ARIZONA WATER RESOURCES NEWS BULLETIN

NEWS BULLETIN NO. 81-4 **OCTOBER-DECEMBER, 1981**

DECREASE IN ARIZONA GROUNDWATER WITHDRAWALS

Groundwater withdrawals in Arizona in 1978 and 1979 were, with one exception, the smallest in over twenty-five years. According to a recent U.S. Geological Survey report prepared in cooperation with the Arizona Department of Water Resources, about 4.0 million acre-feet of groundwater was withdrawn in Arizona in 1979, which is about 200,000 acre-feet less than the amount withdrawn in 1978. The withdrawals in 1978 and 1979 are the smallest since the mid-1950's, with the exception of 1966.

Most of the decrease was in groundwater used for irrigation in the Basin and Range lowlands province. The large amount of water in storage in surface-water reservoirs, release of water from reservoirs, floods, and conservation practices all contributed to the decrease in groundwater use and caused water level rises in several areas. Through 1979, slightly more than 179 million acre-feet of groundwater had been withdrawn from the groundwater reservoirs in Arizona. The U.S. Geological Survey report includes a map showing groundwater pumpage for 1979 and a table of annual and accumulated pumpage since the beginning of record. Data on potential well production, depth to water in selected wells in spring 1980, and change in water level in selected wells from 1975 to 1980 are also included in the report.

Copies of the report, Open-File Report 81-906, "Annual summary of groundwater conditions in Arizona, spring 1979 to spring 1980," are available for inspection at the Arizona Department of Water Resources, 99 East Virginia Avenue, Phoenix and at U.S. Geological Survey offices in: Room 5-A Federal Building, 301 West Congress Street, Tucson; Suite 1880, Valley Center, Phoenix; 2255 North Gemini Drive, Building 3, Flagstaff; 1940 South Third Avenue, Yuma; and Room 5312 National Center, 12201 Sunrise Valley Drive, Reston, Virginia.

STATEWIDE WELL REGISTRATION UNDER WAY

All wells drilled prior to June 12, 1980 that have not been abandoned or sealed must be registered with the Arizona Department of Water Resources by June 14, 1982.

There are approximately 100,000 existing wells in Arizona. About 80 percent of these are small, exempt wells with a pump capacity of 35 gallons per minute or less, used for domestic purposes, including non-commercial irrigation of not more than one acre of land. These wells must be registered, but the owner does not have to pay a fee. Owners of non-exempt wells, those with a pump capacity exceeding 35 gallons per minute, will have to pay a registration fee of $10 per well.

Anyone who filed an intent-to-drill form or an application for a groundwater permit since June 12, 1980 need not register; the well was automatically registered. Persons who applied for grandfathered rights must still register their wells.

The well registration requirement is one of the few provisions of the Groundwater Law that apply outside the Phoenix, Tucson, Pinal, and Prescott Active Management Areas. Information and well registration forms are available at the Water Resources Phoenix office, 99 E. Virginia Avenue and the Tucson, Pinal, and Prescott area offices. For inquiries, the phone number in Phoenix is 255-1546. The toll-free number in Arizona is 800-352-5464.

GRANDFATHERED RIGHTS REGISTRY READY FOR INSPECTION

The Arizona Department of Water Resources, (DWR) has announced that the registry of all who applied for grandfathered groundwater rights is ready for inspection.

The Groundwater Management Act, enacted by state legislators in June, 1980, requires the DWR to publish the listing of all persons who applied for grandfathered rights to preserve their right to continue using groundwater. The registry is now available for viewing at the Phoenix, Tucson, Prescott, and Pinal active management area (AMA) offices.

Any person residing in one of the four AMAs may file a written objection to any application in the same AMA; however, objections may be made only on the basis that the information is believed to be incorrect or insufficient.

Information contained in the registry includes the applicant's name, the type of grandfathered right sought, the location of water use, the number of acres irrigated, and the annual amount of groundwater used.

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Applicants must file written objections with the DWR Phoenix office by July 19, 1982. Any applicant may request a DWR administrative hearing to decide a contested claim.

Homeowners and businesses that use wells with a pump capacity exceeding 35 gallons per minute to water an outdoor area larger than one acre were required to apply for the type 2 grandfathered right by Sept. 14, 1981, or forfeit their right to pump groundwater. Commercial farmers applied for the irrigation right.

In those instances where farmland was purchased and retired to provide the water supply for a specific non-agricultural use, such as a new subdivision, it was necessary for the landowner to seek a type 1 right. If granted, the developer may pump up to three acre-feet per acre of groundwater from the property.

Since Sept. 14, 1981, the only way to obtain groundwater for non-agricultural uses within AMAs is to purchase existing grandfathered rights once they are established, or request a withdrawal permit from the DWR.

Listed below are the addresses and telephone numbers of the four AMAs and the additional locations where the registry is available for viewing. Objections must be filed with the AMA offices.

Phoenix AMA
99 E. Virginia
255-1546
800-352-5464 (toll-free in Arizona)

additional locations:

Salt River Project main, east & west offices
Buckeye Irrigation District office
Roosevelt Irrigation District office
Roosevelt Water Conservation District office
Maricopa County Municipal Water Conservation District #1

Tucson AMA
371 S. Meyer
628-5858

additional locations:

Nogales County Courthouse
Cortaro-Marana Irrigation District office (Marana)

Prescott AMA
DuMar Plaza, suite 312
1555 Iron Springs Rd.
778-7202

Pinal AMA
901 E. Cottonwood Lane, suite B
836-4857

MINI-BENCHES INCREASE CROP YIELD

Yields of dryland sorghum were increased as much as 98 percent in the Southern Great Plains by constructing "mini-benches" to hold all of the rainfall for crop use. Reggie Jones, Soil Scientist at the U.S. Department of Agriculture Laboratory at Bushland, Texas conducted research from 1975 through 1979 on mini-bench use. According to Jones, mini-benches can be constructed on nearly flat Pullman soil with less than two percent slope for about $50 per acre. He says that an economic analysis showed that over a ten-year period mini-benches would increase returns by $303 per acre.

The following account of Jones' research is quoted from *The Cross Section*, a monthly publication by the High Plains Underground Water Conservation District No. 1.

"*[Jones]* compared graded furrows, conventional contour furrows, wide furrows, conservation mini-benches and mini-benches. All plots were 450 feet long and, except for graded furrows, were diked on each end. Graded furrows on 40-inch centers with 0.25 percent slope allowed an average of 2.6 inches of runoff annually. Conventional contour furrows were made on 40-inch centers. Wide furrows were formed on the contour with 40-inch beds and 40-inch furrows. Orthman tri-level equipment was used to make the beds, and two rows of sorghums were seeded 40 inches apart in each furrow. These wide beds and furrows could hold twice as much water as conventional contour furrows.

"Conservation mini-benches consisted of eight 40-inch rows. The top four were planted flat on the slope and contributed runoff to the lower four rows on an area of leveled soil. A motor grader was used to level the area and a border disk was used to build a dike at the lower side of the leveled area. Level mini-benches were built with a motor grader and border disk and were four rows wide.

".... all plots were tandem disked in early April to bury residue and allow volunteer sorghum to sprout. Furrows were made, and leveled areas were sweep tilled in early May to control weeds and volunteer sorghum. Sorghum was planted on all treatments in mid-June. All plots and dikes were treated with propazine at 1.2 pounds per acre active ingredient immediately after planting to eliminate cultivation.

"Runoff control and erosion prevention was severely tested during 1978 when 5.2 inches of rain fell in less than 24 hours, 4.8 of which fell in 7 hours. The USDA researcher said that a storm this severe occurs only once in 75 years.

"All treatments except graded furrow and contour furrows prevented runoff. Jones said the wide furrow, mini-bench and conservation mini-bench had enough capacity to hold all of the water.

"Conserving rainfall and preventing all runoff increased sorghum yields from 51 to 98 percent. ... Average yield was 2,130 pounds per acre on mini-benches. Conventionally, graded furrows produced 1,071 pounds per acre or about average for dryland sorghum on the Southern Great Plains. Sorghum on conservation mini-benches, wide furrow and contour furrows produced 1,830; 1,620; and 1,630 pounds per acre, respectively. ... *[Jones]* studied soil moisture and found that water evaporated from the soil when beds were built in the contour and wide furrow systems.

".... Constructing mini-benches is much cheaper than building larger conservation systems. On a 2 percent slope, 594 cubic yards of soil per acre would have to be moved to build a 42-foot wide bench terrace. Only 118 cubic yards or 20 percent as much must be moved to construct mini-benches. Cost of the large benches at 1975 prices was $250 per acre. The cheaper mini-benches cost only $50 per acre."

In calculating economic returns for the mini-benches and conservation mini-benches, Jones assumed a 10-year life for each terrace system, a sorghum price of $6 per

hundred, and interest at 15 percent. According to Jones, mini-benches can increase returns up to $31 per acre annually over returns from graded furrows. Over a period of ten years, the increase over graded furrows would be $313 per acre for mini-benches and $227 per acre for conservation mini-benches.

LEACHATES MAY POLLUTE GROUNDWATER

A leaching process is used to recover copper and associated metals from the overburden dumps and sub-commercial portions of the ore body as part of copper mining operations in western Salt Lake County, Utah. Water, percolated down through these materials, oxidizes pyrite to form sulfuric acid, which then removes metallic minerals. Copper and other metals are recovered from the acidic waters drained from these areas. However, not all of these waters are captured. Some are known to have entered the shallow groundwater and moved into the west side of Salt Lake Valley.

Local water management agencies in Salt Lake County and the U.S. Geological Survey are initiating an extensive study to delineate the extent of the problem and assess the present hazard to groundwater quality and the future impact on the subsurface environment.

CONFERENCES AND MEETINGS

Annual Hydrology Meeting To Be Held April 24, 1982

The annual joint meeting of the American Water Resources Association Arizona Section and the Arizona-Nevada Academy of Science Hydrology Section will be held at Arizona State University, April 24, 1982.

Topics of papers to be presented include watershed hydrology, groundwater, water quality, water reuse, urban planning, water rights, water economics, and the sociopolitical and technology transfer aspects of water resources.

Registration fee at the meeting is $5.00 for students and $15.00 for all others. Pre-registration (received by April 15) is $10.00; to register early, send check to:

Ray Henkel, Treasurer
Arizona/Nevada Academy of Science
PS (Math Mailroom)
Arizona State University
Tempe, Arizona 85281

The Annual Awards Luncheon will be held at noon on April 24, at $4.50 per plate. Checks for pre-registration and/or luncheon should be made payable to Arizona/Nevada Academy of Science.

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The Governor's Commission on Arizona Environment will hold its bi-monthly meeting April 29 and 30 in Tucson. Topic of the meeting will be minerals policy on public lands. For further information contact Alicia Ray at 261-7803, the Governor's Commission Office in Phoenix.

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Hazardous Waste Management Conference

The Fourth National Two-day Conference on Hazardous Waste Management: Regulation, Enforcement and Response will be held by the Energy Bureau, Inc. March 15 and 16 at the Washington Hilton in Washington, D.C.

Fifteen experts, representing the U.S. Environmental Protection Agency, the U.S. Department of Justice, the Office of Management and Budget (OMB), major corporations such as Allied Chemical, Hooker Chemical and Union Carbide, insurance, consulting and the energy/environment bar, will answer questions and advise on major hazardous waste issues. They will examine the status of RCRA and Superfund, the role of the OMB, financial responsibility requirements, insurance, the role of the states, siting and disposal concerns, contracting, liability issues and litigation strategies.

For further information call Robert Nash, Executive Director of the Energy Bureau, Inc., 41 East 42nd Street, New York, N.Y. 10017. Telephone number is 212-687-3177.

PUBLICATIONS

Alternative Use Plan for City of Tucson Land, Avra Valley, Arizona by K.M. Karpiscak, K.E. Foster, C.B. Cluff, K.J. DeCook, and F. Matter was prepared for the Real Estate Division of the City of Tucson. This is the final report of a study to evaluate various potential Avra Valley land uses that may result in alternative management and maintenance techniques and/or economic return. The report describes historical and existing land use in Avra Valley; identifies alternative technologies and management options for future considerations; and discusses current management problems, alternative technologies, and options the city might consider in promoting alternative management concepts.

Recommended policies and uses for managing Avra Valley Land include limiting soil disturbance; establishing experimental water-harvesting systems; coordinating a city and county land use plan; securing points of entry to city land; recording land treatment activities for each farm, revegetating land before it is retired; maintaining existing dikes and flood-control structures; possible use of city land by the Papago Indian Tribe, using CAP water; and pursuing research activities to develop and use retired Avra Valley cropland.

A limited number of copies are available, free of charge, from George Parker, Real Estate Division, City of Tucson, P.O. Box 27210, Tucson, Arizona 85721.

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Rangeland Hydrology by Farrel A. Branson, Gerald F. Gifford, Kenneth G. Renard, and Richard F. Hadley presents in-depth information for those who must manage rangeland or respond to questions regarding impacts of land use practices on hydrology. Emphasis is on arid and semi-arid lands.

This new Second Edition includes a chapter on modeling with approaches to predicting the effects of land use, and a chapter on snow pack management.

The 352-page Second Edition can be ordered from Kendall/Hunt Publishing Company, 2460 Kerper Boulevard, Dubuque, Iowa 52001. Price is $15.00.

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The Potential for Groundwater Contamination Along Basin Margins in the Arid West: Alluvial Fans and Lake Features is a recently completed report by C.G. Clyde, R.Q. Oaks, P.T. Kolesar and E.P. Fisk.

Many Utah towns are built on alluvial fans or lake deposits along the shoreline of old Lake Bonneville. The reported study assessed the potential impact of man's activities on groundwater quality within these geologic features. Emphasis was on shallow groundwater quality after it was determined that deep groundwater is rarely contaminated at such sites.

A reconnaissance of Utah and Nevada identified and collected field notes on 28 towns built on these features. Four sites underlain by alluvial fans (Willard, Manti, Elsinore, and Spring City) and four sites underlain by lake shore deposits (Hyde Park, Fielding, Providence, and Richmond) were selected for more detailed geologic, hydrologic, and water quality studies.

The data showed that septic effluents, agricultural wastes, and other sources of man-made contamination can be hazards to shallow groundwater quality in allu fans and lake shore sediments. Mercury was found concentrations exceeding the EPA drinking water standards at a few of the sites, but its source was probably natural. Nitrates and phosphates were the most common observable indicators of shallow groundwater contamination at the sites investigated. Coliform bacteria evidently are not transported appreciable distances underground and made poor indicators.

The conclusions reached in the report are believed to be applicable to other areas of the arid west where similar geologic features and basin margin sediments occur. Copies are available for $5.00 each. Please request Hydraulics and Hydrology Series UWRL/H-81/05. Order from Utah Center for Water Resources Research, Utah Water Research Laboratory, UMC 82 Utah State University, Logan, Utah 84322.

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Please address your news items or comments on the Project Bulletin to any of the editors:

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