



THE BACKBONE COOPERATIVE RANGE PROJECT

PROGRESS REPORT - 1957-58

A Cooperative Study of the Economics of
Brushland Clearing Methods

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The Backbone Range Project is located in Shasta County near Bella Vista, California and consists of 320 acres leased from the U. S. Bureau of Reclamation. It is a cooperative project of the California Division of Forestry and the Shasta County Farm Advisor.

The project was established to investigate the use of fire and machinery in the control of brush on range lands. Livestock is being used to measure returns from different treatments. Grass and legume reseeding, fertilization, and chemical brush control are also being investigated.

These investigations are being carried out on an area which originally had dense manzanita and live oak, but very few native grasses and clovers. The area was chosen because it is fairly representative of medium elevation range land in poor condition due to brush encroachment. The soil is considered to be capable of producing fair grass.

Four 40-acre fields were laid out, with treatments as follows: 1) brush crushed by a bulldozer and burned, 2) brush burned standing, 3) brush cleared and windrowed, and 4) control field with no treatment. After treatment, all fields except the control were seeded by airplane, with the following mixture:

	<u>lbs. per acre</u>
Soft chess (Blando brome)	3
Annual ryegrass	1
Rose clover	2
Crimson clover	1
Subterranean clover	1/2
Hardinggrass	1
Total	6 1/2

Burning standing brush--the most common method--was the lowest in total cost per acre. Where the brush was crushed, the total cost was almost twice as much as this method. Where the brush was cleared and windrowed, the total cost was about three times as much.



Typical brush cover on the Backbone Study Area. This site was later mechanically cleared and seeded.

Land treatment costs, Backbone Cooperative Range Project.

Treatment	Crushed \$/acre	Standing \$/acre	Cleared \$/acre	Control \$/acre
Crushing	7.78	-	-	-
Clearing	-	-	24.19	-
Burn preparation	1.98	1.98	-	-
Burning *	2.57	2.57	-	-
Seed	4.87	4.87	4.87	-
Airplane seeding	0.60	0.60	0.60	-
Seed covering	-	-	2.99	-
Total	\$17.80	\$10.02	\$32.65	-

* 1958 reburn costs will be added in for the 1958-59 grazing trials.

Summary of Weight Gains, Costs and Returns for Two Grazing Seasons

	Mashed (43.6 acres)		Standing (41.1 acres)		Cleared (38.2 acres)		Control (40.1 acres)	
	1957 12 head	1958 15 head	1957 11 head	1958 15 head	1957 13 head	1958 15 head	1957 4 head	1958 5 head
Total "in" weight	5770	7390	5520	7535	6190	7165	2010	2815
Total "out" weight	7245	8830	6925	8905	7785	*	2450	3160
Total gain	1475	1440	1405	1370	1595		440	345
Number days								
1957-March 12-May 24	72		72		72		72	
1958-March 19-May 15		57		57				57
Average gain per animal	123	96	128	91	123		110	69
Average daily gain per animal	1.7	1.7	1.8	1.6	1.7		1.5	1.2
Beef production per acre	33.8	33.0	34.2	33.0	41.8		11.0	8.6
Grazing income per acre								
1957 beef @ \$0.20	\$6.77		\$6.84		\$8.35		\$2.19	
1958 beef @ \$0.25		\$8.25		\$8.25				\$2.15
Increase per acre due to treatment	\$4.58	\$6.10	\$4.65	\$6.10	\$6.16			
Cost per acre for treatment	\$17.80	\$17.80	\$10.02	\$10.02	\$32.64			
Percent recovery of cost	26%	34%	46%	60%	19%			
Percent recovery of cost for two grazing seasons		60%		106%		19% plus *		

* Stock broke out of this pasture during storm; data for full season not available.

The figures in the weight gain table show that the treatments have increased meat production per acre. This increase was greatest on the field mechanically cleared, and the production here was almost four times that of the control field in 1957. In 1958 during a heavy April storm, the stock escaped from the cleared field through a broken wooden gate and no data is available on this field for the current season. Although production was greatest on this field, the cost of treatment was also greatest, resulting in the lowest per cent recovery of cost.

More than 100% of the total cost was recovered at the end of the 1958 grazing season from the standing treatment. An unusually good burn, partly due to intense heat from the adjacent mashed field, accounts for the good showing of this treatment. Results suggest that the cost of the standing treatment may be recovered in two grazing seasons, the mashed treatment in four seasons, and the mechanical clearing in five seasons.

The average daily gain of the animals on the 40 acre control field was not as great as the average daily gain on the treated fields, which had three times the stocking. This might indicate a shortage of feed on the control field.

The results of the two seasons tend to point up a 4 to 1 ratio of increased meat production per acre on the treated areas compared to the untreated area.

Although no difference in meat production per acre is indicated in the table for the mashed area over the standing, an analysis of the point-step and line intercept plots show a more desirable plant forage cover on the mashed area.

Final results will not be known for several grazing seasons because conditions of the fields will be changing due to brush regrowth and additional treatment planned for the area.



The same scene as the one on page two after clearing and seeding.

Analysis of Vegetation Cover from Twelve Permanent Line Intercept Plots in Each Field.

	Field A Mashed			Field B Standing			Field C Cleared			Field D Control
	*1954	1956	1958	1954	1956	1958	1954	1956	1958	1956
	%	%	%	%	%	%	%	%	%	%
<u>Grasses and Forbs</u>										
Soft chess (Blando brome)	T	11	33	T	9	27	4	9	17	1
Harding grass	-	T	1	-	T	1	-	T	T	-
Ryegrass	-	12	T	-	7	T	-	4	T	-
Rose clover	-	2	7	-	3	1	-	1	6	-
Nitgrass	T	2	20	T	2	14	1	3	26	1
Silver hairgrass	1	1	1	5	5	16	3	1	1	5
Ripgut brome	T	T	5	2	T	T	4	3	7	1
Wild oat	T	T	2	T	T	1	T	3	8	T
Filago	T	3	2	T	2	2	T	2	1	2
Galium	3	1	**	9	3	**	1	4	*	T
Native legumes	T	2	**	2	1	**	3	9	**	T
Misc. weeds	T	1	1	3	1	1	2	6	2	1
<u>Woody plants</u>										
Live oak	13		T	T		5	11		1	10
Poison oak	2		1	6		1	8		2	4
Yerba santa	T		10	T		2	T		T	1
Ceanothus	9		2	21		1	T		T	T
Manzanita	33		1	27		2	16		T	24
Blue oak	T		-	1		-	10		-	2
Miscellaneous	T		-	2		-	2		-	5

* Composition before burn

** Unable to read in midsummer

T Less than 1%.

The permanent line intercept plots were established in each of the treated fields before the control burn in 1954. The woody plants were primarily live oak and manzanita. Yerba santa has been increasing since the burn. The live oak and poison oak sprouts have grown rapidly. The three treated fields were reburned July, 1958, in order to get a top-kill on the sprouts and a kill on the brush seedlings. The brush regrowth on half of each treated field will be chemically sprayed in April, 1959.

The percentages of grasses and clovers on the area before the 1954 burn were very low. Blando brome, rose and sub clover have been increasing since the reseeding. Harding grass plants are sparse and crimson clover has been almost absent from the start. Ryegrass made a good showing the first two years but the third year there were only a few plants left. The Blando brome growth was good the season following the burn but the last two years' growth has been poor. It appears to be suffering badly from lack of nitrogen.

There are plans to reseed the three treated fields to rose and sub clover in order to raise the nitrogen level in the soil.

