,029	124	10.69	6.64	0.83
Hay (purchased)	5,898	2,796	1,236	37.57	18.04	8.30
Oats	447	83	4	2.85	0.54	0.03
Salt and minerals	219	219	219	1.39	1.41	1.47
Veterinary medicine	706	615	393	4.50	3.97	2.64
Trucking	61	182	244	0.39	1.17	1.64
Marketing	819	514	373	5.22	3.32	2.50
Hired labor	931	1,862	2,598	5.93	12.01	17.44
Machinery fuel and lube	2,578	2,929	323	16.42	18.90	2.17
Machinery repair	913	1,037	183	5.82	6.69	1.23
Equipment fuel and lube	21	10	26	0.13	0.06	0.17
Equipment repair	665	461	329	4.24	2.97	2.21
Interest on oper. capital	<u>983</u>	<u>924</u>	<u>882</u>	<u>6.26</u>	<u>5.96</u>	<u>5.92</u>
Total variable costs	16,862	18,846	16,592	107.40	121.59	111.36
Machinery	2,133	2,423	350	13.59	15.63	2.35
Machinery (forage)	871	519	59	5.55	3.35	0.40
Equipment	4,285	1,833	1,338	27.29	11.83	8.98
Livestock	3,651	3,726	3,766	23.25	24.04	25.28
Land taxes	1,529	955	441	9.74	6.16	2.96
General farm overhead	<u>1,828</u>	<u>1,463</u>	<u>618</u>	<u>11.64</u>	<u>9.44</u>	<u>4.15</u>
Total ownership costs	14,297	10,919	6,572	91.06	70.45	44.12
Unpaid labor (forage)	429	220	12	2.73	1.42	0.08
Unpaid labor (livestock)	<u>5,495</u>	<u>4,518</u>	<u>1,142</u>	<u>35.00</u>	<u>29.15</u>	<u>7.66</u>
Total unpaid labor	5,924	4,738	1,154	37.73	30.57	7.74
Total of above costs	37,083	34,503	24,318	236.19	222.61	163.22
Land charge	14,803	9,249	4,269	94.29	59.67	28.65

Appendix Table W2-4. Estimated average costs for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-81-82 (W-2) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Public grazing						
BLM	34	31	62	0.22	0.19	0.39
Forest	--	9	11	--	0.06	0.07
State	349	99	95	2.21	0.62	0.60
Pasture rent	<u>2,725</u>	<u>2,120</u>	<u>2,337</u>	<u>17.25</u>	<u>13.33</u>	<u>14.70</u>
Sub-total leased	<u>3,108</u>	<u>2,259</u>	<u>2,505</u>	<u>19.68</u>	<u>14.20</u>	<u>15.76</u>
Irrigated pasture	1,827	2,220	1,148	11.56	13.96	7.22
Hay (produced)	3,259	3,033	2,620	20.63	19.08	16.48
Hay (purchased)	1,336	1,977	1,430	8.46	12.43	8.99
Protein supplement	858	490	--	5.43	3.08	--
Barley	500	571	746	3.16	3.59	4.69
Silage	--	--	888	--	--	5.58
Salt and minerals	170	181	181	1.08	1.14	1.14
Veterinary medicine	802	971	615	5.08	6.11	3.87
Trucking	166	156	261	1.05	0.98	1.64
Marketing	414	389	191	2.62	2.45	1.20
Hired labor	774	3,425	3,848	4.90	21.54	24.20
Machinery fuel and lube	2,667	1,603	839	16.88	10.08	5.28
Machinery repair	1,537	934	590	9.73	5.87	3.71
Equipment fuel and lube	89	38	13	0.56	0.24	0.08
Equipment repair	1,528	511	366	9.67	3.21	2.30
Interest on oper. capital	<u>1,743</u>	<u>2,205</u>	<u>1,211</u>	<u>11.03</u>	<u>13.87</u>	<u>7.62</u>
Total variable costs	20,779	20,964	17,451	131.51	131.85	109.75
Machinery	3,034	1,879	1,019	19.20	11.82	6.41
Machinery (forage)	1,428	1,292	1,013	9.04	8.13	6.37
Equipment	5,847	2,534	1,637	37.01	15.94	10.30
Livestock	3,841	3,696	3,698	24.31	23.25	23.26
Land taxes	722	822	652	4.57	5.17	4.10
General farm overhead	<u>2,190</u>	<u>1,551</u>	<u>700</u>	<u>13.86</u>	<u>9.75</u>	<u>4.40</u>
Total ownership costs	17,062	11,774	8,719	107.99	74.06	54.84
Unpaid labor (forage)	1,006	818	324	6.37	5.14	2.04
Unpaid labor (livestock)	<u>6,739</u>	<u>10,862</u>	<u>2,843</u>	<u>42.65</u>	<u>68.31</u>	<u>17.88</u>
Total unpaid labor	7,745	11,680	3,167	49.02	73.45	19.92
Total of above costs	45,586	44,418	29,337	288.52	279.36	184.51
Land charge	8,835	10,052	7,970	55.92	63.22	50.13

Appendix Table W4-4. Estimated average costs for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-81-82 (W-4) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Public grazing						
BLM	--	--	13	--	--	0.08
Forest	--	5	27	--	0.03	0.18
Pasture rent	<u>2,022</u>	<u>3,306</u>	<u>7,950</u>	<u>14.04</u>	<u>22.64</u>	<u>51.62</u>
Sub-total leased	<u>2,022</u>	<u>3,311</u>	<u>7,990</u>	<u>14.04</u>	<u>22.67</u>	<u>51.88</u>
Irrigated pasture	2,903	2,257	2,451	20.16	15.46	15.92
Hay (produced)	1,077	965	907	7.48	6.61	5.89
Hay (purchased)	3,510	2,517	1,145	24.38	17.24	7.44
Protein supplement	3,844	773	1,503	26.69	5.29	9.76
Corn	--	--	729	--	--	4.73
Salt and minerals	215	216	216	1.49	1.48	1.40
Veterinary medicine	797	544	575	5.53	3.73	3.73
Trucking	214	468	1,008	1.49	3.21	6.55
Marketing	795	414	235	5.52	2.84	1.53
Hired labor	1,310	2,401	2,832	9.10	16.45	18.39
Machinery fuel and lube	2,043	1,221	324	14.19	8.36	2.10
Machinery repair	1,347	822	218	9.35	5.63	1.42
Equipment fuel and lube	26	6	20	0.18	0.04	0.13
Equipment repair	1,173	439	396	8.15	3.01	2.57
Interest on oper. capital	<u>2,231</u>	<u>1,304</u>	<u>1,072</u>	<u>15.49</u>	<u>8.93</u>	<u>6.96</u>
Total variable costs	23,507	17,659	21,620	163.24	120.95	140.39
Machinery	2,120	1,777	467	14.72	12.17	3.03
Machinery (forage)	704	605	482	4.89	4.14	3.13
Equipment	6,284	2,087	1,845	43.64	14.29	11.98
Livestock	4,014	3,769	3,817	27.88	25.82	24.79
Land taxes	1,301	1,239	799	9.03	8.49	5.19
General farm overhead	<u>1,653</u>	<u>1,317</u>	<u>606</u>	<u>11.48</u>	<u>9.02</u>	<u>3.94</u>
Total ownership costs	16,076	10,794	8,016	111.64	73.93	52.06
Unpaid labor (forage)	1,050	624	283	7.29	4.27	1.84
Unpaid labor (livestock)	<u>12,783</u>	<u>6,369</u>	<u>1,463</u>	<u>88.77</u>	<u>43.62</u>	<u>9.50</u>
Total unpaid labor	13,833	6,993	1,746	96.06	47.89	11.34
Total of above costs	53,416	35,446	31,382	370.94	242.77	203.79
Land charge	12,682	12,073	7,790	88.07	82.69	50.58

Appendix Table W5-4. Estimated average costs for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-81-82 (W-5) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Public grazing						
BLM	42	70	53	0.30	0.48	0.34
Forest	32	16	20	0.23	0.11	0.13
State	19	32	23	0.14	0.22	0.15
Pasture rent	<u>2,270</u>	<u>2,380</u>	<u>4,196</u>	<u>16.33</u>	<u>16.30</u>	<u>26.90</u>
Sub-total leased	<u>2,363</u>	<u>2,498</u>	<u>4,292</u>	<u>17.00</u>	<u>17.11</u>	<u>27.52</u>
Irrigated pasture	4,106	2,471	2,156	29.54	16.92	13.82
Hay (produced)	2,924	3,090	2,837	21.04	21.16	18.19
Hay (purchased)	1,846	2,841	663	13.28	19.46	4.25
Protein supplement	342	699	962	2.46	4.79	6.17
Corn	295	--	--	2.12	--	--
Barley	--	576	299	--	3.95	1.92
Salt and minerals	182	182	182	1.31	1.25	1.17
Veterinary medicine	786	391	345	5.65	2.68	2.21
Trucking	371	265	195	2.67	1.82	1.25
Marketing	522	262	126	3.76	1.79	0.81
Hired labor	136	2,279	3,489	0.98	15.61	22.37
Machinery fuel and lube	1,331	1,153	746	9.58	7.90	4.78
Machinery repair	767	660	510	5.52	4.52	3.27
Equipment fuel and lube	88	31	27	0.63	0.21	0.17
Equipment repair	2,364	416	2,724	17.01	2.85	17.46
Interest on oper. capital	<u>1,846</u>	<u>1,587</u>	<u>1,108</u>	<u>13.28</u>	<u>10.87</u>	<u>7.10</u>
Total variable costs	20,267	19,402	20,660	145.81	132.89	132.44
Machinery	1,546	1,393	988	11.12	9.54	6.33
Machinery (forage)	1,436	1,236	1,093	10.33	8.47	7.01
Equipment	6,611	1,948	7,136	47.56	13.34	45.74
Livestock	3,784	3,795	3,806	27.22	25.99	24.40
Land taxes	399	397	302	2.87	2.72	1.94
General farm overhead	<u>1,505</u>	<u>1,292</u>	<u>687</u>	<u>10.83</u>	<u>8.85</u>	<u>4.40</u>
Total ownership costs	15,281	10,061	14,012	109.93	68.91	89.82
Unpaid labor (forage)	1,183	664	160	8.51	4.55	1.03
Unpaid labor (livestock)	<u>7,515</u>	<u>5,010</u>	<u>1,038</u>	<u>54.06</u>	<u>34.32</u>	<u>6.65</u>
Total unpaid labor	8,698	5,674	1,198	62.57	38.87	7.68
Total of above costs	44,246	35,137	35,870	318.31	240.67	229.94
Land charge	9,075	9,033	6,870	65.29	61.87	44.04

Appendix Table W6-4. Estimated average costs for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-81-82 (W-6) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Public grazing						
BLM	--	86	97	--	0.60	0.62
Forest	30	52	10	0.21	0.36	0.06
State	40	136	228	0.28	0.94	1.46
Pasture rent	<u>1,101</u>	<u>2,160</u>	<u>1,853</u>	<u>7.59</u>	<u>15.00</u>	<u>11.88</u>
Sub-total leased	<u>1,171</u>	<u>2,434</u>	<u>2,188</u>	<u>8.08</u>	<u>16.90</u>	<u>14.02</u>
Irrigated pasture	4,129	1,067	202	28.48	7.41	1.29
Hay (produced)	2,602	2,684	2,559	17.94	18.64	16.40
Hay (purchased)	1,243	909	1,726	8.57	6.31	11.06
Protein supplement	927	589	893	6.39	4.09	5.72
Oats	656	--	--	4.52	--	--
Barley	--	404	311	--	2.81	1.99
Salt and minerals	150	150	150	1.03	1.04	0.96
Veterinary medicine	466	646	558	3.21	4.49	3.58
Trucking	120	381	311	0.83	2.65	1.99
Marketing	294	221	271	2.03	1.53	1.74
Hired labor	806	1,587	2,749	5.56	11.02	17.62
Machinery fuel and lube	3,179	2,362	1,189	21.92	16.40	7.62
Machinery repair	1,884	1,604	751	12.99	11.14	4.81
Equipment fuel and lube	411	446	227	2.83	3.10	1.46
Equipment repair	601	775	1,238	4.14	5.38	7.94
Interest on oper. capital	<u>1,113</u>	<u>955</u>	<u>922</u>	<u>7.68</u>	<u>6.63</u>	<u>5.91</u>
Total variable costs	19,753	17,213	16,247	136.23	119.53	104.15
Machinery	3,591	3,206	2,383	24.77	22.26	15.28
Machinery (forage)	850	778	669	5.86	5.40	4.29
Equipment	2,201	3,400	4,691	15.18	23.61	30.07
Livestock	4,061	2,673	3,862	28.01	18.56	24.76
Land taxes	723	680	640	4.99	4.72	4.10
General farm overhead	<u>1,739</u>	<u>1,320</u>	<u>721</u>	<u>11.99</u>	<u>9.17</u>	<u>4.62</u>
Total ownership costs	13,165	12,057	12,966	90.80	83.72	83.12
Unpaid labor (forage)	1,040	563	195	7.17	3.91	1.25
Unpaid labor (livestock)	<u>11,235</u>	<u>5,861</u>	<u>1,591</u>	<u>77.48</u>	<u>40.70</u>	<u>10.20</u>
Total unpaid labor	12,275	6,424	1,786	84.65	44.61	11.45
Total of above costs	45,193	35,694	30,999	311.68	247.86	198.72
Land charge	9,063	8,517	8,024	62.50	59.15	51.44

Appendix Table W7-4. Estimated average costs for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-31-82 (W-7) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Public grazing						
BLM	74	80	95	0.57	0.58	0.70
Forest	79	106	29	0.61	0.77	0.21
State	61	88	287	0.47	0.64	2.11
Pasture rent	4,524	3,806	3,834	35.07	27.58	28.19
Sub-total leased	4,738	4,080	4,245	36.72	29.57	31.21
Irrigated pasture	1,577	403	309	12.22	2.92	2.27
Crop residue	--	--	--	--	--	--
Hay (produced)	723	279	313	5.60	2.02	2.30
Hay (purchased)	1,135	2,316	276	8.80	16.78	2.03
Protein supplement	2,258	5,440	451	17.50	39.42	3.32
Barley	--	--	65	--	--	0.48
Salt and minerals	185	185	184	1.43	1.34	1.35
Veterinary medicine	517	292	359	4.01	2.12	2.64
Trucking	165	127	239	1.28	0.92	1.76
Marketing	488	306	242	3.78	2.22	1.78
Hired labor	1,952	2,941	4,211	15.13	21.31	30.96
Machinery fuel and lube	2,443	1,391	1,617	18.94	10.08	11.89
Machinery repair	1,338	639	863	10.37	4.63	6.35
Equipment fuel and lube	15	5	2	0.12	0.04	0.01
Equipment repair	615	511	446	4.77	3.70	3.28
Interest on oper. capital	<u>2,395</u>	<u>1,683</u>	<u>688</u>	<u>18.57</u>	<u>12.20</u>	<u>5.06</u>
Total variable costs	20,543	20,598	14,509	159.25	149.26	106.68
Machinery	2,363	1,358	1,869	18.32	9.84	13.74
Machinery (forage)	349	129	25	2.71	0.93	0.18
Equipment	4,204	3,074	1,986	32.59	22.28	14.60
Livestock	4,282	4,246	4,225	33.19	30.77	31.07
Land taxes	645	565	592	5.00	4.09	4.35
General farm overhead	1,603	1,215	580	12.43	8.80	4.26
Total ownership costs	13,446	10,587	9,277	104.24	76.71	68.20
Unpaid labor (forage)	332	90	3	2.57	0.65	0.06
Unpaid labor (livestock)	<u>15,109</u>	<u>10,623</u>	<u>1,011</u>	<u>117.12</u>	<u>78.43</u>	<u>7.43</u>
Total unpaid labor	15,441	10,913	1,019	119.69	79.08	7.49
Total of above costs	49,430	42,098	24,805	383.18	305.05	182.37
Land charge	5,864	5,139	5,386	45.46	37.24	39.60

Appendix Table W1-5. Estimated average returns for 100-cow planning units in the Pacific coastal regions of Washington, Oregon, and California, 1980-81-82 (W-1) (dollars)

Item	Per 100 cows			Per AU		
	Small	Medium	Large	Small	Medium	Large
Cash receipts	28,475	29,226	27,006	181.37	188.55	181.25
Variable costs	<u>16,862</u>	<u>18,846</u>	<u>16,592</u>	<u>107.40</u>	<u>121.59</u>	<u>111.36</u>
Return over variable costs	11,613	10,380	10,414	73.97	66.97	69.90
Ownership costs	<u>14,297</u>	<u>10,919</u>	<u>6,572</u>	<u>91.06</u>	<u>70.45</u>	<u>44.12</u>
Return to labor, land and management	-2,684	-539	3,842	-17.09	-3.49	25.77
Unpaid labor	<u>5,924</u>	<u>4,738</u>	<u>1,154</u>	<u>37.73</u>	<u>30.57</u>	<u>7.74</u>
Return to owned land and management	-8,608	-5,277	2,688	-54.82	-34.06	18.03
Return to landlord ^{a/}	<u>673</u>	<u>5,111</u>	<u>8,513</u>	<u>4.28</u>	<u>32.98</u>	<u>57.13</u>
Return to all land and management - Total	-7,935	-166	11,201	-50.54	-1.08	75.16
Per AUM				-4.21	-0.09	6.26

a/ Based on 90% of rent paid as a return after covering landlord's costs.

Appendix Table W2-5. Estimated average returns for 100-cow planning units in the western Montana, Idaho, eastern Washington, and northeast Oregon areas, 1980-81-82 (W-2) (dollars)

Item	Per 100 cows			Per AU		
	Small	Medium	Large	Small	Medium	Large
Cash receipts	32,382	32,227	32,306	204.95	202.69	203.18
Variable costs	<u>20,779</u>	<u>20,964</u>	<u>17,451</u>	<u>131.51</u>	<u>131.85</u>	<u>109.75</u>
Return over variable costs	11,604	11,263	14,855	73.44	70.84	93.43
Ownership costs	<u>17,062</u>	<u>11,774</u>	<u>8,719</u>	<u>107.99</u>	<u>74.06</u>	<u>54.84</u>
Return to labor, land and management	-5,459	-511	6,136	-34.55	-3.22	38.59
Unpaid labor	<u>7,745</u>	<u>11,680</u>	<u>3,167</u>	<u>49.02</u>	<u>73.45</u>	<u>19.92</u>
Return to owned land and management	-13,204	-12,191	2,969	-83.57	-76.67	18.67
Return to landlord ^{a/}	<u>2,797</u>	<u>2,033</u>	<u>2,255</u>	<u>17.71</u>	<u>12.78</u>	<u>14.18</u>
Return to all land and management - Total	-10,407	-10,158	5,224	-65.86	-63.89	32.85
Per AUM				-5.49	-5.33	2.74

a/ Based on 90% of rent paid as a return after covering landlord's costs.

Appendix Table W4-5. Estimated average returns for 100-cow planning units in the central valley, foothills, and northern California areas, 1980-81-82 (W-4) (dollars)

Item	Per 100 cows			Per AU		
	Small	Medium	Large	Small	Medium	Large
Cash receipts	24,764	27,629	29,041	171.97	189.24	188.58
Variable costs	23,507	17,659	21,620	163.24	120.95	140.39
Return over variable costs	1,257	9,970	7,421	8.73	68.29	48.19
Ownership costs	16,076	10,794	8,016	111.64	73.93	52.06
Return to labor, land and management	-14,819	-824	-595	-102.91	-5.64	-3.87
Unpaid labor	13,833	6,993	1,746	96.06	47.89	11.34
Return to owned land and management	-28,652	-7,817	-2,341	-198.97	-53.53	-15.21
Return to landlord ^{a/}	1,820	2,980	7,191	12.64	20.40	46.69
Return to all land and management - Total	-26,832	-4,837	4,850	-186.33	-33.13	31.48
Per AUM				-15.53	-2.76	2.62

^{a/} Based on 90% of rent paid as a return after covering landlord's costs.

Appendix Table W5-5. Estimated average returns for 100-cow planning units in the northeast California, southeast Oregon, northern Nevada, and western Utah areas, 1980-81-82 (W-5) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Cash receipts	22,829	28,390	30,356	164.24	194.45	194.59
Variable costs	20,267	19,402	20,660	145.81	132.89	132.44
Return over variable costs	2,562	8,988	9,696	18.43	61.56	62.15
Ownership costs	15,281	10,061	14,012	109.93	68.91	69.32
Return to labor, land and management	-12,719	-1,073	-4,316	-91.50	-7.35	-27.67
Unpaid labor	8,698	5,674	1,198	62.57	38.87	7.68
Return to owned land and management	-21,417	-6,747	-5,514	-154.07	-46.22	-35.35
Return to landlord ^{a/}	2,127	2,248	3,863	15.30	15.40	24.77
Return to all land and management - Total	-19,290	-4,499	-1,651	-138.77	-30.82	-10.58
Per AUM				-11.56	-2.57	-.88

^{a/} Based on 90% of rent paid as a return after covering landlord's costs.

Appendix Table W6-5. Estimated average returns for 100-cow planning units in the western Wyoming, eastern Utah, and western Colorado areas, 1980-81-82 (W-6) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Cash receipts	25,728	26,631	30,861	177.43	184.94	197.83
Variable costs	19,753	17,213	16,247	136.23	119.53	104.15
Return over variable costs	5,975	9,418	14,614	41.21	65.40	93.68
Ownership costs	13,165	12,057	12,966	90.80	83.72	83.12
Return to labor, owned						
land and management	-7,190	-2,639	1,648	-49.60	-18.31	10.56
Unpaid labor	12,275	6,424	1,786	84.65	44.61	11.45
Return to owned land						
and management	-19,465	-9,063	-138	-134.25	-62.92	-.89
Return to landlord	1,054	2,191	1,969	7.27	15.21	12.62
Return to all land and						
management - Total	-18,411	-6,872	1,831	-126.98	-47.71	11.73
Per AUM				-10.58	-3.98	.98

a/ Based on 90% of rent paid as a return after covering landlord's costs.

Appendix Table W7-5. Estimated average returns for 100-cow planning units in the southeast California, southern Nevada, Arizona, and western New Mexico areas, 1980-81-82 (W-7) (dollars)

Item	Costs per 100 cows			Costs per AU		
	Small	Medium	Large	Small	Medium	Large
Cash receipts	23,117	24,503	24,094	179.20	177.56	177.16
Variable costs	20,543	20,598	14,509	159.25	149.26	106.68
Return over variable costs	2,573	3,905	9,585	19.95	28.30	70.48
Ownership costs	13,446	10,587	9,277	104.24	76.71	68.20
Return to labor, owned						
land and management	-10,872	-6,682	308	-84.29	-48.41	2.28
Unpaid labor	15,441	10,913	1,019	119.69	79.08	7.49
Return to owned land						
and management	-26,313	-17,595	-711	-203.98	-127.49	-5.21
Return to landlord ^{a/}	4,264	3,672	3,820	33.05	26.34	28.09
Return to all land and						
management - Total	-22,049	-13,923	3,109	-170.93	-101.15	22.88
Per AUM				-14.24	-8.43	1.91

a/ Based on 90% of rent paid as a return after covering landlord's costs.