



United States
Department of
Agriculture

Soil
Conservation
Service

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Bill W. Winston
Received 3-2-84

Subject: Economic Analysis of
Range Management Practices

Date: August 15, 1983

To: ~~Mark Hicks~~
District Conservationist

Enclosed is a revised draft of the economic analysis of conservation field trials on Coon Creek Cattle Company Ranch and Nadar Agricultural Enterprises.

After performing the analysis using several amortization schemes, I decided to include only the 'seed-20 years and fertilizer-5 years' scenario in the report. Use of other amortization lengths has negligible impact upon results when working with relatively small establishment costs. I was concerned that inclusion of additional analyses might only complicate the report.

I hope this format is acceptable, Mark. Please let me know if you have any comments or suggestions for improving or revising the report.

Dennis Wichelns
Agricultural Economist

c: Ray Borchard



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Bill Helphinstone

Economic Evaluation of Two Range Management Conservation
Field Trials in Placer County, California

August 15, 1983

Prepared with assistance from the Auburn Field Office of the U.S.D.A.
Soil Conservation Service, 550 High Street, Suite 107, Auburn,
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Economic Evaluation of Two Range Management Conservation
Field Trials in Placer County, California

Introduction

Placer County, California extends westward from the Nevada state line through foothills of the Sierra mountains to the Sacramento Valley. Approximately one-third of Placer County is rangeland and 42% of farm income is derived from livestock production. The High Sierra Resource Conservation and Development Council, recognizing the importance of range to land use and the local economy, adopted this Special Range Management Project.

This report presents an economic analysis of the costs incurred and benefits derived as a result of improving the rangeland via this special project.

Objectives

The objectives of this Special Range Management Project are:

1. To extend the grazing season by establishing annuals and legumes (brome grass and clovers) which will provide the rancher with more forage of better quality. Soil protection will also be increased.
2. To obtain better control of noxious weeds including star thistle and tarweed by establishing thick cover of forage plant materials.

Specifically, this project was designed to examine the relative ability of various seed and fertilizer combinations to achieve these objectives.

The Special Range Management Project

Two cooperators were selected for inclusion in this special project. Both ranches, the Coon Creek Cattle Company and Nadar Agricultural Enterprises, are located north of Lincoln in the Sacramento Valley (Major Land Resource Area 17).

On the Coon Creek Cattle Company ranch, six plots were established to examine various seed and fertilizer combinations (Table 1). On the Nadar Ranch, sugar beet lime and turkey manure were applied to native pasture (Table 2). Soil information for the two ranches appears in Table 3.

Table 1. Description of the special range management practices examined on the Coon Creek Cattle Company Ranch, 1982

<u>Plot 1</u>	-- Seeding:	Blando Brome	4#/Acre	} (drilled)
		Subclover	7#/Acre	
		Rose Clover	5#/Acre	
	Fertilizer:	11-48-0	50#/Acre	(banded)
<u>Plot 2</u>	-- Seeding:	Blando Brome	4#/Acre	} (drilled)
		Subclover	7#/Acre	
		Rose Clover	5#/Acre	
	Fertilizer:	11-48-0	100#/Acre	(banded)
<u>Plot 3</u>	-- Seeding:	Blando Brome	4#/Acre	} (drilled)
		Subclover	7#/Acre	
		Rose Clover	5#/Acre	
	Fertilizer:	11-48-0	200#/Acre	(banded)
<u>Plot 4</u>	-- Seeding:	Blando Brome	4#/Acre	} (drilled)
		Subclover	7#/Acre	
		Rose Clover	5#/Acre	
	Fertilizer:	0-25-0	100#/Acre	(banded)
<u>Plot 5</u>	-- Seeding:	Subclover	9#/Acre	} (broadcast).
		Rose Clover	7#/Acre	
	Fertilizer:	0-25-0	300#/Acre	(broadcast)
<u>Plot 6</u>	-- Seeding:	Subclover	9#/Acre	} (broadcast)
		Rose Clover	7#/Acre	
	Fertilizer:	0-25-0	400#/Acre	(broadcast)

* Samples were taken from four replications per treatment (plot).

Table 2. Description of the special range management practices examined on the Nadar Agricultural Enterprises Ranch, 1982

Plot 1 -- Sugar beet lime applied to increase soil pH and promote growth of native grasses and legumes.
Rate: 2 tons sugar beet lime per acre.

Plot 2 -- Turkey manure and bedding applied at rate of 2 cubic yards per acre.

* Samples were taken from four replications per treatment (plot).

Table 3. Description of soils on special range management project plots

Ranch	Land Capability Unit	Soil Name	Texture	Average Slope	Erosion Status
Coon Creek Cattle Co.	IVe-3	Redding and Corning	Gravelly Loam	2-9%	Slight to Moderate
Nadar Agri. Enterprises	IIs-3	Kilaga	Loam	0-2%	Slight

Analysis -- The Coon Creek Cattle Company Ranch

Estimated per acre establishment costs associated with practices on the Coon Creek Ranch appear in Table 4. Total establishment costs ranged from \$86.00 to \$116.50 per acre. Given proper annual maintenance and good grazing management, these fields should remain productive for twenty years before reseeding is needed.¹ Fertilizer applications are expected to be required every five years. The total cost of seeding was therefore amortized over twenty years, while the cost of applying fertilizer was amortized over a five year period. The sum of these amortized amounts becomes the average annual cost of maintaining the special practices. As seen in Table 4, these costs ranged from \$14.09 to \$22.66 per acre on the Coon Creek Ranch.

The value of improved rangeland is based upon the amount of forage produced. This is commonly measured in Animal Unit Months (AUMs) and can be estimated on a per acre basis by taking clippings for small sites and extrapolating weights to an acre level. Clippings were taken from four sites on each of the six plots on the Coon Creek Ranch. Estimated average dry weight of forage produced per acre and the corresponding AUMs produced appear in Table 5. A check plot was included for comparison to the special project plots. Forage production ranged from 0.8 AUMs on Plot 4 to 3.4 AUMs on Plot 1. The value of forage production was estimated on basis of \$12.00 per Animal Unit Month.

Estimated annual net returns per acre are determined by subtracting average annual costs from the value of AUMs produced. On the Coon Creek Ranch, estimated annual net returns ranged from -\$4.60 on Plot 4 to \$26.71 on Plot 1 (Table 6). The negative net returns on Plot 4 indicate that this seed and fertilizer combination may not be a worthwhile practice. Plots 1, 2, and 5 yielded greater net returns per acre than did the check plot.

¹Based on conversation with District Conservationist.

Table 4. Estimated per acre establishment costs for special range management practices on the Coon Creek Cattle Company Ranch, 1982

Item	Estimated Cost Per Acre						
	1	2	- Plot -		5	6	
			3	4			
			(\$)				
Seeding and Fertilizing ^a	32.00	32.00	32.00	32.00	10.00	10.00	
Transporting Machinery	8.00	8.00	8.00	8.00	-	-	
Grass Seed	35.30	35.30	35.30	35.30	36.23	36.23	
Fertilizer	<u>10.30</u>	<u>20.60</u>	<u>41.20</u>	<u>10.70</u>	<u>32.10</u>	<u>45.80</u>	
Total	85.60	95.90	116.50	86.00	78.33	92.03	
Total Amortized Establishment Cost ^b	14.09	16.94	22.66	14.20	15.22	19.02	

^a On Plots 1 through 4, seed was drilled and fertilizer was banded. On Plots 5 and 6, seed and fertilizer were broadcast by hand.

^b Seeding costs amortized over 20 years at 12%.
Fertilizing costs amortized over 5 years at 12%.

Table 5. Estimated per acre yields from special range management plots on the Coon Creek Cattle Company Ranch, 1982

Plot	Dry Weight ^a (#/Acre)	Usable Dry Weight ^b (#/Acre)	Usable AUMs ^c (AUMs/Acre)	Value of AUMs ^d (\$)
1	4,100	3,400	3.4	40.80
2	3,200	2,500	2.5	30.00
3	3,100	2,400	2.4	28.80
4	1,500	800	0.8	9.60
5	3,000	2,300	2.3	27.60
6	N/A	N/A	N/A	N/A
Check	1,550	850	0.85	10.20

a

Average of four clipping weights per plot. Desirable species were not separated from undesirable species.

b

Stubble requirement of 700# per acre was subtracted from the total dry weight.

c

Calculated according to the formula: 1,000# dry weight = 1 AUM.

d

Valued at \$12.00 per AUM.

N/A = Not available in 1982.

Table 6. Estimated annual net returns per acre from rangeland improved by special range management practices on the Coon Creek Cattle Company Ranch, 1982

Item	- Plot -						Check
	1	2	3	4	5	6	
	(\$)						
Total returns per acre per year ^a	40.80	30.00	28.80	9.60	27.60	N/A	10.20
Average annual costs per acre ^b	<u>14.09</u>	<u>16.94</u>	<u>22.66</u>	<u>14.20</u>	<u>15.22</u>	19.02	<u>-</u>
Annual net returns per acre	26.71	13.06	6.14	-4.60	12.38	N/A	10.20

^aFrom Table 5.

^bFrom Table 4.

Analysis -- Nadar Agricultural Enterprises

Estimated per acre establishment costs associated with practices on the Nadar Ranch appear in Table 7. Total establishment costs for sugar beet lime and turkey manure were similar, given the relatively low cost of these fertilizer materials. It was expected that application of lime or manure would be repeated in ten years. Therefore the total cost of establishment was amortized over a ten year period, resulting in average annual costs of maintaining these practices of \$4.89 and \$4.71 per acre for sugar beet lime and turkey manure, respectively.

Clippings were taken from four sites on each of the two treated plots and from a third plot serving as a check. Estimated average dry weights of forage produced per acre and the corresponding AUMs produced appear in Table 8. Estimated annual production ranged from 2.2 AUMs on the turkey manure plot to 2.5 AUMs on the sugar beet lime plot, with the check plot producing an estimated 2.3 AUMs per acre. The value of forage produced was estimated on basis of \$12.00 per Animal Unit Month.

Estimated annual net returns per acre for the three plots appear in Table 9. While the sugar beet lime and turkey manure plots yielded an estimated \$25.11 and \$21.69 in net returns per acre, respectively, the check plot produced annual net returns of \$27.60 per acre.

Table 7. Estimated per acre establishment costs for special range management practices on the Nadar Agricultural Enterprises Ranch, 1982

Item	Estimated Cost Per Acre	
	Plot 1	Plot 2
	(\$)	
Sugar beet lime	4.00	-
Turkey manure	-	3.00
Hauling and Spreading	<u>23.60</u>	<u>23.60</u>
Total	27.60	26.60
Total Amortized ^a Establishment Cost	4.89	4.71

^aTotal establishment cost amortized over 10 years at 12%.

Table 8. Estimated per acre yields from special range management plots on the Nadar Agricultural Enterprises Ranch, 1982

Plot	Dry Weight ^a (#/Acre)	Usable Dry Weight ^b (#/Acre)	Usable ^c AUMs (AUMs/Acre)	Value of AUMs ^d (\$)
1	3,200	2,500	2.5	30.00
2	2,900	2,200	2.2	26.40
Check	3,000	2,300	2.3	27.60

^a Average of four clipping weights per plot, Desirable species were not separated from undesirable species.

^b Stubble requirement of 700# per acre was subtracted from the total dry weight.

^c Calculated according to the formula: 1,000# dry weight = 1 AUM.

^d Valued at \$12.00 per AUM.

Table 9. Estimated annual net returns per acre from rangeland improved by special range management practices on the Nadar Agricultural Enterprises Ranch, 1982

Item	- Plot -		
	1	2	Check
		(\$)	
Total returns per acre per year ^a	30.00	26.40	27.60
Average annual costs per acre ^b	<u>4.89</u>	<u>4.71</u>	<u>-</u>
Annual net returns per acre	25.11	21.69	27.60

^aFrom Table 8.

^bFrom Table 7.

Summary

On the Coon Creek Cattle Company Ranch, several seed and fertilizer combinations produced greater annual net returns per acre than did the untreated check plot. These included the Blando Brome/Clover mix fertilized at 50 and 100 pounds per acre of 11-48-0 and the Subclover/Rose Clover mix fertilized at 300 pounds per acre of 0-25-0.

Application of sugar beet lime or turkey manure did not result in annual net returns above those produced by untreated native pasture on the Nadar Ranch. Even though the cost of materials was small, the cost of application outweighed the increase in forage produced.

In conclusion, the results of the first year's observations of these special range management practices indicate that the practices have achieved their intended objectives. Some caution should be exercised upon interpretation of these results, however, since yield data included both desirable and possibly undesirable species. As additional yield data and cost information are collected in subsequent years, these results can be further refined.

medusa head.!!!

see table

Mel - it will be interesting to find out
what Carver's effect of various plots
show Bill