ARIZONA WATER RESOURCES NEWS BULLETIN

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## WATER RESEARCH PROJECTS FUNDED BY OWRT

Fifteen new water resources research projects have been approved for July 1, 1976, funding by the Office of Water Research and Technology (OWRT), U.S. Department of the Interior, according to University of Arizona Water Resources Research Center (WRRC) Director Sol Resnick. Five other projects funded this fiscal year have been granted continued support through the coming year.

Seven new projects and five continuing projects will be funded under the Annual Allotment Grant. They were evaluated by the WRRC State Advisory Committee and recommended for funding during the transition quarter (7/1/76-9/30/76) and FY 1977 (10/1/76-9/30/77). Seven other projects were chosen from a number of matching grant proposals submitted to OWRT in Washington, D.C., for review and received verbal approval, subject to funds availability. The remaining project was approved by OWRT under the Title II (nonmatching) research grant program.

Titles of new and continuing projects, with principal investigator names and departmental affiliations at the University of Arizona—unless otherwise noted—are:

### MATCHING GRANTS—ARIZONA

*Identification of Aquifer Parameters Using Numerical Techniques.* S. Neuman, Hydrology and Water Resources; and S. Yakowitz, Civil Engineering.

*Fundamental Stochastic Models of the Transport of Water and Solutes Through Saturated and Unsaturated Porous Media.* V. Gupta, Hydrology and Water Resources; R. Bhattacharya, Mathematics; and G. Sposito, Soil Science and Agricultural Engineering, University of California, Riverside.

*Determining Innovative Capability in Water Management Agencies.* J. Nienaber, Institute of Government Research and Department of Political Science.

*Hydrologic Considerations in Decision Analyses for Reclaiming Strip Mine Land in the Southwest.* J. Thames, T. Verma, and D. Thorud, School of Renewable Natural Resources.

*Reclamation of Brackish Waters for Irrigation: Optimization of Process Parameters for Fertilizer-Driven Osmosis.* J. Kessler, Physics.

### MATCHING GRANTS—REGIONAL

*A Four Corners Regional Study of Public Opinion on Water and Other Natural Resource Policies.* H. Ingram, Institute of Government Research.

*Supplement to University of Wyoming Regional Project, Water Requirements for Urban Lawns.* W. Kneebone, Plant Sciences; and G. Johnson, Soils, Water and Engineering.

### ALLOTMENT GRANTS

#### Continuing Projects

*On-site Investigation of Seepage and Evaporation Losses for a Municipal Water Resource Facility.* C. Avery, School of Forestry, Northern Arizona University; and M. Murray, College of Engineering, Northern Arizona University.

*Suitability of Fluorocarbons as Tracers in Groundwater Resources Evaluation.* S. Davis, Hydrology and Water Resources; and J. Moyers, Analytical Center.

*Water Losses from Small Recreational Lakes in Arid Regions and Possible Effects Downstream.* D. Evans, T. Sammis, and D. Young, Hydrology and Water Resources.

*Develop Water Management Methods for Watersheds Subject to Intensive Development—Phase II.* S. Resnick and J. Ben Asher, WRRC; and M. Sneidovich, Systems Engineering.

*An Index for Predicting Surface Water Quality Based on the Vegetation of the Watershed.* E. Stull, Ecology and Evolutionary Biology.

#### New Projects

*The Arizona Water Resources Committee: History and Politics.* H. Cortner, School of Renewable Natural Resources.

*Geophysical and Hydrologic Prediction of Fissuring and Land Subsidence, South Central Arizona.* J. Sumner, Geosciences; and S. Davis, Hydrology and Water Resources.

*Investigation of Municipal Waste Water Constituents Detrimental to Froth Flotation Recovery of Copper and Molybdenum Sulfides.* W. Fisher and S. Rudy, Arizona Bureau of Mines.

*Development of a Low Cost Asphalt-Rubber Membrane for Water Harvesting Catchments and Seepage Control.* C.B. Cluff and R. Frobel, WRRC; and R. Jimenez, Civil Engineering.

ARIZONA WATER COMMISSION • WATER RESOURCES RESEARCH CENTER
OFFICE OF ARID LANDS STUDIES

*Developing Methods for On-site Determination of Unsaturated and Saturated Hydraulic Conductivity Above the Water Table.* S. Neuman, Hydrology and Water Resources; and L. Wilson, WRRC.

*Predicting Discharge on Ungaged Streams from Rainfall Measurements in Southern Arizona.* E. Simpson, Hydrology and Water Resources; and D. Chery, USDA, Agricultural Research Service.

*Evaluation of Groundwater Reserves in the Santa Cruz Valley Area, Pima and Santa Cruz Counties, Arizona.* J. Sumner, Geosciences.

**TITLE II GRANT**

*Dendrochronological Analysis of Destructive Floods.* D. Laing, Laboratory of Tree-Ring Research.

## NATIONAL COMMISSION ON WATER QUALITY SENDS RECOMMENDATIONS TO CONGRESS

Recommended changes in the Federal Water Pollution Control Act have been sent to Congress by the National Commission on Water Quality after more than three years' study of water quality programs.

Commissioners suggested amendments in the following areas:

⊕ Congress should retain the initial July 1, 1977, compliance schedule for best practicable technology for industry and secondary treatment technology for publicly owned sewage treatment works, but authorize case-by-case extensions and, in some cases, outright waivers of the requirements.

⊕ Congress should authorize state certification for planning and administering municipal sewage treatment construction grants programs and the National Pollutant Discharge Elimination System, thereby limiting the federal role to planning and monitoring.

⊕ Congress should extend the 1983 deadline for best available technology for industrial discharges by five to ten years, but still retain the 1983 "fishable/swimmable" water quality goals. Effluent limitations to eliminate toxic pollutant discharges in hazardous concentrations should be implemented as soon as possible . . . no later than October 1, 1980.

⊕ Congress should assure construction grant funding between $5 billion and $10 billion over five to ten years at a fixed federal share of 75 percent.

⊕ Congress should redefine the zero discharge-of-pollutants goal set for 1985 by encouraging recycling, reuse, land application and other methods of waste management.

⊕ Congress should authorize flexibility toward application of water pollution control measures by irrigated agriculture.

## NEW EARTH FISSURE MAPS AVAILABLE SOON

Earth fissure occurrence has greatly increased in Central Arizona since a 1970 mapping by H.H. Schumann of the United States Geological Survey (USGS), according to R.H. Raymond of the United States Bureau of Reclamation (USBR), and Carl Winikka of the Arizona Resources Information System (ARIS). Raymond and Winikka are principal investigators in a project "Earth Fissure Mapping in Central Arizona."

Groundwater depletion-related land subsidence fissures have been previously recognized mainly on the periphery of the Eloy-Picacho, Maricopa-Stanfield, and Mesa-Queen Creek basins in south central Arizona. Fissures remained relatively dormant in the late 1960s but more recently existing fissures have increased in pattern complexity and areal extent. And fissures have opened in new areas, say Raymond and Winikka.

The Arizona Water Commission, Arizona Department of Transportation, ARIS, USGS, and USBR have pooled available personnel and resources to produce an up-to-date map of recognized earth fissures in the Eloy-Picacho, Maricopa-Stanfield, and Mesa-Queen Creek basins. Fissures have been plotted on 1:24,000-scale orthophotoquads by direct observation from a helicopter and by recent aerial photography. Data will be transferred to a one-inch-to-two-miles scale map for publication in the near future.

Earth fissures have damaged airport runways, necessitated highway and railroad track repairs, and relocation of a major aqueduct as well as collapsed or damaged irrigation wells and irrigated fields. Continued maintenance is required for old fissures crossing highways and railroad tracks, but no new damage has been reported elsewhere, the principal investigators say.

Fresh earth fissures have been found, however, crossing a road bordering a developed residential area and in a trailer court. These previously unreported fissures were discovered south of the Sacaton Mountains near Central Arizona State College, southwest of Apache Junction, northwest of Maricopa, and south of Eloy.

New maps soon available will be utilized by participating agencies and will be valuable references for other agencies and the public. The maps will alert users to earth fissure existence so that hazards associated with subsidence and concomitant damage to structures or underground utilities can be avoided or minimized.

Inquiries about the publication may be directed to R.H. Raymond, U.S. Bureau of Reclamation, 135 N. Second Avenue, Phoenix, AZ 85003.

## OFFICE OF ARID LANDS STUDIES' BIBLIOGRAPHIC PROGRAM RECEIVES CONTINUED OWRT FUNDING

The U.S. Department of the Interior Office of Water Research and Technology (OWRT) has awarded a $32,000 one-year grant to University of Arizona Office of Arid Lands (OALS) Assistant Director Patricia Paylore.

The grant will support preparation of 300 abstracts related to worldwide water problems in arid lands as well as publication of two *Arid Lands Resource Information Papers.* The additional abstracts will bring the total OALS production published in *Selected Water Resources Abstracts* to nearly 4,000 since OALS was designated an OWRT Center of Competence.

The two new papers, *Adaptation of Sun-Powered Industrial Systems to Aridity: Implications for Water Resources* and *Drought-Tolerant Plants for Landscaping: A Water Conservation Measure for Arid Climates,* will be the tenth and eleventh in the series published under Miss Paylore's editorship.

Bibliographic support will come from the OALS Arid Lands Information System, a computerized bank of arid lands data, and from new relevant information searches. Texts for the papers will be developed from the bibliographic data.

Ninth in a series of OWRT grants to OALS since 1968, the current grant brings total funding to more than $220,000.

## BETTWY RECEIVES DISTINGUISHED CITIZEN AWARD FROM UA

Andrew L. Bettwy, Arizona State Land Commissioner, received the University of Arizona Alumni Association Distinguished Citizen Award April 8. Bettwy, a land commissioner since 1970, discussed current aspects of Arizona land use planning at a College of Earth Sciences research colloquium on the same day. College of Earth Sciences faculty nominated Bettwy for the alumni award.

A native of Nogales, Bettwy received bachelor's and law degrees from the UA. He's been a member of the Arizona State Bar since 1949. Bettwy serves on numerous state boards and commissions, such as the Water Quality Control Council, the Community Development Council, and the State Parks Board, according to the earth sciences faculty.

Additionally, he serves on the Housing and Urban Development Flood Program, the Small Watershed Protection Administration and the state advisory board to the U.S. Bureau of Land Management. He also is active in the Western States Land Commissioners Association, the Arizona Academy, and various civic groups.

College of Earth Sciences Dean Hugh Odishaw presented the Distinguished Citizen Award to Bettwy.

## OWRT RESEARCH PRIORITIES

The U.S. Department of the Interior Office of Water Research and Technology (OWRT) announced April 5 as the initial deadline for applications for experimental, developmental, or research work in water resources during FY 1977. However, applications submitted later will be considered for funding during the second, third, and fourth quarters of FY 1977.

During FY 1977, OWRT will give priority to research proposals in the following major subjects fields:

### I. WATER RESOURCES PLANNING AND MANAGEMENT

**A. Conflict Identification and Resolution.** Specific systems methodology research is needed to determine mechanisms necessary to encourage effective and timely planning efforts at all levels in water and land resource activities. Also needed is research aimed at efficiently integrating and coordinating water quality and quantity planning.

**B. Water Resources Development Impacts.** Methodology research to determine sociological consequences of planning, development, and management of water resources is needed. Specific and applied research are badly needed for analyzing and evaluating social aspects in the planning impact phase, the construction impact phase and both the short- and long-term operation and management impact phases. Also needed is methodology research for analysis of secondary economic impacts, and social, psychological, and environmental aspects.

**C. Public Participation, Information, and Education.** Research is needed to define public understanding and acceptance of resources management programs; to develop an effective means to determine attitudes and desires of the majority of the people affected by a proposed water resource project; and to determine conditions and demographic indices representative of populations likely to have fast-changing value systems.

### II. WATER SUPPLIES

**A. Conversion Technologies.** Research is needed to develop reliable, economically efficient processes and systems for converting saline and other chemically contaminated waters into a quality suitable for beneficial uses; to define mechanisms of water transport and salt rejection by membranes, effect of membrane structure on transport properties and mechanisms of membrane instability and fouling; to develop new membranes having improved flux and salt rejection characteristics; and to develop improved water pretreatment technology.

**B. Groundwater Supplies.** Research is needed to improve management methods and techniques to protect groundwater supplies from overdraft and quality degradation and to arrive at procedures for optimal use of groundwater for domestic, municipal, industrial, and agricultural purposes.

**C. Presently Developed Basins.** Research to improve water management techniques in presently developed basins, including runoff prediction methods as well as short- and long-term operation optimizations, is needed.

**D. Water Use Efficiency.** Research to identify and evaluate methods to promote conservation and greater efficiencies of irrigation water uses is needed. Objectives are to increase agricultural yields and/or to reduce water use and decrease water losses through deep percolation.

**E. Use of Impaired Waters.** Research is needed on salt-tolerant crop varieties and saline wastewater, brackish water and geothermal condensates use for irrigation; and on treated wastewater use on irrigated food crops.

### III. WATER QUALITY

**A. Analysis.** Research is needed on the relationships between the rate of travel, diffusivity, and life cycles of bacteria and viruses in various groundwater environments; to develop new, and evaluate existing, water quality sampling methods and deal with numerous technical factors; to provide new or improved schemes and techniques for classifying and separating organic compounds in water by class or group.

**B. Runoff.** Research is needed to quantify the magnitude of the nonpoint source pollution problem and its geographical distribution; into nonpoint source evaluations of land management activities; to identify impacts of stormwater runoff, identify key pollutants on specific receiving waters, and to improve urban area hydrologic analytical methods; to determine the relationship of natural and artificial wetlands to quality and quantity of surfacewater runoff and groundwater recharge; to better define the residence time of halogenated organic materials in surface and groundwater wastes.

Researchers interested in pursuing studies in any of the categories outlined above should write OWRT asking for its eight-page statement, "Research Subjects of Priority Interest for FY 1977 Support," and the OWRT *Procedures Memorandum 74-2,* "Guidelines for the Preparation and Submission of Research Proposals." Correspondence should be addressed

to Director, Office of Water Research and Technology, U.S. Department of the Interior, Washington, DC 20240.

## CALLS FOR PAPERS

Calls for papers for the Third International Symposium in Hydrology (June 27-29) and the Second International Conference on Transfer of Water Resources Information (June 30-July 2) have been issued. Both meetings are scheduled to be held at Colorado State University, Fort Collins. Further information is available from either Hubert J. Morel-Seytoux, Director, Third International Symposium in Hydrology, or Neil S. Grigg, Director, Second International Conference on Transfer of Water Resources Information, both at the Engineering Research Center, Colorado State University, Fort Collins, CO 80523.

## NEW PUBLICATIONS

*Policies and Organizations for Urban Water Management*, by Victor A. Koelzer and Alexander B. Bigler, is an analysis of urban water problems, policies, and organizations study, prepared for the National Water Commission and reviewed in November 1971 by an 81-person interdisciplinary group.

Book sections deal with urban water management, urban water services and organization for urban water management. Background information and recommendations could be useful to municipalities and waterworks organizations involved in formulating water policy. Costing $10, the 280-page book can be purchased from Water Resources Publications, P.O. Box 303, Fort Collins, CO 80521.

*Research Needs for the Potable Reuse of Municipal Wastewater* (Report Number PB-249 138/9WP) is a proceedings of a 92-person conference called to define and establish research priorities to develop wastewater reuse for potable purposes. Identified research gaps in health effects, treatment technology and socio-economic areas of potable reuse will provide bases for future Environmental Protection Agency projects. The publication costs $7.75 and can be purchased from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161.

*Irrigation Return Flow: A Bibliography* (OWRT/WRSIC Report Number 75-209) represents a data base search of 89,737 selected water resources abstracts through October 15, 1975. The publication is available from the Water Resources Scientific Information Center, Office of Water Research and Technology, U.S. Department of the Interior, Washington, DC 20240.

*Energy from Coal: Guidelines for the Preparation of Environmental Impact Statements* gives suggestions on what areas may be important and how they should be approached within impact statement framework requirements. Intended for use by federal agency personnel and the private business sector involved in preparing impact statements in compliance with U.S. Department of the Interior (USDI) guidelines, the report's eight chapters are organized according to USDI specifications for impact statements. Copies of PB-242 960/3WE are available for $8.50 each from the National Technical Information Service, Springfield, VA 22150.

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