

MWT

GENERAL PROGRESS REPORT
BURGESS SPRING EXPERIMENTAL RANGE

Construction

The east half of the Burgess Spring Experimental Range was completely fenced late in 1935. The major part of the work on a livestock corral was also completed and the job of hanging a few gates was attended to early this year. The water system — well, windmill, and connections to the troughs — was in operation last fall.

This spring two cattle guards and 211 sixteen-foot-square fenced livestock enclosures were the major construction items that were completed. It was planned to erect about 420 enclosures, but limitations of time and men early in the season before the cattle came onto the area made it possible to build only half the desired number. No more have been put up yet this year.

An enclosure approximately 1 1/2 x 2 chains in size, large enough to enclose a site-factor station and a rodent enclosure and tall enough to exclude deer, was also constructed this spring.

Road work and a proposed mile-long telephone line have not been started.

The west half of the Burgess Spring area, which is about 600 acres in size, was logged during the summer, but none of the 3 miles of proposed boundary fence was built nor work of any kind undertaken.

Road improvement and a rounded-out plan for fire prevention and suppression on the area are needing attention.

Research

Systematic daily records have been gathered since June 19 on the following climatic factors: air temperature, soil temperature at 1/4, 7 and 12 inches below the ground surface, relative humidity, wind movement,

evaporation from a porous-cup atmometer, and precipitation. Daily records have also been made on salt and water consumption by cattle.

The moisture content of the principle plant species tied to stage of plant development, the mortality of pine seedlings, and cattle weights were obtained every two weeks. The first two have been recorded since about the middle of May; the cattle weights were started one month later.

The planned determination every two weeks of the amount of forage on the area, and the species and amount utilized by livestock, proved too much of a task. Three examinations of 627 grazed plots and 211 ungrazed plots for utilization were completed early in the season. Two of these were made before the cattle came onto the area in order to get an indication of utilization by deer. The third examination was made after the cattle had been grazing about one month. Only one more examination will be made this year and this will be at the end of the grazing season; more frequent examinations will not be possible anymore this season.

These data give a picture only of the species utilized and the proportions and parts of the plant taken. Quantitative yield data will be obtained for only a few species, as the exact method for obtaining such values must still be developed into final form.

Actual clipping of forage as a step for obtaining total yield of certain key species is now nearing completion. Grazed plants will be clipped at the end of the grazing season for the purpose of determining how much forage was consumed by the livestock. Comparisons between grazed yields and ungrazed yields will give the amount taken by the cattle.

In addition to the utilization data obtained on quadrats, direct observations have been made on forage species being utilized by cattle. By

following the livestock and watching them with, and sometimes without, field glasses, a record was made of the number of times each plant species was grazed. These observations gave an excellent record of the plant species grazed and also indicated which species were preferred at different times of the season. These records, together with chemical analyses of clipped forage, will be extremely valuable in planning the coming year's work.

The shrub species, particularly Purshia tridentata (bitter brush), form a very valuable part of the forage crop, especially late in the season. Considerable Arctostaphylos patula (manzanita) has been grazed, contrary to expectations. In order to obtain quantitative yield and utilization records of shrubs, which present even a more complex problem than the herbs, square plots 4 milacres in size were established around each of the 838 one-quarter-milacre quadrats on the area now used to sample the herbaceous cover. A record of the number and size of the shrubs found on the larger plots has been started to get at a method of sampling this class of plant. A continuous strip cruise is under way in which the number of shrubs will be counted by 2 1/2-chain units on a strip 13.2 feet wide. The plot data will then be compared with the strip cruise in order to determine which of the two methods will give a representative count of the shrubs. If this is once determined, counts and size determinations can be made on necessary areas and, finally, yield by sizes worked out by actual clipping. Clipping of Purshia for yield is being tried.

A vegetation type map has been one-third completed but is expected to be finished before the season ends. A majority of the forage species have been collected for identification. Seed has been gathered for possible seedling studies.

A few notes have been made on the habits of the cattle, which will

prove valuable in following and handling the animals in the future. Certain changes in design of the corrals and adjoining fences may be undertaken.

An automatic timer has been set up at one of the salt boxes so as to get a record of the time that cattle take salt. A similar set-up is in operation at the water troughs. With these timing devices the relation between salt and water consumption can be worked out. However, this year it looks as though not more than a month's record will be obtained before the end of the season. The recorder at the water is a hand-made affair and gives better results than a \$140 Bristol recorder which is set up at the salt ground, because the latter has not been functioning properly for more than half the time. Any little non-adjustment is sufficient to make it stop. A full week's record has been ruined by the instrument's stopping at inopportune times. The relation between range use and water and salt consumption is one of the pressing local forest problems.

Changes in the design of the experiment

The work of the past season has pointed to the inadequacy of quadrats for measuring plant utilization and the difficulty of sampling as large an area as 537 acres for other purposes as well. The physical task of walking over 22 miles of line for any one sampling effort points to the desirability of reducing the size of the experimental area and balancing off the time saved in walking by increasing the total number of plots to be examined. It can be seen that if the area were reduced in half, all of the plots now on 537 acres could be placed on half that area, which would increase sampling efficiency besides cutting down the walking distance.

It seems that the vegetation and most of the other conditions that need sampling are fully represented by a set of plots which adequately represent utilization.

Another point looms up at this time and that is that this year the 15 head of livestock on the area will not consume more than about half of the forage. It is recognized that the steers came onto the experimental area three weeks late and that it was a good feed year; yet it is felt that at least 20 animals can be grazed on the 537 acres, which means 26 acres per animal. If the area were reduced by half, 10 steers could be used. It seems that 10 animals is about the acceptable minimum statistically.

In order that sampling be improved, it is planned to cut the present area in two and conduct detailed research on one-half with about 10 head of long two or three-year-old steers. Livestock weights could be obtained on the other half of the area with an additional 10 head.

A means of locating livestock on the area is urgently needed. If nothing better can be found, bells will be placed on the cattle next season.

The proposed shift in plans will necessitate building about 1 mile of fence, staking out 400 or 500 additional quadrats, and fencing 100 or 200 of them. //

The construction of a rodent enclosure in the site-factor station is another urgent construction job. //

The great desirability of following animal and plant behavior from the very inception of growth and activity in early spring just as the snow melts, through the season until snow falls again, is indispensable for a full and proper understanding of what takes place in the field and for planning experimental work. Invariably predictions of what will occur in the field are wrong, at least to the extent that the time element is in error, and this leads to incomplete records and often no record at all. In starting investigative work where both physical construction and development of technique as well as actual

recording is involved, and as in all cases where equipment is limited and often long lapses of time take place before any piece of much needed apparatus can be obtained, much effective work time is lost.

A small three-room cabin consisting of a bunk and storeroom, a kitchen and bathroom, located near Cone Troughs, would permit men to stay on the job at Burgess Spring in early spring and during wet periods when roads to the Black's Mountain Branch Station are impassable. This structure will add at least one month to the beginning of the field season and will add another 15 or more days during the remainder of the season. The value of this time cannot be over-estimated.

An increased number of quadrats and a smaller area than last year are expected to be sown with pine seed again this fall. Unless seedlings can be obtained this way for livestock to "work on," the solution of the reproduction problem will have to await a good catch of natural reproduction, which seems slow in coming.

There are indications of an early winter, which necessitates early action on a good many of the problems reported here.