RANGE DETERIORATION IN SOUTH CENTRAL OKLAHOMA

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The writer began this study in 1940 as a graduate research problem. The area studied has been observed by the writer for the past twenty years. The more-important changes in the vegetation have taken place during this time.

The area studied was in T. 1 N., R. 9 W. and was originally part of the Kiowa, Comanche, and Apache Indian Reservation. The land was opened to settlement in 1901.

The area is in the Clear Fork Formation and is Permian in age. This formation consists of red and gray clay shales and lenticular red and gray sandstones. In topography the region is rolling prairie with drainage toward the south.

Following the opening in 1901, the land was fenced and the more-desirable portion placed in cultivation. The early settlers brought few cows and horses with them. This put a very light grazing load on the pasture land.

The pasture land was not overgrazed and remained virtually unchanged until after World War I. Following the war, usage of the land changed from a one-crop program to diversified farming.

This program brought about a large increase in the number of dairy cattle. The pastures were soon stocked to full grazing capacity. The heavy grazing plus the low rainfall from 1932 to 1940 brought about an immediate breakdown in the prairie formation.

This breakdown appears to the writer to have proceeded along general retrogressive steps as follows:

1. CLIMAX BUNCHGRASS PRAIRIE
   a. *Andropogon scoparius* Michx.
   b. *Panicum virgatum* L.
   c. *Andropogon hallii* Hack.
   d. *Sorghastrum nutans* (L.) Nash
   e. *Tripsacum dactyloides* L.
   f. *Bouteloua curtipendula* (Michx.) Torr.

2. MODERATE OVERGRAZING
   a. *Andropogon scoparius* Michx.
   b. *Andropogon saccharoides* Swartz
   c. *Bouteloua curtipendula* (Michx.) Torr.
   d. *Bouteloua hirsuta* Lag.
   e. *Paspalum stramineum* Nash
   f. *Aristida pupurascens* Poir.
   g. Slight increase in weeds

3. HEAVY OVERGRAZING
   a. *Andropogon saccharoides* Swartz
   b. *Bouteloua curtipendula* (Michx.) Torr.
   c. *Bouteloua hirsuta* Lag.
   d. *Paspalum stramineum* Nash
   e. *Bouteloua rigidiseta* (Stead.) Hitchc.
   f. *Aristida pupurascens* Poir.
   g. Considerable increase in weeds

4. COMPLETELY OVERGRAZED
   a. Annual grasses
      (1) *Hordeum pusillum* Nutt.
      (2) *Festuca octoflora* Walt.
      (3) *Bromus tectorum* L.

b. Weeds, dominant vegetation
   (1) *Cirsium altissimum* (L.) Spreng.
   (2) *Vernonia baldwini* Torr.
   (3) *Ambrosia psilostachya* DC.
   (4) *Amphiachyris dracunculoides* (DC.) Nutt.
   (5) *Psoralea tenuiflora* var. *floribunda* (Nutt.) Rydb.

c. Desirable grasses
   (1) *Bouteloua curtipendula* (Michx.) Torr.
   (2) *Buchloe dactyloides* (Nutt.) Engelm.

d. Undesirable perennial grass
   (1) *Aristida purpurascens* Poir.

The breakdown of the prairie under heavy grazing is believed to result from a common cause, even though the rate might be different in adjoining pastures.

It was observed that the change from bunchgrass to short-grass prairie first appeared along the fence lines, around stock ponds, and along the outcrops of clay shales. In all instances it is probable that compaction of soil by constant trampling caused enough change in the soil structure to result in the disappearance of the original prairie grasses.

To check on this conclusion, the writer has tested the soil compaction of the various pasture habitats. The results, expressed as relative soil compaction on an oven-dry-sand basis, are as follows:

Panicum virgatum----------46,
Andropogon hallii----------58,
Andropogon scoparius----------86,
Auto tracks, road----------89,
Buchloe dactyloides----------95.