

Range Improvement on the Flat Top Ranch in Central Texas¹

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Those of us who have been employees of the Flat Top Ranch from the beginning of the range improvement program like to think of Mr. Charles Pettit, the owner, and all the employees as one large family, the Flat Top Ranch Family. As would be expected, all members of the family do not agree on every detail of the different practices used in connection with the program. However, there are several things that all do agree on, (1) *the key to a permanent range is grass cover*, and (2) the native tall bunch grasses, principally big and little bluestem, Indiangrass, and sideoats grama, fit best into the program in our area.

The Flat Top Ranch is located near Walnut Springs, in Central Texas, about 70 miles southwest of Fort Worth. It now includes 17,000 acres of rolling Grand Prairie solis, of which only about 10 to 15 percent is deep enough to be suitable for cultivation. The average annual rainfall is about 32 inches, and the principal vegetation consists of tall bunch grasses. Some invasion of oak, cedar, and other brush has occurred since the area was first settled, almost 100 years ago.

Initial Condition of the Ranch

Mr. Charles Pettit first started the ranch with a purchase of 7,000 acres in June, 1938. Less than 400 acres were in cultivation. In subsequent years, 28 additional tracts, ranging from 80 to 1,000 acres, and including 3,000 acres of cropland, were purchased to bring the ranch to its present size of 17,000 acres.

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At the time of the purchases, all the cropland was low in production due to continuous cropping without any soil improving practices. Clean farming, burning of crop residues, and other malpractices had permitted erosion to become severe on much of the cropland.

All the rangeland had little grass and was infested with weeds, cactus and needlegrass, which was due to overstocking and yearlong use. Many early settlers practiced rotated burning, first to remove what was considered to be an excess of litter, and later, as a method of controlling invasion of cedar and seedlings of other plants.

With few exceptions, all improvements such as fences, buildings and pens were in very poor state, having no value whatsoever in some cases. We believe these conditions were principally due to improper land use, and were positive evidence of the operator eliminating himself by failing to maintain the productivity of the topsoil. We recognize that many of the units were too small, and that droughts, floods and economic conditions were contributing factors. However, regardless of adverse conditions, or size of unit, we believe that the only assurance of a permanent agriculture is maintenance of the soil fertility.

When Mr. Pettit made his first purchase in 1938, he immediately started a program of land improvement. An agreement was signed with the Bosque Soil Conservation District in 1941, and a complete conservation plan was prepared for the ranch. As each tract of land was added, it was treated more or less as an individual unit until it was brought back to full

production and could be added into the over-all ranch plan.

Cropland Improvement

For cropland, the improvement program included first retaining only land suitable for cultivation, land classes I, II, and III as classified by soil scientists of the Soil Conservation Service. Only about 40 percent of the original cultivated land remains in crops today. However, it produces now as much as the original total.

Soil improvement practices are used intensively for cropland. Winter legumes, generally Austrian winter peas, vetch, and sweet-clover, were used to improve badly depleted soils. Rotations of winter legumes followed by Sudangrass, or by 2 or 3 years of corn or grain sorghum used for ensilage, and legumes seeded with oats, barley or rye, used for grazing only, are used in the cropping systems. About 40 pounds of superphosphate has been applied to all land planted to legumes.

All sloping cropland has been terraced, and diversion terraces have been built to control outside water where needed.

We believe that the improvement of cropland on a ranch should be given first consideration. The cropland can contribute materially to the production of hay and grazing crops that can be used profitably to take the pressure off native grazing lands.

Both water and summer supplemental pastures are used on the Flat Top Ranch. Sudangrass planted on cropland for summer grazing helps to relieve the load on range areas so that the tall grasses are able to make sufficient growth to establish a good cover and make some seed. Oats, rye and barley for cool-season grazing relieve the load on a dry range to the extent that some of the grass cover is left for litter, also allowing the native grasses to make considerable growth during the early growing season before starting to graze them.

As we look back on the improve-

ment program of different range areas, we are inclined to believe that some of those crops of grain that were used for pasture only are still paying off due to the fact that they helped to establish a range condition that does not require as much mowing of weeds and lessens the effort to control the growth of cactus and woody plants.

The improvement of production on the retained cropland was much quicker than the re-establishment of the retired cropland to grass, or the improvement of grasses on the badly infested rangeland.

Reclaiming Old Fields

The land retired from cultivation consisted mostly of steeply sloping, shallow and eroded soils. After much effort to re-establish grasses on this land, we found that, where at all practical, it was a good practice to grow a legume on the land before seeding, leaving all the growth of the legume plant for litter in which to seed.

We seeded some of the old fields to native grasses, and some to introduced grasses, such as King Ranch bluestem, Dallisgrass and others. We sodded some to buffalograss, a native grass common on heavily used pastures. We find that none of the introduced grasses, that some would call "Wonder Grasses," fit into the permanent range program as well as the native grasses. The native tall bunch grasses are even taking over and crowding out the buffalograss, after several years of controlled grazing.

Control of Woody Plants

The removal of woody plants and cactus was the first step in improving the range land. This was done by bulldozing cedar and underbrush, by hand grubbing, hauling and piling the cactus, and by hand-spraying chemicals on large trees.

Woody plants were removed from the shallow soils, such as the upland hillsides and ridges first due to less cost, leaving the creek bottoms and deep soils where there

was a heavy growth of large timber and underbrush to the last. However, we believe, now that the creek bottoms have been cleaned out and re-established to grass, that it would be more profitable to the beginner to give the deep soils first consideration.

It may take 4 to 6 years to re-establish a good cover of grass on the shallow soils where little bluestem, sideoats grama and tall dropseed are in the majority in the composition. On the other hand, we have observed that in some cases on the deep soils, the tall native grasses, as big and little bluestem and Indiangrass, have developed into vigorous growing plants within 2 to 3 years following treatment. In our immediate section, we believe that the potential production of the deep creek bottom soils is 10 to 1 that of the shallow soils on the ridges. Although the first cost of controlling brush is much greater per acre, the recovery of grasses and response to seeding is much quicker on the deep soils and the yields are enough greater to balance the cost.

We have found that it is a long way from weeds, cactus, woody plants, and needlegrass on the badly infested range lands to a good cover of the tall native bunch grasses. We are reminded of a statement made by a young man several years ago. This young man and his wife had purchased some rangeland in Central Texas which was heavily infested with about all of the undesirable plants that can be found on a range. They had come to the Flat Top Ranch to observe some of the range improvement practices. Due to their profound interest, we took considerable time and went into detail to explain the many things that had been done to re-establish the grass cover on the ranch. When we had finished, the man said, "Hedrick, we have to buy the land too many times." In reply we said, "Yes, the purchase price of a piece of range land infested with undesirable plants is only a down payment on the finished product."

We have had to do some follow-up work to control sprouts and weeds. We have used sheep and goats to graze off sprouts, mowed weeds and hand-cut sprouts, and sprayed chemicals on weeds and sprouts.

Management Follows Improvement

However, our basic program has been built around deferring pastures and controlling grazing to give the native grasses their best opportunity to grow. We believe that the following benefits have been obtained from keeping a good cover of the native grasses: the grasses compete with and help to control the invading plants, it is the most practical way to tie down the soil, we have had a minimum of evaporation losses, the soil structure is such that rains are absorbed and stored, and the litter is the source of organic matter which is essential on our high lime soils and Central Texas climate.

During the early years of the range improvement program, there was much hay fed to livestock on the range. From observation of the recovery of the range areas where this was done, we believe that the cost of hay fed to conserve cover and litter can be charged off over a period of years. From experience we are convinced that any continuous practice of controlling the growth of undesirable plants by mechanical means is *not* practical.

In addition to grass cover as a means of conserving soil and water, there has been considerable effort made at Flat Top to conserve and make use of runoff water. There have been some 50 earthen dams built with ponds and lakes ranging from 1/2 to 90 surface acres. It is estimated that the total surface area is 250 acres, with an average depth of 10 feet, or a total of 2,500 acre-feet of impounded water if and when all are full.

Do Improvements Pay?

There are many people who ask, "Can the small owner afford grass cover?"

To answer this question, let us ride in a pickup as we drive over some of the ranch on September 24, 1955. During the early morning hours of September 23, 5 to 6 inches of rain fell on the ranch and surrounding area within three hours. All streams adjoining the ranch flooded. There was some flooding of streams that drain the watershed above the ranch. However, there was no flooding of draws or branches that drain ranch land only. Many of the ponds did not catch full. Some small ponds which were dry before the rain caught very little water.

Shortly after leaving the ranch headquarters we turn east on the county road that runs through the ranch. As we come upon a small rise in the road we see a small pond just below the road. The drainage area of this pond is an estimated 80 or 90 acres, 30 acres of which is in cropland. All of the cropland drains across the range land. The amount of water that the pond had caught was less than one acre-foot, much of which apparently had drained from the surface of the road as the water was discolored from the clay that serves as a binder in the material used to hard surface the road.

As we stop on this rise and observe the small pond that is practically empty after the 5 or 6 inches of rain that fell in 3 hours, we would like to go back to the time of purchase of this land.

The drainage area is a part of a 1,000-acre tract that was purchased in 1940 for 14 per acre. The range land was infested with cactus and weeds. The area under cultivation was very low in organic matter and had a very poor soil structure. We remember repairing the fence on both sides of the road after one heavy rain during the early part of the operation of Flat Top. The net wire on the fence had caught enough trash collected off the drainage area by runoff water to cause the fence to go out.

The drainage area since purchase has been maintained at all

times under a good grass cover by removing cactus and mowing weeds, followed by controlled grazing. The stocking rate is now higher than the recognized rate of stocking on adjoining areas where grass cover has not been maintained. The small pond, which under good cover caught so little water, was built principally to catch silt and is one of a series of six ponds built above one of the larger ponds on the ranch.

The larger pond was built in 1940, being completed in April, and has a drainage area of 2,200 acres. The pond when full has a surface area of 30 acres, with a maximum depth of 35 feet, and an estimated average depth of 10 feet, or a total capacity of 300 acre-feet.

At the time the pond was built, approximately 900 acres of the drainage were under cultivation, much of which was very steep. All range areas were in poor condition. More than 50 percent of the drainage area was owned at that time by small farmers. One rain during the latter part of May, 1940, filled all six of the catch ponds above, and filled the large pond, then flooded to the full capacity of the spillway, 300 cubic feet.

Today, all the drainage area is under Flat Top management. The cultivated acreage of the drainage area has been reduced to approximately 350 acres, and the retired acreage has been established to a reasonably good cover. The range land has been improved to what we consider a fair to good condition. Before 5- to 6-inch rain of September 23, the water in the large pond was very low. As we drive across the dam of the pond on September 24, we estimate that the water level had risen 5 feet, an estimate of 30 acre feet run off from 2,200 acres, or about 1/6 of an inch per acre. The rest of that 5 or 6 inches had soaked into the soil where it will be used to grow grass.

One rancher who owns and operates 1,000 acres of land, all of which lies within a neighboring

creek valley, told us that his branches and the main creek of the valley were the highest on September 23, 1955, they had been in 33 years.

Better Grasses Mean More Water

As we go about our daily task, we have been able to make many simple observations which are very convincing. During the winter months, we have been digging and balling trees for transplanting. Some of the trees have been taken from Flat Top Ranch land and some of the trees have been taken from land immediately adjoining the ranch. The trees are dug with hand labor to a depth of 3 to 3½ feet. It is interesting to note how much more moisture is in the soil, and how much better the structure of the soil, where the trees are growing on deep soils that have some grass cover compared to no grass cover.

In another observation, there is a branch that forks just outside of the ranch, one prong coming out of the ranch and the other prong draining through adjoining land. As we cross the prong on the ranch there is running water while on the prong on the other ranch there is no water to be found. This dry branch flooded during the heavy rain of September 23, according to debris and other evidence.

The running water in the streams on the ranch, we believe, is due to the effect of range land under cover and to the impounding of runoff water. We would venture to say that where water has been impounded and held for as much as 12 months, there has been a movement of water through the subsoil, back into the bed of the stream, and starting the stream to flow below the dam.

Below the large dams on the creeks that have considerable drainage areas, there have been several low dams built which impound water to the extent that the creek channel stands full. The water level in these ponds is maintained by opening a valve which releases water from the larger

pond above. The subsoil of the creek bottom land along the channels is irrigated sufficiently to affect the growth of the deep-rooted grasses. There has been vigorous growth of grass on some of these areas during extreme dry surface conditions.

Due to the extreme dry conditions of the subsoil of this area,

after several years of drought, the movement of water through the subsoil has been very easily traced by the growth of the plants. The deep-rooted grasses seem to be able to go the greatest depth for this moisture.

In conclusion, we have heard much about the small operation versus the large operation. As we

think of the practices used to improve and maintain range land, we realize that each tract of land that was added had to be treated as a unit in bringing it back into production. It matters not how large or how small the operation, the important thing, we believe, is regaining and maintaining production.