

# Forty Years of Change in a Shadscale Stand in Idaho

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Photos provide a fast, informative way for ranchers and others to accumulate range trend data. Ranchers are on the range the same time every year and can easily take pictures. There are several small, effective cameras available that will fit in a shirt pocket or saddlebag.

Photos on the following pages chart the changes that have occurred in a shadscale (*Atriplex confertifolia*) stand between 1951 and 1990. The shadscale stand is located in the Raft River Valley of south-central Idaho.

Many people are quick to blame any changes in range vegetation on livestock grazing. However, the area shown in the pictures has not been grazed by domestic livestock since 1945. Most of a band of sheep (about 1,600) were lost due to halogeton (*Halogeton glomeratus*) poisoning in 1945. Animals were on the mountain in the background of the photographs when a storm came up in November of that year. Losses occurred over a three-day period after the sheep were moved off the mountain to the halogeton-infested flat below. Halogeton poisoning generally occurs when hungry animals are allowed to graze in heavy stands of halogeton.

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Concerned about halogeton, the Burley District Bureau of Land Management signed a cooperative agreement with the University of Idaho to study the ecology and control of the plant. Permanent photo points were established on several sites in various salt desert shrub plant communities. Originally it was planned to take range trend photos and transect readings at each site every five years. Due to the yearly changes in vegetation that were taking place in the stands, it was decided to take pictures annually after the first four years. The photos were all taken during the third week of June by the senior author.

A scale insect (mealy bugs) was discovered on the roots of shadscale in the 1950's. This insect is moved by ants from one plant to another and was the cause of stand disappearance in some years. The insect, combined with drought in 1960 and 1961, caused the shadscale to be replaced with annual plants. Weather conditions were responsible for some of the variation that is observed in some photographs (note particularly 1966 and 1969).

Average annual precipitation at Strevell, a nearby weather station, was 9.1 inches during the years 1951–1989. Research on a crested wheatgrass seeding in the same valley has shown a strong correlation between April–June precipitation and annual production of crested wheatgrass. The photos indicate the same relationship between spring precipitation and plant growth in the shadscale community.

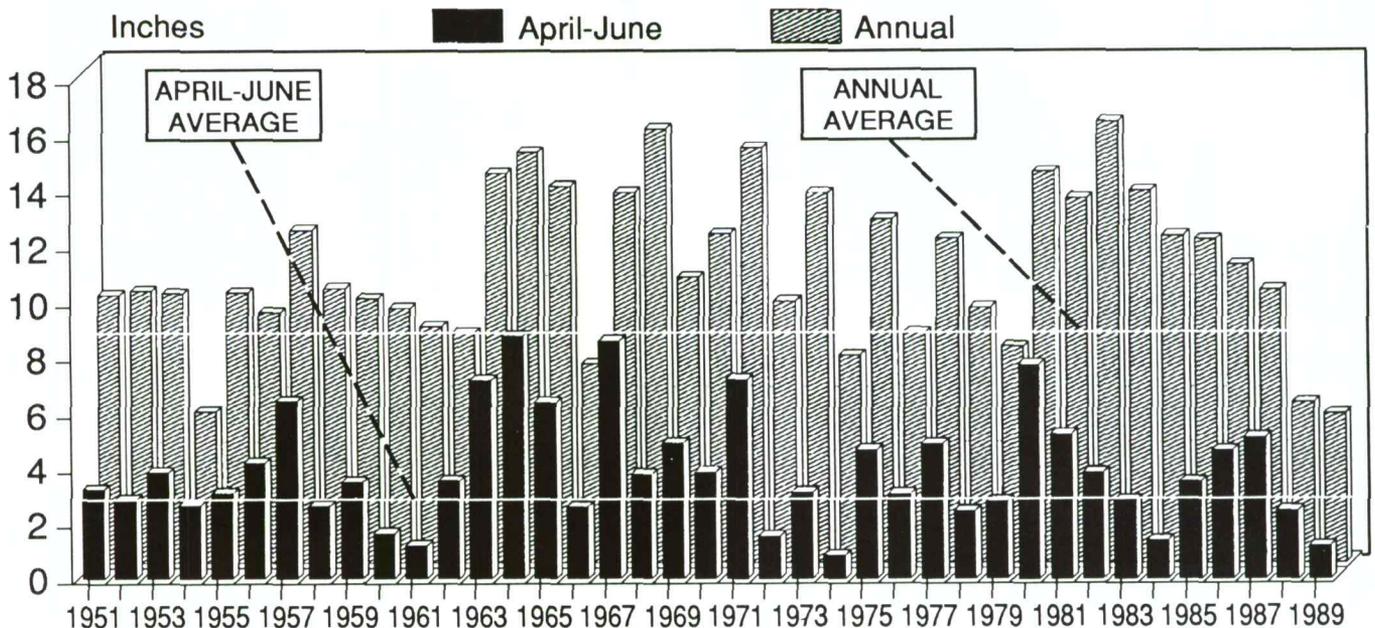
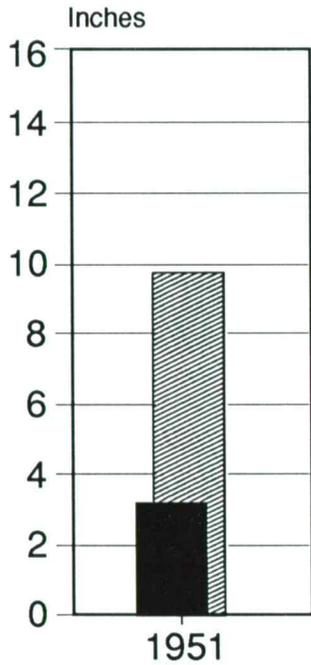
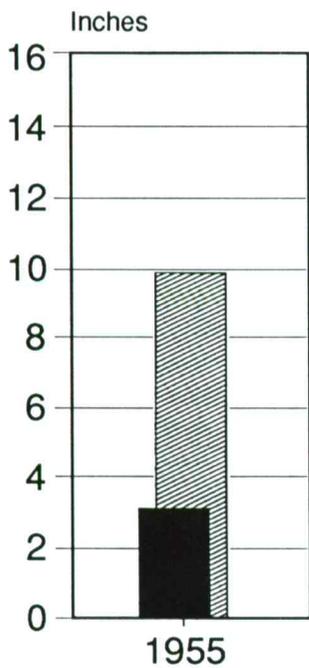


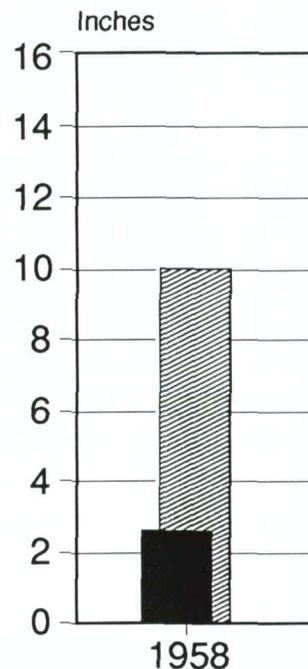
Fig. 1. Annual and spring precipitation at Strevell, Idaho from 1951–1989.



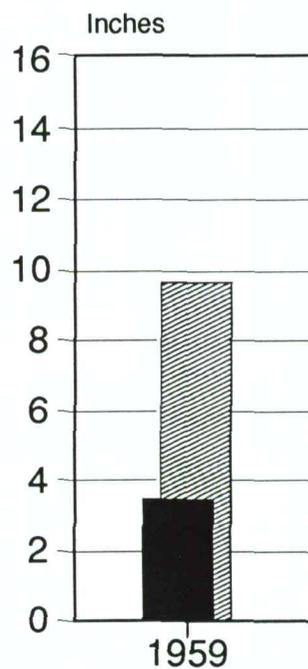
**1951** Appearance of the shadscale stand in 1951. Precipitation was about average during April, May and June of this year. This was the second year of studies by the University of Idaho on halogeton problems in the state.



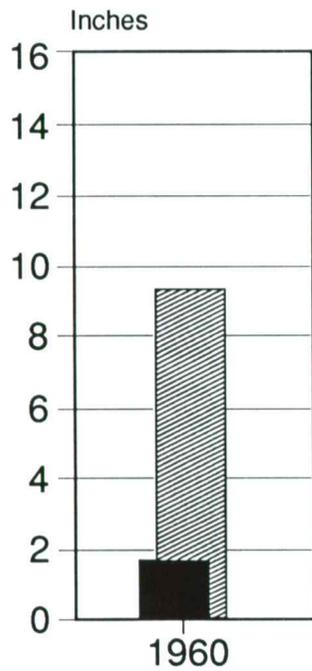
**1955** Appearance of the stand in 1955 after a very dry year in 1954. Halogeton had begun to appear in the stand.



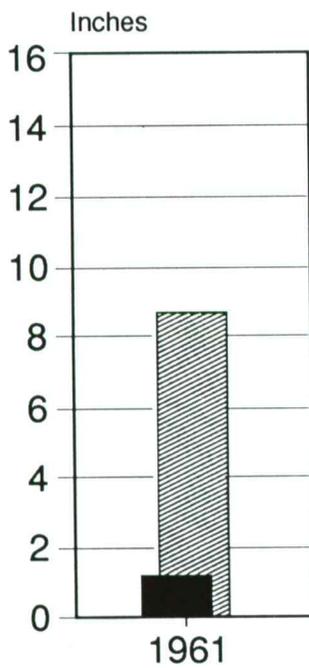
**1958** The scale insect (*Orthiseae* sp.) was beginning to kill branches of shadscale. Prickly pear cactus, Sandberg's bluegrass (*Poa secunda*), squirreltail grass, and globe mallow (*Sphaeralcea grossularifolia*) were perennial plants present in the stand. Halogeton and one other annual plant were present.



**1959** The shadscale, beginning to show the effects of the scale insect, was declining in the stand. Halogeton was very common, and other perennial plants mentioned in previous photographs were also present.



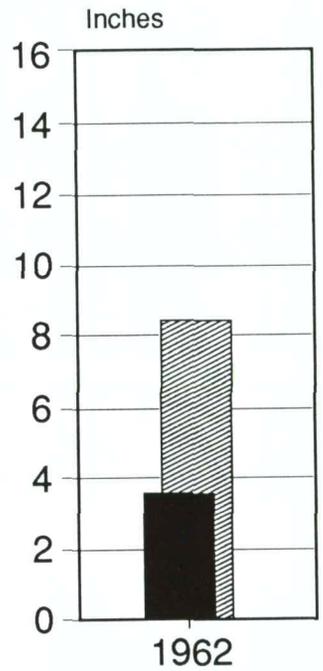
**1960** Most of the shadscale showed the effects of the scale insect working on the roots of the plant. Halogeton was many times more common than in 1959. No shadscale seedlings were found in the stand. Precipitation was much below normal in the spring.



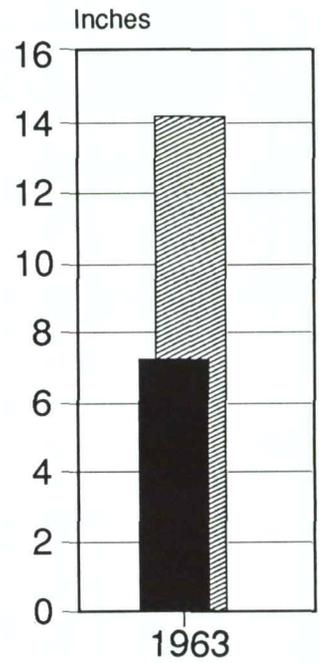
**1961** A few shadscale plants were present, but most of the vegetation was halogeton. Note the dead or partially dead shadscale plants in the background. Spring precipitation was even drier than in 1960.

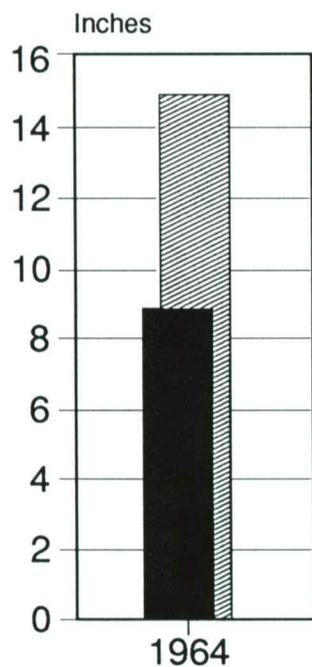


**1962** The area was starting to recover from the effects of scale insects and drought. Precipitation was slightly above normal in the spring of this year. Halogeton was still present, but not as frequent as in 1961.

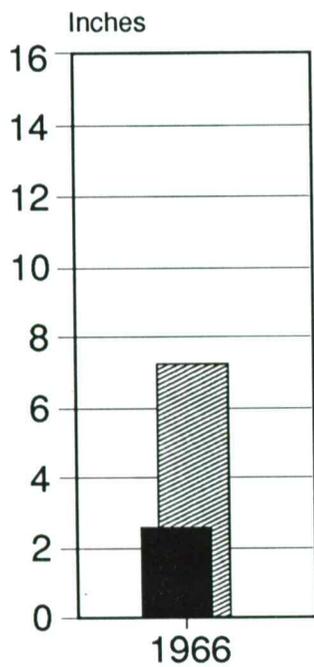


**1963** Precipitation was much above normal in the spring of 1963. A number of shadscale seedlings in 1962 gave rise to the shadscale recovery in this year. Note the globe mallow scattered through the stand.





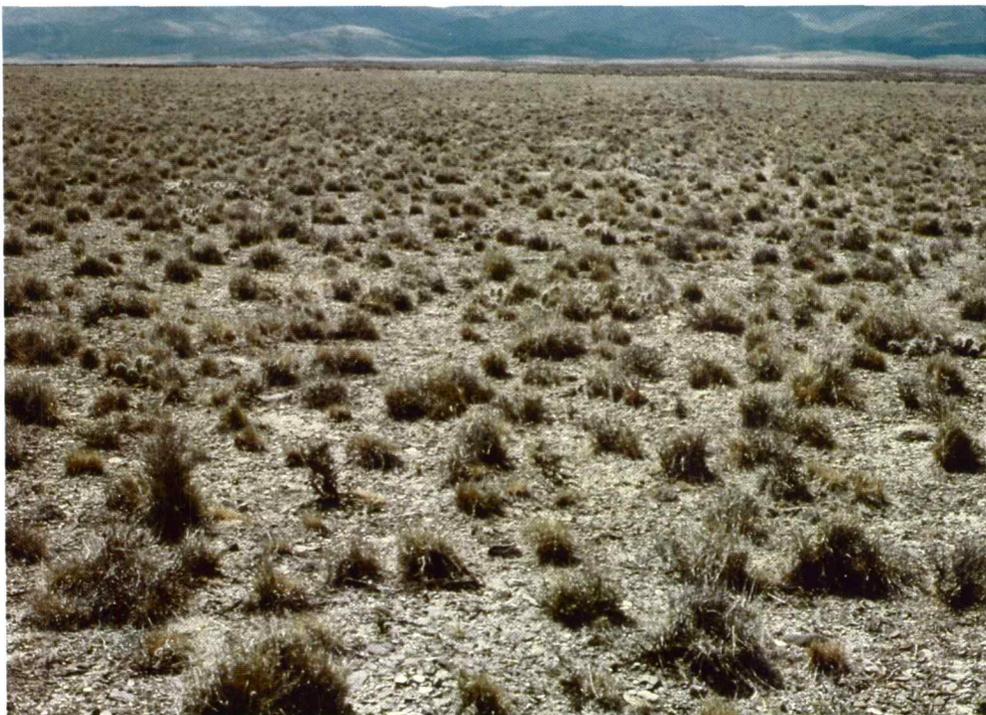
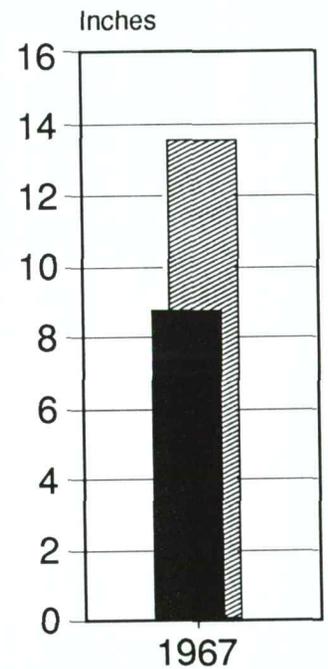
**1964** Note the globe mallow in this year of exceptional precipitation (three times the spring average). This was one of the best globe mallow expressions in the 40 years of the study.



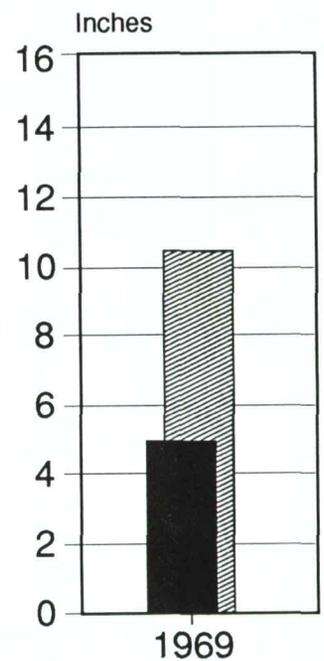
**1966** It was a dry spring with shadscale the dominant plant. Squirreltail, globe mallow, and prickly pear cactus were also present. No halogeton was observed.

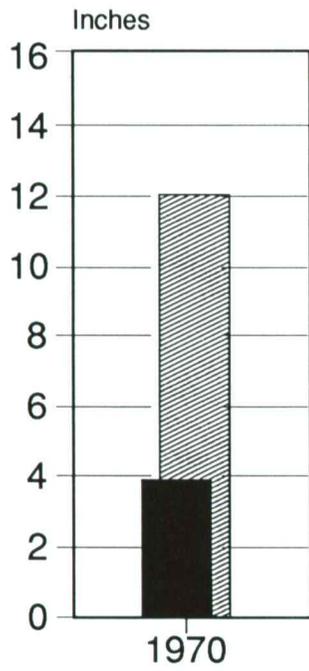


**1967** The spring of 1967 was second only to 1964 in the amount of precipitation. Shadscale, squirreltail grass, globe mallow, halogeton and other annual plants were present.

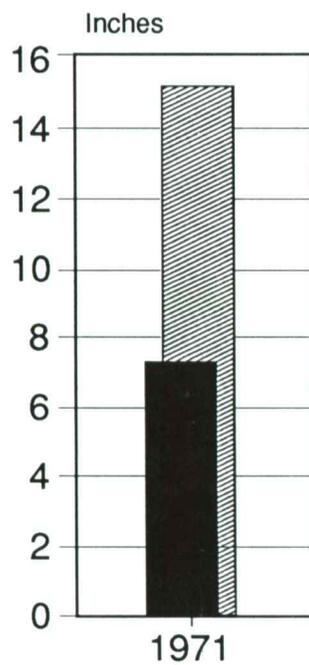


**1969** Note how much the vegetation in this year resembled the vegetation in 1966. Even though the spring precipitation was above average, the time that it fell was apparently critical in determining how the vegetation looked.

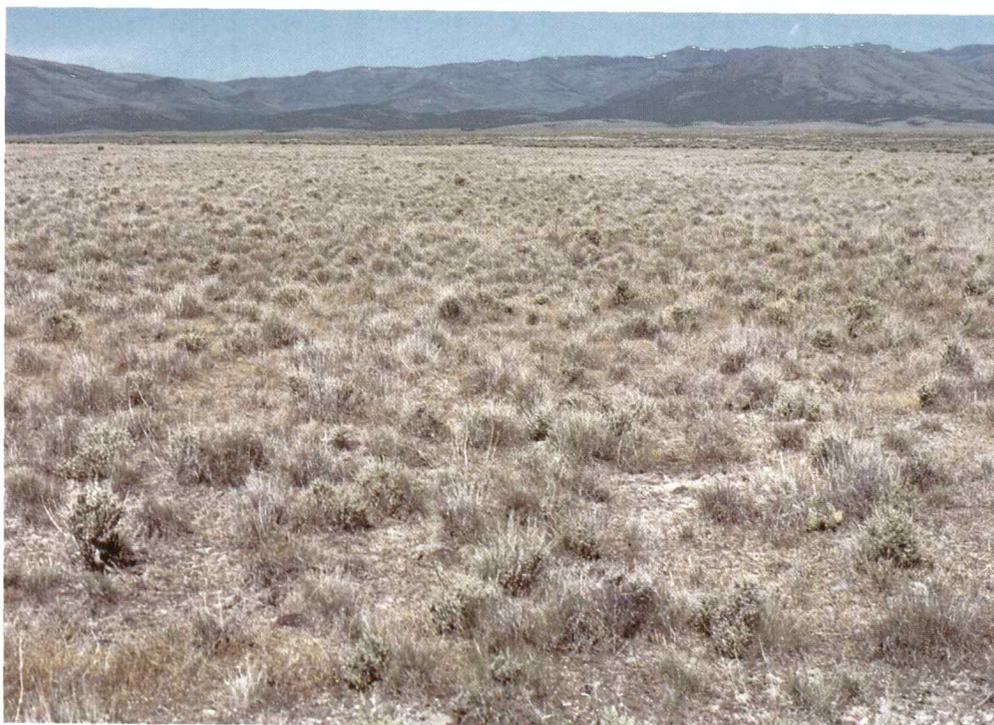




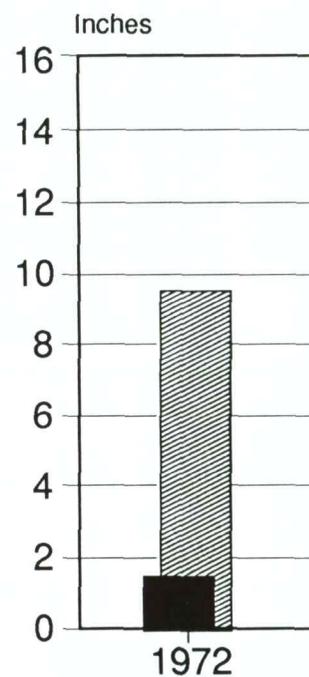
**1970** Shadscale and squirreltail grass were the dominant plants. Halogeton was present, as well as other annuals. Prickly pear cactus was prominent.



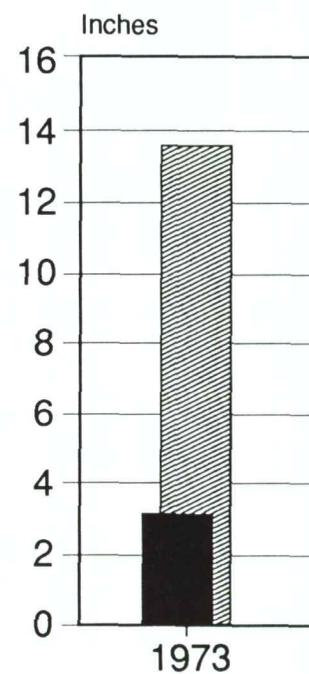
**1971** Squirreltail grass, globe mallow, and cheatgrass (*Bromus tectorum*) were found with the shadscale. Cheatgrass was more prevalent after this year.

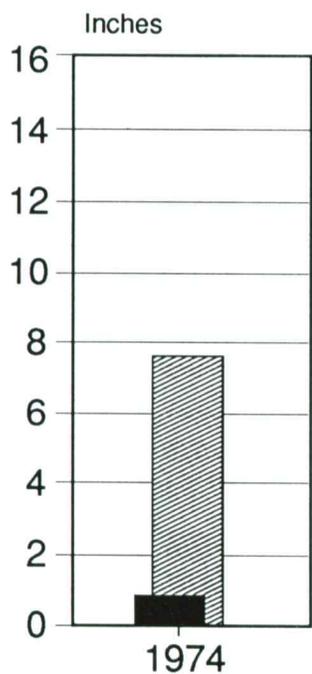


**1972** Following a dry spring period, the shadscale was the most dominant plant. There were squirreltail grass, globe mallow, and various annuals present.

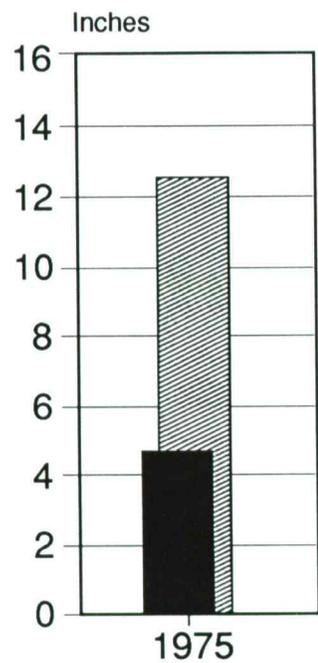


**1973** Squirreltail grass and shadscale were the dominant plants in the stand this year. Globe mallow and Sandberg's bluegrass were also present.





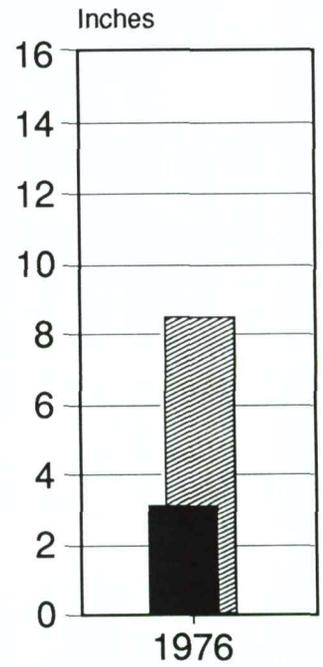
**1974** A very dry year produced squirreltail grass that matured earlier than expected. Note the 1979 photograph for a similar appearance.



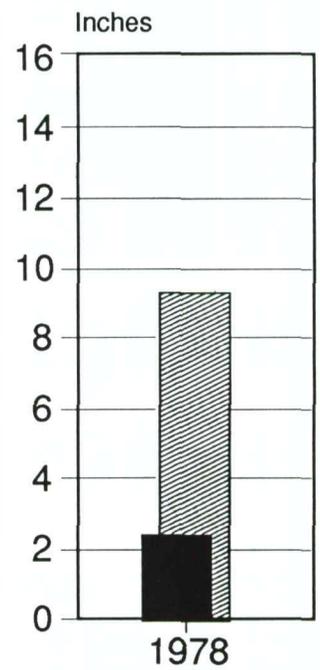
**1975** Above-average spring precipitation produced an entirely different appearance than the year before. Squirreltail grass and shadscale, along with various annual plants, made up the vegetation in this year.

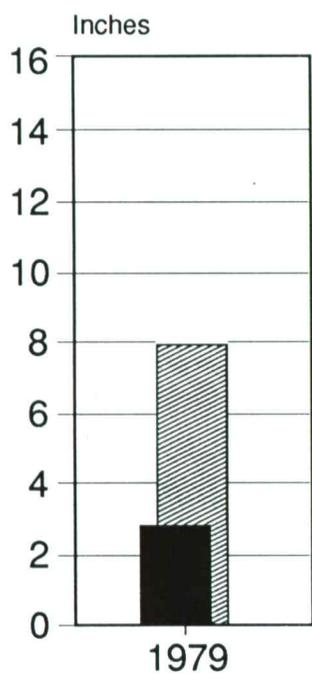


**1976** Squirreltail grass was the dominant plant. Its red spikes obscured the globe mallow and shadscale. There was also cheatgrass in the stand.

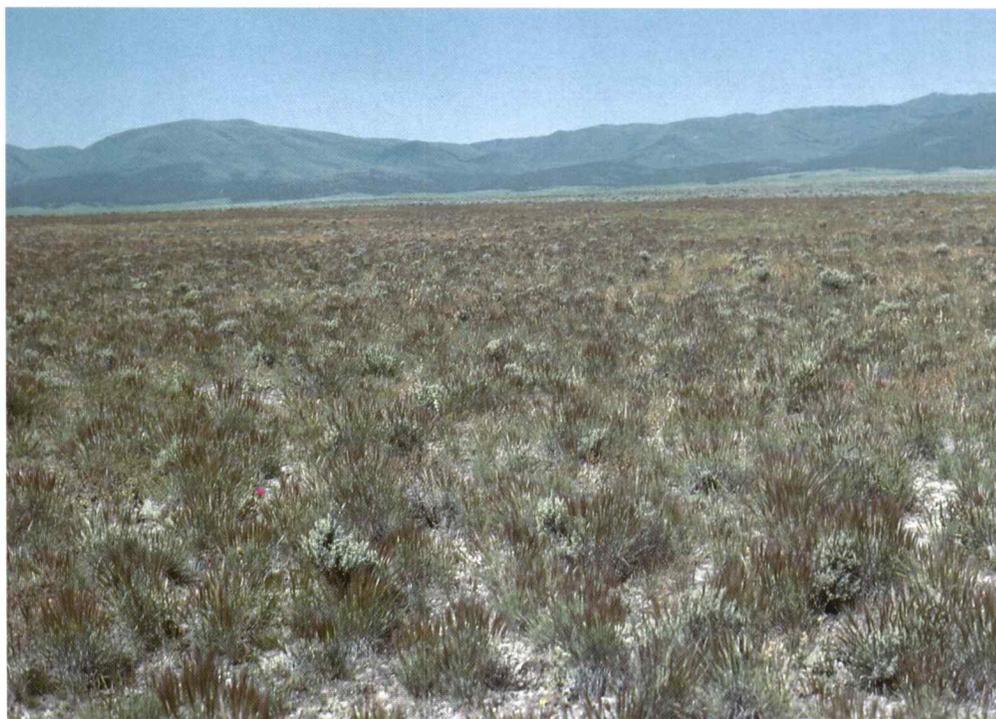
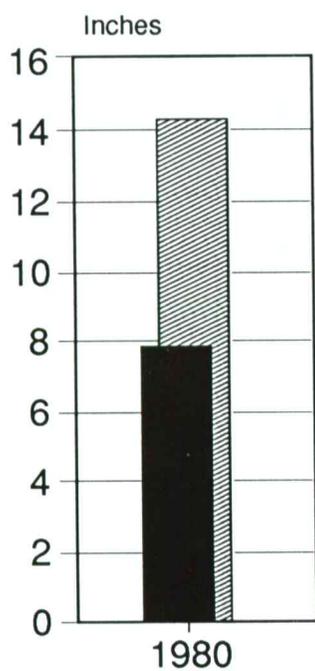


**1978** Squirreltail grass and shadscale were dominant. Spring precipitation was slightly below average during this year.

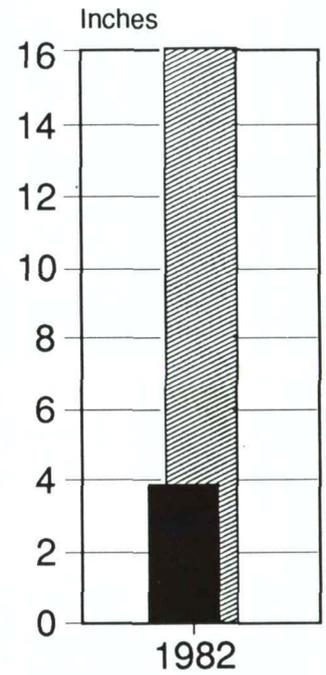




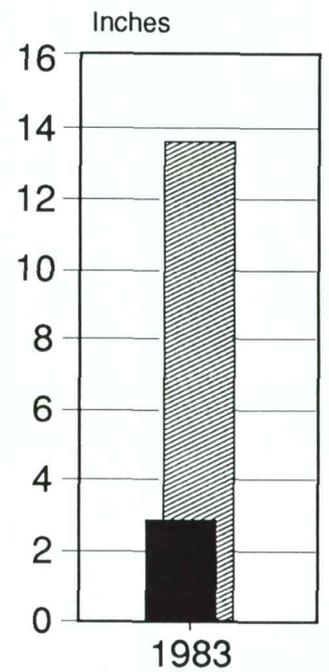
**1979** Spring precipitation was slightly more than the year before. The only explanation for the difference in appearance of the stand this year and the previous year would be that temperature and the time that the rain fell were different. Note that this photograph is very similar to the 1974 photograph.



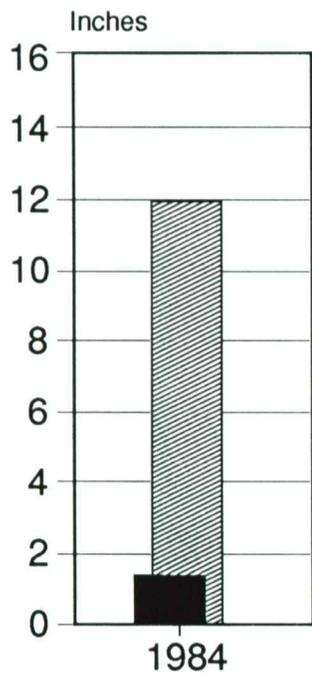
**1980** With above-average spring precipitation, globe mallow was again obvious in the vegetation. Squirreltail grass was a co-dominant in the stand. About one-half of the shadscale was showing the effects of the scale insect.



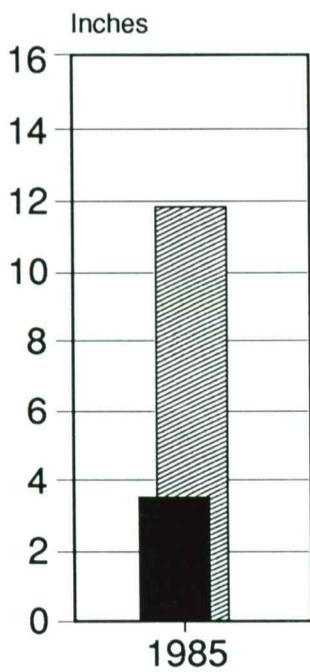
**1982** Squirreltail grass was the dominant plant in the stand. Shadscale was showing some recovery from the effects of the scale insect.



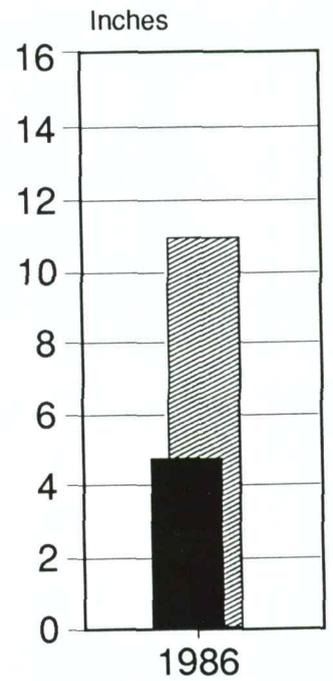
**1983** The scale insect was again causing some damage, as a lot of the plants had dead branches. Squirreltail grass (with red spikes) and globe mallow were dominant in the stand. Cheatgrass was evident throughout the stand.



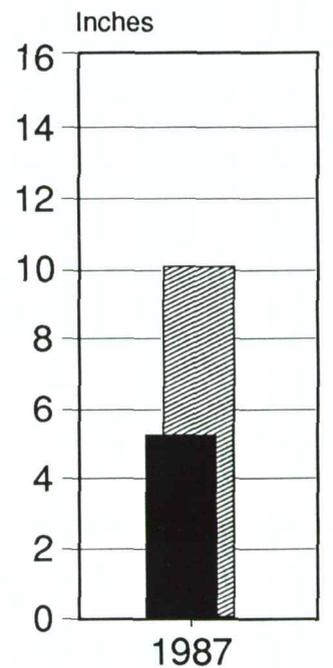
**1984** The scale insect was affecting shadscale, with an increase in annual plants. Squirrel-tail grass and globe mallow were obvious.



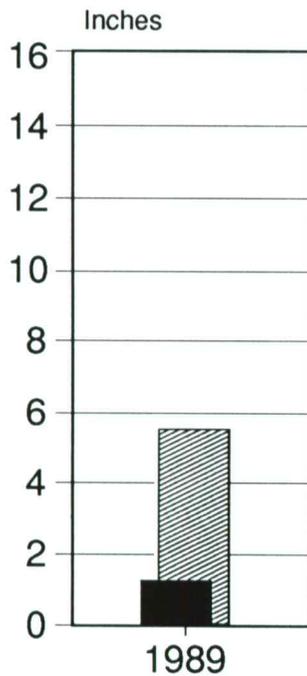
**1985** Shadscale was still showing the effects of the scale insect. Annual plants were common in the vegetation, including halogeton.



**1986** The shadscale was mostly dead. Some seedlings of shadscale appeared in the understory. Cheatgrass, pepper grass (*Lepidium perfoliatum*) globe mallow, and Jim hill mustard (*Sisymbrium altissimum*) were present in the vegetation.



**1987** Grasshoppers were abundant this year. Many shadscale plants were partially or completely dead from the scale insect. Squirreltail grass and globe mallow were common, along with annual plants such as cheatgrass, Jim hill mustard, and pepper grass.



**1989** This year was drier than the previous year and the vegetation reflected the dry condition. The scale insect was still affecting the shadscale. Squirreltail grass, Sandberg's bluegrass, and globe mallow remained as components of the vegetation. Annual plants consisted of Jim hill mustard, and pepper grass.



**1990** Spring precipitation was much improved over the previous years. Squirreltail grass, Sandberg's bluegrass, and globe mallow were the principal perennial plants. Halogeton was the main annual plant in the area. Scattered seedlings of shadscale were noticed this year.