

Variability of Crested Wheatgrass Production over 35 Years

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In the fall of 1952, the Burley Idaho District of the Bureau of Land Management, funded by the Halogeton Control Act, seeded several thousand acres of rangeland to standard crested wheatgrass (*Agropyron desertorum*) and fairway crested wheatgrass (*A. cristatum*). While crested wheatgrass proved to be the most effective way of controlling halogeton (*Halogeton glomeratus*), little was known about managing it, and ranchers were doubtful their cattle and sheep would graze it.

In 1954, the Bureau of Land Management, University of Idaho and Point Springs Grazing Association signed a cooperative arrangement to initiate grazing experiments on 960 acres of the seeding. The study area, renamed the Lee A. Sharp Experimental Area in 1984 by the Bureau of Land Management, is located in the Raft River Valley of southern Idaho. The area is eight miles east of Malta, Idaho, at an elevation of about 4,800 feet.

In the spring of 1955, experimental grazing trials commenced on six 160-acre pastures. In 1960, the six pastures were divided into twelve 80-acre pastures. Yearling cattle have grazed the study area two months in the spring and two months in the fall since 1955, in various grazing regimes and stocking levels (Sharp 1970). Forage and animal production data, weather data and a photographic record have been collected annually for 35 years.

During the period of record, precipitation has averaged about 12 inches annually, but has varied from less than 6 inches to over 18 inches. A rain gauge was installed on the site April 14, 1957, consisting of a 10-inch diameter funnel mounted in a two-gallon can. On April 16, 1988, the Agricultural Research Service installed a recording rain gauge near the old gauge. In the beginning, the site research was conducted out of Moscow, Idaho. As a consequence, the precipitation was not recorded until late April or early May.

Annual production of crested wheatgrass has averaged about 500 pounds of air-dry forage per acre, but has varied from 130 to 1,090 pounds per acre. Production shows a strong correlation with May–June precipitation (72 percent of the variability is accounted for by May–June precipitation). We feel that the correlation coefficient

would be even higher if the April precipitation was included. In the early years of the study, April precipitation data were not available. The photographs on the following pages illustrate the variability in forage production occurring from year to year because of the variation in precipitation. A fall-use only grazing treatment is shown in the photographs as it best reflects the current year's production. The photographs shown also cast doubt on the usefulness of utilization standards for managing rangelands.

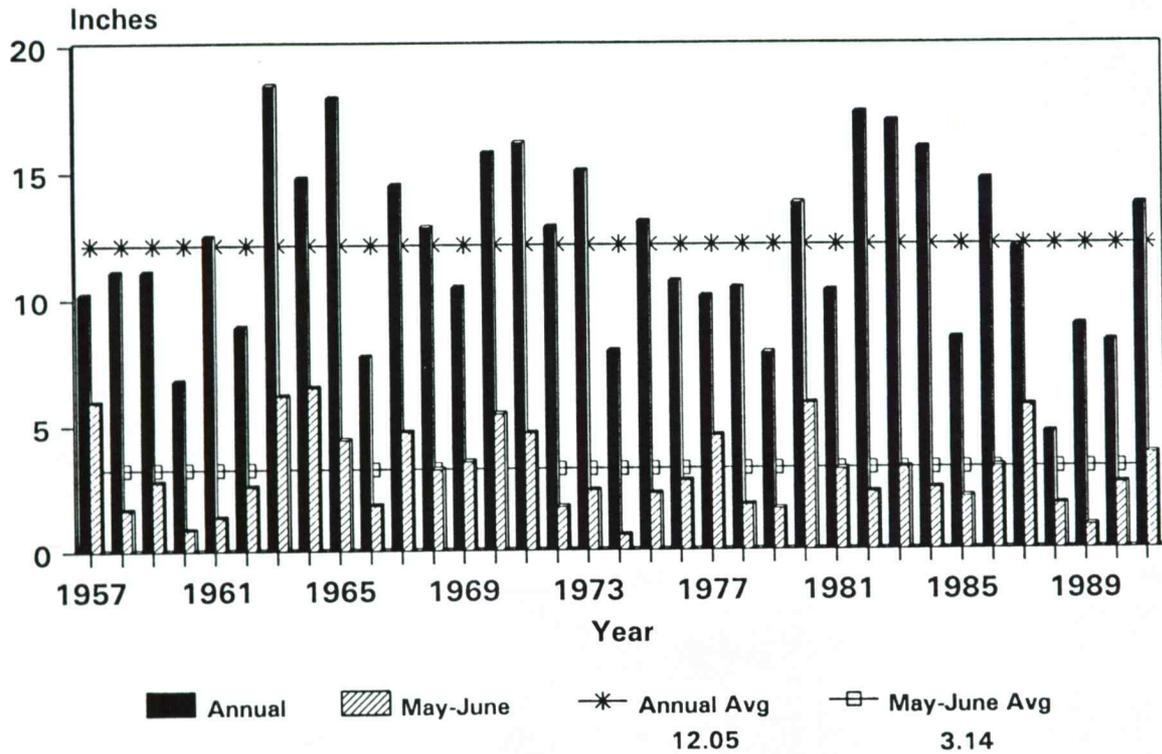
Evidence indicates that the original vegetation on the site belonged to *Artemisia tridentata* spp *Wyomingensis*/*Agropyron spicatum* habitat type. Wyoming big sagebrush and bluebunch wheatgrass were the two most important species. Sandberg bluegrass (*Poa sandbergii*) and a few annual plants contributed to the spring flora. Broom snakeweed (*Gutierrezia sarothrae*) populations exploded in the late 1980's on a portion of the study area, much as it did in the Southwest in the 1970's. However, broom snakeweed did not increase in the pasture shown in the photographs.

The relatively shallow soils of the area form a complex in which the tentatively designated Point Spring series (Solidized Solonetz) is interspersed with a tentatively designated Sublett series. The Point Springs series occurs as small (20–30 feet across) to moderately large (15 acres) irregularly shaped islands in the more extensive Sublett series (Siebe, 1985). Locally referred to as "slick spots", the Point Springs series has a high concentration of exchangeable sodium. During years with less than average growing season precipitation, these high saline areas produce less forage than the less saline areas. In extended droughts, such as that of 1988–1990, crested wheatgrass plants may actually die on the slick spots. The photographic series on the following pages shows crested wheatgrass plants disappearing during droughts and new plants reestablishing during wet cycles.

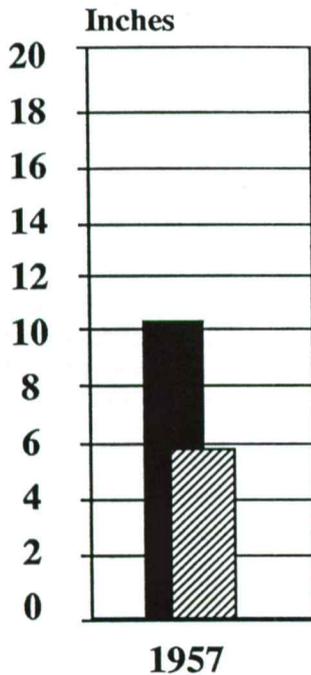
References

- Sharp, Lee A. 1970. Suggested management programs for grazing crested wheatgrass. Idaho Forest Wildlife and Range Exp. Sta. Bul. No. 4. College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, ID.
- Sharp, L.A., K. Sanders, and N. Rimbey. 1990. Forty years of change in a shadscale stand in Idaho. *Rangelands* 12:313–328.
- Siebe, M.A. 1985. Effects of a high-intensity short-duration grazing system on soil compaction and water infiltration in southern Idaho. M.S. Thesis, Univ. of Idaho, Moscow, ID.

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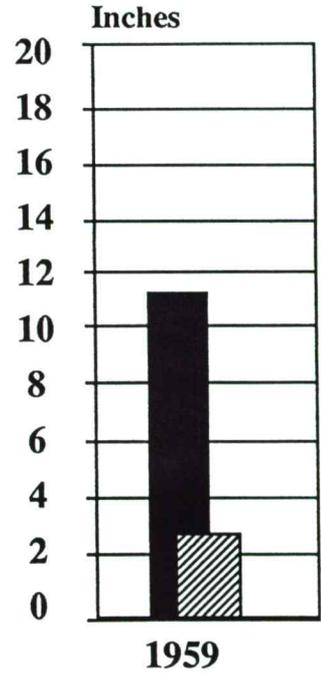
Annual and spring precipitation at the Lee A. Sharp Experimental Area from 1957 to 1991.



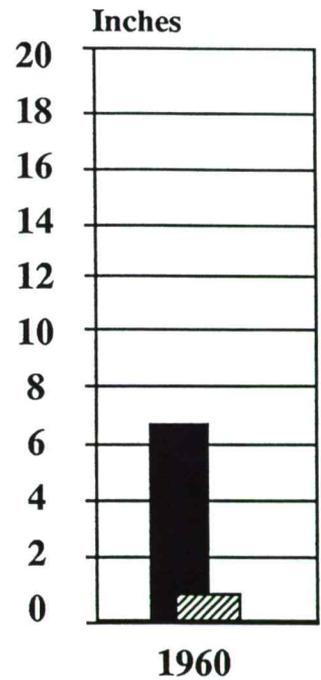
1957 Although the study began in 1955, this was the first year that a rain gauge was established on the site. Precipitation was above normal, with the May precipitation being 4.78 inches and the May-June precipitation being 5.92, compared to an average of 3.14 inches. Crested wheatgrass production was 846 lb/A.

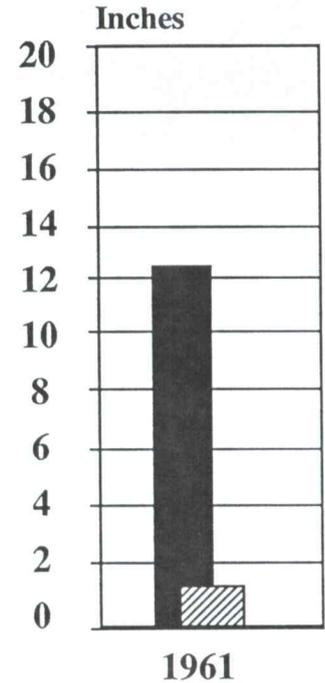


1959 Precipitation over the next two years was slightly below normal, with May-June precipitation in 1959 of 2.74 inches. This photograph shows the production (416 lb/A) resulting from slightly below average precipitation.

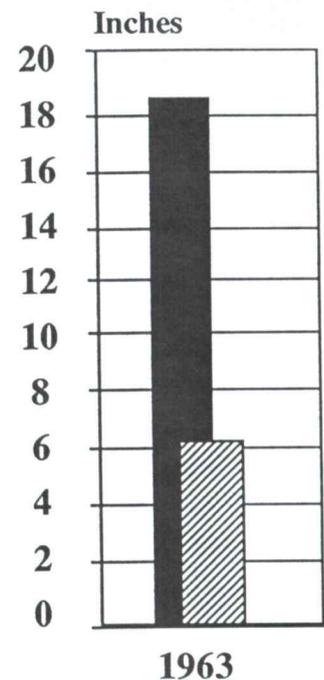


1960 This year was drier than normal, with only 0.54 inches of precipitation in May and only 0.31 in June. Production, as a result, was much below normal at only 186 lb/A.

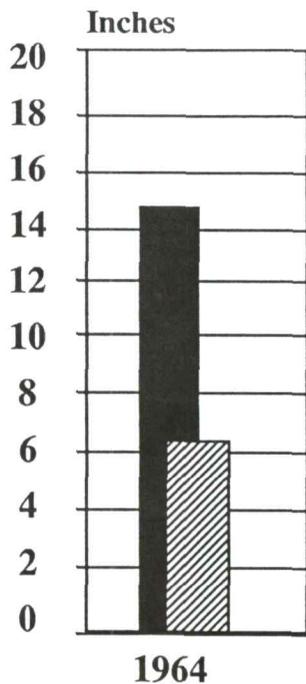




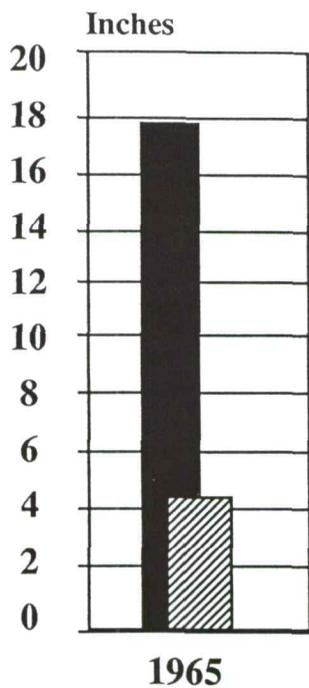
1961 Only 0.48 inches of precipitation fell in May of this year. Although 0.85 inches of precipitation fell in June, growing season precipitation was still below normal. Halogeton is showing up in this photograph, indicating the second year of drought. Crested wheatgrass production was only 247 lb/A.



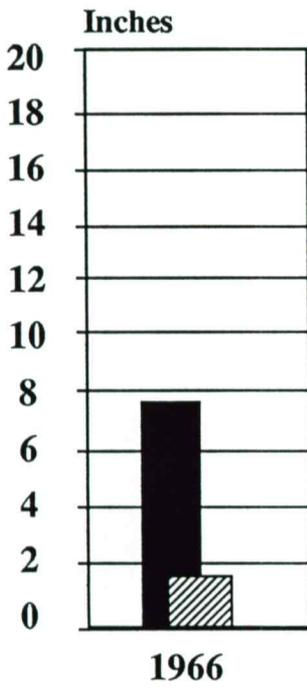
1963 Although 1962 began dry, a rain in the middle of May brought annual precipitation to about average. Precipitation was much above normal during the growing season of 1963 and rain fell during the summer. The grass remained green until about the time of the fall photograph. Grass production again averaged 846 lb/A.



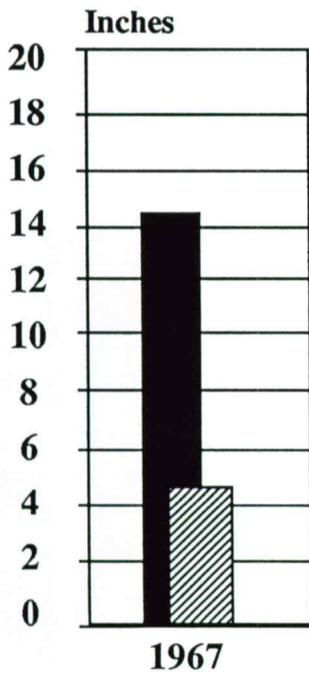
1964 Spring moisture was well above normal. High temperatures produced a grass that was limited in leaf growth and heavy on stem growth. Regardless of intensity of use, animals generally lost weight during the fall. Crested wheatgrass production was 859 lb/A.



1965 This year was much above normal in precipitation and temperatures were lower than in the previous year. The stems remained green through the time that the fall photograph was taken and production was 846 lb/A.



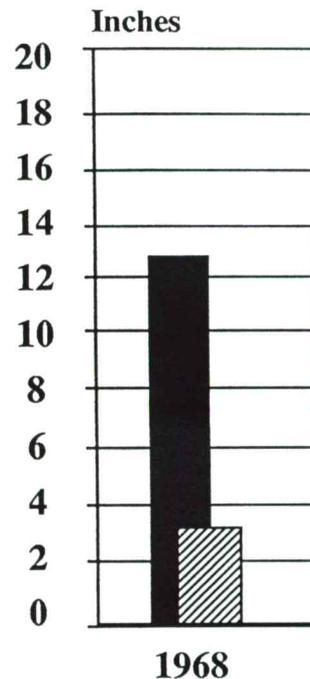
1966 November through May precipitation was below normal and June precipitation was about one-half of normal. Crested wheatgrass production averaged only 246 lb/A.



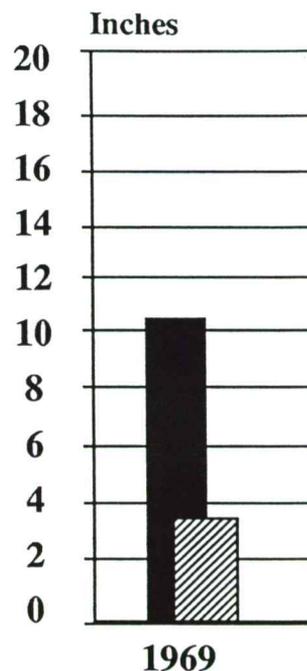
1967 The year was a little above average, although June precipitation was well above average. Grass production was near average at 470 lb/A.



1968 The year started about normal in precipitation, but it rained all through the summer, with over three inches falling in August. Fall animal gains were comparable to the early spring gains this year. Grass production was 450 lb/A.

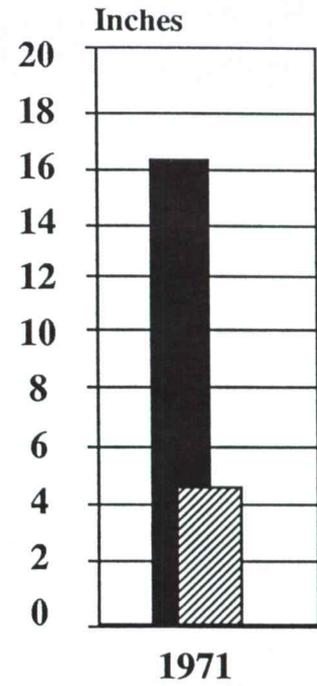


1969 May precipitation was much below normal. Although June precipitation was about normal, it came too late to compensate for May's low precipitation level. Grass production was only 262 lb/A. Note the similarity of this photograph with 1966.

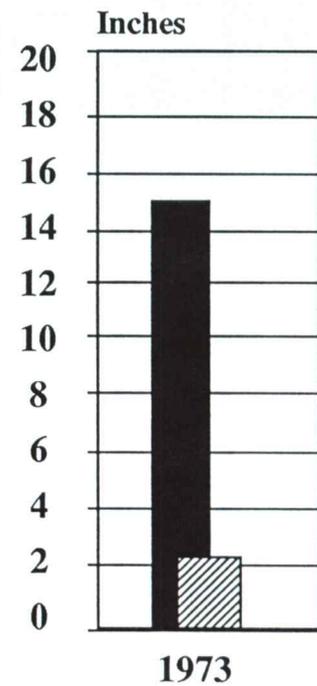


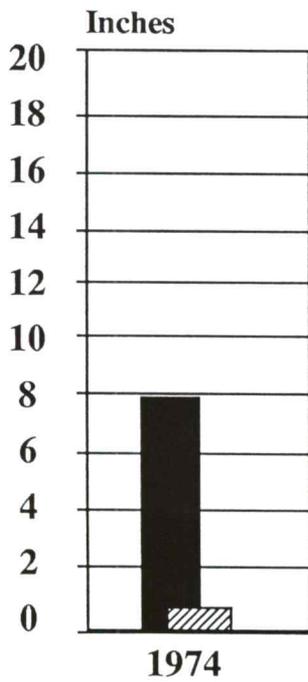


1971 Precipitation was above normal in May and June, as reflected in crested wheatgrass production of 1,090 lb/A.

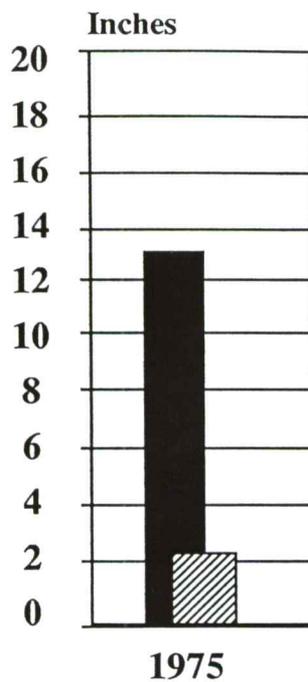


1973 Precipitation was about average during the months of May and June but was above average during the summer months.

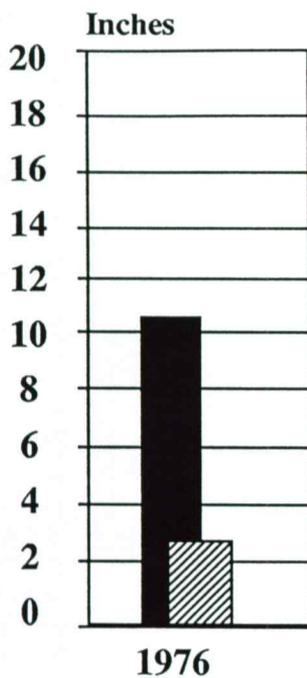




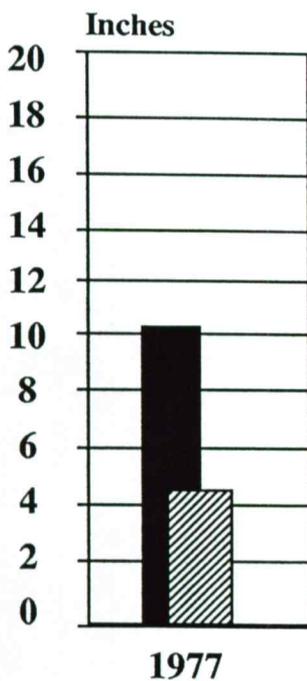
1974 May and June precipitation was much below average. The growth around the badger hole obscures how dry it was, but some indication can be ascertained from the vegetation in the background, with grass production only 324 lb/A.



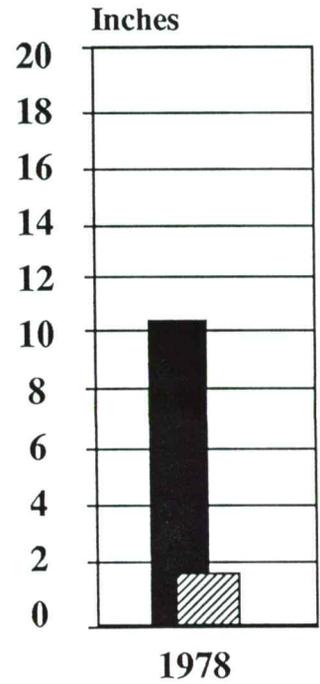
1975 Again precipitation was slightly below average in May and June but above average in August and September. Plant stems retained some green into the fall.



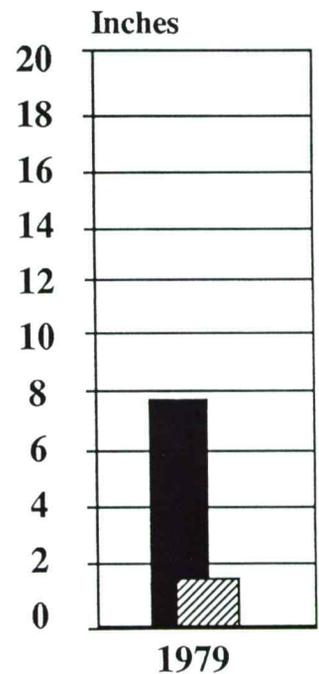
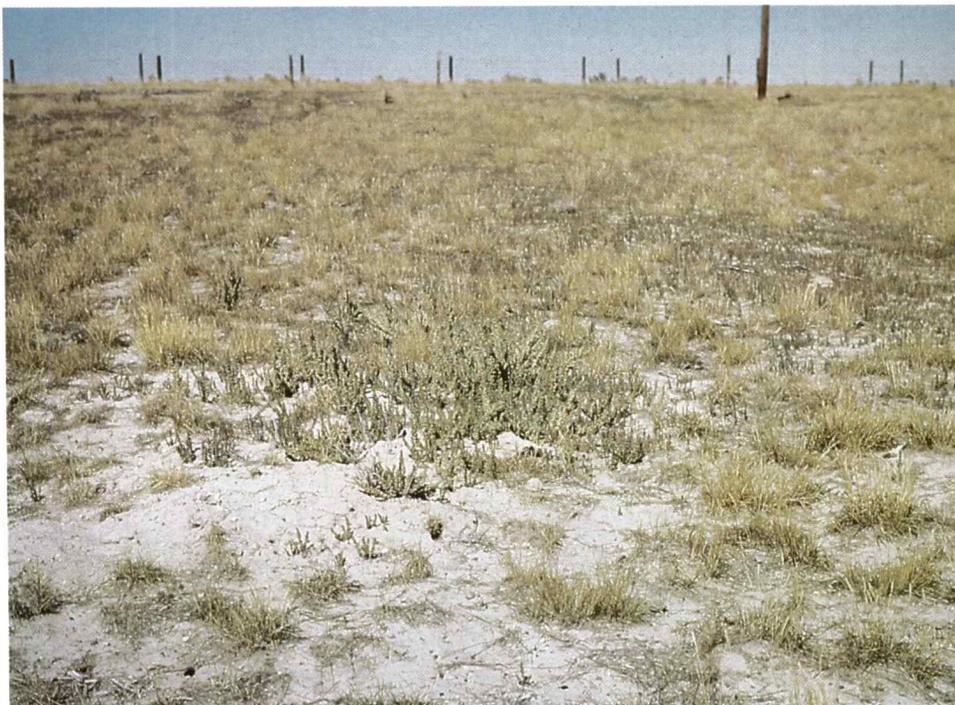
1976 Although May and June precipitation was a little below average, August and September precipitation was sufficiently above average so that green growth was evident in the fall of the year.



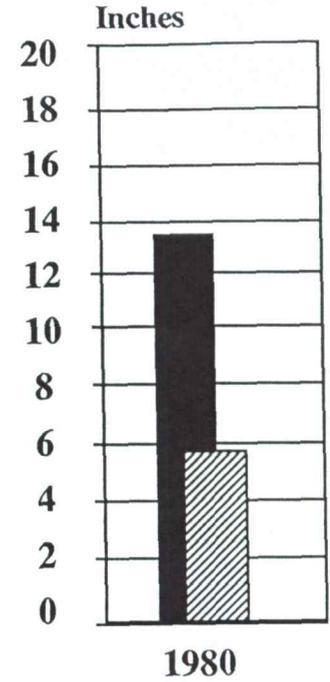
1977 May was exceptionally high in precipitation, but June was a little below average. Halogeton was more evident around the badger diggings in this year.



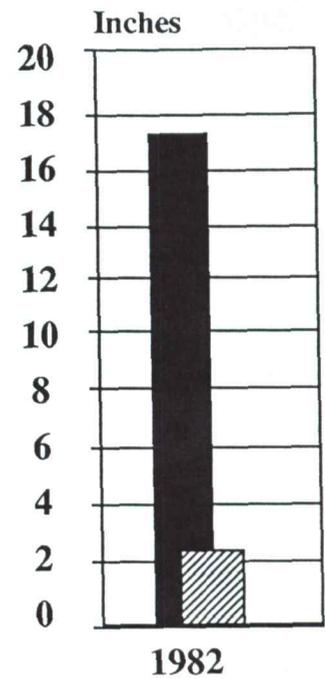
1978 November–April precipitation was the highest since 1963 and 1965; but May precipitation was near average, and June precipitation was much below average. Halogeton is evident near the badger mound.



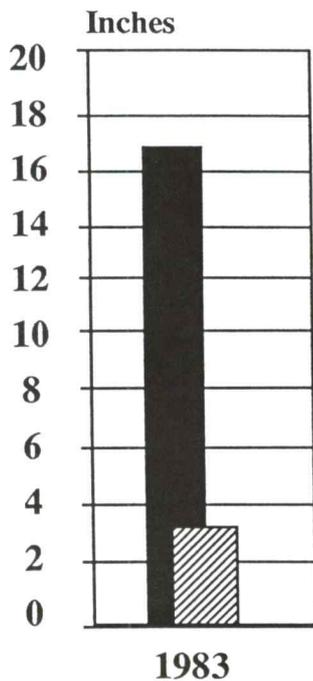
1979 The photograph shows the effects of the low precipitation in May and the slightly less than average precipitation in June. This was one of the drier years on record up to this time.



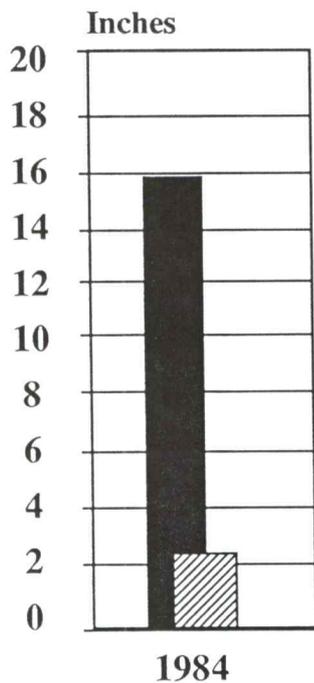
1980 Well above-average precipitation in May and June was reflected in the production this year. Pepper grass (*Lepidium perfoliatum*) occurred on the badger diggings.



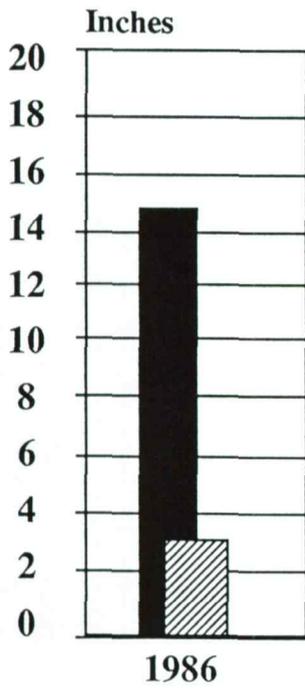
1982 Precipitation was above average during November–April, near average during May and well below average in June. It was above average in August and September, and the grass remained green in the stems well after the time of the photograph.



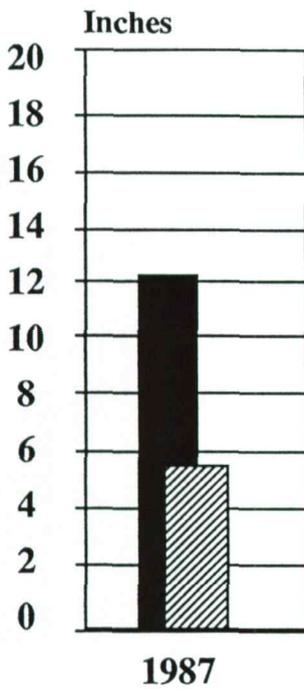
1983 May precipitation was well above normal but June was below normal. August through October precipitation was well above normal as well. Crested wheatgrass production was a little above normal.



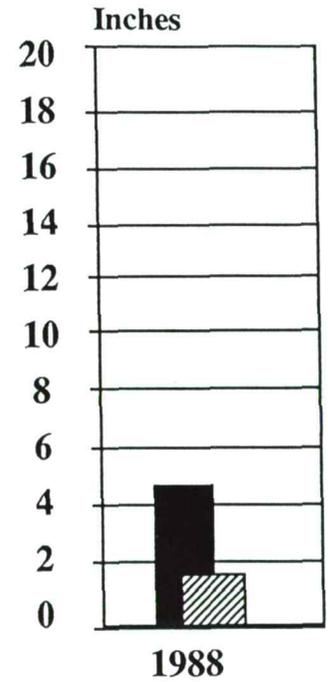
1984 November–April precipitation was above normal and May was below normal. Precipitation for August and the rest of the year was above normal. As a consequence, the grass stems remained green during the summer.



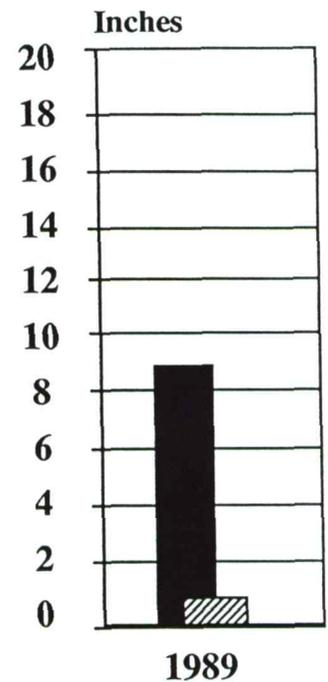
1986 November–April precipitation was one of the highest on record. May precipitation was much above normal, while June was below normal.



1987 The below-normal precipitation November–April was not compensated for by the above-normal May and June precipitation. Another gauge nearby showed a dearth of April precipitation.



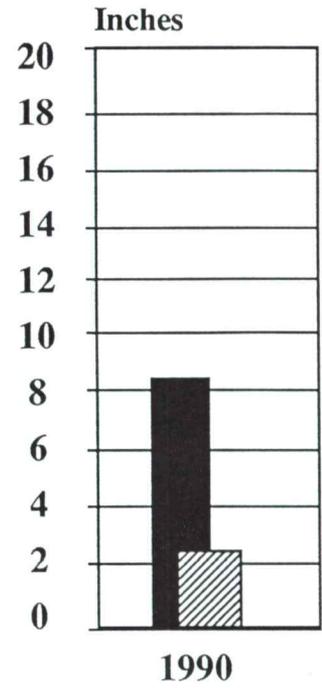
1988 This was the beginning of a three-year dry period. November–April precipitation was well below normal. May precipitation was 1.1 inches below normal and no precipitation was received in June.



1989 November–April precipitation was about average for this period. May and June precipitation was well below normal. Halogeton was common and many crested wheatgrass plants had died, with production only 130 lb/A.



1990 November through April precipitation was again about average, but May and June precipitation was much below normal, as reflected in production (140 lb/A).



1991 Precipitation in November–April was above normal and May was well above normal. June precipitation was below normal. Crested wheatgrass seedlings were starting to appear on the slick spots and production was up at 250 lb/A.

