

Benefits of Rotation-Deferred Grazing on Northwest Ranges¹

CLAUDE C. DILLON, Range Conservationist, Soil Conservation Service, U. S. Department of Agriculture, Spokane, Washington

In recent years there has been considerable discussion about the advantages and disadvantages of a rotation-deferred system of grazing as a grass management practice for improving our native rangelands. Many of these discussions have dealt with the theoretical aspects of this range practice. However, it is only recently that we are beginning to get hold of the results of ranchers' operations whereby we can measure the benefits of this system of grazing. There are a few ranchers who have practiced this system of grazing over a long enough period of time, and have kept sufficiently accurate records to actually measure the benefits on the ground. These benefits can be measured in terms of range improvement, increased forage production, and increased numbers of livestock run.

Dale Bly, a breeder of registered Aberdeen Angus cattle near Harrington, Washington, has been practicing a rotation-deferred system of grazing on his 840 acre ranch since 1950. Dale operated this ranch for two years before he asked his local Soil Conservation District for help in developing a conservation program. The grazing program prior to 1950, consisted of dividing his cattle into two herds, and turning each herd into a pasture, where they remained for the grazing season. The grazing season was from about April 1 to November 15, with the excep-

tion of a month from August 15 to September 15 when all the cattle were turned onto the wheat stubble. Dale, being a recent animal husbandry and range management graduate from Washington State College, soon realized that this grazing program wasn't what he wanted. Two pastures weren't enough to do a good job of animal husbandry on the range with his blooded Angus cattle, and, too, he felt his range was going downhill instead of improving.

Range Sites

With the assistance of Fred Greenfield, Range Conservationist with the Soil Conservation Service, a range site and condition survey was made in the spring of 1950. This survey revealed there were five distinct range sites on the ranch.

There were 265 acres in the Deep Loam Hill site in 1950, 121 acres were in good condition and 144 acres in poor condition. This site is characterized by rolling topography with slopes ranging from 0 to 40 percent. Soils are wind-laid silt loams over 3 feet in depth. The soil is free of stones and the entire site is readily accessible to livestock. The dominant vegetation on this site is beardless wheatgrass (*Agropyron inerme*), and Idaho fescue (*Festuca idahoensis*), with an understory of Sandberg bluegrass (*Poa secunda*). Beardless wheatgrass is more abundant on the southerly and westerly facing slopes, while Idaho fescue dominates the easterly and northerly facing slopes. Both species are bunchgrasses, but Idaho fescue is more of a cool

season plant than beardless wheatgrass, and the difference in growth habits naturally poses a problem as far as grass management is concerned on this site.

One hundred and thirty seven acres of the range were in the Channel-Scabland site, and all this acreage was in good condition in 1950. This site is a complex of soils and vegetation that is so interspersed that it makes it necessary to consider the area as a whole as a management unit.

Soils vary from very shallow loams to deep loams over basalt bedrock. There are numerous rock outcroppings. The topography is broken, but the overall slope of the land is not too great.

On the shallow soil areas, beardless wheatgrass is the dominant grass, with Sandberg bluegrass as an understory grass. On the stony and very shallow soil areas, Sandberg bluegrass becomes the dominant grass species. In the swales or depressions where the soils are deep, an entirely different plant community is found. These depressions collect and hold extra moisture; as a result these soils remain moist throughout most of the summer months. These soils are generally quite saline. The dominant grasses in these areas are giant wildrye (*Elymus condensatus*), cordgrass (*Spartina gracilis*), alkali bluegrass (*Poa junceifolia*), saltgrass (*Distichlis stricta*), and several sedges all of which remain green most of the season. Regrowth can be depended upon for this portion of the site.

The Biscuit-Scabland site occupies 260 acres of the ranch. In 1950, 40 acres were in good condition. This site is also a complex. The deep loam soil areas are 2-3 feet deep, 30-50 feet in diameter, and are rounded, giving the appearance of large round earth mounds. They are referred to locally as "biscuits". The areas between these "biscuits" have very shallow, stony loams which support Sandberg bluegrass and scab sagebrush,

¹Paper presented at the 11th Annual Meeting, American Society of Range Management, Phoenix, Arizona, January 28-February 1, 1958.

with an occasional bunch of beardless wheatgrass.

The dominant grasses on the "biscuits" are beardless wheatgrass and Idaho fescue, with Sandberg bluegrass as an understory. Cattle prefer the Sandberg bluegrass and beardless wheatgrass to Idaho fescue in the spring and early summer months, and in the fall they seek out the Idaho fescue. The biscuit areas produce the bulk of the forage on this site.

The Gravelly Loam site includes 150 acres and was rated in fair condition in 1950. This site has gently rolling topography. The silt loam topsoil is 10 to 12 inches deep, over beds of gravels and sands. It is considered a droughty site because of its limited water holding capacity. The site supports beardless wheatgrass, with a percentage of porcupine grass (*Stipa spartea*), and Sandberg bluegrass as an understory species. These species go into dormancy earlier on this site than on the deep loam site. This is due, primarily, to the lack of moisture.

The bottomland site comprises 27 acres. It is a level area that lies adjacent to a perennial stream. The soils are deep silt loams. Gravels and stones occur in the subsoil. These soils are somewhat alkaline. The dominant grass is giant wildrye. It is associated with saltgrass, alkali cordgrass and alkali bluegrass. At the time of the initial inventory this site was in fair condition.

Cheatgrass, big sagebrush, and several common forbs were found to be invading all range sites.

It should be brought out that this ranch lies in a 12-14 inch precipitation belt. Approximately two-thirds of the annual moisture falls in the form of snow during the winter and early spring months. May and June rains also contribute to the annual grass production. The summer months are usually dry

and warm. Fall rains do occur, but cannot be depended upon every year in sufficient amounts early enough for good fall regrowth. The elevation at the ranch is approximately 2,200 feet.

Wind blows quite constantly during the spring from the southwest, and contributes to the loss of moisture by evaporation.

This range inventory pointed up several problems. The different species of vegetation being produced on the five range sites are best adapted to different seasons of use by livestock. These different seasons of use had to be taken into account in planning a system of grazing that would bring about an improvement in the plant composition.

The condition of the range in relation to water and range sites pointed out a bad distribution problem. Season-long grazing had resulted in "spotty" grazing. There were areas badly overutilized and areas that were not used in the same pasture, which made it difficult to judge degree of use of the "key" grasses.

Application of the Survey

Using this survey as a basis for

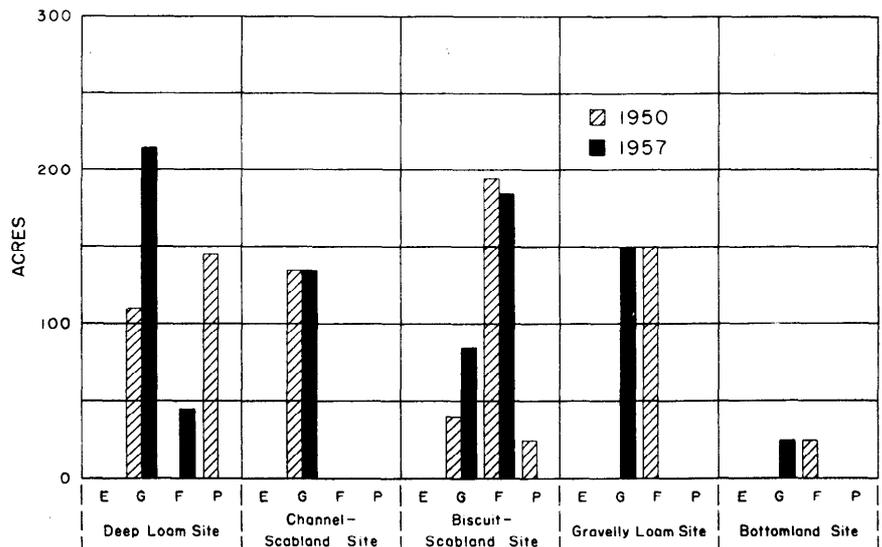
developing his range conservation plan, Dale divided his ranch into five pastures. Fences were placed, as near as it was practical to do so, on range site and on range condition boundaries, in order to get control of the grass resource. This required approximately 1½ miles of pasture division fence.

Three water developments were put in to provide adequate water in each of the newly created pastures.

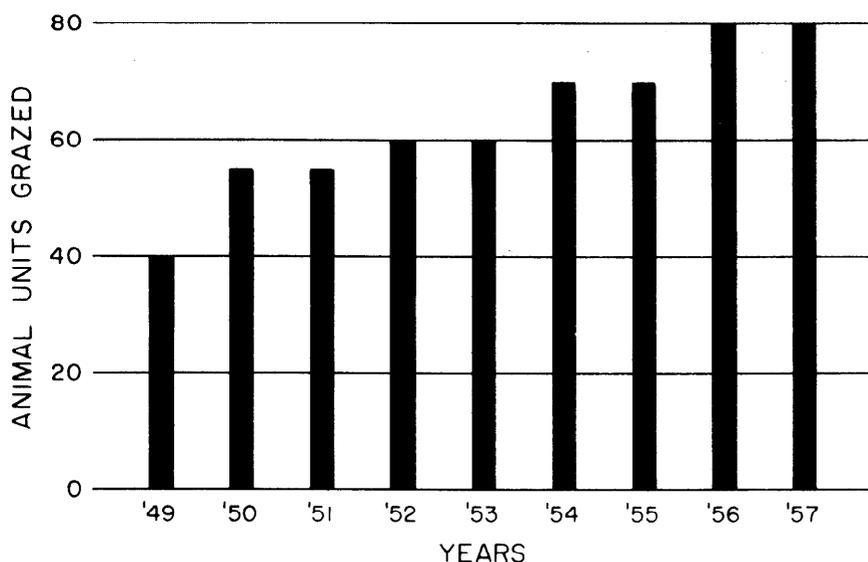
To correct the problems of improper seasonal use of the grass, bad distribution, and too heavy grazing of portions of his pasture, Dale inaugurated a rotation-deferred system of grazing.

This system of grazing allowed one pasture to rest until seed maturity each year. The sequence of grazing these pastures is varied each season, so as not to graze the same pasture at the same time each year. The proper degree of use of key grasses is the "calendar" used to determine when to move the livestock to the next pasture.

Four to five inch stubble height on beardless wheatgrass, 2-3 inch stubble on Idaho fescue, and 10-12 inches on giant wildrye, have proven to be good



Range improvement by range site and condition class on the Dale Bly ranch at Harrington, Washington, over the period 1950-1957, following the installation of a rotation-deferred system of grazing in 1950.



The number of animal units grazed for the entire season on the Dale Bly ranch increased rapidly after the adoption of a rotation-deferred system of grazing in 1950. By 1957 the ranch carried 80 animal units—twice the number supported in 1949.

guides to proper use of these plants. Dale makes his own use checks.

He has tried to leave more forage in the pastures that are grazed in the spring than he does in those pastures which are grazed in the fall after dormancy of grasses. This practice has assured him of more regrowth on his key plants.

Benefits of Rotation-Deferred Grazing

The rotation-deferred system of grazing has resulted in a uniform harvest of his grass crop. The greater number of livestock on a smaller pasture forced the livestock to graze over the entire pasture. They grazed areas away from water as well as those adjacent to water. There was not the selectivity in grazing that existed when the pasture was grazed season-long.

The results of rotating the grazing every 2 to 3 weeks between pastures brought other benefits into the program, which were not considered in the beginning. Pastures grazed before the first of June had sufficient moisture from the soil and June rains to make enough regrowth to complete their life cycle and

produce seed. This regrowth is then harvested after these plants have gone dormant. This made it possible to harvest two crops from the same pasture each year on pastures that were grazed early in the season.

One and sometimes two pastures have been deferred each year until seed maturity of the key grasses. This system has provided a natural reseeding program that has speeded up the establishment of the better grasses over the ranch. When Dale Bly first started his rotation-deferred grazing program, the poor condition range was given deferment two years in succession. This was necessary to improve the vigor of the beardless wheatgrass and Idaho fescue and give them an opportunity to produce seed and establish new plants. This practice has resulted in rapid improvement of the pasture southeast of the ranch headquarters, which was in poor condition in 1950. This pasture is now rated in good condition after seven years. Idaho fescue was the grass which showed the greatest recovery and was accountable for most of the improvement. The new fescue seedlings established easily

on this deep loam site and developed quickly into high producers as a result of rotation and deferment.

When cattle were turned into a pasture that had been deferred until seed maturity, Dale observed that the cattle went from one grass bunch to another eating the seed heads. The next spring young plants were establishing themselves in the droppings, which indicated that some of the seed passed through the digestive system and remained viable. No doubt much seed was shattered and planted by the livestock as they grazed the dormant grasses in the fall.

As the cow herd was moved onto fresh pastures every 2 to 3 weeks, Dale figured the milk flow for the calves stayed at a higher level later in the season. This was reflected by his records which showed the calves gained an average of 2 pounds a day from birth to weaning time.

Another benefit from this type of management, according to Dale, is that he now has much better fall pasture. He is able to leave his cattle on the range until snow, about December 1.

Improved Range Condition

After seven years of following this rotation-deferred system of grazing, another range condition survey was made to determine the amount of improvement that was made on each range site.

The Deep Loam site had 120 acres in good condition and 145 acres in fair condition; 98 acres improved one condition class.

The Channel-Scabland site showed improvement but did not change a condition class.

On the Biscuit-Scabland site, there were 25 acres in poor condition, 195 acres in fair condition, and 41 acres in good condition in 1950. In 1957, the 25 acres in poor condition had improved to fair condition; 43 acres had improved from fair to good condition; and 177 acres remained in fair condition.

All of the 150 acres found on the Gravelly Loam site in 1950 had improved from fair to good condition.

The Bottomland site improved one condition class; 27 acres were in fair condition in 1950, and in 1957 these acres were found to be in good condition.

Range improvement by range site and range condition class from 1950 to 1957 is shown in the accompanying chart.

Increased Grazing Capacity

Another way to measure benefits of this system of grass management is in the increase in the animal units that are grazed on the same range. Prior to 1950, Dale ran 40 animal units on his range. Almost immediately after starting this rotation-deferred system of grazing he was able to increase his herd to 55 animal units. This was made possible chiefly because of an even har-

vest of all of the forage, and re-cropping the pastures that were grazed first each spring. As the condition of the range improved Dale was able to increase the cow herd. In 1957, he carried 80 animal units on the ranch, exactly double the number he was able to run in 1950.

The second chart gives a graphic picture of the yearly increase in animal units Bly has been able to carry on his ranch throughout this period.

Benefits Summarized

In summarizing the benefits of the rotation-deferred system of grazing that has been in effect on the Dale Bly ranch for seven years, it can be said that the system corrected a bad distribution problem. He has been able to get improvement over all of his ranch, even though the "key" grasses have a different season of use. He now gets an even

utilization of practically all of his forage, which helps in determining proper use.

The systematic harvest of his grass crop has resulted in a 100 percent increase in the carrying capacity. He runs 80 animal units on the same range that would support 40 animal units seven years ago. Plants, when given the opportunity to fully develop before they are harvested, consistently yield more than plants that are harvested at weekly intervals, or more often, which is frequently the case when ranges are grazed season-long.

The quality of the forage has improved. This is reflected in heavier calves.

Dale Bly says it is the only system for his type of country, and he is planning a similar system for another ranch that he has recently acquired.