The Effect of the 1949-1954 Drought on the Ranges of Texas

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Localized droughts have been fairly common in Texas, but never before in the recorded history of the state has a drought been so widespread and severe as that of 1949-54. During this 5-year period the lack of rainfall and hot scorching temperatures continuing for month after month brought death in large areas of grassland to the cover of grasses and forbs as well as to many woody plants. Depleted vegetational covers led to the loss of fertile topsoil through wind erosion in many areas in the state.

The drought was as severe on livestock as on the forage which they grazed. Many range animals died and reproduction was greatly reduced (Fig. 1). Through lack of vitamin A, cows often gave birth to dead calves.

The long duration and severity of the drought caused many ranchmen to lose their life savings in attempting to maintain both breeding and commercial herds by continued purchases of large amounts of feed to supplement the sparse native forage.

Forage and Soil Depletion

In the sumer of 1954, millions of acres of grassland ranges appeared to be from 75 to 95 percent devoid of the better grasses (Fig. 2). During windy periods, heavy losses of surface soil and plant residue occurred, especially on heavy clay soils and on sandy soils that comprise large acreages in the state.

With the resumption of rains in the fall of 1954 and in the spring and summer of 1955, considerable topsoil was lost from heavily utilized areas supporting little or no plant residue. Severe gullying occurred on the steeper slopes from storms of high intensity common during this period. Thus the combination of ranges depleted from a long period of drought and intense and often excessive rainfall following the drought interval led to the loss of valuable property and even human life in certain areas of Texas.

A striking example of the consequences of heavy rainfall following drought was the severe flood of September, 1954, which occurred in the Devils River drainage near Ozona. This flood not only severely damaged ranges but caused destruction of home properties and led to the death of 19 persons. Devastating floods also occurred in the lower watersheds of the Rio Grande River during 1954 and 1955 with heavy losses of surface soils where the drought had been unusually severe. Because of the large runoff, the flood extended beyond the river banks and washed out the bridge between Laredo, Texas, and Nuevo Laredo, Mexico. Here again the loss of several human lives occurred as well as the destruction of much valuable property.

Drought Effects on Brush

On many of the rolling hill ranges in the Edwards Plateau, the drought killed large numbers of trees, including species such as post, Spanish, blackjack and shinnery oaks, Ashe juniper, elm and others of minor importance. In the vicinity of Junction, Texas, for instance, as much as 80 to 95 percent of the stand of Ashe juniper died from drought. Thus one

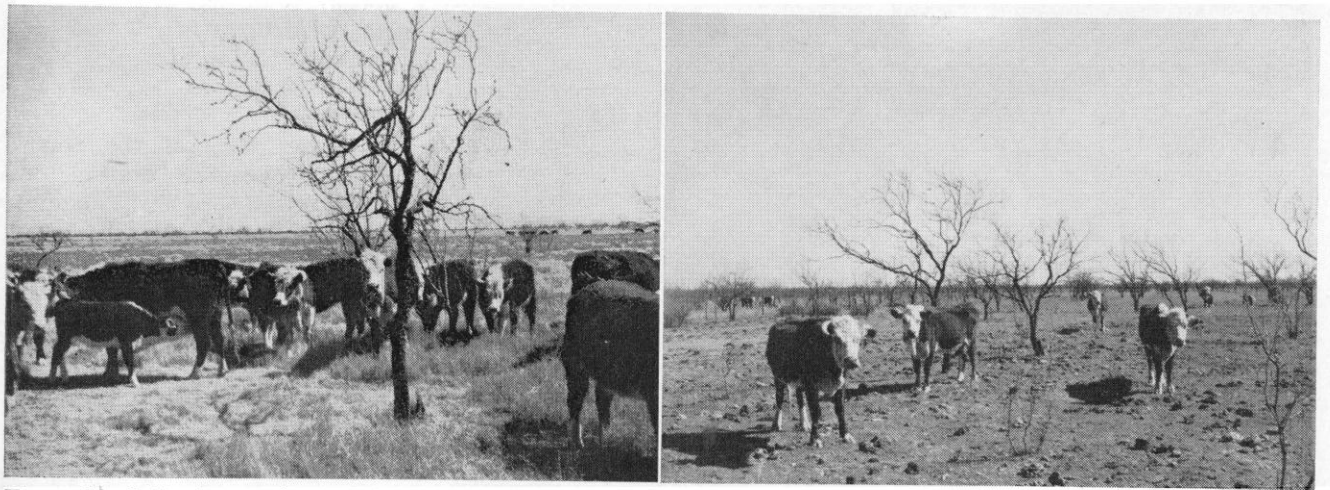

FIGURE 1. *Left.* A properly stocked pasture on the Texas Range Station near Barnhart in good condition, February, 1951. In 1955 this area had made a remarkable recovery from the drought. *Right.* A heavily stocked adjacent pasture after two years of drought. In 1955 this pasture, stocked at a rate common to the general region of the Edwards Plateau, had only partially recovered from drought.

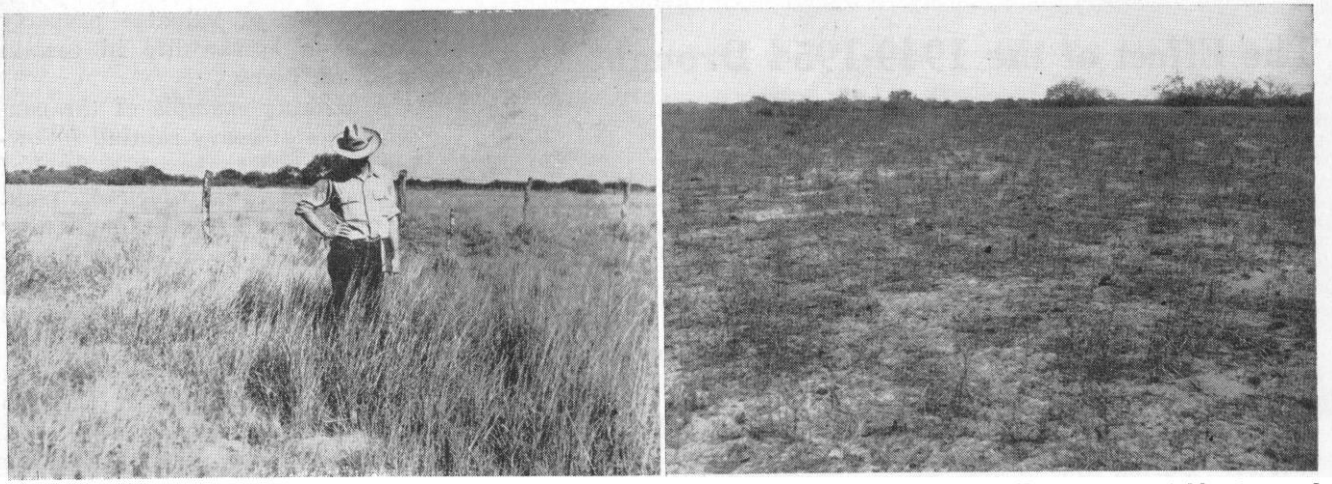

FIGURE 2. *Left.* An excellent condition range in sandy soil in the Rio Grande Plain of south Texas; seacoast bluestem and brownseed paspalum dominant. *Right.* The same range showing the effects of heavy utilization during the first 2½ years of the severe drought. In the fall of 1954 this unit supported only a thin stand of short grasses, weeds and a few tall grasses.

apparent gain from the standpoint of conservation was the death of many individual plants of several undesirable woody species from the Rio Grande Plains to the Cross Timbers of north Texas.

Among the woody plants most resistant to drought were mesquite and pricklypear. In dense stands of mesquite, mortality of 5 to 10 percent was noted. Many old pricklypear plants died from the effects of the drought, combined with the increased injury from insects and grazing. Ranchers in many drought-stricken areas used pricklypear for livestock forage by burning the spines to allow animals to graze (Fig. 3). Use of this emergency forage during the drought, supplemented by limited amounts of cottonseed cake, saved thousands of head of cattle and sheep from starvation. A common practice of effectively utilizing pricklypear was to graze cattle first and follow up with sheep.

Grass Survival

Studies made on many range areas during and after the drought showed that grasses were killed whether grazed or not. At the Texas Range Station near Barnhart, several desirable grasses died out in the check areas, excluded from livestock grazing. On heavily utilized pastures of this station, short grasses of high forage value, such as curly mesquite and buffalo grass, showed a very high mortality. Curly mesquite grass, which in 1948 comprised 77 percent of the grass cover on the Sonora Ranch Experiment Station, showed the following degrees of survival in 1954 under various stocking rates:

Stocking Rate	Survival Percent
Heavy (48 A. U./ section)	9
Moderate (32 A. U./ section)	12
Light (12 A. U./ section)	15
Rotation (32 A. U./ section)	22

On rocky soils at the Sonora Ranch Experiment Station, numerous seedlings of curly mesquite were established in the fall of 1954 from seed that had apparently remained viable during the drought period. These plants made a remarkable growth in 1955 and reestablished a good cover following the drought. On the heavy soils of the Texas Range Station, 85 miles north of the Sonora Ranch Station, however, very few seedlings of curly mesquite developed under similar moisture conditions. The few old plants that survived the

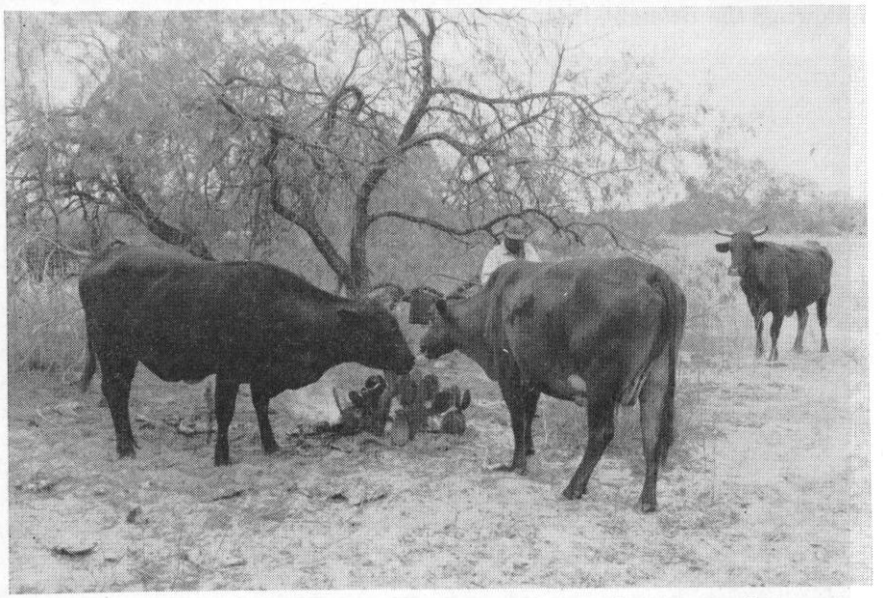

FIGURE 3. Cattle eating prickly pear as soon as the rancher burns off the spines. Note absence of grass plants and loose condition of soil.

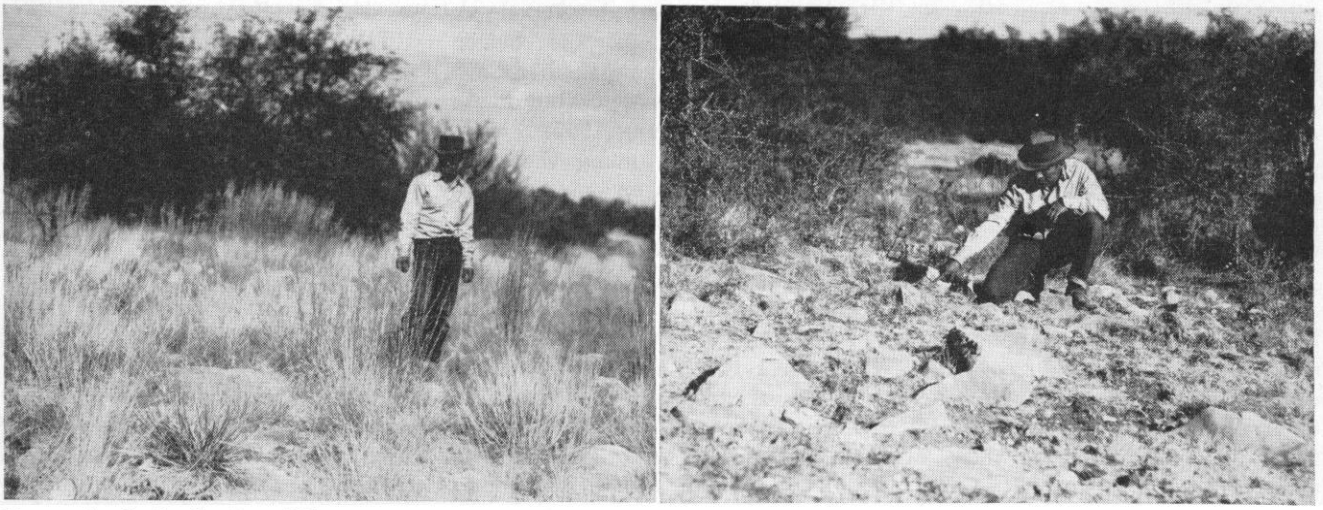

FIGURE 4. *Left.* Good condition range on a rocky site with shinnery and live oak in the Edwards Plateau, suppporting tall bunch grasses before the drought. Under normal stocking rates the grasses survived but a high percent of the oaks died. *Right.* Heavy utilization on similar range during the early stages of the drought reduced the stand of tall grasses but some protection was afforded by the surface rocks.

drought produced many strong stolons. Within the same area, weakened plants of buffalo grass, with root crowns more deeply set and more resistant to trampling than those of curly mesquite, made fair to good recoveries and thus developed fast-growing runners after good rains.

Data obtained at the Texas Range Station and on adjacent ranges indicate that seedlings of tall grasses were extremely scarce during the drought-recovery period. Close utilization of these tall grasses during the drought period would be expected to curtail seed production. A few seedlings may have developed but escaped observation. In southwest Texas, drought studies conducted by the Department of Range and Forestry revealed that a few grass seedlings appeared during the second year of drought but these died when grazed or clipped.

On ranges supporting substantial amounts of brush, some of the better grasses and forbs survived the drought period because of the protection afforded by dense clumps of brush against close utilization by livestock (Figure 4). Brushy ranges in many hardland soil areas now support more healthy grass plants than nonbrushy areas because of this protection from grazing. This greater survival of grasses, however, does not argue for brush-infested ranges, since other undesirable conditions prevail on such areas. Few woody plants died on heavily-stocked oak-brush ranges in certain areas from which tall bunchgrasses had been depleted through close grazing prior to the drought. On similar lightly stocked ranges, the brush species often suffered heavy mortality because of the strong competition for available moisture offered by the substantial cover of deep-rooted grasses (Fig. 5).

At the Sonora Ranch Experiment Station the mortality of live oak brush was as high as 90 percent in deep lowland soils supporting both oak brush and bunchgrasses. A high percentage of the bunchgrasses survived in these areas. Drought recovery has been most rapid, however, on the rocky ranges supporting many of the better bunchgrasses, as shown in

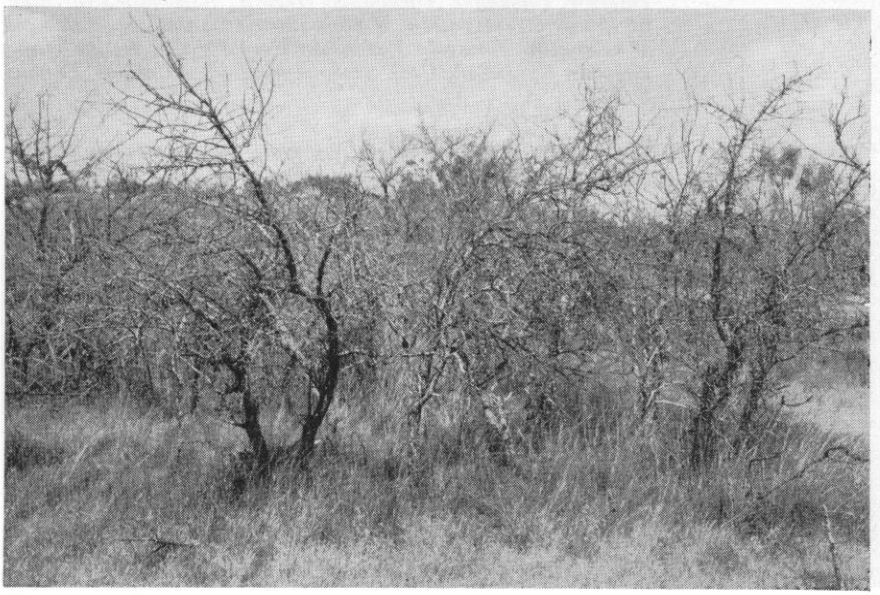

FIGURE 5. A high mortality of live oak occured on this lightly stocked pasture on the Sonora Ranch Experiment Station during the drought. Excellent grass recovery took place following the drought interval.

the following data from the Sonora Ranch Experiment Station in 1954:

Grass	Percentage survival
Curly mesquite	12
Side-oats grama	97
Silver bluestem	87
Wright three-awn	45

Examination of the root systems of deep-rooted bunchgrasses showed that many old roots died during the drought. Newly developed roots were sparse and very short as compared with those of comparable plants during years of normal rainfall. On the heavily utilized hardland ranges, crowns of desirable perennial grasses were often so severely trampled that few or no new roots developed. A high percentage of the better grasses on these ranges died and weeds of low forage value made rapid growth during 1955.

Termites were among the most destructive agents on many ranges during the latter part of the drought period. Increased activity of these consumers of plant materials was evident in the abundance of earthen, termite casts covering the severely grazed stubble and crowns of grasses and forbs. As these plants died, the termites consumed the roots as well as parts of the root crowns. Ranges subject to such destruction recover slowly and it may take years of desirable management to restore them to their former productiveness.

Summary

The damage resulting on the ranges of Texas from the 5-year drought period, 1949-54, can be correlated with land management and the type of soil.

In general, ranges that were properly managed before and during the drought came through in fair to good condition; overstocked ranges were severely damaged and subsequent recovery has been very limited. Thus ranchmen have evidence of the need for carrying out proper management practices year after year, not only to meet drought periods, but to build for an economic unit by capitalizing on the years of favorable moisture. Thus the old rule still prevails that close grazing does not pay.