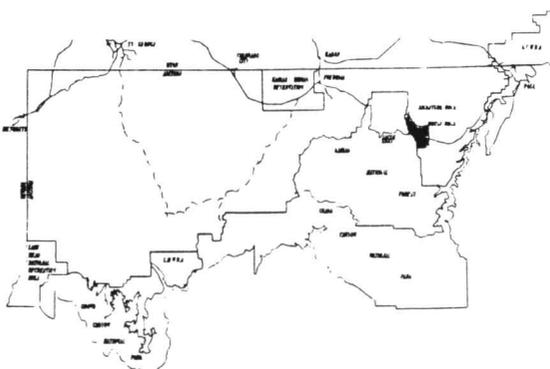


# A Drought and 2 Grazing Systems

**Lee E. Hughes**

One of the challenges of range management is to compare one system of management with another with regard to their response to a different natural or management-induced factor. Drought and grasshoppers were dominant influences on rangelands of the southwest in the late 1980s. Drought has long been recognized as a good test of a grazing system as drought tends to magnify any weakness of management practice. The drought and subsequent grasshopper invasion of 1988 through 1990 provided a good opportunity to stress test two different grazing systems of the Arizona Strip. The two allotments examined in this paper are adjacent to each other, have similar range sites, and similar precipitation.

Two major range sites occur on both allotments—Sandy Loam Upland and Sandy Upland. Both range sites are dominated by grass species. The Sandy Upland sites have both a large warm-season grass component and a cool-season component. The Sandy Loam Upland is dominated by the warm-season component. The cool-



season grasses are mostly Indian rice grass, squirrel tail, and needle grasses. The warm-season grasses are blue grama, black grama, and galleta.

the grasshopper added a further stress to the grazing systems by consuming what little forage production that did occur. This stressed all forage plants.

## The Drought

The drought began in earnest in the 1988–1989 water year. The 1987–1988 water year had above normal precipitation patterns and amounts; the summer rainfall was below normal. The 1988–1989 precipitation was a poor year for forage production as was early 1990. In addition to drought, both allotments experienced a heavy grasshopper infestation during 1988 and 1989 (in 1989 grasshopper counts showed 60–100 per square yard). When present,

## The Grazing Systems

Signature Rock is under a holistic resource management (HRM) and has a planned higher stocking level with 9.7 acres per AUM to attain the ecological benefits from HRM. The higher stocking levels are designed to chip the soil from hoof action, increase mineral cycling, attain uniform grazing over eight cells or paddocks, and achieve other benefits described under the HRM model. The House Rock allotment is under a rest-rotation grazing system. This system has three

The Allotments and Their Data

Allotment Name	Total Area	Actual Use *	Management System	Range Sites	Period of Use
Signature	4600 acres	9.7 Acre/AUM	Holistic Resource Management	50% Sandy upland 50% Sandy loam upland	Yearlong 40 Head **
House Rock	17000 acres	12.7 Acre/AUM	Rest Rotation	Same as above	110 Head **

\* Actual use for both allotments is based on animal unit months (AUMS) used from 1986 to 1989.

\*\* An average figure for the year. House Rock varies from 40 to 225 head per year. Signature Rock varies from 40 to 171 head per year.

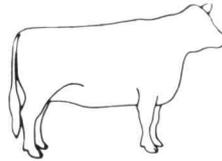
Precipitation Table

Allotment Name	Fall	Winter	Spring	Summer	Year
Signature Rock 1987-1988	% of Normal 152	% of Normal 112	% of Normal 115	% of Normal 51	% of Normal 94
1988-1989	55	98	56	67	68
1989-1990	25	83	106	133	97
House Rock 1987-1988	165	90	223	75	126
1988-1989	39	95	32	52	55
1989-1990	14	84	122	156	105

Normal Precipitation (in inches)

Allotment	Fall	Winter	Spring	Summer	Total
Signature Rock	2.10	1.99	2.12	3.97	10.17
House Rock	1.57	1.72	1.57	2.85	7.70

pastures and a separate holding pasture. The House Rock allotment has a stocking level of 12.7 acres per AUM. The Signature Rock cells are used every year for short periods of time and movement occurs in accordance to forage growth and use of the cells' forage. The House Rock three pasture system uses every pasture every year. However, a year rest occurs after each use period. Sometimes longer rest periods have happened because of drought or other reasons.

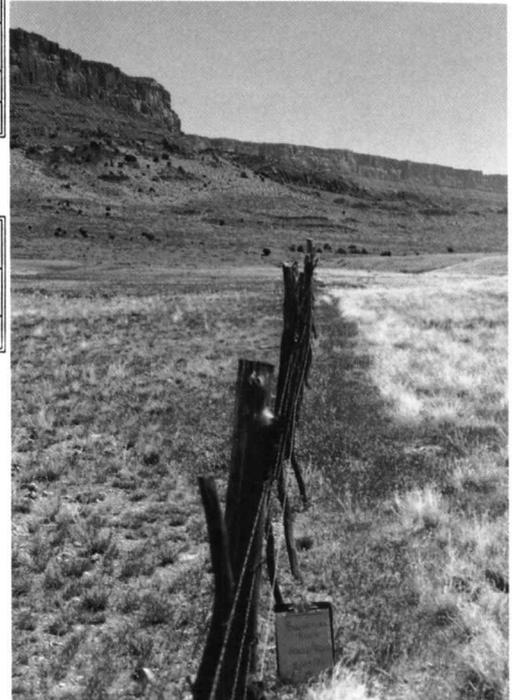


**The Drought and the Grazing Systems**

The Sandy Upland sites experienced a good growth of the perennial grasses and shrubs in both allotments in 1989. The sandy loam upland, on the other hand, being a tighter soil experienced little growth of the perennial grass species, even though the House Rock allotment was rested from livestock grazing for a year and a half. The grasshoppers and cattle in Signature Rock utilized essentially all of what little growth occurred. The grasshoppers occurred in small numbers on the Sandy Upland site, not stressing the forage plants on that site in both allotments.

Both grazing systems operated without problem until late 1988. The Signature rock grazing system with its higher stocking level of 9.7 acres per AUM fully utilized its forage resource by November. The allotment was destocked. The forage on the allot-

**Illustration 1**



Signature Rock/Houserock—1986



Signature Rock/Houserock—1990

*Illustrations 1 and 2 (see facing page also) are in the Sandy Loam Upland Sites. Drought is the great equalizer. The 1986 photos show rest-rotation reserve forage characteristics of rested pasture. The Signature Rock pasture had little reserve forage. The Houserock side had not had cattle grazing for 1 1/2 years when the 1990 picture was taken. With the exception of one month, the same is true for Signature Rock.*

## Illustration 2



Houserock/Signature Rock—1986



Houserock/Signature Rock—1990

### Illustration 3



House Rock



Signature Rock

*Sandy Upland Sites. House Rock rest-rotation had reserve grass whereas Signature Rock is slicked off. Both areas are equidistant from water. The tall herbaceous plant in Signature Rock is an annual.*

ment did not receive the vital summer and fall rains in adequate amounts and the forage in all pastures was consumed. House Rock allotment

with its lower stocking level and rest rotation grazing system had a rested pasture to turn the cattle into for grazing. House Rock allotments used

pastures by the summer of 1989 became fully utilized. The allotment was totally destocked in the fall. The rested pasture, which lies adjacent to Signature Rock, had ample forage on the sandy upland sites but none on the Sandy Loam Uplands; was continued in a rest state for the winter. The House Rock allotment's ranchers reduced their herd to 25 head, and due to the plentiful forage on the Sandy Upland sites on the rested pasture, turned the small herd into the rested pasture in the spring of 1990. The Signature Rock allotment had 30 head of cattle put into it in the fall of 1990, but the cattle were removed from the allotment before winter of 1991 due to inadequate forage.

#### Conclusion

The higher stocking level of the Signature Rock allotment's grazing system allowed the forage of the allotment to be fully utilized on all range sites. This forced an earlier destocking in 1988. House Rock allotment, however, had its forage fully utilized on its range sites about nine months later, with the exception of the Sandy Upland sites in the rested pasture. This site, due to the lack of grazing, responded to the meager rains with a good growth of forage.

In a drought, all grazing systems need to manage the livestock numbers with care. The Signature Rock allotment, under HRM, did not heed nature's warning and ended up destocking for two years. The House Rock management did the same in two of its pastures and had to destock for the winter of 1989-1990. But because of a rested pasture, the allotment's managers were able to return a small foundation herd to the allotment.

Both allotments now operate with lower stocking levels and/or shorter use periods in the allotments until the drought is broken.