



What is the best way to utilize grazing land for the production of beef? What are the gains and carrying capacities on various types of forage and what are the costs involved? These questions are pertinent to cattlemen, owners of grazing land, and managers of public lands.

The answers to these questions on Forest Service grazing land would be of particular interest. The Farm Advisor's Office of Siskiyou County undertook an approach to a study of this problem on May 1, 1947 putting special emphasis on Forest Service grazing land and its use in producing beef.

Records were obtained from four cattle ranchers in Scott Valley. A study was made of each ranch operation as a whole as well as on the various types of grazing land used by the ranches. The Forest Service grazing land considered in the study is in the Klamath National Forest and covers the Marble and Salmon Mountain areas. The other types of grazing land used were classified as low elevation hill range, valley irrigated pasture, grain stubble, and hay aftermath.

A summary of the records to date (May 1, 1949) follows in this report. The number of records included is small and apply only to these ranches and to the period covered. They are not presented as averages for the industry, but they should be somewhat typical of ranches in the Scott Valley area.

#### DESCRIPTION OF CATTLE OPERATIONS IN THE SCOTT VALLEY AREA

For the benefit of other than local readers, a brief explanation of cattle operations in this area is given. The ranches covered in this report are located in Scott Valley near the town of Etna. Three of the four ranches ran cattle on nearby low hill range, irrigated valley pasture, grain stubble, hay aftermath and on grazing allotments in the National Forest. The fourth ranch used the same types of feed except that it had no National Forest grazing allotment.

In general, cattle are turned out on the privately owned low hill range in the Spring. Irrigated pastures are used mostly in the summer, but some stock are grazed all year on it along with hay in the winter. National Forest grazing land is also used in the summer for three months. In the fall the cattle are grazed on hay aftermath and grain stubble as well as irrigated pasture. The winters are severe enough to necessitate the feeding of considerable hay during the winter months. Hay is produced locally on these ranches from wild hay meadows and alfalfa fields.

Salable beef are usually kept on irrigated pastures while cows and calves use the hill and forest grazing land. Most of the calves are born in the spring on the low hill feed, but the calving period in many cases extends on into late summer.



HERD STATISTICS

Table I, which follows, considers records of the ranches as a whole. Other tables will break down costs and production according to feed sources. It shows that the ranches are not particularly large as compared to some other cattle producing areas. The calf crops raised are not particularly high, but even so the pounds of beef produced per animal unit are excellent. The figure of 358 lbs. is comparable to a similar production record of 351 lbs. in 1935 on four ranches in other parts of Siskiyou County. A similar comparison on costs of producing beef per cwt. is \$6.39 in 1935 and \$24.14 in 1948 - almost four times greater.

The \$176.51 figure on investment per animal unit concerns only the stock and facilities used by the cattle. Grazing and hay land is not included. A further discussion of investment follows in Table XI. In 1935 the investment figure was \$85.22.

Table I: Herd Statistics, Production, & Investment on Ranch Operations as a Whole

Item	Average 4 Ranches 1947	Average 4 Ranches 1948	Average 4 Ranches 2 years
Average Number of Cows	168.6	170.5	169.55
Average Animal Units	363.5	363.4	363.5
Animal Units per Cow	2.2	2.1	2.1
Percent calf crop raised	76.1	70.4	73.3
Percent mortality of all stock	7.4	2.8	5.1
Hours of labor per Animal Unit	7.7	8.5	8.1
Pounds of beef produced per Animal Unit	386	319	358
Pounds of beef sold per Animal Unit	567	427	497
Average price per cwt. of stock sold:			
Cows	18.39	19.18	18.78
Calves	21.01	25.59	23.30
Heifers	23.43	23.21	23.37
Steers 1-2 years	24.66	23.12	23.89
Steers 2 years & over	21.53	24.61	23.07
Average of all sales	21.12	23.00	22.06
Average value per cwt. of beef produced	21.67	23.07	22.37
Net cost per cwt. of beef produced	17.03	24.14	20.58
Management income per cwt.	4.64	-1.07	1.79
Investment per Animal Unit:			
Land in lots and corrals	1.31	1.24	1.27
Buildings and improvements	25.10	22.50	23.80
Equipment	3.28	3.16	3.22
Stock	126.87	169.56	148.21
Total not including pasture	156.56	196.46	176.51



ACRES OF LAND AND FEED USED

Table III shows how much land and feed is necessary to maintain an animal unit throughout the year in Scott Valley when operated under similar conditions to these ranches. It took about 14 acres of land of various types, as listed below, plus over a ton of hay and some grain. The averages were obtained by dividing the average number of animal units of the herds for the year into the acres of land actually used during the year. Therefore, it does not necessarily represent carrying capacity of various feeds, but it does show the land needed for an overall yearly feed supply. Some of the land, such as grain stubble and hay aftermath was rented and only used for a short period. The acres on National Forest land were obtained from Forest Service Maps and only include meadows and stringers and not the adjoining timber or brush areas.

Using the figures below, a 100 cow ranch operated similarly would need 2124 acres of hill range; 200 acres of irrigated pasture; 4 acres of lots and corrals; 80 acres of hay land to furnish the 250 tons of hay needed and 100 acres of aftermath hay could be rented for pasture; 10 acres of grain land to furnish the 15,000 lbs. of grain used and 74 more acres of stubble could be rented for grazing; and 400 acres of meadows rented from the National Forest. In all, 2418 acres could be owned and 574 acres could be rented.

These figures appear high, as some ranches can carry an animal unit on less land than required by the ranches in this study. It must be noted, however, that most of the irrigated pasture listed here is unimproved and hay is cut from pastures in many cases.

Table III: Acres of Land Used and Supplements Fed Per Animal Unit Throughout the Year

Item	Average 4 Ranches 1947	Average 4 Ranches 1948	Average 4 Ranches 2 years
Acres of Various Feeds Used per A.U. year:			
Low Hill Range	11.01	8.75	9.88
Irrigated Valley Pasture	.96	.90	.93
Aftermath Hay Pasture	.89	.79	.84
Grain Stubble	.42	.36	.39
National Forest (Average of 3 ranches only)	1.81	1.71	1.86
Feed lots and Corrals	.02	.02	.02
Total Acres of land used	15.11	12.53	13.92
Pounds of Hay Fed	2108	2752	2430
Pounds of Grain Fed	61	79	70
Pounds of Salt & Minerals Used	24	26	25

CARRYING CAPACITY OF VARIOUS PASTURES

Table IV shows the number of days that an animal unit can be supported on an acre of various kinds of feeds. The cattle had supplemental hay or grain while on these pastures, especially in the cold seasons, but this extra feed was deducted from the actual carrying capacity, so the figures indicate the net days that can be expected from grazing alone. All through this report an animal unit month of supplemental feed was considered to be 400 lbs of total digestible nutrients. The animal unit months furnished from hay and grain was determined by dividing 400 into the total digestible nutrients of hay and grain fed. The feed days per acre were obtained by subtracting the days of feed furnished by supplements from the total days an animal unit was on an acre of pasture. In Scott Valley the stock cattle are usually put on aftermath hay land and grain stubble in the fall. As this feed is grazed off, hay is fed, until during the mid-winter most of their feed comes from hay alone. For example, an animal unit was actually on an acre of grain stubble for 63 days but only 40 days was furnished by the stubble. The other 20 days were furnished by hay.

Probably some pastures were not stocked to capacity and others were overgrazed, but the gains made by the cattle indicate that in general, the pastures held their own and that the figures are fairly representative of carrying capacity.

Table IV: Animal Unit Days of Feed Furnished Per Acre from Various Feeds

Item	Average	Average	Average
	4 Ranches 1947	4 Ranches 1948	4 Ranches 2 years
Animal Unit Days Feed per Acre from Pasture Alone:			
Low Hill Range	5.8	6.9	6.4
Irrigated Valley Pasture	123.2	157.0	140.1
Aftermath Hay Pasture	48.3	25.5	36.9
Grain Stubble	52.2	27.6	39.9
National Forest (Average of 3 Ranches only)	20.3	16.5	18.4
Average days per acre of all pasture	18.8	20.8	19.8





SOURCES OF FEED FOR AN ANIMAL UNIT DURING THE YEAR

Table VI, which follows, shows how the year's feed is distributed in order to maintain an animal unit. It is represented by animal unit months. There are 12 animal unit months of feed for an animal unit a year. The table shows how many months were furnished from various feed sources. The figures were obtained by dividing the animal unit months of feed from each pasture by the average number of animal units for the year. It shows the proportion of feed furnished from different sources on a yearly basis.

An examination of the figures shows that irrigated pasture furnished more feed in 1948 than 1947, but that hay aftermath furnished more in 1947. Of special note is the greater amount of feed furnished from hay and grain in 1948 when there was a severe winter. Profits in Table II reflect this.

Table VI: Animal Unit Months of Feed Furnished from Various Sources for the Year

Item	Average 4 Ranches 1947	Average 4 Ranches 1948	Average 4 Ranches 2 years
A. U. Months of Feed from pasture only:			
Low Hill Range	2.2	2.0	2.1
Irrigated Valley Pasture	3.9	4.7	4.3
Aftermath hay Pasture	1.4	.6	1.0
Grain Stubble	.7	.4	.5
National Forest (Average 3 Ranches Only)	<u>1.2</u>	<u>.9</u>	<u>1.1</u>
Total A. U. Months from Pasture Alone	9.4	8.6	9.0
Animal Unit Months from Hay & Grain	<u>2.6</u>	<u>3.4</u>	<u>3.0</u>
Total	12.0	12.0	12.0

RELATIVE IMPORTANCE OF DIFFERENT FEED SOURCES

Table VII is similar to Table VI except that it shows the percentage of the years feed supply that was furnished by the different pastures and feeds. It therefore shows the relative importance of various feed sources and how much of the years supply is dependant on each source. Actually, a years supply of feed for cattle is like a chain and each feed source is a link in the chain. Some of the links are larger than others but each is just as strong and just as important. For example, the National Forest only furnished about 9% of the total feed required, but it was just as vital as irrigated pasture to the ranches in order to link the gap between two other feed sources on the ranch.

In general, it will be noticed that about 75% of the feed was furnished from grazing on pastures and 25% from hay and grain. Hay and grain furnishes 1/4 the years feed supply but is over 1/2 the total feed cost, therefore consideration should be given to means of reducing the feeding of hay. One proposal is more use of low hill range for winter grazing.

Table VII: Percentage of Feed Furnished from Various Sources

Item	Average 4 Ranches 1947	Average 4 Ranches 1948	Average 4 Ranches 2 years
Percentage of years feed furnished from different sources:			
Low Hill Range	17.7	16.4	17.1
Irrigated Valley Pasture	32.3	38.3	35.3
Aftermath Hay Pasture	11.8	5.5	8.7
Grain Stubble	5.9	2.7	4.3
National Forest (Average of 3 Ranches only)	10.1	7.6	8.8
Hay	21.3	28.3	24.7
Grain & Concentrates	9	1.2	1.1
Totals	100%	100%	100%

Table VIII portions the gains that the cattle made during the year to the various feed sources. Cattle were actually weighed on and off pastures where possible but weights and gains were estimated in many cases. It is true that errors were made in judging weights, but the results are as accurate as conditions would allow and probably are indicative. The figures were obtained by dividing the pounds produced on different pastures by the average number of total animal units for the year. Therefore the results show the relative production of each feed source and not the actual pounds produced from each source. Each animal unit gained 360 lbs. during the year and 58 lbs. of this gain was allocated to the National Forest. Actually while on the National Forest each animal unit gained 135 lbs. as shown in table X. This last figure was obtained by dividing the pounds produced on the National Forest by the animal units actually carried in the forest.

It was thought by some previewers of this report that the production proportioned on a yearly basis was more indicative than on an actual basis, because of the influence of weather and other conditions. Actually, most stock cows lose weight on hay in winter and make exceptional gains on range in the spring. Should gains on hay feeding be penalized when conditions are adverse, while gains on range and forest lands are exaggerated because weather, feed, and cattle conditions are just right? The yearly basis shown here distributes the gains more evenly.

A study of this table shows that most of the beef is produced on irrigated pasture and only 1/5 of the beef is produced from hay and grain. About 17% of the year's beef is produced on the National Forest even though it only furnished 9% of the feed. This means that very good gains are made on forest grazing land.

Table VIII: Pounds of Beef Produced Per Animal Unit from Various Feed Sources

Item	Average 4 Ranches 1947	Average 4 Ranches 1948	Average 4 Ranches 2 years
Pounds Produced Per A. U. During the year on Various Feeds:			
Low Hill Range	97	49	73
Irrigated Valley Pasture	149	108	129
Aftermath Hay Pasture	20	18	19
Grain Stubble	10	10	10
National Forest (Average of 3 Ranches only)	62	53	58
Hay	57	80	69
Grain & Concentrates	--	4	2
Total Produced per A. U.	386	319	360

COSTS PER ANIMAL UNIT MONTH OF FEED

Table IX, below, gives the costs of an animal unit month of feed incurred from various feed sources. The figures were obtained by dividing the costs of each type of feed by the animal unit month furnished from the feeds. The costs of the feeds were determined by charging interest, taxes, rental fees, or the going rate of that feed. For example, on low hill range that was owned, 5% interest on the land value plus taxes were considered the cost of that feed. Aftermath hay pasture was charged at the going rate of \$2.00 per head month. The National Forest was charged only the grazing fee. Hay and grain was charged at the going price.

The table shows that the cost per animal unit month of feed from pasture was \$2.00 which is in sharp contrast to the \$8.69 for hay. Grazing is essential for the profitable operation of beef cattle. It takes about \$4.00 every month to pay for all feed used by an animal unit on these ranches.

Table IX: Cost Per Animal Unit Month of Feed on Various Pastures

Item	Average	Average	Average
	4 Ranches 1947	4 Ranches 1948	4 Ranches 2 years
Low Hill Range	\$ 2.46	\$ 1.86	\$ 2.16
Irrigated Valley Pasture	2.59	2.04	2.31
Aftermath hay pasture	2.01	2.11	2.06
Grain Stubble	1.97	2.13	2.05
National Forest (Average of 3 Ranches Only)	.38	.64	.51
Average Cost per A. U. Month for Pasture	2.15	1.86	2.00
Hay	7.55	9.83	8.69
Grain & Concentrates	<u>15.92</u>	<u>15.97</u>	<u>15.94</u>
Average Cost of all feed per A. U. Month	3.50	4.33	3.91

NATIONAL FOREST EXPENSES AND PRODUCTION

Since this study was primarily undertaken to show the utilization of different types of grazing land, with special emphasis on National Forest grazing land, then a further examination is needed for this source of feed. The previous tables have shown the ranch operations as a whole and have given the relative positions of each feed source. The following table, X, details the National Forest as a feed source for these ranches.

Table X shows all expenses that were actually incurred while the three ranches ran cattle on the Klamath National Forest for two seasons. These costs do not include any overhead for the valley ranch. It is necessary to have a valley ranch before a forest allotment can be obtained. The gains shown here were obtained from weights both actual and estimated when the cattle were turned on and taken off the forest.

Allotments in the Klamath National Forest are usually from July 15 to October 15, but definite dates are set according to weather and feed conditions each year. There were 4,634 acres of meadows and stringers included in the three allotments and over 1100 animal units were grazed on them each season. The allotments were from one to three day drives from the home ranch. Camps are made in the mountains and serve as headquarters when the cattle are scattered, salted, moved, etc. during trips to the forest.

It has often been wondered what the expenses are to take cattle to the forest. It is obvious that it is more than the 50¢ head month fee. Table X shows the total expenses to be \$9.24 per animal unit for the season or \$3.41 per animal unit month. The going rate for irrigated pasture at this time was \$4.00 per head month.

Beef was produced in the forest at a cost of \$6.80 per cwt as opposed to \$20.58 which was the cost per cwt of all beef produced on these ranches. This cheap production is due to very satisfactory gains of 1.7 lbs. a day and a reasonable cost of \$3.41 per animal unit month of feed.

The figures indicate it would be to the ranchers advantage to have an allotment. The forest is also being used to good advantage when it produces \$7.39 worth of beef per acre in 3 months at a cost of \$2.25 per acre.



INVESTMENT IN THE CATTLE BUSINESS

The figures given in Table XI, below, are only an approach to a difficult but often asked question. The figures used were obtained from the ranches in this study (see tables II & III) and may not be representative of other ranches. It is difficult to set a value on land. The values used were selected arbitrarily and are more or less of an average for the last 10 years.

A 100 cow ranch operated such as these, will maintain an average of 215 animal units during the year. The land listed below, necessary to support a herd of this size, is all considered as being owned. Likewise, the hay and grain land necessary for feed is considered as owned and is included in the total ranch. It may not be too unreasonable to expect a completely stocked ranch of this size to be valued at \$100,000.00. A smaller investment, of course, could be realized if less land were owned and more was rented.

Even with a large investment such as shown here, the Management Income would only be about \$1,600.00 and the Farm Income about \$4,000.00. This again shows that the cattle business is one which demands a large capital investment and the return is barely the going rate of interest on the money invested.

As shown below, the investment in only the cattle enterprise of the ranch is about \$385.00 per animal unit. In 1935 a similar figure on investment was about \$138.00. The investment for a complete cattle ranch, including the cattle enterprise plus hay and grain land, dwelling, and farming equipment is \$494.00 per animal unit, as indicated by the results of this cost study (See table III for a further discussion).

Table XI: Investment in the Cattle Business for a 100 Cow Ranch in Scott Valley when operated similarly to the Ranches in this Study.

Item	Amount	Value Per Unit	Total Investment	Investment Per Animal Unit
100 Cow Ranch aver. 215 A.U. & needs				
Land for Lots and Corrals	4 Ac.	\$ 50.00/Ac.	\$ 200.00	\$ .93
Stock Bldg & Improvements		23.80/AU.	5117.00	23.80
Equip: Saddles, Hayracks, water, etc.		3.22/AU	692.00	3.22
Stock	215 AU.	148.21/AU.	31865.00	148.21
Low Hill Range	2124 Ac.	7.00/Ac.	14868.00	69.15
Irrigated Valley Pasture	200 "	150.00 "	30000.00	139.57
Hay land (for hay & pasture)	80 "	150.00 "	12000.00	55.81
Grain land (for grain & pasture)	10 "	150.00 "	1500.00	6.98
Extra items for: haying harvesting, fencing, irrigation, hay barns etc.		Estimated	5000.00	23.26
Dwelling		Estimated	5000.00	23.26
<b>Total Investment for Complete Ranch</b>	<b>2418 Ac.</b>		<b>\$106242.00</b>	<b>\$494.19</b>
Additional land to be rented:				
Aftermath Hay Pasture	100 Ac.	\$ 2.00/Ac	\$200.00	\$ .93
Grain Stubble	74 "	2.00/"	148.00	.69
National Forest Allotment	400 "	.32/"	128.00	.59
<b>Total Pasture Rented</b>	<b>574 Ac.</b>		<b>\$ 476.00</b>	<b>\$ 2.21</b>
Recapitulation of above Items:				
Investment in Cattle & Facilities (Items 1-4 above)			\$37874.00	\$ 176.16
Investment in Range & Pasture (Items 5&6 above)			44868.00	208.72
Sub Total - Investment in Cattle Enterprise of Ranch			\$82742.00	\$ 384.88
Investment in Hay & Grain land, Farming Equipment, Dwelling, etc. (Items 7-10 above)			\$23500.00	\$109.31
<b>Total Investment in complete cattle ranch</b>			<b>\$106242.00</b>	<b>\$494.19</b>

BRIEF SUMMARY OF BEEF CATTLE COST AND LAND UTILIZATION STUDY  
TWO YEAR AVERAGE OF 4 RANCHES IN SCOTT VALLEY, SISKIYOU COUNTY.

From May 1947 to June 1949 records were kept on 4 cattle ranches in Scott Valley in order to gain more information on beef production and on the best way to utilize land in that area to produce beef. Special emphasis was placed on the role that the Klamath National Forest played in cattle operations. The cost figures compiled below are considered sufficient for a basis of a study of this type. Sufficient information has also been obtained on the relative value and position of various feed sources. In the future, records will be obtained more completely on carrying capacity and gains. Progress reports will be distributed from time to time.

HERD DATA

Total number of animal units in the 4 ranches - - - - -	1454
Percent calf crop raised - - - - -	73
Hours of labor per animal unit - - - - -	8.1
Pounds of beef produced per animal unit	358
Percent mortality - - - - -	5.1

INVESTMENT PER ANIMAL UNIT

Land (range, pasture, lots, - no farming land - 10.83 acres) -	\$ 209.
Stock - - - - -	148.
Buildings, improvements, & equipment - - - - -	<u>28.</u>
Total investment for cattle enterprise per A.U. - - - - -	\$ <u>384.</u>
Additional land rented per A. U. (2.7 acres) - - - - -	2

COSTS AND INCOME PER ANIMAL UNIT

Feed costs (pasture, hay, grain & salt) - - - - -	\$ 47.79
Labor - - - - -	7.34
Horses, auto, & truck - - - - -	2.90
Misc., taxes, insurance, etc. - - - - -	2.45
Depreciation - - - - -	1.92
Interest - - - - -	-8.90
Stock purchased - - - - -	<u>37.90</u>
Total costs per animal unit - - - - -	109.20
Income from stock sales and inventory gain per A. U. - - - - -	<u>116.45</u>
Management income per A. U. - - - - -	7.25



## FEED DATA

Source of Feed For Year	Acres Used Per Average Animal Unit	Animal Unit Days of Feed per Acre	Animal Unit Month of Feed for Year	Pounds Beef Produced per Average Animal Unit	Percentage Feed Furnished	Cost Per Animal Unit Month
Low Hill Range	9.88 Acr.	6.4	2.1	73	17.1	2.16
Irrigated Pasture	.93 "	140.1	4.3	129	35.3	2.31
Aftermath Hay	.84 "	36.9	1.0	19	8.7	2.06
Grain Stubble	.39 "	39.9	.5	10	4.3	2.05
National Forest	1.86 "	18.4	1.1	58	8.8	.51
Feed lot, Corrals	.02 "	--	--	--	--	--
Hay	2430 lbs	--	--	69	24.7	8.69
Grain	70 "	--	3.0	2	1.1	15.94
Salt & Minerals	25 "	--	--	--	--	--
Totals	13.92 ACR	19.8	12.0	360	100.0	3.91

NATIONAL FOREST DATA (3 Ranches only)

These figures concern only the period while cattle were in the forest. It shows what took place in the forest only and does not concern the rest of the year or other operations.

Labor & provisions - - - - -	\$ 5.05
Saddle horses & Pack animals - - - - -	1.45
Feed, salt, grain, & hay - - - - -	.84
Equipment - bells, auto, truck - - - - -	.60
Grazing fees - - - - -	<u>1.30</u>
Total cash costs per animal unit while in forest - - - - -	\$ 9.24

Feed days per animal unit (Average grazing period - - - - -	81.2
Cash costs per animal unit month in forest - - - - -	3.41
Pounds of beef produced per animal unit in forest - - - - -	135
Average daily gain per animal unit in forest - - - - -	1.7
Acres of meadows in forest per animal unit - - - - -	4.1
Number of trips made to forest per season - - - - -	4.5
Death loss while in forest - - - - -	1.3