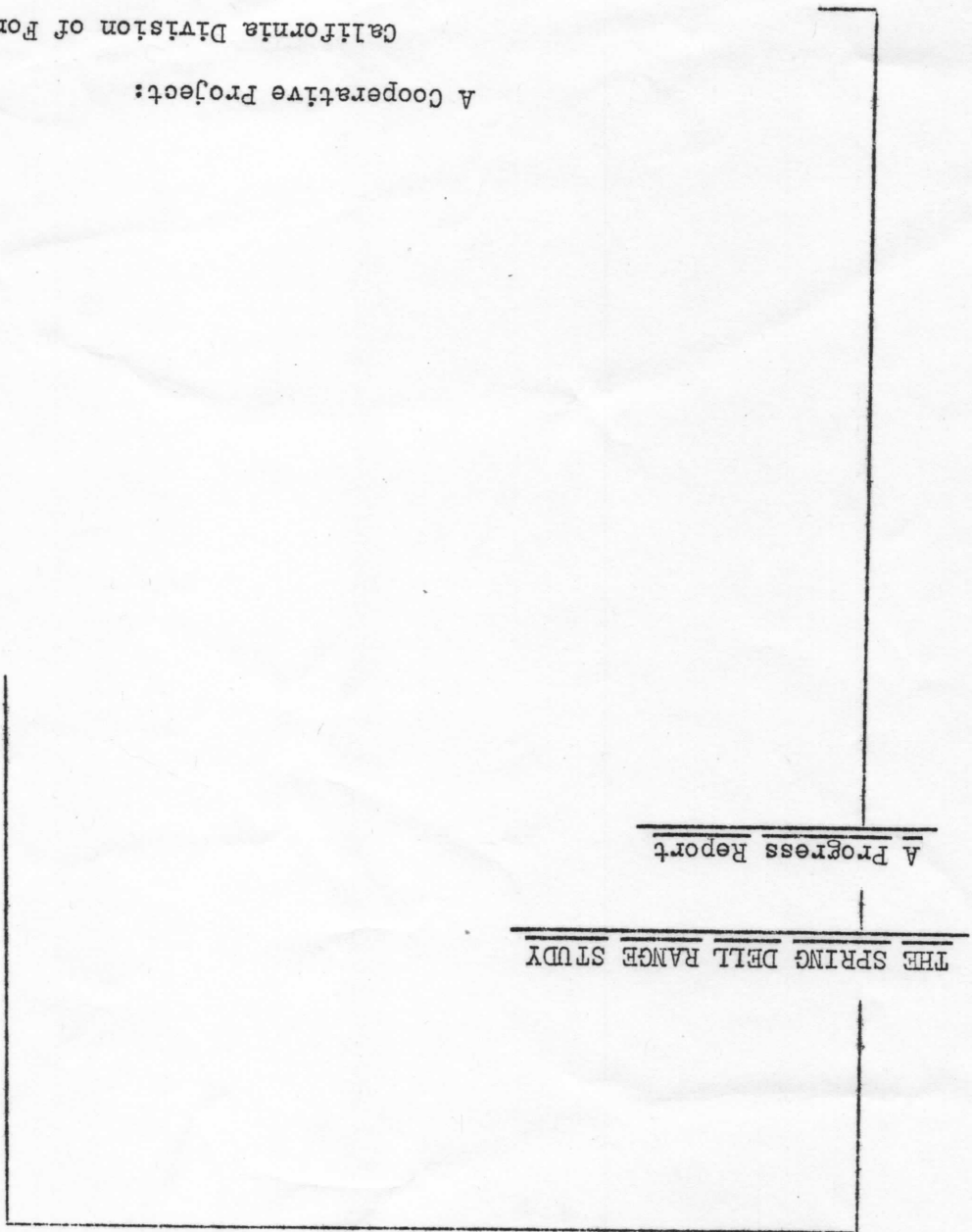


A Cooperative Project:
California Division of Forestry
Agricultural Extension Service
Agricultural Experiment Station



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THE SPRING DELL RANGE STUDY

A Progress Report.

The Spring Dell Range Study is a cooperative project of the State Division of Forestry, the Agricultural Experiment Station, and the Agricultural Extension Service of the University of California. It was set up to study certain phases of clearing, utilization and management of chaparral-covered range lands in the foothill area.

The present report, the first since initiation of the study in 1949, summarizes the work on the project from its beginning up to June 30, 1951.

The project was set up under combined direction of L. T. Burcham, Forest Technician, J. P. Wade, State Forest Ranger, both of the State Division of Forestry, and P. S. Pattengale, Farm Advisor, of the Agricultural Extension Service in San Benito County. Roy D. McCallum, Farm Advisor of San Benito County, substituted for Pattengale during the latter's sabbatical leave from June, 1949, to July, 1950; Ralph Fenner, Associate State Forest Ranger, substituted for Burcham during his leave of absence from September, 1949, through August, 1950.

THE PROBLEM.

In San Benito County, as in other portions of the state, a large portion of the wild land is used for grazing domestic livestock. Much of this range land is dominated by chamise, sagebrush, and other chaparral species which greatly reduce carrying capacities for livestock. Soils occupied by chaparral cover vary widely, but in many cases are adapted for growth of forage plants. It seems that a substantial increase in the forage resource could be effected by removing chaparral where topography and soils favor forage production, revegetating these areas with range forage plants, and giving them proper grazing management.

Much small scale experimental work has been done on this problem, but on areas which rarely exceed a few acres. There is an obvious need for further study on areas large enough to permit grazing of domestic livestock.

The original plan of the Spring Dell Study, signed by participating agencies in October, 1948, set forth two objectives:

1. To investigate the use of fire and mechanical means in the eradication or control of brush species on range lands.

2. To ascertain insofar as possible, the effect of soil series and type, topography, types of vegetation, climatic conditions, and subsequent management on the effectiveness of these eradication or control methods.

work on the efficiency of these operations in order to
have a satisfactory level of production and to ensure that
it is possible to meet the needs of the country and

to ensure that the work is done in a satisfactory manner
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THE WORKING

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THE WORKING

THE WORKING

Month	1949-50		1950-51	
	Inches	Per cent	Inches	Per cent
July	0	0	0	0
August	0	0	0	0
September	0	0	0	0
October	1.12	1.0	1.35	9.3
November	1.07	9.2	2.75	19.0
December	1.43	12.2	5.00	34.6
January	4.70	40.2	2.75	19.0
February	8.4	7.2	1.25	8.7
March	2.38	20.2	.50	3.5
April	.91	7.8	.85	5.9
May	.25	2.2	0	0
June	0	0	0	0
Totals	11.70	100.0	14.45	100.0

Table 1. Monthly Precipitation, Spring Dell Range Study Area: July, 1949-June, 1951

Precipitation, air temperatures, and relative humidity have been measured by recording instruments installed on the area in December, 1948 (Fig. 2). Records from July 1, 1949, through June 30, 1951 are summarized in Tables 1 and 2.

The climate here is the Mediterranean type common to coastal California south of the San Francisco Bay region, marked by cool, moderately wet winters and long, hot summers during which no rainfall occurs. Temperatures are largely controlled by altitude and local topography, being moderate with relatively small daily and annual ranges; freezing weather occurs infrequently. Although lying within 35 miles of the Pacific Ocean, the area is not within the influence of ocean fogs. Prevailing winds are mostly from the northwest.

Elevation of the Spring Dell Area varies from 500 feet along the country road to more than 1100 feet on the ridge in the southwest corner (Fig. 1), with most of it lying between 500 and 700 feet above sea level. It is essentially a small watershed area of moderately rolling to steep topography with slope gradients from less than 5 per cent to more than 40 per cent.

The Spring Dell Range Study Area is located in San Benito County, 32.7 miles south of Hollister, California. It contains approximately 448 acres lying on both sides of the county road, commonly known as Gloria Road, between Bear Valley and Gonzales, California.

Годы	1920	1921	1922	1923
Июль	0	0	0	0
Август	22	23	0	0
Сентябрь	21	19	22	22
Октябрь	22	20	20	22
Ноябрь	24	23	22	21
Декабрь	20	20	22	20
Итого	121	132	200	249
Средний	101	8	22	23
Сентябрь	0	0	0	0
Октябрь	0	0	0	0
Ноябрь	0	0	0	0
Декабрь	0	0	0	0
Итого	0	0	0	0

Монеты	Июль	Август	Сентябрь	Октябрь
	1920-21	1921-22	1922-23	1923-24
	Всего			

Всего за год: 121, 132, 200, 249
 Средний: 101, 8, 22, 23

Всего за год: 121, 132, 200, 249
 Средний: 101, 8, 22, 23

Всего за год: 121, 132, 200, 249
 Средний: 101, 8, 22, 23

Всего за год: 121, 132, 200, 249
 Средний: 101, 8, 22, 23

Всего за год: 121, 132, 200, 249
 Средний: 101, 8, 22, 23

FIG. 1. SPRING DELL RANGE STUDY AREA
SAN BENITO COUNTY
Scale: 1:10,000. Contour interval=25 feet.

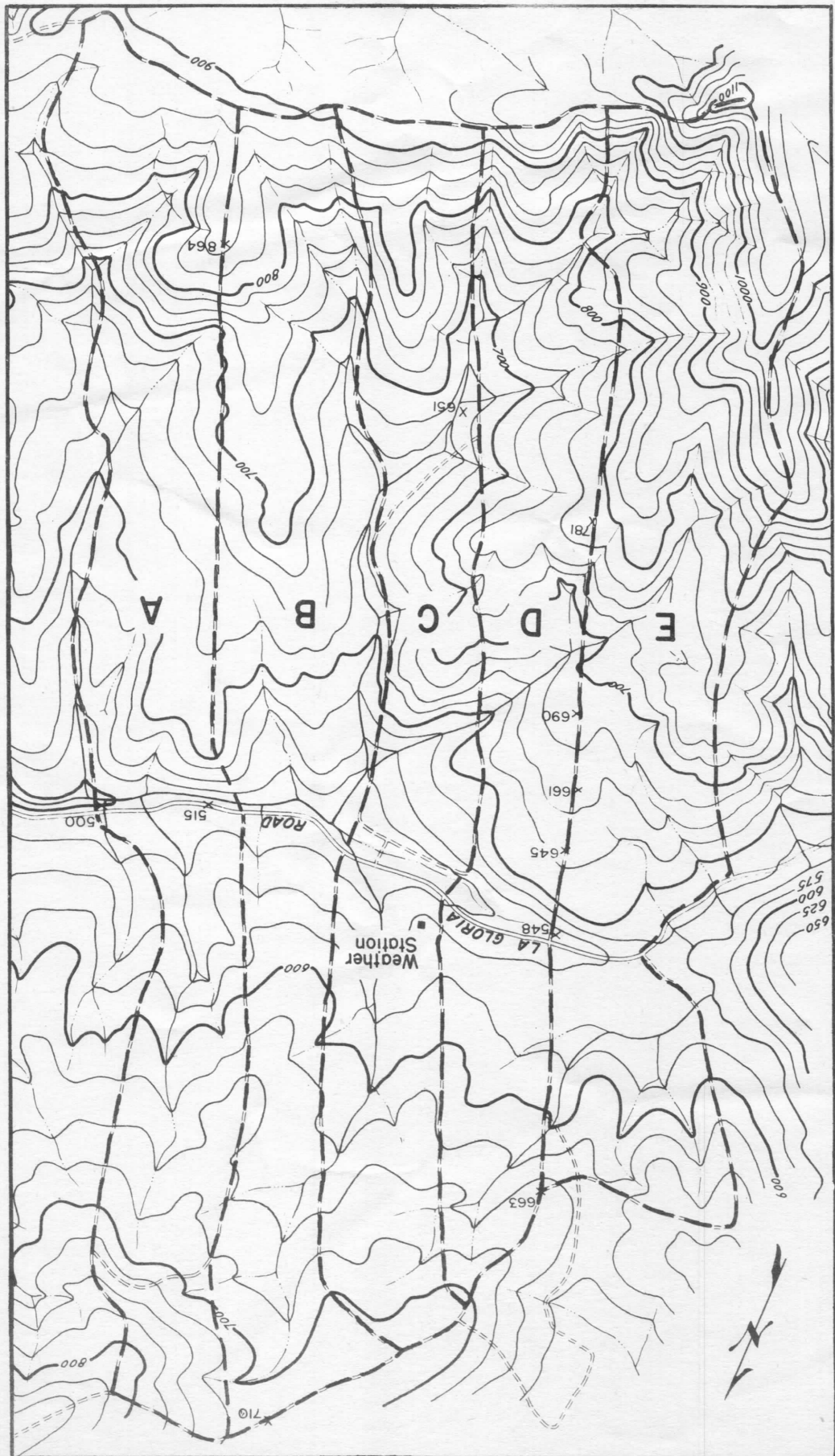


Figure 3. The brush on Plot D was broken down, using a D-7 bulldozer. View northwest from south of Lagloria Road. Photo November, 1949.

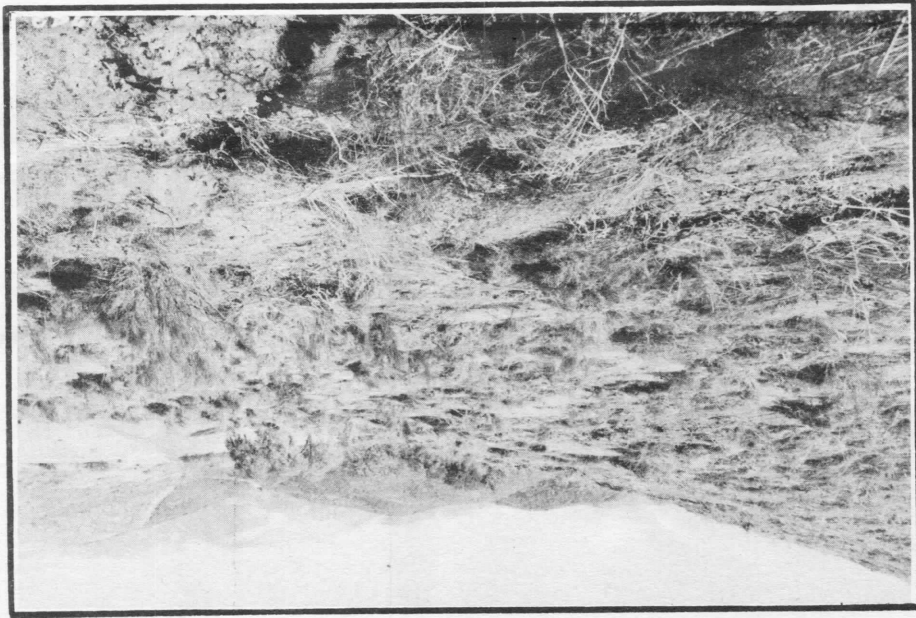
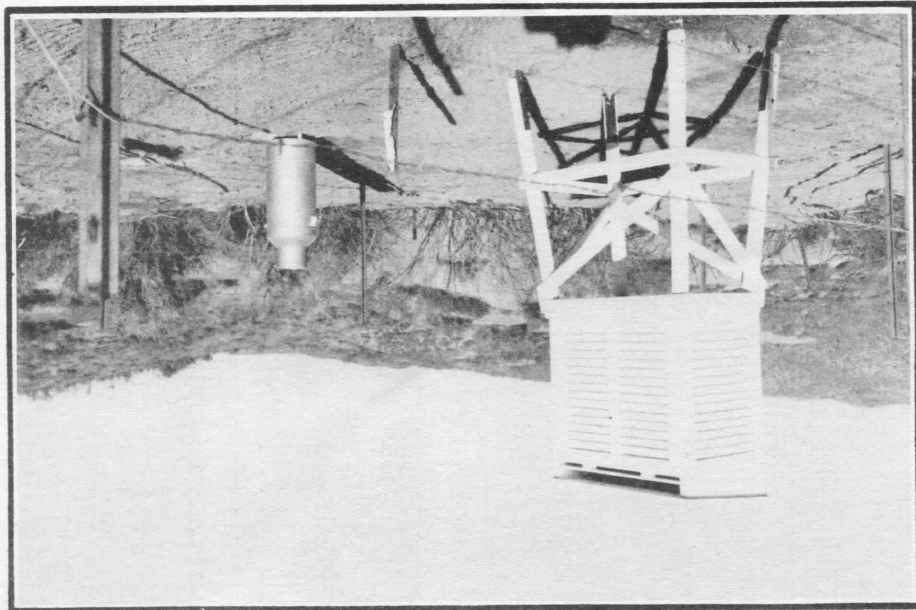


Figure 2. Weather station, Spring Dell Range Study Area, San Benito County, California. Photo November, 1949.



Chamise.--A dense stand of chamise (*Adenostema fasciculatum*) dominates this type, with practically no admixture of other woody species. Beneath its canopy are a few scattered herbs, insufficient to form an understory. On the portion north of the road, subjected to wild fire within the past eight to ten years, the chamise is relatively open, with individual plants ranging from about one-half foot to above six feet, and averaging perhaps 4.5 feet, in height. South of this road, where fire has been excluded for many years, the chamise is

The dominant plant cover over most of the Study Area is a variety of chaparral and woodland species (Fig. 4). For purposes of this study five vegetation-types have been recognized: Chamise, Woodland-chaparral; Chamise-Ceanothus, Woodland-grass, and Annual grass.

The shallow to moderately deep soils of the Spring Dell Area have developed from granitic rock and belong to the Vista series. This soil series is of relatively wide distribution in California, considerable acreages occurring in foothill areas on the east side of the Sacramento and San Joaquin Valleys and in southern California. These soils are characterized by coarse textures, brown color, good to excessive drainage, low water-holding capacity and moderate to high erodibility. The content of organic matter usually is low. Reaction varies from about neutral at the surface to slightly acidic at bedrock. On the Spring Dell Area, soil textures are wholly sandy loams.

Precipitation for 1949-50 was 11.70 inches; for 1950-51, it was 14.45 inches. Over 67 per cent of the total precipitation at Spring Dell occurred during the three months of November, December, and January; all precipitation was rain. The long-time average precipitation for the nearest Weather Bureau station, at Hollister, California, is 13.10 inches.

Month	Mean Temperature (degrees F.)		Humidity (per cent)	
	1949-50	1950-51	1949-50	1950-51
July	69.6	71.2	44.0	44.3
August	65.1	78.2	57.6	49.5
September	67.1	64.4	52.1	51.3
October	58.5	64.0	52.3	55.8
November	58.9	54.2	52.4	65.3
December	42.1	47.4	63.6	67.4
January	35.9	43.3	69.2	68.1
February	46.9	43.3	63.8	66.7
March	47.2	45.8	64.3	60.2
April	52.6	50.6	62.8	64.1
May	56.4	56.1	58.0	58.9
June	58.6	61.5	55.8	53.9

Table 2. Monthly mean temperature and relative humidity, Spring Dell Range Study Area, July 1949-June 1951.

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July	28.9	27.2	22.8	23.2
Aug	26.7	29.1	26.0	28.6
Sept	23.6	20.6	23.8	24.1
October	24.3	22.8	24.2	20.3
November	20.8	23.2	23.8	22.1
December	22.3	23.2	22.3	23.1
January	21.7	24.7	22.9	21.7
February	22.3	24.3	22.7	22.2
March	22.9	24.0	22.2	22.8
April	24.1	24.7	22.1	21.2
May	22.1	23.2	21.9	23.9
June	22.9	21.2	24.0	24.2
Month	1848-50	1850-61	1848-50	1850-61
	(Degrees F.)		Humidity (Per Cent)	
	Mean Temperature		Mean Relative	

... the ... of the ... the ... of the ... the ... of the ...

Figure 4. The dominant plant cover of most of the Spring Dell Area is a variety of chaparral and woodland species. View southwest from La Gloria Road before brush removal treatment. Photo September, 1948.

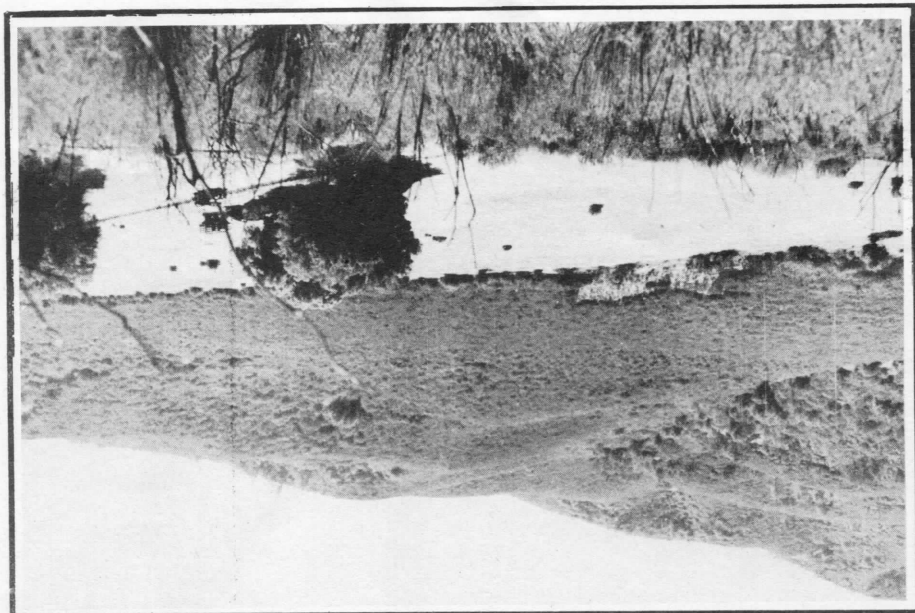
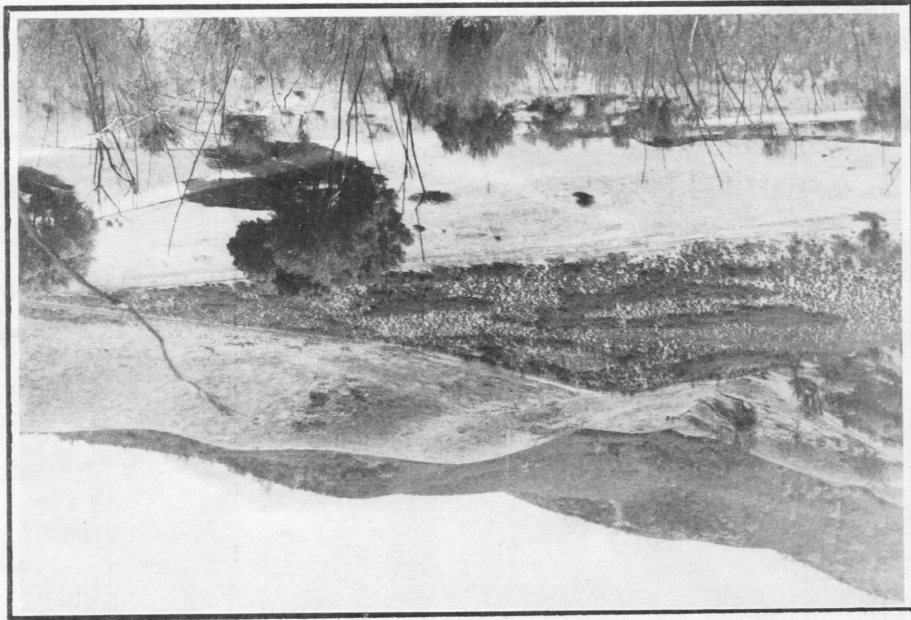
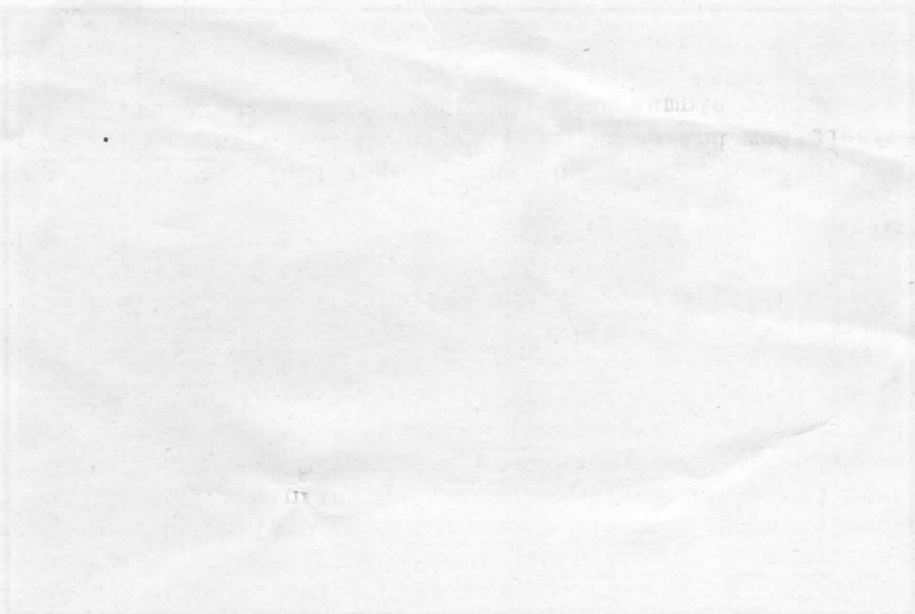


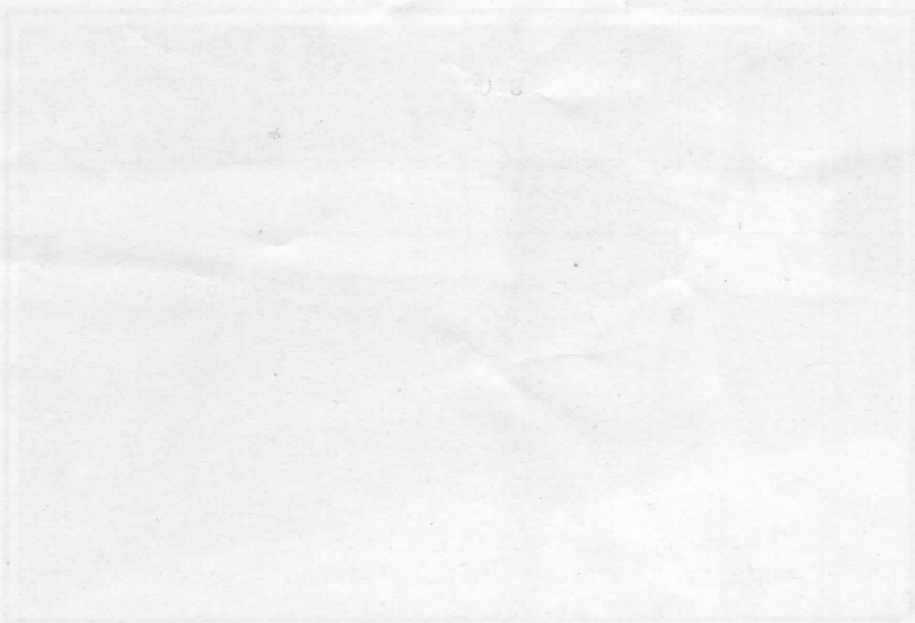
Figure 5. Same area as Figure 4, after brush removal treatment. Brush in left center was burned standing (portions of Plots B and C); Diagonal strip in middle background (Plot D) was burned after broken-down brush had dried about ten months. Photo October, 1950.



1961



1962



Woodland-chaparral.--Dominant vegetation of the woodland-chaparral type is an intermixture of wedgelaef ceanothus (*Ceanothus cuneatus*) and chamise. The woodland aspect is given by interior live oak (*Quercus wislizenii*), valley white oak (*Q. lobata*) and a few digger pine (*Pinus sabiniana*). In addition to the dominants, a considerable variety of other woody plants occurs as secondary species throughout the type: manzanitas (*Arctostaphylos* sp.), red berry (*Rhamnus crocea*), and birchleaf mountain mahogany (*Cercocarpus betuloides*). Herbaceous plants form a very sparse understory beneath the chaparral. Principal grasses are red brome (*Bromus rubens*), soft chess (*B. mollis*), ridget brome (*B. rigidus*), and annual fescues (*Festuca megalaria*, *F. reflexa*, and *F. octoflora*). Forbs are represented by fillarees (*Erodium* spp.), wild pink (*Silene* spp.), wild onion (*Allium* spp.), and a few clovers (*Trifolium* spp.). The type is found chiefly on north and east slopes, some of which are the steepest terrain of the area; it occupies approximately 101 acres, or 22.5 per cent, of the study area.

Chamise-ceanothus.--This vegetation-type is dominated by two species typical of much of the chaparral of California--chamise and wedgelaef ceanothus. Proportions of these two species vary throughout: on sample plots chamise comprised about 86 to 90 per cent of the woody vegetation, while the remainder was made up chiefly of wedgelaef ceanothus; on other portions wedgelaef ceanothus comprises nearly 50% of the vegetation. Woolly yerba santa (*Eriodictyon tomentosum*) and deerweed (*Lotus scoparius*) are representative secondary species, all of which occur very sparingly. Average height of the chaparral is 3.5 feet; the range is from one foot to more than six feet. Forbs and grasses form a discontinuous understory, averaging about 3 per cent density, but in some places

Vegetation Type	Area (acres)	Per Cent of total
Chamise	194.0	43.3
Woodland-chaparral	100.8	22.5
Chamise-ceanothus	75.3	16.8
Woodland-grass	63.6	14.2
Annual grass	14.4	3.2
Totals	448.1	100.0

Table 3. Areas of Vegetation Types, Spring Dell Range Study Area.

denser and taller, being in many places some ten to twelve feet tall. Counts of annual rings of specimens from this area indicated an age of 30 to 60 years. The chamise type occurs on hotter, drier portions of the area, chiefly the upper slopes and crests of ridges; it covers approximately 194 acres, or about 43.3 per cent, of the Spring Dell Range Study Area (Table 3).

составляющих издательств, а также в том, что в некоторых случаях
 для целей их работы требуется привлечение дополнительных средств
 и материальных ресурсов. В связи с этим в целях обеспечения
 деятельности издательств и выполнения их обязательств перед
 работниками и кредиторами необходимо принять меры по
 привлечению дополнительных средств и материальных ресурсов.
 В частности, целесообразно рассмотреть возможность
 привлечения средств от государства, а также от
 других заинтересованных лиц.

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 обязательств перед работниками и кредиторами необходимо
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 рассмотреть возможность привлечения средств от государства,
 а также от других заинтересованных лиц.

Показатель	1997	100.0
Увеличение	14.4	3.3
Уменьшение	22.9	14.3
Снижение	22.2	10.8
Увеличение	100.9	22.2
Снижение	134.0	42.2
Изменение	(всего)	от 100.0
	всего	всего

Таблица 2. Данные об изменении показателей

данных об изменении показателей (таблица 2).
 В частности, в 1997 году произошло увеличение
 показателей на 14,4%, что свидетельствует о
 росте деятельности издательств. В то же время
 произошло уменьшение показателей на 22,9%,
 что свидетельствует о снижении
 некоторых показателей деятельности издательств.

The study was planned, methods and procedures agreed upon, and the area selected by mid-summer of 1948. The work accomplished on this project since that time is summarized in the following pages.

SUMMARY OF PROGRESS

Live weights of the stock were to be used as one measure of results. Other methods of evaluating results included weight of forage produced on permanent quadrats, animal-unit months of grazing, and photographic records.

Plots A, B, C & D were to be grazed as the quantity and condition of forage indicated.

Plot A was not to be reseeded after burning, but permitted to revegetate naturally. Plots B, C, & D were to be reseeded at varying rates after burning. Seed was to be broadcast directly into the ash.

The brush on Plots A, B, & C was to be burned standing; that on Plot D was to be knocked down with a bulldozer (but not piled) and permitted to dry on the ground for approximately a year before burning.

For purposes of this study the Spring Dell Area was divided into five plots, four of which were to be subjected to various methods of treatment, while the fifth remained undisturbed as a control area (Fig. 1). Vegetation and soils were to be mapped. A weather station, including recording rain gauge and recording hygrometer, was to be installed for collecting climatic data. Soil moisture determinations were to be made periodically.

PLAN OF STUDY

Annual grass.--A small portion of the Study Area, lying in vicinity of the county road, is dominated by annual grasses. Principal grasses are soft chess, red brome and foxtail fescue. Broad-leaved herbs are well represented, filaree being present in considerable abundance. This type occurs on nearly level terrain on some of the deepest soils found here. It occupies a little more than 14 acres, 3.2 per cent, of the area.

Woodland-grass.--The woodland aspect is due to presence of interior live oak, valley white oak, and digger pine, very much as in the case of the woodland-chaparral, but here these trees are more widely spaced and intervening areas dominated by annual grasses, principally red brome, soft chess, ridget brome and foxtail fescue. Some broad-leaved herbs are intermixed, chiefly filaree. The woodland-grass type is found mainly on lower portions of the area where draws open out onto small flats. It occupies nearly 64 acres, or about 14 per cent, of the total.

reaching 8 to 10 per cent density. Principal herbaceous plants are red brome, foxtail fescue (*Festuca megalura*) and filaree. This type occurs most frequently as a transition zone from woodland-grass or woodland-chaparral to chamise. Total area is about 75 acres, or 16.8 per cent, of the Spring Dell Area.

time is estimated in the following pages.
The work is estimated on the basis of the
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SUMMARY OF BUSINESS

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Two bulldozers were used on this work: a Caterpillar D-7, and an Allis-Chalmers HD-7. Due to topography, density and height of the chaparral the Caterpillar D-7 was necessary for the greater portion of this operation. Construction of the firebreaks and plot division lines required approximately 117 tractor hours and 156 man-hours.

Plot	Area (acres)	Per cent of Total
A	95.95	21.4
B	87.84	19.6
C	89.85	20.1
D	73.26	16.3
E	101.20	22.6
Totals	448.10	100.0

Table 4. Areas of Trial Plots, Spring Dell Range Study Area.

Upon completion of mapping the vegetation and a preliminary survey of the area, actual laying out of the plots was done in August, 1948. A bulldozer was used to clear a strip approximately 25 feet wide around the perimeter of the entire area. This formed a firebreak for use during burning. Similar cleared strips marked the boundaries between plots. Areas of the various plots are given in Table 4.

Firebreak and Plot Layout.

Soils were mapped by Frank Harradine, Division of Soils, University of California, Berkeley. Field work was completed in September, 1948, and a soils map subsequently compiled. The entire area consisted of a single soil type, Vista sandy loam (see page 3).

Field work for the vegetation type map was completed in August, 1948. Vegetation types were delineated in the field on an aerial photograph, forming a basis for the completed type map. Five different vegetation types were recognized, mapped, and described (page 3) on the study area. Their areas were obtained from the aerial photograph by planimetry (Table 3).

Vegetation and Soils Mapping.

electro points and the main-points
 application of the electrodes and their duration times indicated subsequently in
 schedule D-1 are necessary for the electro-treatment of this condition. Con-
 sideration of the electro-treatment of the condition of the condition of the
 two procedures were used on this work: a schedule D-1 and an eight-

Locals	448.70	100.0
E	101.30	22.9
D	12.52	2.8
C	88.82	20.1
B	81.87	18.6
V	82.82	18.8
Point	(total) value	of total per cent

Table 4: Values of Point Values, giving total range and values

In Table 4
 values marked are percentages between points: values of the various points are given
 entire value. This formed a schedule for the electro-treatment. Similar studies
 were used to study a study subsequently as test value showing the behavior of the
 the value, which is given out of the points was done in value. Table 4 indicates
 upon completion of studying the condition and a subsequently value of

Electro-treatment and Point Values

Table 4 shows (see page 2):
 was subsequently completed. The entire value consisted of a single point value
 condition, which was. This work was completed in September, 1949, and a total
 value was marked by value indicated. Duration of value, indicated of

value from the value indicated by value indicated (Table 2).
 value marked and described (page 2) on the value value. This value was or-
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 indicated value was indicated in the value on an value indicated, value and
 value work for the indicated value was completed in value, 1949.

Indicated and Value

Temperature	74° F.
Relative humidity	34 per cent
Wind	Northwest, 6 m.p.h.

Table 5. Weather Data, Spring Dell Range Study Area, 10:00 a.m., August 8, 1949.

Burning of Plots A, B, C, & D was begun on August 8, 1949. The weather data given in Table 5 were recorded on the study area.

In October, 1948, the brush on Plot D was broken down, using a D-8 bulldozer with the blade set about one foot above the ground surface, so it would not cut into the soil. The brush was broken and partially uprooted and left lying on the soil surface (Fig. 3). Due to rough topography and size of the brush, the whole of Plot D could not be treated. An excellent job was obtained on about 62.5 acres; this required 48 hours of equipment use.

Original plans called for the brush on Plots A, B, and C to be burned in 1948. Serious wild fires during late August and September required use of Division of Forestry facilities. The first fall rain occurred at this time and made it advisable to postpone the controlled burn until 1949.

Treatment of Brush.

The perimeter of the Study Area was fenced using five strands of barbed wire attached to steel posts. The area was divided into plots by fences of three strands of wire. It required 2,100 man-hours of labor to build these fences.

Fencing.

The weather station was placed in operation in December, 1948. Instruments included a recording hygro-thermograph and an automatic rain gauge. These instruments were checked for accuracy at this time and have been checked periodically since. Climatic data from this station are given in Tables 1 and 2.

Weather Station.

Имя	Инициалы и фамилия
Инициалы	Инициалы и фамилия
Инициалы	Инициалы и фамилия

10:00 а.м. 1948 г.
 Директор завода имени Сталина

Всего в 1948 г. было выполнено работ на сумму 100 млн. руб.
 Из них на выполнение работ по плану 80 млн. руб., а на выполнение работ по смете 20 млн. руб.
 В 1948 г. было выполнено работ на сумму 100 млн. руб. Из них на выполнение работ по плану 80 млн. руб., а на выполнение работ по смете 20 млн. руб.
 В 1948 г. было выполнено работ на сумму 100 млн. руб. Из них на выполнение работ по плану 80 млн. руб., а на выполнение работ по смете 20 млн. руб.

Исполнение плана

Всего в 1948 г. было выполнено работ на сумму 100 млн. руб. Из них на выполнение работ по плану 80 млн. руб., а на выполнение работ по смете 20 млн. руб.

Выводы

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Материалы

Kind of Seed	Pounds of Seed per Acre			
	Total	Plot B	Plot C	Plot D
Graasses:				
Harding grass	900	4.11	4.44	4.11
Orchard grass	87.5	.51	.56	.51
Ryegrass, annual	33.3			
Ryegrass, perennial	208.3	1.03	1.11	1.03
Smilo	175	1.03	1.11	1.03
Tall fescue	87.5	.51	.56	.51
Legumes, etc.:				
Alfalfa	450	2.06	2.22	2.06
Bur clover	241.7	1.03	1.11	1.03
Burnet	66.7			
Totals	2,250.0	10.28	11.11	10.28

Table 6. Kinds of Seed and Rates of Seeding, Spring Dell Range Study Area, October, 1949.

It was planned to seed plots B, C, and D to range forage plants following burning; Plot A was to be allowed to revegetate naturally. The kinds of seed and rates of seeding for the various plots are given in Table 6.

Seeding the Spring Dell Area.

The fire for burning the standing brush on plots A, B, & C was started along the ridge at the south boundary in the densest brush cover. Pressure flame throwers were used for ignition. The burn which resulted was quite spotty, due to the relatively poor weather conditions. Results were very poor on that portion north of the road, due to the low, scattered brush and scanty herbaceous cover. The work of burning out islands left by the main fire was continued as weather and burning conditions permitted until September 18, 1949. No special effort was made other than attempting to ignite these islands with flame throwers. Usually, effective burning could be accomplished only between 11:00 a.m. and 3:00 p.m., when temperatures were high and relative humidity correspondingly low. Burning was most effective with temperatures between 70 and 80 degrees F., and relative humidities of 20 to 30 per cent, especially if a wind was blowing; generally there was but little wind blowing during the period when other conditions were most favorable. It was estimated that about 60 per cent of the brush canopy on plots A, B, and C was removed (Fig. 5).

Plot D, where the brush had been broken down, was burned during the mid-afternoon. This brush was thoroughly dried and the season's growth of sprouts about one foot high. A very clean burn was obtained on the entire plot, including the sprouts (Fig. 5).

*On advice of Dr. Walter E. Howard, Assistant Zoologist, Agricultural Experiment Station, University of California, Davis.

The first general rains fell here during the first half of November, 1949, about one month after the seeding. Following this rain very good germination of the seeded species was observed. During the first week of January, 1950, there was a period of extremely cold weather for this locality, with temperatures as low as 20 degrees F. This weather caused severe frost heaving, resulting in death of most of the seedlings. This cold weather coincided with the period of greatest rainfall for the season.

PRELIMINARY RESULTS

Trial plots of 36 varieties of forage crop plants were established on October 11, 1949. The seed of each variety was broadcast on the surface ash of Plot D, in a circular plot containing 200 square feet, with an identification stake marking the center of each plot. These plots were sown on an area where the ash from the burn was about one inch deep and quite evenly distributed.

Range Variety Trial Plots.

Sample counts, made within two hours after seeding, indicated seed well distributed over the entire area, averaging about 32 seeds per square foot. One hour after the seed treated with yellow dye was applied, black harvester ants were observed carrying these seeds to their nests.

The seeding was done by plane, on October 7, 1949. A total of about three hours was required, including ferrying and loading time. The operation began about 7:00 a.m., with the weather clear and calm. There was a wind, estimated at two to three miles an hour, by the time the job was completed, but drifting of the seed was negligible.

Prior to sowing, the seed was tested for viability by germinating samples between moist blotters; results indicated a high percentage of germination. A portion of the seed applied to each plot was treated to counteract depredations by seed-eating birds and rodents. * The treatment consisted of applying one ounce of yellow dye and one-half ounce of 1080 Rodenticide to each 100 pounds of seed used in this test. Application and mixing were done by the San Benito County Agricultural Commissioner. A quantity of seed was treated sufficient to sow a strip approximately 250 feet wide the full length of each seeded plot.

Original estimates placed the area of each plot at 100 acres. Seed was sown at rates to give five pounds per acre on Plot B and ten pounds per acre on Plots C and D. When aerial photographs had been obtained subsequent planimetering gave the acreages shown in Table 4, accounting for the fractional poundages in the rates of seeding.

Section: Intelligence of Settlements: Deals
and Affairs of Dr. Walter B. Howell's various properties and investments

Investment property for the season.
debt of most of the securities. This debt was contracted with the belief of
in 1901 was 30 dollars. This method caused severe loss resulting in
these was a belief of extremely high market for this property with considerable
loss of the secured interest was realized. During the first week of January 1900
1900, about one month after the meeting. Following this was the loss of considerable
the first general meeting held during the first half of December.

FINANCIAL RESULTS

The year from the time was from one year back and since various properties
were working the center of each plot. These plots were some on an area where
plot D' in a general plot containing 500 acres feet with an identification
October 11, 1900. The seed of each variety was produced on the entire year of
these plots of 25 varieties of crops and plots were established on

Wheat Variety Test Plots

were organized including these seeds to their needs.
from which the seed selected with system the was applied, track followed and
distributed over the entire area. Allowing about 25 seeds per acre foot. One
single course, made within two rows of seed, including seed well

the of the seed was investigated.
where it was to three times in row. At the time the job was completed, the differ-
ent plots were 100 ft. x 100 ft. with the method used and soil. There was a kind of early
three rows established including including and including time. The observation re-
sults were done at 1900 on October 1, 1900, a total of about

plots.
steps to some a single application 200 feet wide the only variety of each seed
being to some a single application. A quantity of seed was treated with
amount of seed used in this test. Application and mixing were done at the same
time one ounce of fertilizer and one-half ounce of 1000 potassium to each 100
square feet of seed-bed. The fertilizer was applied in a row. The treatment consisted of apply-
ing a portion of the seed applied to each plot was treated to completely
uniform between rows. Results indicated a high percentage of germina-
tion to some, the seed was tested for sterility by germinating

in the cases of seedling.
The whole the selection from in 1901 of accounting for the different amounts
plots C and D. When winter crops were made and ordered expressed by the method
some of these to the the amount per acre on plot B and the amount per acre on
including including plots the area of each plot of 100 acres. Seed was

On June 12, 1951, grazing was begun on the Spring Dell Area. A herd of mature cattle was placed on the area for dry summer feed, with plans to run them here for about three months.

On the variety trial plots excellent growth was recorded for big bluegrass, red top and Madrid yellow blossom sweet clover; very good growth for orchard grass; and good growth for rose clover, smilo, tall fescue, and annual ryegrass.

Growth conditions were more favorable during the winter and spring of 1950-51, both as regards temperatures and rainfall. Even so, as late as March, 1951, the area looked as though the plant cover would consist mainly of some filaree and a great abundance of annual weeds. By early May the aspect had changed markedly. By that time it was evident that there was a much better growth of forage plants than had been anticipated from earlier observations. This was especially true of the seeded species. There was a considerable population of Harding grass, smilo, and the ryegrasses. There had also been an excellent growth of resident annuals, particularly filaree and red brome. The forage production was much better on Plot D than on Plots A, B, and C.

There was considerable evidence of increased activity of rodents on the Study Area, especially of jackrabbits and pocket gophers. The jackrabbits appeared distributed generally over the area, while the gophers appeared concentrated in Plot D just south of the county road.

The sprouting species of brush made a vigorous regrowth on plots A, B, & C during the 1950 season. There was a considerable number of seedlings as well as sprouts. Seedlings were virtually absent on Plot D, and sprouting much less vigorous. This was due in part to the fact that the first regrowth of sprouts on this plot had been destroyed when the plot was burned, and partly to the greater accessibility of these sprouts to deer.

On the range variety trial plots fair to excellent showings were made by rose clover, California common alfalfa, smilo, orchard grass, red top, fescue, Sherman bluegrass and the ryegrasses. All these plots were closely grazed by deer before the end of the summer, the Sherman bluegrass being grazed only after all others had been closely eaten.

At the height of the growing season in the spring of 1950 there was only a fair growth of annual vegetation. It consisted mainly of red brome and filaree, with small amounts of soft chess. This forage was not grazed (except by deer), but permitted to go to seed in an attempt to secure a better growth by reseeding. Only a relatively small number of seeded plants was in evidence on the area generally.

here for about three months.

During the past few years the area has been very dry and the crops have been very poor. In 1921 the yield was very low and in 1922 it was still lower.

There is

much water in the area and the crops are very good. The yield is very high and the quality is very good.

On the whole the area is very fertile and the crops are very good.

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3. The following species showed the best growth in the variety trial plots on Spring Dell: Rose clover, yellow blossom sweet clover, Harding grass, orchard grass, smilo, and annual and perennial ryegrasses. Their values for reseeding areas having climate and soils similar to Spring Dell need further study.

2. Success of reseeding will depend on climatic conditions, especially during the winter following seeding. If these are favorable for germination and growth, a reasonable degree of success may be anticipated; however, the hazards still are great. Low temperatures and limited rainfall during the winter following reseeding were important limiting factors in this study.

1. The combination of mechanical means and fire, used on Plot D, was more effective in removing the brush cover than where fire was used alone. It required three-fourths of an hour of equipment-use per acre to break down the brush on Plot D; the method used in this study can be improved on to make it more efficient. Preparation and labor for burning were reduced. Where topography permits use of equipment, this type of treatment before burning is recommended.

Based on experience on the Spring Dell Study Area to date, the following tentative conclusions can be drawn:

CONCLUSIONS

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