

File
MONTEREY

Proj. file

FORTY YEARS OF RANGE IMPROVEMENT IN MONTEREY COUNTY

This report is a compilation of the brush and range improvement programs carried out by the Farm Advisors from 1920 through 1959. It does not imply that this is the only work done in this field, but a report on the primary programs to develop information for Monterey County.

This summary has been written to assist the present range team in formulating a strong range improvement program for the coming years.

When Tom Mayhew first surveyed the county regarding range problems, he found that we had about 50,000 to 60,000 cows which comprised nearly all the animal units, or about the same number of animal units our ranges carry at the present time.

The principal complaints by the rangemen were:

1. The quality of forage was becoming poor.
2. The carrying capacity was getting less.

The Farm Advisor's recommendations were:

1. Deferred grazing
2. Cross fence for controlled grazing
3. Re-seeding investigations to be carried out in cooperation with the Agricultural Extension Service.

Therefore, the first introduced species to be tried by the Extension Service in Monterey County was Harding grass. After the first year the Farm Advisor was quite enthusiastic. Over the next ten years several species of grasses and legumes were tried in the various areas of the county. (See Table I)

TABLE I

Harding Grass	Excellent	Burr Clover	Excellent
Orchard Grass	Good	Melilotus Alba	Good
Meadow Fescue	Good	Red Top	Good
Blue Grass (Rogue River, Oregon)	Good		

Of these species only Harding grass gave the worker any encouragement, and only then in the relatively high moisture areas (20" annually, or more). Furthermore, to get the best results a good seed bed needs to be prepared. However, he concluded that Harding would grow even in the more arid areas of the county once the plant became established, except in light or sandy soils.

From 1930 to 1936 several more introduced species were planted and observed. (See Table II)

TABLE II

Crested Wheat Grass	Ladak Alfalfa
English Rye Grass	Burr Clover
Western Rye Grass	Sweet Clover
Western Wheat Grass	Australian Salt Bush
Tall Meadow Oat Grass	Brome Grass

It was found that Western Rye and Crested Wheat grass showed the most promise of the grasses, Burr Clover did very well as did Dryland alfalfa. However, rodent control in the Dryland alfalfa was a serious problem.

From 1938 to 1941 Farm Advisor Rueben Albaugh did an outstanding piece of range work which was expanded after the end of the war. From this work, the basic re-seeding recommendations are being made today. (See Tables III through VIII)

TABLE III

Hunt Properties, Inc. Big Sur Area

Elevation: 25'; Rainfall: 25" + ; Soil: Sandy Loam

Species	Stand	Growth
Subterranean Clovers	Excellent	Excellent
Lotus Corniculatus	Fair	Fair
Common Alfalfa	Poor	Fair
Ladak Alfalfa	Poor	Fair
Medicago Hespida Sardoa	Excellent	Excellent
Medicago nuricata	Good	Good
Medicago Scutellata	Fair	Fair
Medicago Turbinata	Good	Good
Yellow Sweet Clover	Poor	Fair
Lotus sp.	Poor	Poor
Strawberry Clover	Poor	Poor
Burjet	Fair	Fair
Medicago S.P.K. 1843	Fair	Fair
Medicago Blancheana	Fair	Fair
Medicago Lelloralis	Fair	Fair
Michels Hybrid Grass	Poor	Poor
Creeping Alfalfa	Excellent	Excellent

TABLE IV

J. G. Armstrong Ranch Marina, California
 Elevation: 60'; Rainfall: 18"; Soil: Marina Sand

Species	Stand	Growth
Red Top	Fair	Fair
Burr Clover	Fair	Fair
Western Rye Grass	Excellent	Excellent
Orchard Grass	Fair	Good
Tall Oat Grass	Excellent	Excellent
Tall Fescue	Fair	Good
Galloway Alfalfa	Fair	Good
Ladak Alfalfa	Fair	Fair

TABLE V

Tularcitos Ranch Upper Carmel Valley
 Elevation: 526'; Rainfall: 18"; Soil: Overwash Sandy Loam

Species	Stand	Growth
Tall Oats	Excellent	Excellent
California Brome	Excellent	Excellent
Tall Fescue	Excellent	Excellent
Domestic Rye Grass	Excellent	Excellent
Perennial Rye Grass	Fair	Good
Lotus Corniculatus	Good	Good
Common Alfalfa	Fair	Fair
Ladak Alfalfa	Good	Good
Burr Clover	Good	Good
Harding Grass	Very Good	Good
Burnet	Excellent	Excellent
Subterranean Clover	Fair	Fair
Orchard Grass	Excellent	Excellent
Lotus Major	Fair	Fair
Rhodes Grass	None	None
Veldt Grass	Excellent	Excellent

TABLE VI

Silacci Ranch Alisal Area
 Elevation: 185'; Rainfall: 15"; Soil: Chualar Sandy Loam

Species	Stand	Growth
Tall Oats	Fair	Excellent
Tall Fescue	Excellent	Good
Domestic Rye Grass	Fair	Good
Perennial Rye Grass	Good	Good
Common Alfalfa	Poor	Poor
Ladak Alfalfa	Poor	Poor
Burr Clover	Excellent	Excellent
Harding Grass	Good	Good
Burnet	Good	Good
Trigonella Corniculata	Fair	Fair
Trigonella Balsensae	Fair	Fair
Yellow Sweet Clover	Poor	Poor
Orchard Grass	Good	Good
Subterranean Clover	Fair	Fair
Kikuyu Grass	Fair	Fair

TABLE VII

Trescony Ranch San Lucas
 Elevation: 524'; Rainfall: 12"; Soil: Lockwood Gravelly Loam

Species	Stand	Growth
Kikuyu	Good	Good
Tall Fescue	Good	Good
Perennial Rye Grass	Good	Good
Yellow Sweet Clover	Fair	Fair
Wimera Rye Grass	Good	Good
Certified Rye Grass	Good	Good
Veldt Grass	Poor	Fair
Reed Canary Grass	Excellent	Excellent
Pilca Butta (Aust. Alf.)	Excellent	Excellent
Subterranean Clovers	Fair	Fair
Galloway Alfalfa	Excellent	Excellent
Ladak Alfalfa	Good	Good
Crested Wheat Grass	Poor	Poor
Orchard Grass	Good	Good

TABLE VIII

B. F. Porter Estate

Bradley Area

Elevation: 600'; Rainfall: 9"; Soil: Lockwood Gravelly Loam

Species	Stand	Growth
Hardium Bulbosum	Poor.	Poor
Burnet	Excellent	Fair
Harding Grass	Excellent	Poor
Smilo	None	None
Fescue Grass	Good	Fair
Burr Clover	Fair	Fair
Ladak Alfalfa	Good	Poor
Common Alfalfa	Good	Good
Perennial Rye Grass	Good	Good
Domestic Rye Grass	Good	Good
Tall Oats	Poor	Poor
California Brome	Good	Fair
Tall Fescue	Good	Fair
Jaragua	None	None
Koa	None	None
Late Tallaroom (Sub. clover)	Good	Good
Early dwalganup (Sub. clover)	Good	Good
Subterranean Clover	Good	Good
Euryops Multifidis	None	None

(Seed production poor in all species)

From these plots the most promising were made into a mix and five acre plots were put out. From these plots reseeding recommendations were made.

From 1942 several large acreages of dryland alfalfa were established with excellent results. The problem of rodents, deer, etc., continued to be the most serious drawback to alfalfa.

From 1945 to 1949 some 83 different species of grasses and legumes were planted. These plantings were generally made in the lower rainfall regions (less than 15" average). No new strains were noted which changed the Farm Advisor's opinion of the best reseeding mixture. (See appendix for complete list of species planted in Monterey County.)

RANGE RESEEDING RECOMMENDATIONS

I Soil Preparation (in order of preference)

1. Summer fallow - drill one inch in dust
2. Stubble disc - drill one inch in dust
3. Dry disc - drill one inch in dust

II Reseeding Recommendations

1. General

- a. Domestic rye grass -- 3 pounds
- b. Tall fescue -- 5 pounds
- c. Alfalfa -- 5 pounds

2. Coastal

- a. Domestic rye grass -- 2 pounds
- b. Tall fescue -- 3 pounds
- c. Harding grass -- 2 pounds
- d. Alfalfa -- 5 pounds

3. If other species are added, reduce domestic rye grass and tall fescue. Other species can be substituted if you have:
15" of rainfall or more, Lomas grass, Smilo, Smooth Brome, and Harlan Brome also do well; if 20" of rain or more, birds foot trefoil and rose clover do well.

III Management of Reseeded Areas

1. Mow before the annuals head out, or
2. Graze heavily for short period, then
3. Keep stock off until perennials set seed.

IV Fertilizer

Place recommended fertilizer with seed

Since 1949 several reseeding plots have been put out but no significant change has been made in the above recommendations. In recent years some alfalfa reseeding has been made with the same good results as noted earlier.

FERTILIZERS

Range fertilization was first tried in Monterey County in the early 1940's. After the war (1946) more intensive fertilizer plot work was carried out. In general, it was noted that nearly all the ranges responded to Ammonia, particularly Ammonium Sulphate. It was found (between 1946 and 1959) that Ammonium Sulphate gave about ten days to two weeks earlier feed; from two to five fold increase in grass production; and, it did not affect the growth of the legumes.

Definite sulphur responses have been noted in the Lonoak and Carmel Valley areas. However, this deficiency is suspected in other areas. From 1946 to 1959 it has been noted that in certain areas phosphate gives good legume growth but in other areas this has not been noted. Unfortunately, we do not have enough soil information to correlate with these results. Thus, it is difficult to make standard recommendations for phosphate. However, certain conclusions can be made:

1. Most areas will respond to nitrogen fertilization if there is enough moisture. At present we feel the rainfall should be at least 10".
2. Range fertilization pays in extra feed and money in the pocket where normal responses are found.
3. In most instances combination fertilizers such as 16-12-0, 20-20-0, etc., will give good response, but these are not necessarily the most economical.

In effort to demonstrate the value of range fertilization, a large scale program was initiated with Pacific Valley Cattle Company on their Cholame ranch. In 1957, forty acres were fertilized with Ammonium Sulphate at 300 pounds per acre. In 1958 a 200 acre field was fertilized in the same way. In both 1957 and 1958 the fertilized field produced more than twice the amount of beef as did the control field. In addition, the field fertilized in 1957 had a carry-over effect nearly equal to the year it was fertilized.

The cost of the fertilized acreage per pound of additional gain was 11.2 cents per pound in 1957 and 17.8 cents per pound in 1958. However, when the carry-over effect was added in the cost for the original field it was 7.4 cents per pound additional gain.

Some of the factors we are still concerned with are:

Where are phosphorous and sulphur economical in Monterey County?

Can the quality of forage be changed for better or worse by continued fertilization?

Will ammonia fertilization increase the hazard of nitrate poisoning or molybdenum poisoning?

What are the minimum moisture requirements for maximum fertilization benefits?

Will you produce more feed by fertilizing the better bottom soils or by fertilizing the shallow hillside?

BRUSH CONTROL

Several avenues of brush control have been explored since the mid 1930's. This included controlled burns, chemicals, and mechanical clearing. All the methods have had a degree of success.

Burning seems to be the least expensive and probably the least permanent. Chemicals to date when properly and carefully managed, have done a good job but quite an expensive one. Mechanical clearing has been relatively permanent and the most satisfying but the most expensive.

At the present time work is being done with a new pelleted chemical (fenuron) which looks promising. If it is effective, airplane or helicopter application will be possible.

MISCELLANEOUS

It was found that cultivation alone increased the filaree growth three to five fold. However, tarweed increased by three fold. If such weeds can be controlled, cultivation may be quite practical in some areas.

Deferred grazing was tried on 21 ranches in the county. An increase in native stipas was noted on a few ranches. Range soil moisture determinations were initiated for the first time anywhere in Monterey County in 1958. This long range program was designed to determine the best time to remove livestock from the range to obtain maximum seed production of the more desirable range plants.

LONG RANGE NEEDS TO IMPROVE MONTEREY COUNTY RANGE LANDS

There have been many changes in Monterey County since 1919. However, the basic problem remains much the same as in the first days of Monterey County Extension work. This problem is range management.

In most instances the ranges are over-stocked, not cross fenced, and have relatively poor water development. Thus, we continue to choke out the few good species of annual forage we have left and the better introduced species have little chance for survival by over-grazing.

As in 1919, we still have 50,000 to 60,000 head of cattle on our ranges. However, in the areas south of King City these ranges are becoming stocker ranches, rather than cow-calf. Basically, we have a better chance of improving our ranges in these stocker areas if certain requirements are met, as we have better control of our numbers and better range coverage than with the cow-calf operation.

Our general recommendation at the present time is to cross fence and develop water for better range management; and, in the case of cow-calf operations, to stock the range to the minimum feed year with cows. This type of operation then lends itself to supplementing the range with stockers in good feed years. If these basic requirements are met, then range improvement becomes a reality -- but only then.

If the ranchers are unwilling to practice good range management then most of the information developed to date will be of little use to them. Assuming the range men wishes to do a better job of range management, the Monterey County Agricultural Extension Service should adopt a long range program which will provide the tools which will increase or at least maintain the carrying capacity we now have.

As the physical features and environment is so different from one end of the county to the other, and from one side to the other, it is felt that some basic information would be desired before significant suggestions can be made.

The basic long term plan should be as follows:

I Soil Survey

A. Any recommendations for reseeding, fertilization, etc., will depend upon the soil and the amount of moisture that can normally be expected.

1. This can be accomplished, in part, by the work being done by the staff soil Farm Advisor. However, more complete information could be had if the range men took representative soil samples from the area they wished to improve and have the soil analyzed. This information should be channeled to this office for mapping and recommendations.

II Brush Range Improvement

A. There are approximately 45,000 acres of brush in Monterey County which could be removed economically.

1. This can be accomplished by:

- a. Encouraging the development of a County Brush and Range Improvement Committee.
- b. By organized brush burns.
- c. By mechanical brush removal.
- d. By continuing to investigate the various chemical controls.
- e. By combinations of these various tools.

III Reseeding

A. Continue investigating new species

B. Investigating better methods of reseeding. i.e., fertilizer placement with seed.

C. Emphasize grazing management of reseeded areas.

D. Compare yields from reseeded areas with control.

IV Range Fertilization

A. Continue investigating the value of range fertilization

1. Can quality of forage be more rapidly changed by fertilization?

2. Can range fertilization be harmful to livestock by causing nitrate poisoning of micro-element difficulties such as Mb or Se poisoning?

3. Is it cheaper to fertilize than:

a. renting range land

b. supplemental feeding

V Develop New Information

A. Range soil moisture, as a tool for better management practices .

B. Tissue analysis, to better determine fertilizer needs.

C. Better species from existing plants such as Burr Clover.

D. Micro-element investigations

VI Watershed Management

A. Encourage watershed management practices to promote maximum water and forage yield.

VII Medusa Head

A. Educate and alert ranchers to the Medusa Head problem.

B. Initiate program of control if it is in the county.

VIII Poisonous Weeds

A. Determine the species within the county and maintain a history of livestock losses.

B. Prepare herbarium mounts for identification -- teaching purposes.

APPENDIX I

Legumes

Medicago

Ladak Alfalfa
Creeping Alfalfa
Galloway Alfalfa
California common Alfalfa
African Alfalfa
Argentina Alfalfa
Buffalo Alfalfa
Grimm Alfalfa
India Alfalfa
Ranger Alfalfa
Burr Clover (sardoa)
Burr Clover (California)
Barrel Clover
Black Medic
Snail Medic
M. Nuricata
M. Turbinata
M. S.P.K. 1843
M. Blancheana
M. Lellorales

Lotus

Prostrate birdsfoot Trefoil
Erect birdsfoot Trefoil
Big Trefoil

Trifolium

Palestine Strawberry Clover
Alsike Clover
Red Clover
Hop Clover A
Ladino Clover
Strawberry Clover
Rose Clover
Crimson Clover
Late Tallarook Clover
Mt. Barker Subterranean Clover
Early devalganup (sub clover)

Trigonella

T. Corniculata
T. Basensae

Melilotus

Yellow Sweet Clover "Madrid"
Yellow Sweet Clover

Vicia

Lana Vetch
Purple Vetch

APPENDIX II

Grasses

Lolium

Clunes rye grass
Wimmera rye grass
Perennial rye grass
Annual rye grass
Short-rotation rye grass
H-1 rye grass

Elymus

Blue wild rye grass P 10128
Blue wild rye grass 835
Argentina wild rye 182
Argentina wild rye 183

Bromus

Fescue grass
Mountain brome grass
California brome
Harlan brome
Smooth brome (Lincoln)
Blando brome

Agropyron

Crested wheat grass
Agropyron wheat
A. tauri turkey (I 4295)
Western wheat grass

Festuca

Kentucky 31
Tall fescue
Creeping red fescue
Chewing fescue

Stipa

Purple stipa
Nodding stipa

Arrhenatherum

Tall meadow oat grass
Non shattering oat grass

Dactylis

Orchard grass
Akaron orchard grass
Palestine orchard grass
Orchard grass (Golden Gate
X Samaria, 801)

MISCELLANEOUS

Reed canary grass	Chloris goyana
Harding grass	Paspalum laeve
Harding X reed canary grass	Poa prantensis
Smilo	Same
Veldt grass	Panicum antidotale
Meadow foxtail	Agrostis alba
Rhodes grass	Avina sativa
Dallis grass	Hordeum vulgar
Kentucky blue grass	Triticum aestivum
Melica ciliata, Iran	Australian salt bush
Blue panic	Kikuyu grass
Red top	Koa haole
Oats	Jarazua
Barley	Michels hybrid grass
Wheat	Pilca butta
Burnet	Bulbous barley
Burnet (European strain)	Atoiples semibaecata
Phalaris arundinaeea	Pennisetum claudestinum
Phalaris tuberosa	Leucaena glauca
Cross bred	Hyparrhenia rufa
Oryzopsis miliachea	Cross bred
Alopecurus pratensis	Hordeum bulbosum

Farm Advisors Involved in Range Improvement Work - 1919 - 1959

Tom Mayhew	1919 - 1934
Reuben Albaugh	1927 - 1949
H. D. Hollembeak	1949 - 1957
Joseph Muir	1950 - 1957
Daniel M. Irving	1955 - date
Harry Agamalian	1957 - date
Robert O. Leonard	1957 - date
James R. Lugg	1958 - date

