

# Grass Management Pays Big Dividends

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Net returns jumped from 4 to 83 cents an acre in eleven years on Howard Sachs' ranch solely through a sound grass management program, and Sachs has records to prove it.

The management plan Sachs used to make this possible was built on proper range use and a rotation-deferred system of grazing. Sachs not only increased his profits but improved the over-all condition of his range.

The increased production came from sound grass management on native rangeland and not from reseeding or from additional moisture. The program was developed with the assistance of Al Blomdahl, range conservationist, Soil Conservation Service.

Questions that flash into the minds of ranchers considering range conservation plans like Sachs' are: How much will it cost? How do I go about putting it into effect? What are the possible returns?

These are questions that every businessman asks when he considers a major reorganization or additional investments. Records of Sachs' operation provide answers to these and other questions.

Sachs grazes an 8,450-acre bunchgrass-sagebrush range on the southern slopes of Badger Mountain in Douglas County, Washington, for a period of seven to eight months each year. It is typical of thousands of acres of rangeland throughout the West.

## Climatic Conditions

The elevation at the ranch varies from about 1,500 to 2,500

feet. It is a few hundred feet lower in elevation than Waterville, 15 miles to the north, where the average annual precipitation is 10.6 inches. Rock Island, near the Columbia River some 10 miles southwest of the ranch, had an average annual precipitation of 9.52 inches for the years 1947 to 1957. Annual precipitation ranges from 5.45 inches to 17.41 inches (Table 1). About 70 percent of the yearly moisture falls between October and April. May and June rains contribute to grass production even though most of the grass crop is produced from moisture stored in the soil during late fall and winter.

Grass starts growth about March 20 and matures in early July. In some years there is a little fall regrowth in October and November. Daily temperatures during the summer have been recorded as high as 100 degrees.

A range condition survey was made for the ranch by Sachs and Blomdahl in 1946. This survey provided the basic information used in developing the rotation-deferred system of grazing that Sachs planned and put into effect the spring of 1947.

## Range Sites

There are three main range sites on the ranch. The site that covers most of the acreage and contributes most to production is the Silt Loam site with soils over two feet in depth. The major plants on this site are bluebunch wheatgrass (*Agropyron spicatum*) and big sagebrush (*Artemisia tridentata*), with an understory of Sandberg bluegrass (*Poa*

*secunda*) and cheatgrass (*Bromus tectorum*). Idaho fescue (*Festuca idahoensis*) shows up occasionally on north-facing slopes.

Associated with the silt loam is the Scabland site primarily along ridge tops. Soils are very shallow and stony. The vegetation is primarily Sandberg bluegrass and low sagebrush (*Artemisia arbuscula*).

The Rockland Foot Slope site occurs along the steeper canyons. The foot slopes, of colluvial material of varying depths, support bluebunch wheatgrass, Sandberg bluegrass with a few scattered plants of giant wildrye (*Elymus condensatus*).

Bluebunch wheatgrass produces the bulk of the forage on the ranch and is the basis for Sachs' grass management program.

Although there were several pastures already on the ranch, three and one-half miles of additional inside fence were built to control the grazing more effectively on each range site. This additional fencing was done in the fall of 1946.

## Grazing Program

Before Sachs entered into his program of range improvement, the gates were left open except to the pasture used for early spring grazing. Cattle roamed from pasture to pasture at will. Now all gates are kept closed. Cattle never enter a pasture until driven there at the scheduled time.

Sachs had been taught as a boy that when the surface soil of ranges reserved for spring use had dried to a depth of a "jack knife blade" (about four inches), all livestock had to be moved off if those ranges were to remain in good condition.

Sachs makes this moisture test daily in the spring to make certain the livestock are moved in time. This "rule-of-thumb"

**Table 1. Annual precipitation, 1947-1957, at Rock Island, Washington, ten miles southwest of Howard Sachs' ranch.**

Years	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Ave.
Inches	5.45	17.41	5.77	12.60	11.87	6.43	9.63	5.92	9.40	10.75	8.31	9.52

method he uses to judge soil moisture conditions has proved to be a good one. Four years out of five, enough moisture was left in the soil after grazing stopped for bluebunch wheatgrass to start growth again, complete its normal growth cycle and produce seed. This second crop of grass is reserved for spring feed the following year.

Sachs never turns his livestock on the range in the spring until there is enough new growth to supplement the dry grass that is carried over.

The pasture used for early spring grazing for many years has remained in good condition.

Over the rest of the ranch, areas on which livestock grazed for the remainder of the grazing period were in fair and poor condition. These areas were grazed closely every year during the period of active plant growth. Bluebunch wheatgrass had died out over much of the range on this portion of the ranch. Plants that were left were being protected from grazing by plants of big sagebrush. Cheatgrass and big sagebrush had taken over the space formerly occupied by bluebunch wheatgrass. The only areas of excellent condition range that could be found were areas farthest from water and seldom grazed until the rest of the range had been overused.

Plants, like animals, must be fed to keep them alive. Bluebunch wheatgrass plants draw upon the food reserves stored in their roots from the time they start growth in the spring until they develop seed. Food reserves in the roots are at their lowest about the time the plants are in the "boot stage." The plants do not replace these food reserves until after seed heads start to

yellow or the plant goes into dormancy (McIlvanie, 1942).

The rotation-deferred system of grazing that Sachs planned was developed around this basic principle of plant growth and plant development.

In the pasture grazed first every spring until the soils dried to a depth of about four inches, the plants were able to keep the food storage in their roots filled to capacity.

To give the bluebunch wheatgrass in the other pastures the same opportunity, Sachs scheduled the harvest of his range grasses in such a way that no pasture, except the early spring pasture, would be grazed at the same time year after year. Pastures that were grazed during the period of active plant growth one year were deferred one and sometimes two succeeding growing seasons to give the grass plants an opportunity to regain vigor. These deferred pastures

are grazed in late summer and fall.

This program made it possible for the grass plants to become vigorous. Young and small plants increased in size. New plants became established from seed. As this process of plant succession continued, the condition of the range improved.

Cattle are moved from pasture to pasture every two to four weeks depending on the feed supply.

The rotation-deferred system of grazing that Sachs uses is a good systematic method of harvesting range vegetation. Sachs, after using this system for ten years, points out that the amount of forage harvested in a pasture by livestock in any season has to be watched closely for best results.

#### Proper Range Use

The "calendar" that he uses to tell when to move his cattle from one pasture to another is the degree of use on his key grass, and not the calendar hanging on the kitchen wall.

Sachs keeps a close watch on

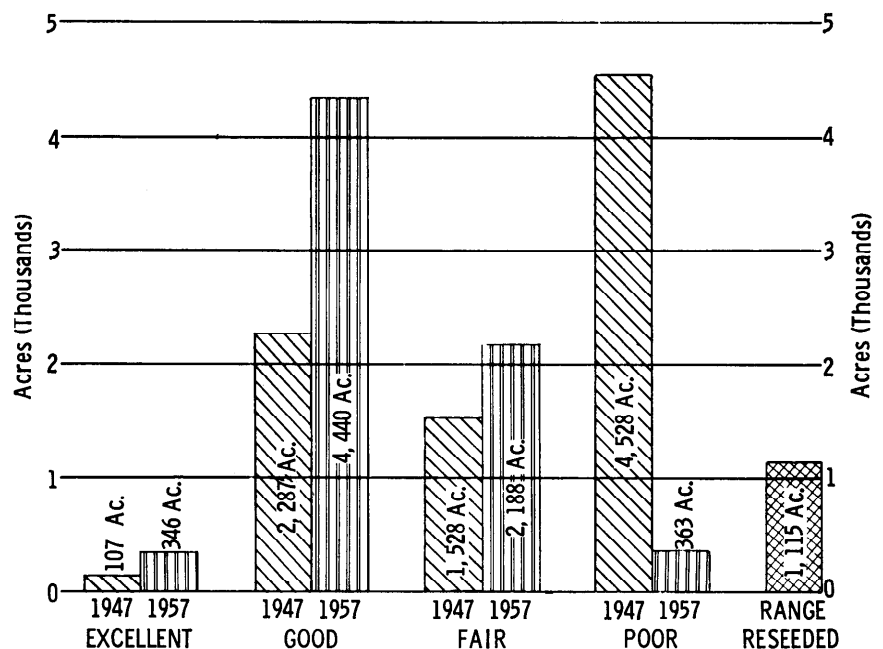


FIGURE 1. Acreage in each range condition class in 1957 compared to acreage in each class in the spring of 1947 when Sachs started his grass management program.

**Table 2. The number and class of livestock grazed on the ranch, percent of calf crop and weaning weights of calves for an eleven-year period.**

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Cows over two years old	80	80	90	95	110	120	130	140	151	151	117
Yearling replacement heifers	0	10	10	20	15	15	15	20	20	20	13
Calves	75	75	78	82	90	96	110	119	129	104	93
Percent calf crop	94	94	87	86	82	80	85	85	86	69	80
Average weaning weight	385	385	395	420	425	430	438	440	440	445	490
Hold-over yearlings for sale	0	0	0	0	0	0	60	60	99	109	91
Bulls	4	4	4	5	5	5	5	6	6	6	6
Horses	3	3	3	3	3	3	3	3	3	3	3
Two-year-old steers	0	0	0	0	0	0	0	0	0	0	9

his grass. When the cattle graze bluebunch wheatgrass to an average stubble height of four to five inches, he moves them to the next pasture. He learned by experience that this stubble height represents approximately 50 percent removal of the current year's growth. This is the maximum that can be harvested, he says, in any one year if bluebunch wheatgrass is to remain vigorous and increase in composition over the ranch—a goal he is shooting for.

The condition of the range improved over the ranch as a result of the program that had been applied. In order to have a measurement of the amount of improvement made, another range condition survey was made for the ranch in 1957. The results of this survey were compared with the original survey made in 1946.

In eleven years 346 acres had improved from good to excellent condition; 4,440 acres that were in fair and poor condition improved to good condition; and still another 2,188 acres of range that were in poor condition improved to fair condition (Figure 1).

#### **Livestock Numbers Fluctuate With Forage Supply**

Before any grass management program becomes effective, livestock must be in balance with the forage supply. In the process of developing his plan, Sachs decided to reduce his herd. The condition of his range indicated that 80 cows were all the range would support until it had a chance to improve. Sachs had been running about 160 head. He sold down to 80 in the fall of 1946. Naturally he kept the best cows he had on the ranch.

Calves are born in March and April and sold as weaners in November when the cows come off the range. To give flexibility to his stocking program, some calves are held over and marketed as yearlings. Sale time is governed largely by the remaining feed supply.

The percent of calf crop fluctuated quite a bit over the years (Table 2). There was a reason. In the first two years after Sachs started his program the calving herd was mature cows. When the two-year-old heifers came into production, calving percentage dropped. Also, in 1955 one of Sachs' bulls proved sterile, and he attributed the low percentage of calf crop in 1956 to this.

In 1956 over a thousand acres were still in such poor condition that Sachs decided it would be more economical to reseed these

**Table 3. Annual costs per acre while livestock were on the range. Costs are divided into land costs which are fixed and livestock costs which tend to fluctuate annually.**

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Fixed annual land costs											
per acre of rangeland											
Fencing	\$ .07	\$ .07	\$ .07	\$ .07	\$ .07	\$ .07	\$ .07	\$ .07	\$ .07	\$ .07	\$ .07
Taxes	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05
Interest on investment of rangeland	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04
Total annual land costs	\$ .16	\$ .16	\$ .16	\$ .16	\$ .16	\$ .16	\$ .16	\$ .16	\$ .16	\$ .16	\$ .16
Annual livestock costs											
per acre while on rangeland											
Labor	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16	.16
Veterinary supplies, salt, etc.	.02	.02	.02	.02	.03	.03	.03	.04	.04	.04	.03
Insurance and taxes on livestock	.01	.01	.01	.01	.01	.01	.02	.02	.02	.02	.01
Interest on investment in livestock while on range	.08	.09	.10	.11	.12	.12	.13	.14	.16	.16	.12
Pick-up truck expenses	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07	.07
Total annual livestock costs	\$ .34	\$ .35	\$ .36	\$ .37	\$ .39	\$ .39	\$ .41	\$ .43	\$ .45	\$ .45	\$ .39

**Table 4. Annual production cost and net returns to range improvement and management per acre of rangeland.**

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957
Total pounds of beef produced from rangeland	24,591	27,021	30,810	38,440	41,250	44,255	58,680	64,640	69,041	59,054	62,844
Pounds of beef produced per acre of rangeland	2.9	3.2	3.6	4.5	4.9	5.2	7.0	7.6	8.2	7.0	7.4
Gross income per acre from beef @ 18.5¢ per pound	\$ .54	\$ .59	\$ .68	\$ .85	\$ .91	\$ .96	\$1.28	\$1.40	\$1.51	\$1.28	\$1.38
Total land and livestock costs per acre of rangeland	.50	.51	.52	.53	.55	.55	.58	.59	.61	.61	.55
Net return to range improvement and management	\$ .04	\$ .08	\$ .16	\$ .32	\$ .36	\$ .41	\$ .70	\$ .81	\$ .90	\$ .67	\$ .83

acres than to restore them through management alone. The reseeding program started in 1956 called for excluding two pastures from grazing for two years, which is the reason the breeding herd was reduced in 1957 as shown in table 2.

As the range improved, several changes took place. Calves of approximately the same age were weighing more at selling time. Cows developed into larger animals even though heifers were bred to calve when they were two years old. There were fewer "cutbacks" at selling time. More of the animals brought top prices. Sachs is sure these extra benefits were the result of better quality feed for the herd while on the range.

### Production and Income

In calculating production and income from the range, as shown in table 3, Sachs considered only the production from the calf crop and gains made by yearlings, whether they were sold or held for replacement. The weights of cull or fat cows sold were not used.

Sachs was conservative in figuring production from his calves. He deducted the normal birth weight of 70 pounds per calf. He reasoned that the cows were not on the range for nearly four months prior to calving, and too, he wanted to know the gains made by the calves while on grass. This was one way to arrive at their weight when they were turned out in the spring.

Gains made while grazing grain stubble fields, usually for 30 days each year, were subtracted from the selling weights. This off-the-range gain was computed by multiplying the average daily gain per calf for the season by the number of days they grazed on the stubble fields.

Sachs weighed the calves held over at weaning time and again in the spring as they were turned on the range. This gave accurate gains made on grass by yearlings.

In eleven years beef production increased from 2.9 pounds to 7.4 pounds per acre—a 255 percent increase. Net returns to range improvement and management over this same period jumped from 4 cents to 83 cents per acre.

The total in pounds of beef produced on grass was multiplied by 18.5 cents—the long-time average price for beef—to determine gross income from grass.

### Expenses

The items of expense chargeable to land and livestock while on the range were taken from ranch records and are shown in table 4 on a per acre basis. Costs such as taxes, fence construction and maintenance, and interest on investment in land were considered as fixed costs and they remained the same during the period of 1947 to 1957. The fixed costs amounted to 16 cents per acre. Costs chargeable to livestock while on the range fluctu-

ated during this same period from 35 to 45 cents per acre.

### Summary

The grass management program that increased net returns from 4 to 83 cents per acre in eleven years on Howard Sachs' ranch was based on proper use of the key range grass, bluebunch wheatgrass, and a rotation-deferred system of grazing.

Grazing the same pasture early every spring did not cause range deterioration. One reason why the range held up over the years was that all livestock were moved off before the grasses were grazed too close and while there was sufficient moisture in the soil profile for plants to start growth again and complete their normal growth cycle four years out of five.

The rotation-deferred system of grazing that Sachs follows was so designed that no pasture on the ranch, except the one used for early spring grazing, is grazed at the same time year after year. This makes it possible to defer the grazing of all the range one and sometimes two successive years during the period of rapid plant growth when food reserves are lowest in the root systems.

Under the system of grass management applied on this ranch, all the range improved in condition. On the better sites the range improved as much as two condition classes.

Sachs kept livestock numbers in balance with the feed supply by adjusting the size of the

breeding herd. Calves were held over and marketed as yearlings. The current year's feed supply largely governed the date yearlings went to market.

Livestock were moved from

pasture to pasture every two to three weeks. They were moved when it was determined the forage in the pasture had been properly used and not on a predetermined calendar date.

#### LITERATURE CITED

McILVANE, SAMUEL K. 1942, Carbohydrate and Nitrogen Trends in Bluebunch Wheatgrass with Special Reference to Grazing Influences. Plant Physiology Vol. 17, No. 4, pp. 540-557.