regardless of whether raised or purchased, commonly exceed costs of grazing. Thus, any reduction of the 29–36% dependency on winter hay could have net positive benefits if animal performance is not hampered. Larger herd sizes on the average were feeding less hay which probably reflects greater flexibility in their management of the resource base.

Combining both Forest Service and BLM forage data shows that from 34–53% of the range forage consumed is provided by these two land ownerships. When placed on a seasonal basis, the contribution is even more significant. Federal land management agencies need to recognize that the forage produced under their management is extremely important, especially when viewed from the perspective which shows the importance of critical feed periods. However, until actual AUM amounts are known from the various land ownerships represented within a county, there is no good way to estimate what effects any change in permitted grazing may have. When seasonal dependence is known by forage source, both ranchers and management agency personnel can cooperatively evaluate impacts brought about by any given management change. Thus, proposed forage reallocations could be suggested in the light of more factual information and should result in greater cooperation between the public and private sectors. ●

Conservation on Hopi Rangelands

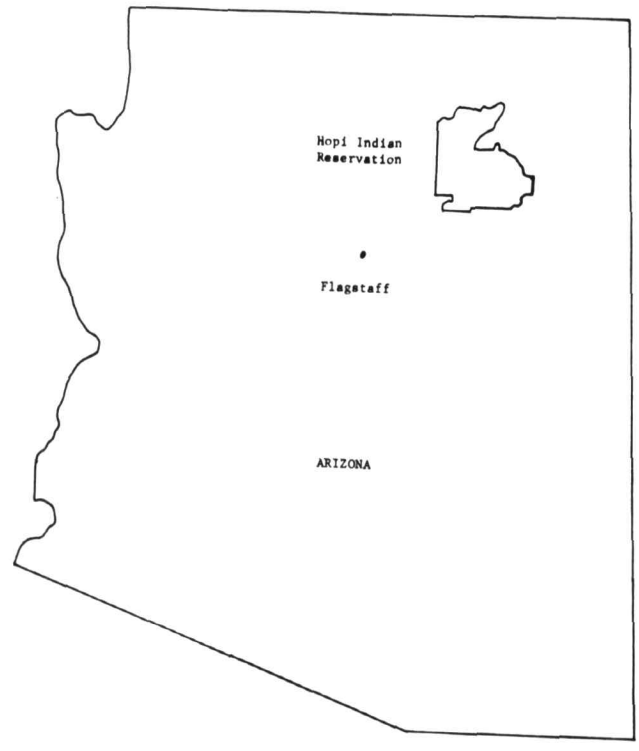
Harmon S. Hodgkinson

The effects of soil and water conservation on range resources often are not realized until years later. The land user or manager knows that conservation practices applied and maintained will pay in the long run. He also realizes that as technology advances, systems need to be improved.

A Soil Conservation Service (SCS) soil-vegetation survey team was assigned to the Hopi Indian Reservation in northeastern Arizona in 1980 to provide the Bureau of Indian Affairs (BIA) and the Hopi Tribe with a cooperative soil survey and a range site and condition survey to be used in the planning, application, and use of Hopi lands.

The Hopi Tribe in 1882 was granted 2,600,000 acres, but presently is living on about 650,000 acres. The Hopi have lived in this area for nearly 1,000 years. Old Oraibi, built at least by 1150, is probably the oldest continuously occupied city in the United States today. The Hopi people dryland farm some areas close to the villages, raising corn, beans, squash, melons, and some fruit trees. Cattle and some sheep are the livestock commonly grazing the rangelands.

The Hopi farmers and ranchers over the years have received assistance in applying conservation practices from the BIA at Keams Canyon. As a member of the SCS survey team, I have seen many conservation and range management practices on the land. Some of the practices were installed recently. Others were installed 40 years ago. BIA photo files document the past, and new photos taken in 1982 show how these conservation practices have improved and protected Hopi soil, water and range resources. The areas are located in a 6 to 10-inch precipitation zone at elevations of 4,800 to 6,000 feet.



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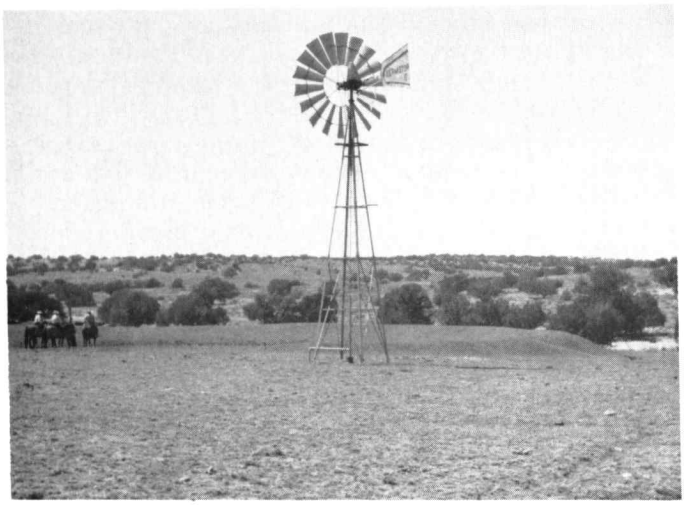
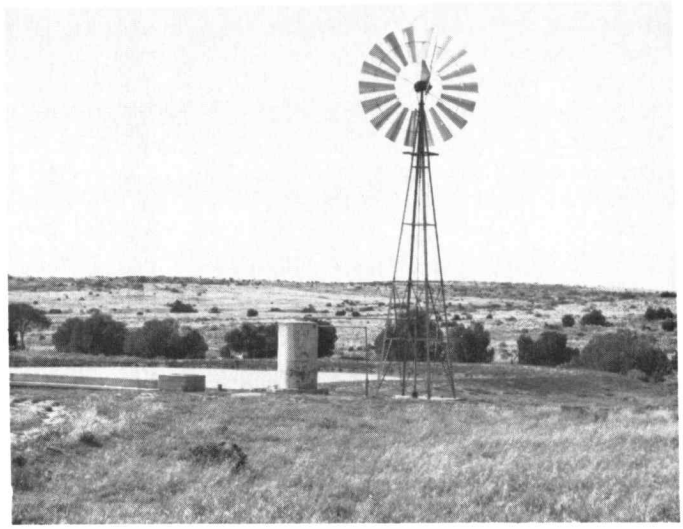
The author thanks the BIA at Keams Canyon for access to their photo files and Oscar Lalo, who assisted in this project.

Editor's Note: The Soil Conservation Service worked on the Hopi Indian Reservation from 1935 until 1940, when a Government Departmental major reorganization took place and moved the SCS from all Indian lands.



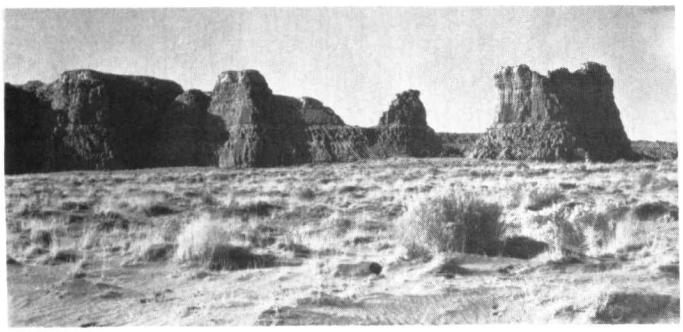
BIA Photo

Windmill - 1957. *Water is essential for the health of livestock and aids in obtaining proper distribution of grazing animals. Water was pumped into an earth pond after the establishment of this windmill. Grasses in the foreground are primarily galleta and blue grama. The species are grazed closely, as is typical around watering facilities. Bare ground is minimal.*



SCS Photo

Windmill - 1982, 25 years later. *Over the years it became important to ensure having water for any grazing season of the year. A storage tank and a float-equipped watering trough were added to provide flexibility to the system. Water pumped by the windmill is first stored in the tanks, then distributed into the watering trough. Excess from the tank goes into the earth pond. The vigor of galleta and blue grama has improved. Cheatgrass is also present in minor amounts. Bare ground is still minimal.*



SCS Photo

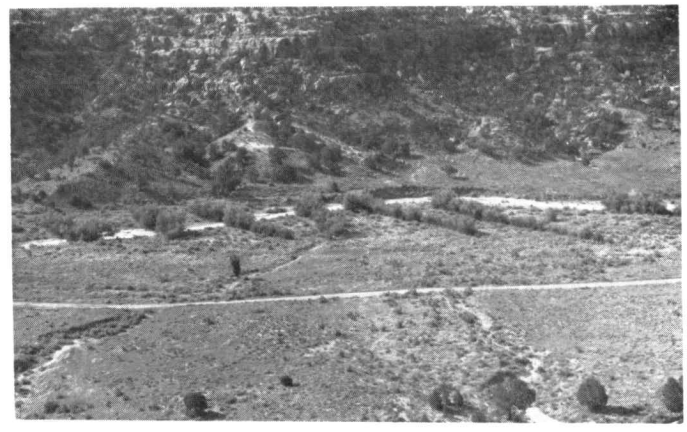
Garces Mesa - 1936. *Milton S. Snow, intrigued by the Navajo Sandstone formation, has documented in the foreground the Sandy Upland Range Site. Major species include galleta, sandhill muhly, Indian ricegrass, and an occasional fourwing saltbush. This site is an annual precipitation zone of 6-8 inches. A sparse plant community is produced, leaving bare sandy soil between plants. Natural wind erosion occurs on the site, especially in the spring when winds are strong.*

SCS Photo

Garces Mesa - 1982, 46 years later. *The plant species have changed some on the Sandy Upland Range Site. Sandhill muhly now dominates. Indian ricegrass, galleta and sand sagebrush are also present. The vigor of the plants is good because of proper grazing, and there is less bare soil than in 1936. This site is very fragile and must be properly grazed in a planned system to maintain or improve the resource.*

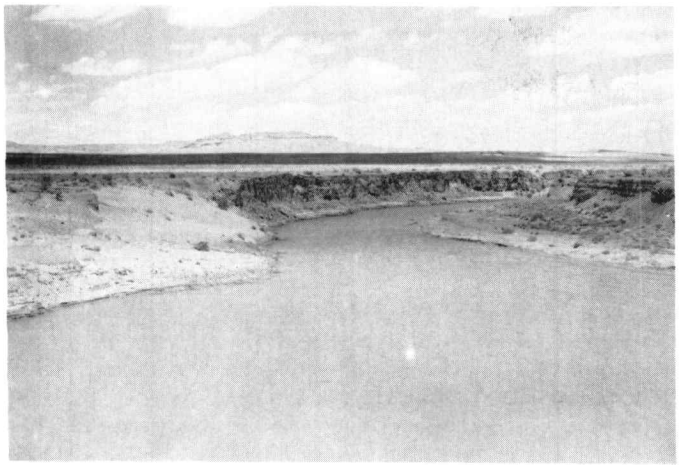
BIA Photo

Echo Wash - 1962. *Summer thunderstorms are intense and have the potential to severely erode intermittent sandy washes. In the early 1960's, Russian-olive trees were planted across Echo Wash to slow down the runoff from these storms. The trees are 2-3 feet tall.*



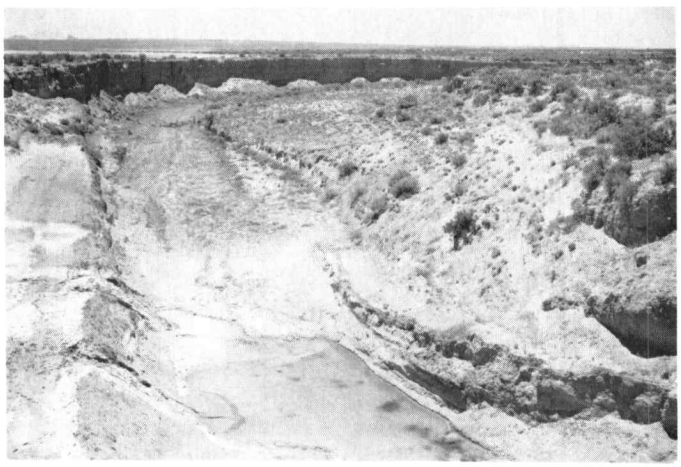
SCS Photo

Echo Wash - 1982, 20 years later. *The Russian-olive trees are now more than 20 feet tall and have helped control erosion within the wash. Wildlife habitat and the aesthetics of the wash have been greatly enhanced. Adjacent Utah junipers have increased in size, and other vegetation has also improved.*



BIA Photo

Polacca Wash - 1945. *Water backs upstream on Polacca Wash after a thunderstorm. A newly constructed earth dam was built across the wash to help control erosion. The soils along Polacca Wash are highly erosive. Sidebank cutting and sloughing are common from the runoff of severe summer thunderstorms.*

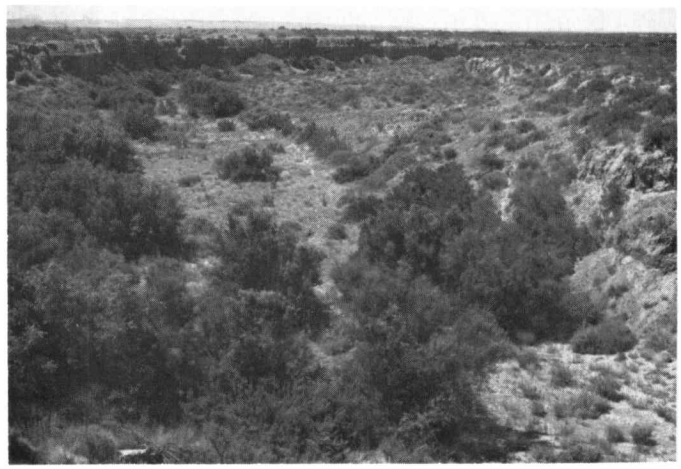


BIA Photo

Polacca Wash - 1945. *The channel downstream from the newly constructed earth dam built across Polacca Wash to control erosion. Summer thunderstorms not only cut the channel down, but widened it by sidebank cutting. The channel in places is more than 100 feet deep and 400 feet wide.*

SCS Photo

Polacca Wash - 1982, 37 years later. *The wash channel has almost completely silted in and is covered by vegetation. Now, storm runoff is slowed by a series of dikes and diversions that spread the water over the channel area. The vegetation is dominated by western wheatgrass, bottlebrush squirreltail, greasewood, and saltcedar. A grazing resource and wildlife habitat have resulted from the project.*



SCS Photo

Polacca Wash - 1982, 37 years later. *The wash has been healed by vegetation of saltcedar, fourwing saltbush, greasewood, Indian ricegrass, galleta, and bottlebrush squirreltail. Through the conservation effort of erosion control, a grazing resource and wildlife habitat has been improved.*