

# ARIZONA WATER RESOURCES NEWS BULLETIN

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## WATER RESOURCES RESEARCH BUDGET PROJECTIONS REPORT FOR FY 1978 RELEASED

The FY 1978 Water Resources Problems and Research Budget Projections Report for the Colorado River — Great Basin Region has been released. The report was prepared cooperatively by the water resources research institutes of Arizona, California, Colorado, Nevada, Utah and Wyoming, which constitute the Colorado River — Great Basin Consortium of Water Research Institutes and Centers (CWIC).

Individual state priority problem assessments and budgetary requirements for CWIC states are included in the report. Water resources problems, research priorities and budget projections outlined in the report will be combined with those of similar regional groups of water institutes throughout the United States to obtain a meaningful national picture. The national report will be assembled under the auspices of the National Association of Water Institute Directors. These reports are being constructed within a time framework to be useful for the Office of Water Research and Technology (OWRT), Department of the Interior and other administrative and legislative governmental divisions which may benefit from these evaluations and projections.

Although projections made in the report are displayed with rather direct and obvious relation to the OWRT program, it should be noted that all of the CWIC institutes have good working relationships and substantial contract support from other state and federal agencies.

The Colorado River — Great Basin region has no river basin commission with which to collaborate in identifying regional research and monitoring relevant research. However, an effective collaboration with the Pacific Southwest Inter-Agency Committee (PSIAC) has been fostered. PSIAC has membership from all federal and state agencies and organizations having water or water-related programs. Its purpose is to coordinate programs and activities of the several mission agencies through an exchange of information and ideas. Collaboration through PSIAC promotes better cooperation in planning and executing each agency's activities. Through its technical and executive committee structure, PSIAC has provided CWIC with valuable recommendations and suggestions for urgently needed research.

The report summarizes water problems and research budget projections for each of the CWIC states. Only those projections dealing with Arizona water problems and research needs will be discussed here.

The CWIC Problem Area and Research Classification Matrix for Arizona, FY 1978, is reproduced here as it appears in the report.

ARIZONA WATER RESEARCH CLASSIFICATION MATRIX.

(1/75)

SYSTEMS & PROCESSES (RESEARCH)	RESEARCH WILL DEAL WITH THESE SYSTEMS & PROCESSES															
	I. HYDROLOGICAL			II. BIOLOGICAL			III. SOCIOLOGICAL			IV. PLANNING & MGT.			V. ENGINEERING		VI. DATA ACQUISIT.	
PROBLEM AREAS	A. Atmospheric	B. Watershed	C. Channel Flow	D. Groundwater	E. Sedimentation	F. Wetlands	G. Water Quality	H. Water Resources	I. Socio-Economic	J. Land Use	K. Planning	L. Design	M. Construction	N. Operation	O. Data Collection	P. Data Analysis
<b>WATER QUANTITY</b>																
A. Control of Excess Water	S	S														
B. Water Supply Augmentation and Conservation	S	S	C	S	S											
<b>I. WATER QUALITY</b>																
A. Control of Eutrophication																
B. Effects of Pollution			C	C												
C. Water Treatment Processes and Disposal of Wastes	S	S	S													
<b>II. ENVIRONMENTAL IMPACT</b>																
A. Economic Effects																
B. Ecovestige Effects																
C. Public Welfare Effects	S	S						S	S	S	C			S	S	S
<b>V. WATER PLANNING &amp; MANAGEMENT</b>																
A. Institutions	S	S	C					S	S	S		C	S		S	
B. Methods & Procedures	S	S												S	S	
C. Basic Data								S	S					S	S	

CLASSIFICATION LEGEND:  
C - Critical  
S - Severe

Critical water problem areas in Arizona outlined in the FY 1978 report are reproduced below. Following the discussion text is the problem area budget projection table.

### CRITICAL WATER PROBLEM AREAS IN ARIZONA

#### Problem Areas and Research Needs Descriptions

<i>I. Water Quantity Problems</i>	<u>Problem Area</u>	<u>Research Class.</u>
	I-B	I-E; III-A, B, E; V-I, V-B

In addition to CAP water importation, further water conservation research and application is needed to offset groundwater depletion. As agricultural irrigation is a major use, continued advances are urgently needed in the practical and large-scale application of methods which increase irrigation efficiency.

<i>II. Water Quality Problems</i>	<u>Problem Area</u>	<u>Research Class.</u>
	II-A	I-C, E; IV-A, C; V-C; VI-B

Increased nitrate-nitrite concentration in domestic groundwater supplies from recharge of secondary-treated sewage effluent in normally dry stream channels is an incipient problem at many localities. Research is needed to map distribution and to alleviate biological pollution of groundwater reservoirs.



Research is also needed to determine the effects of mine operations on the quality of groundwater supplies. The need for establishment of monitoring programs near copper mines and coal strip mining areas should be implemented immediately.

**III. Environmental Impact** Problem Area Research Class.  
III-A I-E

Subsidence problems can be projected from the already observed effects to both the near-term and long-term periods.

Problem Area Research Class.  
III-C IV-D

Ongoing research should be extended and implemented to improve land restoration and development at mining sites.

**IV. Water Planning and Management** Problem Area Research Class.  
IV-A I-E; III-B

It should be stressed that water-rights problems are of immediate and long-range significance. Groundwater mining in many parts of the state aggregates some 2.2 MAF/yr under the present form of riparian rights, so that physical availability of groundwater is being constrained by declining water levels and local depletion of reserves. Moreover, legal availability of groundwater is being constrained by conflicts and claims among user entities such as private pumpers, water utilities and industries, federal reserve lands, and Indian agrarian water users.

Problem Area Research Class.  
IV-A IV-C

State and local programs should implement results of studies for utilizing urban storm runoff in urban recreational areas. Management plans for conjunctive recreational use and flood-hazard reduction have been formulated, and detailed design and operation could be effected by municipal agencies.

Problem Area Research Class.  
IV-C I-E; VI-A

Basic field data are required as input to calibration and validation of models, e.g., groundwater flow models. Such data will improve the accuracy of models and facilitate their employment as predictive tools.

## UA PROFESSOR COMPLETES COMPREHENSIVE WATER LAW TREATISE

The first comprehensive treatise on water laws in the United States during the past 60 years was completed recently by University of Arizona Law Professor Robert Emmet Clark.

Clark was editor-in-chief and contributing author along with 19 other experts on water law during the 16-year compilation of the seven-volume "Water and Water Rights."

Main chapter headings in the set published by The Allen Smith Co. of Indianapolis, Ind., include "Public Rights in Water Uses and Private Rights in Land Adjacent to Water," "Federal Reclamation Law," "Indian Water Rights," "State Administrative Regulation of Water Quality," "Water Quality Control in the Federal Jurisdiction," "Federal Flood Control Activities," "Weather Modification" and "Western Groundwater Law."

Other topics discussed are the growth of state and federal regulations, pollution control, international water law and the legal-economic dilemma of allocating scarce water resources among competing entities.

Recognized in the legal profession as the definitive work on water law, it has been cited as an authoritative reference in cases brought before the U.S. Supreme Court and numerous state and federal appellate courts.

Cost of the full collection is \$199.50. Individual volumes sell for \$35. Further information is available from The Allen Smith Co., 1435 N. Meridian St., Indianapolis, Ind. 46202.

## \$6.3 MILLION AWARDED FOR NAVAJO PROJECT

The U.S. Bureau of Reclamation has announced granting \$6.3 million to construct a pipeline distribution system to irrigate an additional 9,900 acres of desert land on the Navajo Indian Reservation. The project is scheduled for completion in the fall of 1977 and will bring total irrigated land on the reservation to nearly 20,000 acres.

Ultimate goal of the long-range Navajo Project is 110,000 acres of irrigated farming land by 1980, according to the bureau.

**ARIZONA Water Research Problems and Budget Projection by  
Problem Area for Different Funding Levels [in \$1000] Fiscal Year 1978**

Problem Areas	Allotment		Matching		Available Funds	Total Columns [2] and [5]
	\$110	\$250	\$50	\$150		
	[1]	[2]	[3]	[4]	[5]	
<b>I. Water Quantity Problems</b>						
A. Control of Excess Water	7	14	3	9	23	37
B. Water Supply Augmentation & Conservation	24	50	11	33	84	134
<b>II. Water Quality Problems</b>						
A. Control of Entering Pollutants	16	30	7	21	28	58
B. Effects of Pollutants	11	30	5	15	19	49
C. Water Treatment Processes & Disposal of Wastes	9	20	4	12	17	37
<b>III. Environmental Impact</b>						
A. Economic Effects	4	10	2	6	13	23
B. Ecosystems Effects	2	8	1	3	7	15
C. Public Welfare Effects	13	30	6	18	42	72
<b>IV. Water Planning and Management</b>						
A. Institutions	13	30	6	18	41	71
B. Methods & Procedures	2	8	1	3	13	25
C. Basic Data	9	20	4	12	31	51
<b>TOTALS</b>					<b>318</b>	<b>572</b>



*UA Law Professor Robert Emmet Clark [left] and A. Wayne Guernsey [right], The Allen Smith Co. vice president and editor-in-chief, toast the completion of the massive, seven-volume "Water and Water Rights" to which Clark contributed as well as acted as editor-in-chief. Content of the glasses is not apropos to the vessels, but it is to the occasion — it's water.*

### COLORADO RIVER RUNOFF FORECAST ABOUT AVERAGE

April-July Colorado River runoff from the watershed above Lake Powell is expected to reach 7.6 million acre-feet, about 95 per cent of the long-time average, according to the U.S. Bureau of Reclamation Lower Colorado Region office at Boulder City, Nev.

The estimation is based on the April 1 snow courses within the watershed area and presumes normal precipitation during the runoff season. The bureau predicts Lake Powell will rise about 15 feet, which is five feet higher than the 1975 peak.

### CONFERENCES

**An International Conference on Managing Saline Water for Irrigation: Planning for the Future** will be held at Texas Tech University, Lubbock, Texas, Aug. 16-20, 1976.

Conference sponsors are New Mexico State University, Texas A&M University, U.S. Salinity Laboratory and U.S. Environmental Protection Agency.

The conference's purpose is to focus international attention on problems in using saline water for irrigation and on procedures for predicting impacts of irrigation on soil salinity and salinity of irrigation return flows.

For further information contact Dr. H.E. Dregne, Department of Plant and Soil Science, Texas Tech University, Lubbock, Texas 79049.

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The American Water Resources Association will hold its twelfth annual conference at the McCormick Inn, Chicago, Ill., Sept. 20-21, 1976. Conference topic is **Water — Center of Crises — Past, Present, and Future**.

Conference general chairman is Dr. Zubair A. Saleem, Department of Geological Sciences, Box 4348, 2456 SES, University of Illinois, Chicago, Ill. 60680.

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An **Advances in Ground Water Hydrology Symposium** will be sponsored by the American Water Resources Association at the McCormick Inn, Chicago, Illinois, immediately following the association's twelfth annual conference September 20-21, 1976, at the same location.

Symposium chairman is Dr. Zubair A. Saleem, Department of Geological Sciences, Box 4348, 2456 SES, University of Illinois, Chicago, Illinois, 60680.

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August 1-4, 1976. 31st Annual Meeting. **Soil Conservation Society of America**, Minneapolis, Minnesota. Contact: H. Wayne Pritchard, SCSA, 7515 N.E. Ankeny Road, Ankeny, Iowa 50021.

August 2-4, 1976. **Second International Association of Hydraulic Research Symposium on Stochastic Hydraulics**, Lund, Sweden. Contact: Organizing Secretary, Symposium on Stochastic Hydraulics, Department of Water Resources Engineering, Lund Institute of Technology, Fack 725, S-220 07, Lund, Sweden.

August 9-12, 1976. **Reclamation of Drastically Disturbed Lands**, Wooster, Ohio. Contact: Dr. Paul Sutton, Ohio Agricultural Research and Development Center, Route 6, Caldwell, Ohio 43724.

August 10-12, 1976. **Symposium on Inland Waterways for Navigation, Flood Control and Water Diversions**. Colorado State University, Fort Collins, Colorado. Contact: **Rivers 76**, Colorado State University, Engineering Research Center, Fort Collins, Colorado 80523.

August 15-22, 1976. **First General Assembly and Symposia on Natural Resource Management in Developing Countries**, Sydney, Australia. Sponsored by Association of Geoscientists for International Development. Contact: Dr. A.R. Berger, Secretary-Treasurer, AGID, Department of Geology, Memorial University, St. John's, Newfoundland, Canada.

August 16-25, 1976. **25th International Geological Congress**, Sydney, Australia. Sponsored by Australian Academy of Science, Geological Society of Australia, and International Union of Geological Sciences. Contact: Secretary-General, 25th I.G.C., P.O. Box 1892, Canberra City, ACT 2601, Australia.

September 15-17, 1976. **Third National Ground Water Quality Symposium**, Las Vegas, Nevada. Contact: Third National Ground Water Quality Symposium, c/o NWWA, Suite 135, 500 West Wilson Bridge Road, Worthington, Ohio 43085.

September 19-24, 1976. **The Hydrogeologic Regime of Inland Lakes**, Merrimac, Wisconsin. Contact: D.A. Stephenson, Environmental Resources Unit, 1815 University Avenue, Madison, Wisconsin 53706.



## PUBLICATIONS

*Maps Showing Ground-Water Conditions in the Lower Hassayampa Area, Maricopa County, Arizona — 1975* has been developed by R.S. Stulik and R.L. Laney, both with the U.S. Geological Survey.

The maps are part of a series of maps which eventually will describe the entire state. The maps illustrate changes in water levels, 1970-1975; irrigated areas, 1974; pumpage, 1973-1974; depth to water; well depth and altitude of water table, 1975; and specific conductance and fluoride concentration, 1974.

Prepared by the U.S. Geological Survey in cooperation with the Arizona Water Commission, the report is published as "U.S. Geological Survey Water Resources Investigations 76-35."

A limited number of copies are available from the Arizona Water Commission, 222 North Central Avenue, Suite 800, Phoenix, and at U.S. Geological Survey offices in Room 5-A Federal Building, 301 West Congress Street, Tucson, and Suite 1880 Valley Center, Phoenix. Computer listings of basic data used to prepare the maps are available for inspection at these same offices.

Copies of the documents may be made at individual's expense in either of the U.S. Geological Survey offices.

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Groundwater from the Coconino aquifer supplies about 76 per cent of the water used in the 3,400-square-mile area of southern Navajo County, according to *Ground Water Resources and Water Use in Southern Navajo County, Arizona*, a report prepared by the U.S. Geological Survey in cooperation with the Arizona Water Commission. The aquifer underlies the entire area.

About 6 per cent of the area's water is pumped from a local aquifer called Pinetop-Lakeside and from the alluvium along large stream channels and floodplains. Another 15 per cent is supplied by surface water and 3 per cent is imported, the report said.

Depth to water in the Coconino aquifer ranges from more than 1,000 feet below land surface near the Mogollon Rim to several feet above land surface in artesian areas along Silver Creek and the Little Colorado River.

Depth to water in the Pinetop - Lakeside aquifer is from 25 feet under land surface near Rainbow Lake to more than 600 feet in the area's northern and eastern parts. Depth to water in

alluvium along large stream channels in the area's northern region generally ranges from 20 to 40 feet below land surface.

The report contains maps illustrating geology, groundwater conditions and water chemical quality. Tabulated material includes spring flow measurements, well records, water quality data and drillers' well logs.

*Ground-water resources and water use in southern Navajo County, Arizona* was prepared by Larry J. Mann. Copies of the report are available at the Arizona Water Commission, 222 North Central Avenue, Suite 800, Phoenix, and at the U.S. Geological Survey office, Room 5-A Federal Building, 301 West Congress Street, Tucson. Inspection copies are on hand at U.S. Geological Survey offices at Suite 1880 Valley Center, Phoenix; 601 East Cedar Avenue, Building 3, Flagstaff; 1940 South Third Avenue, Yuma; and Room 5312 National Center, 12201 Sunrise Valley Drive, Reston, Virginia.

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*Directory of EPA, State and Local Environmental Activities* describes federal environmental quality monitoring projects and related state and local programs. The 384-page directory, S/N 005-000-00143-0 is available for \$4.95 from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

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The 1976 *Soil-Water-Air Sciences Directory* is available from the U.S. Department of Agricultural Research Service, National Program Staff, Beltsville, Maryland 20705.

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

Phil Briggs, Arizona Water Commission, Suite 800, 222 North Central Avenue, Phoenix, Arizona 85004.

Jim DeCook, Water Resources Research Center, University of Arizona, Tucson, Arizona 85721.

Ken Foster, Office of Arid Lands Studies, University of Arizona, Tucson, Arizona 85721.

UNIVERSITY OF ARIZONA  
WATER RESOURCES RESEARCH CENTER  
WATER INFORMATION SECTION  
TUCSON, ARIZONA 85721

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