

NEBRASKA TECHNICAL NOTE
U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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Range and Pasture Technical Note No. 2
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Conservation Helps a Dry Creek Flow Again

Two articles that document the effects of range management and techniques regarding water quality and quantity within a watershed.

Enclosure

NEBRASKA TECHNICAL NOTE

U. S. DEPARTMENT OF AGRICULTURE



SOIL CONSERVATION SERVICE

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RANGE TECHNICAL NOTE NO. 45
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CONSERVATION HELPS A DRY CREEK FLOW AGAIN*

West Rocky Creek, located 20 miles west of San Angelo, Texas, is flowing again. Range conservation work on five ranches over a 74,000 acre watershed restored water flow to a dry West Rocky Creek. Lack of knowledge about proper grazing, suppression of fire and heavy continuous grazing eventually led to a decline in grass cover. These conditions made way for erosion, reduced water holding capabilities, stopped the aquifer recharge cycle, and allowed brush to invade.

Adverse climatic conditions also had a role in reducing West Rocky Creek's flow. In 1918-1919 a drought altered the year long flowing creek to an intermittent stream. By 1935, the spring which fed West Rocky Creek was completely dry. Once productive rangelands that had produced 2,000 pounds per acre of forage were reduced to 500 pounds per acre.

In 1964 following an intensive range conservation program involving root plowing, reseeding, tree dozing, aerial spraying, and chaining, the water guzzling brush was replaced by a less consumptive water using grass cover. Precipitation again infiltrated into to the soil profile and recharged the springs. One of the five landowners noticed a spring that had been dry for almost 30 years began flowing.

By continuing the range improvement practices, all five ranches had springs flowing by 1970 at rates ranging from 475 to 4,000 gallons per minute. Following continued range improvement practices and proper grazing use, forage production was brought up to 2000-2500 pounds per acre.

There were other benefits from the conservation work at West Rocky Creek watershed besides the improved range condition and forage quantity and quality. The bonus benefit was used by the residents of San Angelo. West Rocky Creek's renewed flow supplemented the city's water supply reservoirs with an estimated 525.6 million gallons of water annually. Although it covered only 3 percent of the watershed, West Rocky Creek provided 7 percent of San Angelo's total water needs.

RANGE RELATED IMPACTS ON WATERSHEDS *

Long term research conducted on the Edwards Plateau and in the Rolling Plains of Texas has documented how livestock grazing and range related factors impact upon watersheds.

Heavy Grazing

There is a large body of information leading to the conclusion that heavy grazing has negative hydrologic consequences on watersheds. The most negative effects are: accelerated runoff, increased erosion, and decreased infiltration rates due to reduced vegetative cover.

Light Or Moderate Grazing

There are few hydrologic differences between pastures continuously grazed lightly or moderately.

Grazing Systems

A four pasture three herd deferred rotation system was hydrologically similar to that of no grazing.

A one herd high intensity to low frequency system (8 pastures, 17 days grazed, 119 days rest) was hydrologically similar to moderate continuous grazing.

A double stocked one herd short duration system (14 pastures, 4 days grazed, 50 days rest) was hydrologically similar to heavy grazing.

Bunch Grass and Sodgrass

Research indicates that (1) higher infiltration rates and less runoff (Figure 1), (2) greater organic matter, (3) more aggregate stability, (4) rougher soil surface, (5) less bare ground, and (6) lower bulk density were characteristic of bunch grasses areas when compared to sodgrasses.

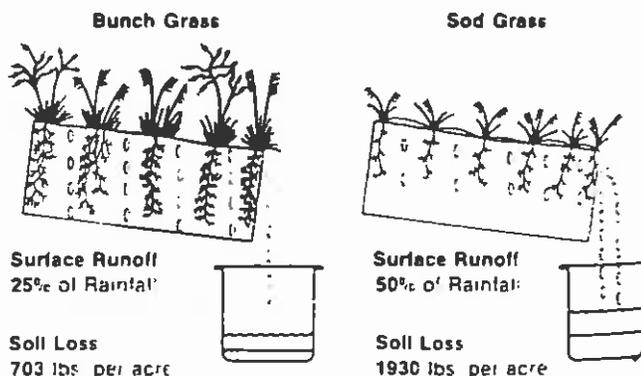


Figure 1. Average runoff and soil loss based on 4 inches of simulated rainfall in 30 minutes at the Sonora Research Station, Texas.

Crusts

Crusting is associated with soils that have low organic matter, high silt content, and low aggregate stability. The crust is often harder than the rest of the soil, has a low infiltration rate, and is a prime factor in causing runoff and erosion.

Water Quality

The major pollutant from rangeland watersheds is sediment. Moderate continuous grazing or grazing systems should reduce sediment losses from most watersheds. However, if watersheds have been severely overgrazed, instituting moderate continuous grazing or a specialized grazing system, may not reduce sediment losses. Bacteria or nutrients as potential pollutants from livestock grazing do not appear to be a problem on range areas other than riparian zones.

References

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* Summary of article, "Livestock Grazing Impacts On Watersheds", as published in *Rangelands* 5(3), June 1983.