

INTRODUCTION TO THE HOPI RANGE WATER SUPPLY PROGRAM

District 6 of the Hopi Reservation consists of 624,064 acres of range land. The elevation varies from 6800 feet in the northeast to 5030 feet in the southwest. The topography of the northern portion is characterized by long finger like projections of black mesa supporting the growth of pinon, juniper, sage brush, and grass. There are many springs in this area that seep between the different formations of sand stone. The southern area is less broken and exhibits a rolling topography which supports galleta, blue grama, and alkali sacaton grass. The extreme southern portion is very dry. The soil is of a sandy nature which absorbs most of the runoff, and excludes the possibility of building good charcos in that area. Geological Survey has deleted approximately a seventy-five square mile area as having no ground water in sufficient quantity to justify drilling.

The Reservation is operated under a livestock permit system with the grazing capacity of 23,627 S.U.Y.L. This includes the complete range areas of the reservation. Those areas without water are not being utilized and consequently put a heavier grazing burden on the areas with water.

The yearly stock count emphasizes the change over from sheep to cattle and to protect the range resource, it is essential that more water be developed in certain areas of the District. The present stock water in District 6 is inadequate to provide water for the livestock industry, especially in regard to protecting the range resources.

The proposed water plan includes sixty-five windmill wells (Forty old and twenty-five new ones), two artesian wells, five water places developed by piping, and ten springs as permanent water. This will provide one watering place for each twelve square mile area which is slightly less than the nine square mile area recommended by the latest investigation.

Table one shows the Range water plan developed for the Hopi jurisdiction. The number carried under present number of wells includes only Range windmills. Many of the dug wells support only four or five head of cattle or a small band of sheep. Three of the school wells are dual purpose, but the remainder are inaccessible for livestock use.

Springs have a major position in the over-all water plan, but most of them are too small to be a principle source of range water. At the present time there are two artesian wells and ten major springs which can be considered capable of supplying water

to a nine section range area. Many of the smaller springs do an excellent job of filling in the gaps in the water pattern. Most of these need to be rehabilitated, and there are ten new springs that could be developed for supplemental water. This Agency plans to furnish only the materials in the development and rehabilitation of springs. The Indians utilizing the springs will provide the labor.

In 1940 up until about 1951, the majority of the ranchers were grazing sheep. The majority of the herds were grazed in areas near the mesas with a resulting depletion of forage in those areas. Previously, no wells were planned for the areas near the mesas because of that situation. This was done to assist in the movement of herds away from the mesas. The number of breeding cows has increased from 1,020 in 1946 to 2,073 in 1954. This increase came about when some of the ranchers near the mesas changed to cattle and moved their herds to areas near the district line. The decrease in sheep numbers near the mesas has taken the stress off that area and has made it possible to include wells for that area in the new plan.

The steady change from sheep to cattle is changing the water needs in District 6, especially in the areas near the mesas and in the dry southern portion. Since sheep require much less water than cattle and can travel farther to water, it is essential that water be developed in these areas to take care of the increasing cattle numbers. The complete lack of water, except for two charcos, is creating a hardship on the ranchers as well as deteriorating the range around the existing water holes in this dry southern area. Included in this program are plans to alleviate the situation with pipe lines. This is the most critical area and has received a high priority in the development plan.

In the 1940's the thinking on range water was that it should be placed so an animal would not have to travel more than two or two and one-half miles. More recent investigations have shown that to achieve correct distribution and more efficient use of the animal unit; water should be placed every three miles or so, so that an animal does not have to travel more than one and one-half miles. In view of the change being made from sheep to cattle, the more efficient use of the range and the animal unit to be derived from water spaced every three miles, the following plan has been prepared for the Hopi jurisdiction. This plan is designed to put water throughout District 6 at approximately every three miles so that the requirements of all classes of livestock will be met.

Proposed Windmills. This plan calls for the construction of twenty-five new windmill wells to give workable water distribution throughout District 6. All locations are fairly certain to contain water; however, each location will be checked with the Geological Survey Ground Water Division before drilling. Five of

these wells are in doubtful areas as to location because of proximity to the mesa. These wells are the last ones to be drilled under the program and sufficient time will be available to work out complete plans.

Pipe Lines. The lower end of Talahogan range unit and the lower end of Burro Springs Tovar range unit are completely without water except for two good charcos and a few short seasonal ones. Six dry holes have been drilled in this area in the past twenty years. Apparently the best and most economical way to make water available is to pipe from known sources of water, these being the Jeddito wash and the Polacca wash. Two pumps and approximately fifteen miles of pipe line will make this seventy-five square mile area completely accessible to livestock.

Charcos Twenty-five charcos are needed to complete the dead spaces in the water plan. In some instances the charcos will be installed in front of old reliable dirt tanks that have been partially silted in. This will provide an excellent desilting basin as well as a reliable water catching area. These charcos are to be built with ACP funds and SMC funds included in the 20-year program.

Springs It is planned to develop ten new springs. The labor will be supplied by the people utilizing the springs. These springs are for the most part low yielding ones, but they will supply water for a small band of sheep as well as filling in the over-all water supply picture.

Rehabilitation At the present time there are forty range windmill wells in District 6. Sixteen of these wells are in poor condition since they were drilled and equipped prior to 1943 and the majority of the parts are original equipment. Ten are in fair condition which means fifty per cent of the parts require replacement but will last from two to four years without major repairs. Five of the wells are in good condition which means they will last about four to seven years without major repairs. Nine range wells have been drilled in the last four years and can be expected to last seven to twelve years without major repairs.

Tribal Participation At this time there is little possibility of the Tribe assuming any of the operation and maintenance or construction cost for this development. The Tribe has no source of income and there appears no hope for a change in this situation until the Hopi Executive Order Jurisdiction is settled. Plans are being made, however, for the individual user to assume some responsibility for the smaller operation and maintenance needs of the wells, tanks, and troughs. If this plan is approved, it is planned to work up an agreement between the users of the pipe line system in which they will furnish the labor required for the maintenance of that system.

Proposed Hopi Range Water Supply Development Program - 1956

Range Windmill Wells		Pipe Line Development		Char cos*	Springs				
Pres. No.	Number Needed	Overall Total	No. of Mi. Needed	No. of pumps Needed	Number Needed	Pres. No. Perma. Sprg.	Pres. No. Tem. Sprgs.	No. Inv. Develop.	Overall Total
40	25	65	15	2	25	11	22	10	43

New Construction

25 windmill wells \$153,548
 15 miles of pipe line
 and 2 pumps 71,021
 Total \$224,569 ✓

Rehabilitation

Rehabilitate 36 wells \$70,122
 Total \$70,122 ✓

294,691 -

Total need to complete Water Development Program \$274,691

1958 100,000
 1959 100,000
 60 100,000
 1,300 000

*Cost to be included in 20-year SMC program (estimated cost \$61,150)