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Arizona Water Conditions

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Fall Report

October 1994

prepared by:

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The information contained in this report is intended to present an overall summary of water supply and water related conditions within the State of Arizona during the spring and summer seasons of 1994. If more detailed information is desired on any subject mentioned in this report, contact Larry P. Martinez, Water Supply Specialist, USDA, Soil Conservation Service, 3003 N. Central Avenue, Suite 800, Phoenix, Arizona 85012-2945 or by telephone at (602) 280-8841.

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USDA-Soil Conservation Service

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SUMMARY

April precipitation in Arizona varied greatly but, as a whole, moisture conditions across the state were below average.

In May, conditions improved throughout the state with the exception of southeastern Arizona, which experienced less than average moisture for this time of year.

June precipitation was below normal statewide; however, portions of the White Mountains, the Prescott area, and portions of southeastern Arizona did receive rain.

July did not produce the usual thunderstorm activity and, although some storms did develop, precipitation was below average throughout the state.

August continued to be dry statewide, although some thunderstorm activity did produce heavy rains in Nogales, in portions of the White Mountains, and in most areas on the Coconino National Forest.

In September, moisture conditions improved substantially statewide with thunderstorms occurring throughout south-central and southeastern Arizona. Good moisture was also reported along the Mogollon Rim, the White Mountains, and throughout much of northern Arizona including the Navajo Indian Reservation.

Streamflow for the six month period April through September, like precipitation, varied greatly. Flows in April fell below normal levels as the result of poor spring moisture, while streamflows in May and June were above average on the Verde River and on Tonto Creek. July and August saw streamflows taper off to below normal levels. In September, most major Arizona streams produce above average flows with the arrival of monsoon thunderstorms.

Major reservoirs in Arizona provided normal water supplies throughout the summer months. Some small reservoirs and ponds went dry or to very low levels by the end of July, but many began to recover in August and September with the arrival of the monsoons.

As a result of a relatively dry winter, spring rangeland conditions were only fair. Stock water supplies in spring were adequate in most parts of the state but soil moisture in many areas was short. Cool spring weather hampered spring growth that did occur. Plant production improved somewhat with warmer weather in April.

By the beginning of summer, range conditions had deteriorated. Short soil moisture supplies were limiting growth. Lower elevation rangelands showed the most stress. In some areas, stock water supplies were short and hauling of livestock water was more common than usual all across the state.

With improved moisture conditions in late August and September, range and pasture conditions had improved considerably in many areas. Stock water supplies had increased and soil moisture was less limiting. Overall range conditions across the state were rated at 78% of normal by October 1, 1994, although some areas were still experiencing dry conditions.

WATER CONDITIONS

STREAM-FLOWS

Runoff from major Arizona streams was above the 30 year median for the period May, June and September, but were substantially below the 30 year median in April, July and August. Table 1 illustrates the percent of median flow for each spring and summer month and the median for the six month period.

TABLE 1
1994

STREAM	Arizona - Percent of Median Streamflow *						Apr-Sep
	Apr	May	Jun	Jul	Aug	Sep	
Salt River	49	67	85	50	61	210	65
Tonto Creek	80	241	195	68	31	115	74
Verde River	58	147	102	80	75	143	85
Gila River HSV	57	75	122	39	28	91	51
San Francisco	63	72	95	54	34	124	56
Virgin River	-	-	-	-	-	-	-
Lit. Colorado	20	4	7	5	5	13	31

* Preliminary data subject to revision. % of median based on period 1961-1990.

- Preliminary data incomplete

RESERVOIR STORAGE

Most major reservoir in Arizona held substantial volumes of water as of April 1994. As a result most water users having access to these reservoirs had on serious shortages during the spring and summer season.

As of October 1, 1994, the six Salt River Project reservoirs held a combined storage of 1,151,495 acre feet (af) at 57% of capacity. San Carlos was 21% of capacity as of October 1, which reflects minimal storage due to construction

From October 1993 to June 1994, an additional 348,000 af of water was diverted from the Colorado River and pumped into Lake Pleasant. By April 1994, the lake was filled to elevation 1,701 which officially completed the first fill for the dam structure. Pump/Generator tests were conducted and all units were commissioned in June 1994.

From June 1 to September 30, 1994, approximately 450,000 af was released from Lake Pleasant for CAP deliveries. The water level dropped 63 feet, from El. 1,701 to El. 1,638. The lake's surface area decreased from 9,900 acres to 6,000 acres.

In a normal year of CAP operation, the planned reservoir water level fluctuation is 60 feet.

- Planned Approx. Maximum W.S. Elevation = 1,680
- Planned Approx. Minimum W.S. Elevation = 1,620

The reservoir level will rise, mid-October through May, while Colorado River water is pumped into the lake. Conversely, the reservoir level will drop, June to mid-October, while water is released into the CAP and Maricopa Water District (MWD) systems for customer deliveries.

Additional benefits of the dam and reservoir include hydroelectric power generation, flood control storage, improved water quality, and greatly enhanced water-based recreation.

AGUA FRIA RIVER INFLOW: Precipitation was below normal for the water year. The Agua Fria watershed produced only 19,000 af of runoff into Lake Pleasant. The normal inflow to the lake, from the Agua Fria, is 50,000 af per year. Compared to last year's 445,000 af of runoff inflow, it represents a 96% reduction in volume of natural runoff.

GRANITE REEF UNDERGROUND STORAGE PROJECT (GRUSP)

DELIVERIES: Previously, the CAP received approval to lease storage space and transport CAP water to the GRUSP. In June 1994, construction was completed and CAP started using the recharge facility. CAP implemented the releases through the SRP turnout and interconnect facility. Approximately 40,000 af was directly recharge at the GRUSP basin in the Salt River channel.

**WATER
QUALITY**

The 1994 Water Quality Assessment Report from the Arizona Department of Environmental Quality provides the following information on Arizona's water quality to date:

Approximately 5,600 stream miles have been assessed, which is 5% of the estimated 108,000 stream miles in Arizona that includes streams, washes and canals. By combining miles partially and not supporting designated uses, 3,725 stream miles are assessed as impaired (66% of 5,600 stream miles assessed). 54 lakes were also assessed. Of the 55,089 lake acres assessed, 45,668 acres (82%) were assessed as impaired (partially or not supporting designated uses).

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Causes of impairment (stressors that cause violations of surface water quality standards or other criteria) may be different for each waterbody; however, a few generalities should be considered about the causes of impairment. Metals such as arsenic, beryllium, cadmium, etc. are major stressor category of lake uses. The combination of turbidity, suspended solids, and siltation remains the principal cause of stream impairment and a major cause of lake impairment.

Non-point sources of pollution include silviculture (forestry), urban runoff, agriculture, and resource extraction (wetland and riparian). Of the 3,725 stream miles assessed as impaired, non-point sources were indicated as probable contributors to partial or non-point sources of use impairment on 93% of lakes assessed.

SCS FIELD SUPPORT TEAMS REPORT

Northern Arizona The Kingman SCS field office reported no major water shortages on irrigated lands resulting in normal crop production. General range conditions were assessed as fair to good. Small livestock dirt tanks filled in the spring, but were dry by mid-summer. Water hauling was required for livestock in some areas.

The Fredonia SCS field office reports the irrigation season was very short this year; no surface water was available through the summer months. Near the community of Moccasin, Arizona, crop acreage reduction occurred due to poor water supplies. In the Colorado City area, water users experienced shortages even though Short Creek Reservoirs 1 and 2 filled in early spring. Groundwater was used in the Colorado City, Cane Beds, Moccasin, and Littlefield communities as the primary source for irrigation.

Winter and spring precipitation resulted in roughly average forage production across the Arizona Strip. Houserock Valley, however, received little spring moisture that resulted in below average forage production. Through the summer months most areas produced slightly below average forage production. Some isolated areas received summer moisture and were above average. Browse species, such as Fourwing Saltbush, were foraged more this summer due to the poor quality of forage available. Many ranchers weaned and shipped calves early as a result of poor forage conditions and lack of adequate livestock water. Range production was, at best, fair.

On the Navajo Indian Reservation, the Kayenta SCS field office reports precipitation was good this spring and though the summer. Crop production was mostly dryland Indian corn and yields were good due to above average soil moisture. All small dirt tanks filled in the spring even though livestock water hauling from community wells was the norm during the summer months. Range production was rated fair to good in most areas. Sedimentation problems in the smaller livestock dirt tanks and problems with washed out access roads were reported due to flash flood conditions in some isolated areas.

The Chinle SCS field office reported that, as of mid-September, Many Farms Lake was at 65 percent of capacity; Tsaille and Wheatfields Lakes at 70 percent of capacity; and Round Rock Reservoir at 20 percent of capacity. Since the dam at the reservoir is under repair, the community of Round Rock experienced a water shortage this year. Many Farms, Tsaille, and Wheatfields Lakes held

adequate storage through the spring and summer months for both irrigation and recreational uses. Range production was generally rated as poor area-wide. Hauling water from community wells for livestock was more apparent this year.

The St. Michaels SCS field office reports that, as of mid-September, Asaayi and Red Lake were at 50% of capacity, while Chuska Lake was at 40%. There were no water shortages reported near these communities. Although the dam is under repair at Ganado Lake, storage was reported.

The southeastern and southwestern portion of the Navajo Indian Reservation had some rain in early spring, but conditions were dry by July. Water hauling from community well was necessary for livestock. Dryland crops did not mature due to poor soil moisture.

In the Chuska Mountains, the snow pack was below average last winter. Most streams were dry by summer due to poor spring moisture. As a whole, range production was rated poor through the summer, improving to fair as the results of fall moisture.

The Holbrook SCS field office reported that groundwater and reservoir supplies were adequate for irrigation purposes. Schoens Dam filled to 30,000 af and remains 33% of capacity. Mexican Lake, with a total capacity of 1500 af, was full by spring, but empty by September. Fools Hollow Lake, which is primarily a recreational area, also filled to a capacity of 1500 af. Little Mormon Lake filled to 1500 af in spring, but was empty by September. Clear Creek Reservoir is filled with sediment from the January 1993 floods. Range production was generally rated fair in spring, poor during summer, and recovering to fair this fall. Water hauling for livestock purposes was common throughout the Holbrook area.

The Springerville field office reported that prior to July 15 it was extremely dry. From July 15 through August 30, higher than normal precipitation occurred. Range production was very good during this period. The monsoons in September also provided good moisture. As a result, Nelson Reservoir spilled water in early September.

The Flagstaff field office reported Upper Lake Mary to be at 32% of capacity as of September. Lake Mary is used in conjunction with several groundwater wells to supply water to the City of Flagstaff.

Verde Valley water users seemed to have a normal water year, with no report of serious shortages. Some irrigation systems are still not functioning properly as a result of the 1993 floods.

Generally, there was good spring precipitation in the surrounding areas from Flagstaff. Although rain occurred, soil moisture at the end of winter was so low that little runoff did occur. In summer, precipitation started early, but was infrequent. This resulted in low soil moisture until the monsoons came in August and September. Most livestock dirt tanks in the higher elevations filled at this time. Livestock water hauling was necessary in some areas. Range production was reported as good.

At the Prescott field office, precipitation totals have been below average for most the year. Thunderstorm activity in late spring, however, brought the precipitation total to slightly above average.

The summer months were dry in Prescott. Monsoon activity did not begin until mid August. As a result, Willow and Watson Lakes were unable to supply water to irrigation users in early summer and were estimated at 10% of capacity in September. Those users who relied on groundwater as their primary water supply were not affected. The users who relied on water from the lakes did not grow a crop this year or had to limit the area they planted. Ranchers in some areas began hauling water to their livestock by midsummer. Range forage production varied from poor to fair throughout the area due to short soil moisture.

Southern Arizona The Parker field office staff reported a normal water year. The irrigation water supply for users in the Parker area is diverted from the Colorado River and was adequate. It was reported that water deliveries in the Parker area run about \$7.00 per acre feet. Range productivity was rated fair for the spring and summer.

The Yuma field office report was similar to that from Parker. Irrigation water deliveries in the Yuma area are from Colorado River water and do not normally limit crop production. A significant factor, however, is that many farmers are still recovering from the 1993 floods, with some cropland totally lost from production and some irrigation systems operating poorly, if operating at all.

At the Sells field office, groundwater was used as the primary source for crop production. Well water was also used as a supplement for livestock. In several communities, water hauling began by midsummer. In August, once the monsoons came, the small dirt tanks in many areas held water.

The Tucson field office reported that it was dry spring through summer. Groundwater was the primary source for irrigation. Some cotton farmer had to irrigate 1 or 2 more times than normal because of the dry weather conditions. It was reported that some water hauling to livestock occurred and some ranchers reduced their range livestock numbers due to the lack of livestock water and range feed. Due to below normal precipitation range production area-wide is rated to be 30-50 percent of average.

The Douglas field office reports that groundwater was there primary water source, since no major or local reservoirs exist in the area. It was also reported that the spring and summer months were very dry. Even though thunderstorms did produce some rain in summer, they were sporadic and not affective. Livestock water hauling occurred. Most dirt tanks did not fill until late summer when monsoon thunderstorm activity finally began. General range production was, at best, rated fair in some areas.

Water conditions in the Willcox field office area were variable, as was the case throughout most of Arizona. Many locations received near average rainfall amounts, with several areas reporting below normal amounts. Winter and spring moisture was slightly below average followed by mostly average to

below average summer precipitation. Groundwater is the primary source of irrigation water in the Willcox area. Groundwater was adequate and was used to supplement stream diversions in the Saint David area. Direct stream diversions were also used in the Pomerence area. Both communities reported below normal surface water supplies. Some crop acreage reductions were reported due to less surface water availability. High energy costs for pump water tend to reduce profit margins to the point where some land is left idle in short water years. Crop production also suffers in short years because crops receive less irrigation water. In general, range production was mostly fair in the Willcox area through the spring and summer months.

In the Gila Valley, the Safford field office reports that below average precipitation was received throughout the spring and summer months. To make things worse, Safford received 1.6 inches of precipitation from November 1, 1993 to February 28, 1994, which is well below average. In the summer, rains were spotty with .40 inches of rain measured in July and 1.59 inches measured in August. Direct stream diversions from the Gila River were the primary source of irrigation water in the Gila Valley. The stream diversions were supplemented with groundwater during the spring and summer months. Direct stream diversions were not adequate through the growing season this year. Most cotton crops were under irrigated due to tight water supplies. Some cover crops were abandoned so water could be used on cotton. Range production in the beginning of summer was rated fair to poor due to below average winter and spring moisture. Many rancher had to supplement livestock feed more than usual this summer.

On the San Carlos Indian Reservation, the SCS field office reports that irrigation water was diverted from the Gila River and was adequate for the amount of land irrigated. No groundwater was used for irrigation purposes. Small dirt tanks used for livestock water filled during the summer monsoons and provided adequate water. In general, range production was normal, however, spring precipitation was below average. Good September precipitation caused Talkalia Lake to fill and spill water. The dam at San Carlos Reservoir is under repair and storage is quite low for this time of year.

In the Casa Grande, Chandler, Phoenix, and Buckeye field office areas many water users have access to surface irrigation water in areas supplied by the Salt River Project, the numerous Irrigation Districts, and the Central Arizona Project. Groundwater is the primary irrigation source in all areas outside these special use districts and was adequate. No adverse affects were reported due to the dry summer conditions.

**INFORMATION
SOURCES**

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