

Clawson

THE RANCHITA RANGE STUDY

by

W. James Clawson and Franklin F. Frank*

The Ranchita Range Study is a cooperative brush conversion project. It is being conducted by the California Division of Forestry, the Agricultural Extension Service and the Ranchita Cattle Company (Lester Mankins, Manager). The purposes of the Study are: 1) to demonstrate brush range improvement techniques developed by research, and 2) to determine and show the economics of the various treatments.

The Study is located approximately 14 miles southeast of the City of San Luis Obispo. The four fenced plots originally included 275 acres, of which selected areas in each plot have been treated. Elevation ranges from 650 to 1200 feet and rainfall averages 20 inches per season. The aspect of all plots is generally east, with slopes averaging 30 to 35 percent. The soil (San Timeteo sandy loam) ranges in depth from 12 to 24 inches. Brush vegetation is typical of the central coastal chaparral type with chamise and ceanothus dominating.

BURN TREATMENTS

PLOT NO. 1

Brush Removal

Brush on about 45 acres was crushed with an anchor chain pulled by two TD-16 tractors in February, 1960. An average of eight acres per hour were crushed on rolling topography and four per hour on steeper slopes.

Firelines were also constructed at this time using the same bulldozers. Output was near 600 lineal feet per hour per unit.

Burning operations were conducted in October, 1960 with excellent results despite poor burning conditions.

To reduce erosion and siltation below the plot following brush removal, a system of erosion check dams were constructed. A TD-9 tractor was able to build one dam per hour. The dams were quite effective in reducing erosion and at the same time provided better spring stock water distribution.

Revegetation

Approximately 24 acres of the accessible slopes on this plot were seeded in November, 1960 with a 5-foot rangeland drill. The remaining steeper slopes were hand-broadcast seeded. A mixture of perennial grasses (3.2 pounds Harding-grass, 1.1 pounds Perennial ryegrass, and 0.7 pounds Smilo) were seeded at the rate of 5 pounds per acre.

*Farm Advisor, San Luis Obispo County
Forester I, District 5, California Division of Forestry

In December of 1961 a mixture of legumes (Bur clover and Lana vetch) was broadcast at rates up to 8 pounds per acre over the area seeded to grasses the previous year. An average of 1.3 acres per hour were drilled and 1.6 acres per man hour were broadcast seeded.

Despite extremely poor weather conditions, establishment of the drill seeded grass was good with density stabilizing around 30 percent. The grasses broadcast seeded did not do nearly as well; density increased to only 4 percent in the second year. The legume overseeding was almost a complete failure due to loss of seed to birds, poor inoculation and heavy competition from established grasses.

Follow-up Brush Control

To control brush regrowth and competing weeds, the treated area was sprayed by helicopter in May of 1961 with a mixture of 2,4-D and 2,4,5-T (4 pounds acid equivalent per acre). This initial spraying was followed by spot applications in 1962 and 1964 using the same herbicides.

The results of the initial spraying was good and the combination of the two spot treatments was excellent with the overall kill exceeding 99 percent.

PLOT NO. 2

Brush Removal

The brush on Plot No. 2 was crushed, the fireline constructed, and burning operations conducted using the same methods and at the same time as on Plot No. 1. The brush on this plot was younger and less dense and did not crush well. The results of the burn were only fair, leading to the obvious conclusion that crushing is most effective in dense old growth brush.

Revegetation

The same mixture and rate of perennial grasses used on Plot No. 1 were used on this plot. Ten acres were drill seeded and 19 acres were broadcast seeded in November of 1960. As with Plot No. 1, the same legume overseeding was carried out in 1961 on the 29 acres seeded the year before. The results of revegetation closely paralleled that of Plot No. 1, the drill seeded grasses doing fairly well while the broadcast seeding of both the grasses and legumes very poorly. There is little doubt that drilling spelled the difference between success and failure on both Plots 1 and 2.

Follow-up Brush Control

Plot No. 2 was given the same initial herbicide treatment as Plot No. 1, but only one follow-up application. These treatments were not quite as effective as on Plot No. 1 because of spotty burning. The lack of the second spot treatment allowed the brush encroach to the point where herbicide control was no longer economical. The need for continuous follow-up treatment is apparent.

DISKING TREATMENTS

PLOT NO. 3

Brush Removal

An attempt was made to burn the standing brush on Plot No. 3 when the crushed brush was burned in 1960, but due to poor burning conditions little was accomplished. Because of favorable results obtained from small scale brush disking trials in 1960, it was decided to renew conversion efforts on Plot No. 3 through brush disking.

In May of 1965, 25 acres of standing brush were disked. Using a 9-foot brush disk pulled by a TD-20, it was possible to disk .83 acres per hour. The disk knocked down, uprooted and turned under most of the brush which ranged up to 15 feet in height. Concentration of debris was left on the surface only where brush was extremely heavy. Some brush sprouts appeared during the summer following disking, but were insignificant when compared to those following a burn.

Spot burning was conducted where debris was concentrated. To kill the remaining brush sprouts and turn under the remaining debris, a second disking was undertaken. The second disking produced a very clean seed bed, removing most surface debris and all sprouts at an output of one acre per hour.

Revegetation

The entire area disked was drill seeded, using a 10-foot rangeland drill, in November of 1965. A 10.5 pound per acre mixture of perennial grass and legumes was sown (4.0 pounds Hardinggrass, 0.5 pound Smilo, 4.0 pounds Lana vetch, and 2.0 pounds Rose clover). Drilling was done at the rate of 2.1 acres per hour. As in 1960-61 growing season, weather conditions were extremely poor for establishment during the 1965-66 season. First year density of seeded grasses and legumes was below 20 percent; however, early measurements in 1967 indicate increases in density and good establishment, especially on the better sites.

Fertilization

The 25 acres which were converted were fertilized with ammonium sulfate at the rate of 60 units N per acre in November of 1966. Single superphosphate was also applied on a three acre test site at the rate of 60 pounds phosphoric acid per acre. The results have not been quantitatively evaluated; however the grasses reflected a very obvious nitrogen response and the legumes showed a definite phosphate response.

PLOT NO. 4

Brush Removal

Brush and trees on this plot were removed by three methods; crushing and burning, disking and spot burning, and bulldozing. Approximately 50 acres were

treated in June of 1966. Brush on 26 acres of the steeper upper slopes was crushed in June, using railroad rails attached to a cable pulled by two D-6 tractors. Crushing was considerably slower than on Plots No. 1 and No. 2 because of steep, broken topography with output running only 1.44 acres per hour. The very tall and dense brush crushed well on all but isolated sections of the north slopes.

About 24 acres on the more moderate slopes were disked for the first time in June of 1966. The results were excellent, closely paralleling those on Plot No. 3. Due to extremely heavy brush, output was 0.69 acres per hour--slightly less than on Plot No. 3.

Several acres of oak trees scattered throughout the area were removed by bulldozing with D-6 tractors. While very effective, this method is extremely expensive. If actual acreage cleared is figured, output was only .14 acres per hour.

Firelines were constructed around the entire area treated and three check dams were constructed. Due to the access created by crushing and diskings, a TD-9 tractor was able to build firelines at the rate of 1,000 feet per hour. The check dams were built by a D-6 tractor in less than one hour each.

In October of 1966, the entire area crushed and disked was broadcast and spot-burned. Results were excellent even though nearly an inch of rain had fallen a few weeks before and burning conditions were poor at the time. In January of 1967, after many delays because of rain, the area was disked for the second time. The second diskings removed all brush sprouts, seedlings and weeds which appeared following the early rains. Since very little debris remained following burning, it was possible to use a 15-foot grainland disk for much of the second diskings. This increased output to an average of 2.0 acres per hour.

Revegetation

Three seed mixtures were used on various parts of this plot.

In November of 1967, the crushed area was handbroadcast with 34 pounds per acre mixture of annual grasses and legumes, (5 pounds Wimmera ryegrass, 24 pounds barley, and 5 pounds Lana vetch). In early January of 1967, approximately 16 acres of the disked area was drill seeded with a mixture of annual legumes, (4 pounds Rose clover, 4 pounds Crimson clover, and 2 pounds Subterranean clover) at the rate of 10 pounds per acre. On the same date the remaining eight acres of the disked area was drilled with a mixture of annual grasses and legumes at the rate of 12 pounds per acre (1 pound Blando brome, 5 pounds Wimmera ryegrass 4 pounds Lana vetch and 2 pounds Rose clover).

With the excellent seedbed and moderate topography, it was possible to drill at the rate of 2.8 acres per hour.

While density measurements have yet to be made, visual observations indicate excellent germination and establishment of all seeded grasses and legumes. Drill seeding at such a late date was a gamble, but weather conditions proved favorable and success resulted.

Fertilization at Seeding

The 16 acres sown to annual legumes were fertilized by ground broadcaster prior to the second disking with single superphosphate at the rate of 60 pounds phosphoric acid per acre. This operation was done at the rate of 6.6 acres per hour.

Approximately 12 acres of the disked area, which included four acres previously fertilized with phosphate, were fertilized with ammonium sulfate at the rate of 60 units N per acre. This operation was done in conjunction with drilling, using fertilizer bins on the range drill.

BRUSH REMOVAL COSTS

Previous publications of this Study have used actual costs for all treatments on each plot. To develop a more realistic approach to the cost of brush removal such as was done on these plots, a sample cost study was developed using data from the Ranchita Range Study. This cost study appears as "Appendix "A".

FOLLOW-UP MANAGEMENT PROCEDURES

After the initial type conversion, there must be a series of follow-up procedures such as spot spraying and fertilization. A description of these steps, along with their actual costs for each, appear as "Appendix B". Much of the follow-up work was done on reduced acreage on each plot.

GRAZING RESULTS

The grazing results appear as "Appendix "C".

Appendix A

METHODS AND SAMPLE COSTS OF BRUSH REMOVAL ON THE RANCHITA RANGE STUDY

by
W. James Clawson, F. Fred Frank, Phil S. Parsons*

* *
*

For the purpose of comparison, a unit of 100 acres of brushland was chosen. For mechanical clearing this is a realistic unit to undertake at one time. The most important consideration is the selection of a site that is suitable and has a high potential for forage production. To burn alone, the acreage would be larger and the cost per acre would be reduced.

The cost figures used here are based on information obtained from the Ranchita Range Study, a cooperative demonstration project involving the Ranchita Cattle Company, California Division of Forestry and the University of California, Agricultural Extension Service. Equipment costs were derived from assuming use on a 6,000 acre ranch where 1,000 acres of brushland could be converted. Labor rates are figures at \$2.50 per hour and includes Workman's Compensation, Social Security and other fringe benefits.

The conditions for which the costs are presented for each method are as follows:

METHOD I - CRUSHING AND BURNING

1. A unit of 100 acres.
2. One D-7 ranch tractor used and one similar tractor rented when necessary.
3. An anchor chain was pulled by two tractors to crush brush in the spring and summer of the first year.
4. Burning and seeding were done in the second year.
5. Forty men, four pickup sprayers and two tractors were required for the burn.
6. A seed mixture of annual grasses and legumes were used at 10 pounds per acre and flown in the ash.
7. A broadcast follow-up spraying was done by a fixed-wing airplane using three quarts of 2,4-D; 2,4-5-T "brushkiller" mixture.

METHOD II - BRUSH DISKING

1. A unit of 100 acres.
2. A ten-foot ranch-owned brush disk was used.
3. The fireline to burn residue after first disking was prepared by disking three times over a mile perimeter.
4. Burning residue required 10 men, one tractor and one sprayer.
5. A seed mixture of 10 pounds per acre included: 4 pounds Hardinggrass, 1 pound Perennial Ryegrass and 5 pounds annual legume, which was drill seeded with single super phosphate (0-20-0) being banded with the seed.
6. A 10 foot range drill was rented at 25 cents per acre.
7. Travel and setup time of drill includes picking up, returning and calibrating, using a two-ton flatbed and two men.
8. Follow-up spot spraying was done by two men and a spray rig using the same mixture above.

*Farm Advisor, San Luis Obispo County.

Forester I, District 5, California Division of Forestry.

Extension Economist, University of California, Agricultural Extension Service

SAMPLE COST TO IMPROVE BRUSH RANGE BY CRUSH-BURNING
in
SAN LUIS OBISPO COUNTY

Operation	Hours per Acre	Cash and Labor Cost per Acre			Total
		Labor	Fuel & Repair	Materials	
				Kind & Quantity	Cost
FIRST YEAR - crush brush and build fire lines					
Crushing brush	.21	.53	1.53		2.06
Crushing brush	.21	.53	2.52		3.05
Travel & setting up equip	.04	.10	.31		.41
Fireline construction	.10	.25	.72		.97
Miscellaneous					.32
Total First Year Cost		1.41	5.08		.32
SECOND YEAR - burn and seed					
Burn and patrol	2.02	5.05			5.05
Tractor work	.13		.94		.94
Tractor work	.06		.72		.72
Pickup and sprayer work	.14		.35		.35
Pickup and sprayer work	.19		.78		.78
Transportation:					
Jeep on fire	.14		.21		.21
To and from fire			.68		.68
Miscellaneous, including food and fusees					2.40
Seeding (contract)				Plane/10# seed	8.00
Total Second Year Cost		5.05	3.68		10.40
THIRD YEAR - Follow-Up Spraying					
Spraying (contract)				Plane & Material	8.00
Total Third Year Cost					8.00
TOTAL CASH AND LABOR COST		6.46	8.76		18.72
Overhead costs - 3 years					
Depreciation on equipment				1.59	
Interest on equipment investment (7%)				.81	
Interest on improvements (7%)					
First Year				.48	
Second Year				1.82	
TOTAL OVERHEAD COST				4.70	4.70
TOTAL COST PER ACRE TO IMPROVE RANGE					38.64

SAMPLE COST TO IMPROVE BRUSH RANGE BY BRUSH DISKING
in
SAN LUIS OBISPO COUNTY

Operation	Hours per Acre	Cash and Labor Cost per Acre				Total
		Labor	Fuel & Repair	Materials		
				Kind & Quantity	Cost	
<u>FIRST YEAR - Brush removal and seeding</u>						
First disking	1.30	3.25	10.34			13.59
Travel & setting up	.04	.10	.32			.42
Fireline construction	.05	.13	.40			.53
Burn & patrol	.40	1.00				1.00
Tractor standby	.04		.29			.29
Pickup and sprayer	.04		.10			.10
Miscellaneous: (transportation, food fusees, etc.)					.25	.25
Second disking	.75	1.88	5.96			7.84
Seed				Seed @10#/acre	8.00	8.00
Fertilizer				0-20-0 @400#/A	10.00	10.00
Drilling	.40	2.00	.29			2.29
Travel & set-up	.15	.75	.30			1.05
Total First Year Cost		9.11	18.00		18.15	45.36
<u>SECOND YEAR - Follow-up spraying</u>						
Pickup and sprayer work	.50	2.50	1.25			3.75
Material				2,4-D; 2,4,5-T @ 3 Qts/acre	3.00	3.00
Total Second Year Cost		2.50	1.25		3.00	6.75
Misc. office, etc. (5% of cash & labor costs)						2.60
TOTAL CASH AND LABOR COST		11.61	19.25		21.25	54.71
<u>Overhead costs - 2 years</u>						
Depreciation on equipment				2.20		
Interest on equipment investment (7%)				.90		
Interest on first year improvement (7%)				3.18		
TOTAL OVERHEAD COST				6.28		6.28
TOTAL COST PER ACRE TO IMPROVE RANGE						60.99

Appendix B
RANCHITA RANGE STUDY

FOLLOW-UP MANAGEMENT SUPPLEMENT

1961-1968

Excision Control

Research has shown that following initial conversion of brushlands, certain follow-up practices are necessary to assure maximum, long term economic returns. Described below are those practices which were undertaken to prevent brush encroachment, control soil erosion and maintain high forage production on each of the four plots of the Ranchita Range Study.

Plots Nos. I & II

Herbicide Spraying

Following initial conversion, which included a broadcast herbicide application in 1961, follow-up spraying was necessary to control "hard-to-kill" brush sprouts and brush seedlings which appeared subsequent to the initial treatment.

The first follow-up spraying was completed in May of 1962. A total of 68 acres of the better sites on Plots I and II were spot sprayed with brushkiller (a mixture of 2,4-D and 2,4,5-T) at the rate of 4 lbs. per acre treated, using hand carried sprayers and a small mistblower.

The results were good where the mistblower was used and only fair where hand sprayed (Mostly on Plot II.)

A second follow-up herbicide spraying was undertaken in April of 1964 to control the remaining brush sprouts and seedlings on Plot I. On this occasion, 32 acres were spot treated with brushkiller at the same rate using hand sprayers. The results were good, leaving less than one percent of the original brush sprouts and seedlings.

In May of 1967, a third follow-up spraying was undertaken on Plot I to control brush seedlings which appeared over the past three years. Brushkiller was spot sprayed at 4 lbs. per treated acre with backpack mistblowers. The results were excellent and further herbicide spraying on Plot I is expected to be minimal.

Plot II illustrates dramatically the need for effective follow-up measures to control brush encroachment. With a partially effective first follow-up application and no second and third applications, brush has rapidly reoccupied the converted area.

It is still too early to evaluate this work, however, the effects of the herbicide are in evidence. From past experience, it is expected that another light spot application will be necessary to completely control brush sprouts.

Plots Nos. I & II, cont'd

Erosion Control

To reduce erosion and siltation below Plots Nos. I and II following brush removal, a system of eight erosion check dams were constructed in 1961. A TD-9 bulldozer was able to build one dam per hour in strategic locations. The dams were quite effective in reducing erosion and, as an added benefit, provided well-distributed stock water well into the summer.

Fertilization (Plot I only)

With a decline in forage production in evidence, a fertilizer trial was established on Plot I in 1963 to determine soil deficiencies and potential economic returns. It was determined that the application of nitrogen was justified to maintain high forage yields. In December of 1964, 32 acres of the better sites on Plot I were aerielly fertilized with urea at the rate of 60 lbs. elemental N per acre.

In November of 1966, 10 acres of Plot I were again fertilized with ammonium sulfate at the rate of 60 lbs. N per acre and in January of 1967 an additional 10 acres on Plot I were fertilized with the same material at the same rate.

The 1964 fertilization was considered very successful with substantial increases in forage yield resulting. The 1966 fertilization was not as effective as expected due to leaching by heavy rains; however, the 1967 fertilization produced very good response. The importance of timing in the application of nitrogen was clearly demonstrated.

Plot No. III *Herbicide Spraying

Initial conversion on Plot III included disking, spot burning, a second disking, drill seeding and a spot herbicide application to control the scattered brush sprouts and seedlings. The first herbicide application in May of 1967, as expected, retarded but did not completely control the "hard-to-kill" brush sprouts.

A follow-up spot application of herbicide was undertaken in May of 1968. Brushkiller was spot applied with a backpack mistblower at the rate of 4 lbs. per acre treated over the entire area disked.

It is still too early to evaluate this work, however, the effects of the herbicide are in evidence. From past experience, it is expected that another light spot application will be necessary to completely control brush sprouts next year.

Plot No. III, cont'd

Fertilization

To assure maximum forage production and to aid in the bacterial breakdown of tons of organic matter which was disked into the soil, the entire 25 acres converted was fertilized with ammonium sulfate at the rate of 60 lbs. elemental nitrogen per acre in November of 1966. Single super phosphate was also applied in addition to the N on a 3 acre test site at the rate of 60 lbs. phosphoric acid per acre.

In contrast to the poor response from N applied at the same time on Plot I, the grasses on Plot III showed excellent response. Also, the legumes on the 3 acre test site showed a good phosphate response. The reasons for this seeming contradiction probably hinge around factors of soil depth and texture and the vegetative condition of the grasses.

The soil on Plot III was considerably deeper and less sandy than on Plot I, therefore leaching was not as severe. Also, since Plot III had not been grazed the previous year, the grasses (particularly the perennials) were growing well and in a position to benefit immediately from fertilization. Plot I, however, had been heavily grazed the year before and the growth of grasses was retarded to a point where no immediate response to fertilization was realized.

Plot No. IVHerbicide Spraying

Since conversion on this plot was initiated in 1966, no follow-up herbicide application has been made. It is planned, however, to spot treat the better sites with brushkiller as a follow-up to the initial spraying which was done in May of 1968.

Erosion Control

Three small erosion check dams were constructed on Plot IV in July of 1966 to reduce erosion and downstream siltation. Extremely intense rains and high runoff filled all three dams with silt during the first year. Two of the larger dams were cleaned and reconstructed in November 1967 and functioned effectively during the winter.

Fertilization

Approximately 15 acres of Plot IV which were drill seeded was fertilized prior to seeding. Since this work was considered to be a phase of initial conversion

Plot No. IV, cont'd

the details can be found in the leaflet describing the actual conversion program.

Itemized below are the costs of various follow-up practices which were carried out on the Ranchita Range Study from 1961-1968.

Follow-up Management Costs*

Plot I

Follow-up Spraying #1	May 1962	39 acres	@ 3.67	= \$143.13
Follow-up Spraying #2	April 1964	32 acres	@ 3.61	= 115.45
Follow-up Spraying #3	May 1967	40 acres	@ 5.83	= 233.25
Erosion Check Dams	December 1961	7 each	@ 9.30	= 65.10
Cleaning Check Dams	December 1962	7 each	@ 6.12	= 42.84
Fertilization #1	December 1964	32 acres	@ 9.53	= 304.91
Fertilization #2	November 1966&			
	January 1967	20 acres	@ 10.00	= 200.00

Plot II

Follow-up Spraying #1	May 1962	29 acres	@ 3.67	= 106.43
Erosion Check Dams	December 1961	1 each	@ 9.30	= 9.30
Cleaning Check Dams	December 1962	1 each	@ 6.12	= 6.12

Plot III

Follow-up Spraying #1	May 1968	25 acres	@ 9.89	= 247.25
Fertilization #1	November 1966	28 acres	@ 12.49	= 349.63

*Based on actual expenditures for materials, equipment and labor. Equipment and labor costs based on CDF reimbursement rates; AGC rates used when CDF rates could not be applied.

Appendix C

GRAZING SUPPLEMENT 1962-1968

The first year after seeding (1961) no grazing was conducted, thus allowing seeded plants to become established. Since then grazing has taken place each year using replacement heifers, steers, or a mixture of both. Grazing patterns have been varied to make use of available forage. Table No. 1 shows the yearly grazing procedure.

In 1965-1966 cattle were grazed on Plot No. 1 during the winter to utilize the Hardinggrass residue. These steers maintained their weight during the period from November 11th until approximately March 1st. To arrive at a gain value for this period, the amount of TDN necessary to maintain 30 head for 126 days was converted to the amount of gain expected for 15 head during this period. This was estimated at 1.68 pounds per head per day. In addition, final weights for Plot No. 2 were lost in 1966. Thus gain from this pasture for the period February 3rd until May 15th were estimated to be one pound per head per day.

In 1967 and 1968, grazing was delayed because of the lack of fencing along the upper portions of the plots. This greatly reduced the use of Plot No. 4 in both years.

To arrive at a grazing value of the weight gains, we have elected to use 12 cents per pound gain. This is the amount the ranch receives on their cattle lease. Table 2 summarizes total gain and head days, while Table 3 indicates estimated grazing values.

Table 1. Grazing Procedure

Grazing Season and Plot No.	No. Head	Date On	Date Off	Days Grazed	Average Weight On	Average Weight Off	Average Daily Gain
1962 Plot 1	17 a	March 21	April 20	30	531	630	3.3
Plot 2	13 a	March 21	April 20	30	510	593	2.8
Plot 1	17 a	Aug. 15	Oct. 1	46	667	721	1.2
Plot 2	13 a	Aug. 15	Oct. 1	46	670	710	0.9
1963 Plot 1	19 b	April 15	Aug. 5	111	572	748	1.6
Plot 2	12 b	April 15	Aug. 5	111	578	742	1.5
1964 Plot 1	18 a	Feb. 14	May 16	91	654	766	1.2
Plot 2	12 a	Feb. 14	May 16	91	617	739	1.3
1965 Plot 1	30 c	Jan. 20	March 18	57	372	449	1.4
Plot 2	30 c	March 18	June 2	75	449	560	1.5
Plot 1	30 c	June 2	July 21	49	560	604	0.9
1966 Plot 1	30 b	Nov. 11, '65	Mar. 17, '66	126	463	482	
Plot 2	20 b	Feb. 3	May 15	101	286	387*	1.0
1967 Plot 1	20 b	Feb. 2	Feb. 25	23	428	469	1.8
Plot 1	10 b	Feb. 25	May 2	66	450	612	2.4
Plot 1	23 b	May 2	May 19	17	606	633	1.6
Plot 2	6 b	April 10	May 19	39	566	630	1.6
Plot 3	15 b	Feb. 2	Feb. 25	23	438	503	2.8
Plot 3	25 b	Feb. 25	May 2	66	498	602	1.6
Plot 3	12 b	May 2	May 19	17	602	638	2.1
1968 Plot 1	25 a	March 1	May 3	62	438	527	1.4
Plot 2	10 a	March 1	May 3	62	450	545	1.5
Plot 3	25 a	March 1	May 3	62	418	531	1.8
Plot 4	15 a	April 3	May 3	30	503	552	1.6

Footnote: a = replacement heifers, b = steers, and c = mixed

*estimated because data lost.

Table 2. Grazing Production

Year	Plot #1 (45 Acres)		Plot #2 (50 Acres)		Plot #3 (34 Acres)		Plot #4 (35 Acres)	
	Lbs. Beef Gained	Head Days	Lbs. Beef Gained	Head Days	Lbs. Beef Gained	Head Days	Lbs. Beef Gained	Head Days
1962	2,600	1,292	1,600	988				
1963	3,350	2,109	1,970	1,332				
1964	2,020	1,638	1,470	1,092				
1965	3,620	3,180	3,330	2,250				
1966	3,175 ¹	1,890 ¹	2,202 ²	2,020 ²				
1967	3,050	1,511	390	234	4,030	2,199		
1968	2,230	1,550	950	620	2,820	1,550	730	450
Total	20,045	13,170	11,730	8,536	6,850	3,749	730	450

¹Data converted from TDN Values to maintain 30 head to weight gain on 15 head.

²Off weights lost: End weights estimated.

³Up to May 3, 1968.

Table 3. Estimated Grazing Value

	Plot #1	Plot #2	Plot #3	Plot #4
Average Daily Gain	1.52	1.37	1.82	1.62
Gain Per Acre	445	235	201.5	21
Value @ 12¢ 1b/gain	\$2,405.40	\$1,407.60	\$822.00	\$87.60
Estimated Value Per Acre	\$ 53.45	\$ 28.15	\$ 24.18	\$ 2.52