ABSTRACTS

THE following are abstracts of papers given at the annual meeting of the Range Management Society in Denver in January 1949.

Eradication of Big Sagebrush (*Artemisia Tridentata*)

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Big sagebrush is the dominant plant on the 96,000,000 acres of the sagebrush-grass type. It has increased in density and has spread to areas which were not originally sagebrush.

Where sagebrush prevents erosion and is valuable for browsing, it should not be removed. However, there are many areas where sagebrush hinders livestock movement and uses moisture which might be used by grass. Areas supporting thick stands of sagebrush will produce 1500 pounds of herbage each year when the brush is removed. Where the brush is eradicated and replaced with grass, it means better ranges.

Methods of eradication vary with such things as the type of brush, understory plants, topography, rocks, soil type, size and location of the area. Of the many methods of sagebrush eradication, burning is the cheapest and most widely adapted, but is also the most dangerous to use. Grass seeds can be drilled on burned areas without further seedbed preparation. Wheatland and brushland plowing are successful methods of eradication but are expensive. Railing is also adapted to big, brittle plants. Pipe harrows will kill small brittle plants and cover seed on rocky areas. Spraying with 2,4-D and related compounds is new but offers promise.

Eradication should not be carried out in the fall when the ripe sagebrush seed might be planted as the old plants are eradicated.

Either natural or artificial revegetation should follow eradication. The treated areas should be managed to give the grass a chance to grow, and to help prevent the return of sagebrush.

Comparative Yields and Cover of Native Grass on Pasture and Revegetated Areas at Hays, Kansas

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A question that is commonly asked when the matter of grass reseeding is being discussed is 'how do these reseedings compare with native pasture, that is, how do they compare in yields of forage and in basal ground cover?'

On the college farm at Hays, Kansas, 600 acres of cultivated land have been retired and seeded back to native grasses. This has provided ample opportunity to make observations between native pasture and reseeded areas. The college

land is a part of the mixed grass prairie occurring on the Fort Hays limestone outcropping. Short grass predominates on more level uplands and gentle slopes, while on the steep, rocky hillsides grasses such as big bluestem, little bluestem, and side oats grama are abundant. Western wheat grass, big bluestem, and other tall grasses accompanied by an understory of short grass make up the vegetation in the ravine bottoms and lowlands. On the rolling land adjacent to the pasture a reseeding program was initiated in the spring of 1941, and with the exception of 1943 and 1944, additional seedings have been made each year.

Permanent plots have been staked in these areas for use in determining ground cover and species composition. Since 1944, forage yields have been obtained by clipping representative areas each month from June to September. Both yield and ground cover data were obtained from the native pasture and an area of "go back" land which was turned back into the pasture in 1920.

The reseeding done on the college farm at Hays has not entailed any unusual methods of seed bed preparation or planting; however, no seedings have been total failures. The 1941 seeding was planted in a thin sorghum residue with a 10-inch semi deep furrow drill with flute feed. About 30 acres were seeded to blue grama and 6 acres to a bluestem mixture. The stand was well established by the end of the second season. In the fall of 1946, this 36-acre planting was mowed and baled, yielding about 800 bales of good quality hay. In 1947, 16 tons of baled hay were harvested from the same area. This seeding has been used in obtaining yields and cover for comparison with the native pasture.

The blue grama seeded in 1941 yielded an average of slightly over one ton of forage per acre, 1944–1948 inclusive. The average yield of the natural revegetation was about the same as the blue grama seeding, but included only 3 years data. The short grass in the pasture produced an average of 1700 pounds for the 5-year period. The yields of the natural revegetation and short grass represents production from areas previously grazed while no grazing occurred on the blue grama seeding.

A much wider margin exists between the native bluestem and that on the revegetated area. The reseeded mixture averaged over a ton per acre for a 4-year period while the grass on the hillsides in the pasture yielded only 1100 pounds for a 5-year average.

Again the pasture yield was from formerly grazed areas and on somewhat thiner soil than the revegetated grass which had received no grazing.

The monthly yields as a whole were greatest on June 1, this clipping representing all spring growth to that date. Production was progressively less each month from June to September.

Average seasonal precipitation (1944–1948) followed the same trend as yields when rainfall in April and May were combined. About 70% of the seasonal rainfall (April to September) was received before July 1.

The short grasses produced about 70% of their total yield before July 1, while the bluestem made less than 65% of their weighted growth during the same period.

The basal cover of the grass in the revegetated area gradually increased until they were about equal to the vegetative cover in the pasture. As usual, the short grass cover exceeds that of the bluestem. In eight years, the artifically revegetated area had attained a higher basal cover than the natural revegetation possessed after 28 years.

Kansas has 7 million acres which should be turned back to grass. If well estab-

lished, this grass should furnish about an animal month of grazing per acre on the average. Seasonal grazing for an additional million cattle would help materially in stablizing the agricultural economy of Kansas farmers.

Relationships between Land Taxation and Range Land Use

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Because rental values per acre of range lands are low, it is especially important that taxes bear a good relationship to the rental values. A range land tax that absorbs all or nearly all of the "economic rent" leaves scant incentive for private ownership and management of the land.

It is possible to develop good standards and guides for range land taxation based upon grazing capacity and economic rent. There are wide differences in the economic rent, per unit of grazing capacity, for range lands of high and of low productivity. Probably this varies for cattle from a high of about fifty cents an animal month of capacity to a low of twenty cents an animal month. The figures are based upon long-run price experience. These differences in the rental value per unit of capacity result in extreme differences in rentals per acre. Probably these extremes are from a high of about fifty cents an acre to a low of two or three cents an acre for the lowest grade of range lands attractive to private ownership.

Range land taxes should not absorb more than a third of the economic rent of the land. Such a taxation procedure would equalize the tax between grades of land and would strengthen the incentive for ownership of low-grade lands. This taxation procedure would also facilitate the restoration to range use the areas that have been mistakenly used and taxed as dryland agricultural lands.

Clipping Methods for Measuring Forage Yield

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Clipping methods for measuring forage yield are reliable, simple, adaptable, and relatively cheap. Also, results are in terms of weight and can be easily converted to pounds per acre.

Clipping methods are best adapted to localities or range management systems in which the growing season ends before grazing begins. Under this condition clippings can be made at the end of the growing period.

Only readily grazed species in accessible areas should be considered in sampling for forage yield. What should be clipped depends on which forage species are present and the kinds of animals grazing an area. Work can be reduced materially by employing principles of "Key Species" or "Key Areas" and by lumping similar species together for weighing.

Plots should be of an efficient, easily computable size and shape and large enough to yield a weighable sample on spring scales graduated to one gram. Grasses may be clipped at ground level or proper use height. Dead material should be discarded and weights taken when the herbage is air dry. However, herbage yields must be calibrated against actual stocking rates and utilization records before they can be safely used for adjusting stocking.

Public Land and Taxes

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Large blocks of tax-free public lands are often cited as a major handicap to local governments. It has been pointed out also that where some stockmen operate in part on public lands and others on private lands, inequalities in operating costs develop. Several authorities agree that the most practical solution is to raise grazing fees on public lands to the full commercial value of the forage.

In exploring the effects of public lands on the local tax structure, several facts have become evident. These are as follows: (1) Studies have shown payments in lieu of taxes plus Federal Government expenditures for developing the lands, frequently are much greater than potential taxes. (2) The public lands are a means for effective rural zoning with attendant savings to local governments. (3) Flood and fire damages, and resultant heavy local costs, should be less from government protected lands. (4) Good land use, often impractical under private ownership of range, timber, and watershed lands, may increase benefits and tax returns over wide down-stream areas. (5) Multiple use, usually neglected under private ownership, often increases local benefits.

Management of Reseeded Ranges

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Fifteen years' progress has made the range reseeding phase of the range conservation program very popular.

Unfortunately, grazing before the seedings are established, as well as the tendency to graze them too early, too close and for too long, are causing the early loss of some good to excellent seedings. This is causing some ranchers to wonder if seeded grasses can be grazed and kept in good production.

Experience in the management of seeded and native perennial bunchgrasses has taught us to:

1. Protect all range seedings from grazing until the grasses are well anchored in the soil.

2. Limit the degree of utilization to provide the needed residues to give surface protection to the soil to control runoff and erosion.

3. Apply the same grazing practices to reseeded and native perennial bunchgrass range for optimum forage production.

Three-, four-, five-, and six-pasture systems of rotation-deferred grazing are proving effective in keeping range seedings and native perennial bunchgrass ranges in high production. These are more effective than season-long grazing because they break up the seasons of use into grazing periods that:

1. Induce the livestock to harvest each years' forage crop with the least interference with normal plant growth.

2. Make it possible for the plants to frequently store up needed food reserves in their roots for survival and vigorous growth.

3. Allow the important forage grasses in each pasture to produce an occasional crop of seed to naturally reseed themselves.