

RANGE-FORAGE Grazing Those engaged in managing range lands constantly have to decide Should Leave Fifth or the extent to which the range More of Plant Volume plants should be utilized. It is impossible to suggest to them a basis for decision that will apply to all ranges. A method can be outlined, however, that will fit most cases.

The first step is to find out what species can be perpetuated on the particular range with reasonable use and management and about how dense a ground cover can be expected. The type of soil, available moisture, temperature, and other such factors must be considered. The species that should be perpetuated can be decided upon from a study of existing conditions if the species occupying the range grow there naturally. If overgrazing, fire, or some other disturbing factor has favored the growth of the plants present on the range in place of others that would occupy it if it had been left undisturbed, then the species that occupied the range before it was abused must be determined.

The next step is to ascertain which are the better forage species. Livestock rather consistently eat certain species in preference to others. Generally, a good forage plant is relished by livestock, is nutritious, has no bad effects, grows either abundantly or to a large size, or both, so that it makes up an appreciable proportion of the forage and holds its own well in competition with other plants. If, in addition, it is a good soil binder it has added value for watershed and soil protection. It is species of this kind that should be perpetuated and, therefore, upon which the management of the range should be based. Experience and experimentation have shown that range abuses, such as too heavy grazing, or too early grazing, result in the killing out of the better forage species and the coming in of inferior species. The livestock thus get less feed, and feed of poorer quality. Often poisonous plants are among the species that replace the better forage plants. Usually, also, depleted ranges are subject to erosion and contribute to floods.

Perpetuating Desirable Species

The next question is how to manage the grazing so that better forage species will be perpetuated in a vigorous condition. Protection from too early grazing and opportunity for the plants to produce sufficient seed are important. The food used by the plants and stored in them is synthesized in the leaves. Therefore, it is essential that there be a fair amount of leafage all during the growing season. Species differ in the amount of leaves and stems they can lose and still remain vigorous. As a general rule, however, about one-fifth of the volume of the herbaceous species should be left at the end of the grazing season. If more is taken the plants will weaken and die. A few species will not endure even this degree of utilization. Blue-bunch wheatgrass (*Agropyron spicatum* or *A. inerme*), for example, apparently will not continue to do well if more than half, or at most two-thirds, of the plant volume is utilized each year. In the case of browse species, enough of the new twig growth should be left each year so that there is an average of one or two lateral buds to the twig. Heavier use results in hedged, scrubby plants with many dead limbs and twigs, and eventually in death.

Where the soil is loose, the slope steep, the range partly depleted, or where other special conditions exist, the degree of utilization must be less than that indicated above.

The most important points are to perpetuate the better forage species and leave one-fifth or more of their volume each year. If this is done one need not be concerned about the less-palatable species, for it is certain they will be unharmed. Nor need one ordinarily (very steep slopes and loose soils are exceptions) be concerned about injury to soil, watershed, or timber reproduction, for on ranges where the plants are properly utilized injury to other resources is rarely found.

ERNEST WINKLER,
Assistant District Forester, Forest Service.

RANGE Stocking Must Be Conservative to Allow for Poor Years. Few things have as vital an effect on the range-cattle industry of the Southwest as the variation in yield from year to year of perennial range grasses and the consequent unevenness in the capacity of the range to support livestock. Over most of the region the native perennial grasses are the basis of the forage supply for at least a part and in many cases a very considerable part of the year. Other vegetation may serve as a supplement and occasionally is of extreme importance in times of drought; but its failure does not ordinarily cause the same degree of concern as a failure in the perennial grass crop. A study of the annual yield of perennial grasses made by the Forest Service at the Santa Rita Range Reserve in southern Arizona has proved of considerable value in pointing out the need for a strictly conservative basis of stocking if this important forage is to be maintained on the range in sufficient quantity.

The data on yield have been collected for six separate years, 1921, 1922, and 1925 to 1928, inclusive—years that averaged from fair to excellent in production. In the drought year, 1924, practically no growth was produced on the area studied. During the six years of study six important grass species on a given area showed an average high yield of 176 pounds in the best year, as compared with 52 pounds in the poorest year.

In the foothill type of range, four important grass species showed an average variation in yield on a given area of from 21 pounds per acre in a poor year up to 121 pounds in a good year. The 6-year average in the foothill type was 70 pounds; and a summarization of the data for the period showed that for three years the yield was below the average, for two years very slightly above, and for one year appreciably above.

In the mesa type, where two of the most important grasses were studied, the yield on a given area varied from 114 pounds in a poor year up to 260 pounds in a good year. The 6-year average yield in this case was 205 pounds. The yield in two of the years was very much below this average, in two slightly above, and in two appreciably above.

Individual species in both types showed generally a very much greater variation, the yield in a good year being from four to six times that in a poor year.