

THE LIVESTOCKMAN'S HANDBOOK FOR MANAGEMENT AND IMPROVEMENT  
OF RANGELAND IN WESTERN COLUSA, GLENN AND TEHAMA COUNTIES\*

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This handbook is a cooperative effort between Cooperative Extension and Soil Conservation Service to consolidate and organize range improvement recommendations in this tri-county area. Concerned about the wide divergence of recommendations, Farm Advisors Monty Bell and Ken Ellis worked with Range Specialist Les Berry to set up a meeting with the Soil Conservation Service in late 1969 to initiate this project. Monty Bell provided the key leadership as he was the only staff who lasted through the whole program. The handbook is still in the draft stage waiting to be finalized when Monty returns to Glenn County. Those cooperating with the project do have copies of the entire handbook and the Agronomy & Range Science Extension office has five copies for loan to those who might be interested.

The recommendations are as specific as possible and are intended to be in a loose-leaf form for making copies of site specific recommendations as well as facilitating revisions when needed. The recommendations will not replace but should assist the individual site analysis by the ranchers and those providing assistance.

The handbook is organized into five sections as follows:

- I. Evaluation and general management of rangeland resources.
- II. Fertilizing rangeland.
- III. Major rangeland soil groups.
- IV. Range improvement recommendations.
- V. Brush management.

The handbook information is organized using five soil groups. These are soils of similar characteristics from a soil, plant and animal management standpoint. Table 1 shows the grouping and information relating to livestock capacity.

Acreage of each of these soil groups by county are shown in Table 2. This information provides some indication as to the extent, current productivity and possible productivity under range improvement. If these soil groups are considered in terms of "management areas", or as SCS calls them, "range sites", they should help in defining specific range programs. We should then be able to see where our time would be best allocated, where information should be prepared or developed and what kind of educational programs might be needed. In addition it is a systematic way to put our recommendations together for use by ourselves and others.

Information on "Soil Group A" follows as an example of the material in the handbook prepared by this cooperative effort under Monty Bell's leadership.

\*Prepared for Farm Advisors Range Conferences, Spring 1977.

Table 1.

Soil Group	Major soil series, complexes and associations	Total lbs. dry matter produced/acre <sup>1</sup>	Range of animal unit months <sup>2</sup> (AUM) and acres (Ac) required		
			AUM's/Ac	Ac's/AUM	Ave. Ac/head 4-7 mo. season
A	Newville, Corning, Red Bluff, Dibble, Perkins, Redding, Pleasanton and Chamisal	300-1500	.4 - 1.9	2.7 - .5	20
B	Altamont, Nacimiento, Ayar, Myers	1500-3500	1.9 - 4.4	.5 - .2	5
C	Milsholm, Sehorn, Contra Costa, Millsap	1000-2500	1.3 - 3.1	.8 - .3	10
D	Maymen, Parrish, Stonyford, Lodo, Los Gatos	100- 800	.1 - 1.0	8.0 - 1.0	35
E	Maxwell (venado), Leesville, East Park	200-2500	.3 - 3.1	4.0 - .3	15

<sup>1</sup>Based on test plot clippings.

<sup>2</sup>AUM = amount of feed necessary to maintain a 1000 pound cow for one month. It is equivalent to .4 ton or 800 pounds of hay, 540 pounds concentrate, 1.2 ton silage, 400 pounds TDN.

Table 2. Soil group acreage.

Soil Group	Colusa	Glenn	Tehama	Total
A	8,700	57,000	308,000	373,700
B	124,400	61,700	48,900	235,000
C	56,900	97,200	104,100	258,200
D	50,800	105,000	129,600	285,400
E	8,800	500	---	9,300
Total	249,600	321,400	590,600	1,161,600

MAJOR RANGELAND SOIL GROUPS

Soil Group A

Main soil series and complexes in this group include:

Soil Series-Complexes	Approximate Rangeland Acreage			Total
	Colusa	Glenn	Tehama	
Newville	-	38,000	194,000	232,000
Corning	7,000	15,000	70,000	92,000
Red Bluff	-	-	12,000	12,000
Dibble	-	-	12,000	12,000
Perkins	-	2,000	9,000	11,000
Redding	-	300	10,300	10,600
Pleasanton	-	1,700	700	2,400
Chamisal	1,700	-	-	1,700
Total	8,700	57,000	308,000	373,700

Associated soils include Hillgate and Kimball.

Most of the acreage in this group lies in the first foothills west of the Sacramento River in an 8 to 20 mile wide dissected terrace running from French Creek in Glenn County north to the Tehama-Shasta line.

In the south region these soils are located on small terraces in a broken belt along the foothills west of Arbuckle, Williams and Maxwell and another narrow broken strip runs from Stonyford to Newville in the Stony Creek Valley.

These are brown or red gravelly terrace soils, well drained on the surface but have a clay pan 8-22" deep. They are chiefly hilly to steep but are nearly level in a few places. Elevation ranges between 250 and 2000 feet and the rainfall from 17 to 30 inches.

The poor soil structure makes it extremely hard when dry and soft when wet (consistency of concrete wet or dry). Water may stand in low spots during the winter but the surface dries quickly with warm north winds during the spring.

Dry feed quality is poor because there are no effective legumes.

The native vegetation consists of:

- a. 5-10% desirable grass, soft chess, slender wild oats.
- b. 10-20% less desirable grass, medusa-head, fescue, red brome ripgut.
- c. 20-50% desirable forbs, broadleaf filaree, native lotus.
- d. 25-55% undesirable forbs, plantain, lupine, tarweed.
- e. Some sites have dense tree and brush cover, blue oak, manzanita, buck-brush, live oak and digger pine.

Feed production is low:

- a. 800-1800 lbs. per acre dryland barley where farmable with 5-7 year rotation.
- b. 300-1500 lbs. dry matter per acre of open land.
- c. .4 - 1.9 animal unit months (AUM) per acre.
- d. 2.7- .5 acres per AUM.
- e. Ranchers figure 20 acres per head for a 4-6 month season running from November through May.

CHARACTERISTICS OF THE PRINCIPAL RANGE SOILS

Group	Soil	Depth From Surface Inches	Texture	Slope %	Permeability Inch/Hr	Available Water Capacity Inch/Inch Soil	Acid Base Reaction pH	Calcium Carbonate Lime %	Storie Index	Fertility				Color	
										N	P	K	S		
A	Newville	0-15"	gravelly loam	3-50%	.8-2.5	.10-.14	5.6-6.5	0	14-31	Low	Med	High	Med	brown	
		15-26"	gravelly clay		.05-.2	.10-.14	5.6-6.0	0						reddish-brown	
		26-48"	v cobbly sandy clay loam		.8-2.5	.07-.11	6.1-6.5	0						light yellowish-brown, light reddish-brown, brown	
	Corning	0-14"	gravelly loam	0-15%	.8-2.5	.12-.15	5.6-6.0	0	20-28	Low	V	Low	High	Med	yellowish-red
		14-40"	clay		<.05	.14-.17	5.6-6.5	0							reddish-brown
		40-60"	v gravelly sandy clay loam		.2-.8	.07-.10	5.6-6.0	0							to yellowish-red mottled light yellowish-brown, yellowish-red, red
	Red Bluff.	0-20"	gravelly loam	0-3%			4.5-5.0	0	31-41	Low	Low	Low	Low		reddish-brown
		20-72"	sl gravelly clay loam				5.1-5.5	0							red
	Dibble	0-6"	silty cl loam	10-50%			5.6-6.0	0	42	Med	Med	Med	Med		pale brown
		6-34"	clay loam				5.6-6.0	0							yellowish-brown
		34"	semiconsolid siltstone												yellow
	Perkins	0-22"	gravelly loam	0-15%	.8-2.5	.11-.14	5.6-6.5	0	54-57						light brownish-gray
		22-46"	gravelly clay loam		.2-.8	.09-.11	5.1-6.0	0							light olive brown
		46-64"	v gravelly sandy clay loam		.8-2.5	0.7-.09	5.1-5.5	0							light yellowish-brown
	Redding	0-14"	gravelly loam	0.30%	.8-2.5	.12-.14	5.6-6.0	0	17	Low	V	Low	High	High	yellowish-red
		14-23"	clay		<.05	.12-.14	5.6-6.0	0							yellowish-red
		23-54"	hardpan		<.05			.1							yellowish-red



## RANGE IMPROVEMENT RECOMMENDATIONS

### Range Soil Group A - brown and red gravelly, terrace soils

Range site A1 - Entire soil group area except where brush is substantial or tree canopy is solid.

Objective 1 - increase early production and palatability of native vegetation.

#### Recommendations - range fertilization

1. 40-60 lbs. nitrogen per acre broadcast on the surface will double feed and if applied prior to fall rains will advance range growth six weeks ahead of unfertilized range. There will be no carryover response the second year. Ammonium sulfate has been the fertilizer of choice because of price, reduced leaching loss and sulfur content which improved clover growth in swale areas.
2. Use the cheapest source of applied nitrogen. At present 300 lbs. per acre ammonium sulfate costs about \$15.00 per acre applied.(1976). On land open and level enough ground rig application is usually cheaper than air.
3. Allow at least 4 inches growth before grazing to allow grass to utilize the nitrogen. -
4. Do not apply too far ahead of fall rains or losses may occur.
5. Do not apply after February 1st because there may not be enough rain and plant growth to respond.
6. 150 lbs. nitrogen per acre will increase feed 3 to 4 times the first year and 2 times the carryover year compared to unfertilized range. This may be economical under certain livestock-fertilizer-feed price relationships.

7. Even though phosphorus and sulfur are deficient in these soils, no response is expected unless nitrogen or an effective legume is present.
8. Stocking level must be increased or no economical gain will result from fertilizing.



5. Fertilize based on soil test results.

<u>Test</u>	<u>Fertilizer or Equivalent</u>
pH less than 5.5	3 tons/acre sugar beet lime
Available phosphorus (reduce by 250 lbs. if sugar beet lime applied)	
less than 5 ppm	500 lbs. single superphosphate
5-10 ppm	250 lbs. single superphosphate
over 10 ppm	100 lbs. single superphosphate

6. Lightly disc or harrow to loosen top 1" of soil. Heavier discing may be necessary if the field has not been farmed.
7. Broadcast or drill properly inoculated seed before the opening rain in October. If no rain by November 1st, plant dry.
8. Ringroll immediately after broadcast seeding to cover seed and firm seedbed.

Management of new stands

1. Graze moderately during winter when field is dry enough.
2. Do not graze from April 15 to June 1 to allow flowering and seed set.
3. Graze heavily during the dry season.

Management of established stands

1. Fertilize with 100 lbs. single superphosphate per acre each year unless soil test for phosphorus is high (over 20 ppm). If high, apply 150 lbs. elemental sulfur per acre every 5 years. If pH is below 5.5, apply 3 tons sugar beet lime per acre every 5 years. Take clover samples for tissue test. See section on fertilizing range.
2. Close grazing during the entire season will favor sub clover. Grazing all year except April 15 to June 1 will favor rose clover. Undergrazing will depress clover production.

Range site A2 - level and free enough of rocks, brush and trees to farm with common dry farm equipment.

Objective 1 - Establish annual legumes to increase quantity and quality of feed for seasonal or year-round grazing.

Recommendations:

1. Order seed early (June) because most comes from Australia.

Seed must be inoculated. Best method is by using Pelinoc-Pelgel just before seeding. Materials presently (1976) available only through dealers handling Nitragin Company inoculant.

<u>Seed Varieties</u>	<u>Lbs./Acre Broadcast*</u>
Sub clover	
Geraldton	2
Daliak	1
Yarloop	1
Seaton Park	2
Howard	1
Woogenellup	2
Mt. Barker	1
Rose clover	
Wilton	2
Hykon	2
Kondinin	2
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\*8 lbs. per acre is adequate where seed is drilled 1/4" deep in a fine, firm seedbed.

2. If the field has been farmed to grain, harvest with a straw spreader.
3. Graze the stubble to remove most of the straw.
4. Take a soil sample of each field or major soil type. A minimum of 20 sub-samples 6 inches deep taken throughout the field are needed for each sample.