

# ARIZONA WATER RESOURCES NEWS BULLETIN

NEWS BULLETIN 75-3

MAY-JUNE 1975

## NEW OWRT WATER RESEARCH PROJECTS

Twelve new water resources research projects have been approved for funding during FY1975-76 by the Office of Water Research and Technology (OWRT), U.S. Department of the Interior, according to Sol Resnick, Director of the University of Arizona Water Resources Research Center. In addition, four projects funded during the past year have been granted continuing support for further research during the coming year.

Two of the twelve new projects were chosen from several matching grant proposals which were submitted to OWRT in Washington, D.C., for review. Each year, matching grant proposals from the three State Universities are sent to Washington along with a list of State priorities. The proposals are then reviewed by OWRT and a decision is made as to which projects will be funded. Institutions having projects approved must then match the amount provided by OWRT.

The remaining ten new projects and four continuing projects will be funded under the Annual Allotment Grant.

Each year a listing of water-related research-need statements, prepared by representatives of several State agencies in Arizona, is distributed with the announcement to the three State Universities calling for research proposals to be funded under the Annual Allotment Grant. After the proposals are drafted, they are evaluated by the WRRC State Advisory Committee as part of the review process before being submitted to OWRT with recommendation for funding. In this way, it is believed that this water research program has become increasingly responsive to the needs of the State.

The twelve newly activated projects as well as the four continuing projects along with the Principal Investigators and their departmental affiliation, at the University of Arizona unless otherwise indicated, are as follows:

### Matching Grants

Modeling Soil Water Movement for Trickle Irrigation, Phase II (B-045-ARIZ). A. Warrick, Soils, Water and Engineering; D. Lomen, Mathematics; and J. Ben-Asher, Water Resources Research Center.

A New Stochastic Approach to the Foundations of Deterministic Transport Equations for Porous Media (B-046-ARIZ). V.K. Gupta, Hydrology and Water Resources; R.N. Bhattacharya, Mathematics; and G. Sposito, Department

of Soil Science and Agricultural Engineering, University of California, Riverside.

### Allotment Grant

#### *Continuing Projects*

Utilization of Clear Water Sewage Effluent in Mineral Processing (A-046-ARIZ). W. Fisher, Arizona Bureau of Mines.

Extended Use of Treated Municipal Wastewater by the Buckeye Irrigation Company: A Documentation of Effects (A-050-ARIZ). A. Day, Agronomy and Plant Genetics; T. Tucker, Soils, Water and Engineering; and C. Cluff, Water Resources Research Center.

Investigation of Bacteriological Pollution of Recreation Waters in Arizona (A-053-ARIZ). G. Lehman and M. Fogel, School of Renewable Natural Resources.

Riparian Dendrochronology: A Potential Method for Reconstructing Flood Characteristics of Ungaged Watersheds (A-058-ARIZ). C. Stockton, Laboratory of Tree-Ring Research.

#### *New Projects*

On-Site Investigation of Seepage and Evaporation Losses for a Municipal Water Resource Facility (A-062-ARIZ). C. Avery, School of Forestry; M. Murray, College of Engineering; C. Chase, College of Business Administration; all at Northern Arizona University.

Suitability of Fluorocarbons as Tracers in Ground Water Resource Evaluation (A-063-ARIZ). S. Davis, Hydrology and Water Resources.

Text and Commentary for a New Weather Control Article of the Arizona Water Code (A-064-ARIZ). R. Davis, College of Law.

Water Losses from Small Recreational Lakes in Arid Regions and Possible Effects Downstream (A-065-ARIZ). T. Sammis and D. Evans, Hydrology and Water Resources.

Water Quality of Streamflow from Ponderosa Pine Forest Watersheds on Sedimentary Soils (A-066-ARIZ). P. Ffolliott, School of Renewable Natural Resources.

Organic Quality of Groundwater (A-067-ARIZ). D. Kasper, Department of Civil Engineering and Engineering Mechanics.

Energy Costs of Wastewater Reuse (A-068-ARIZ). D. Pingry, Division of Economics and Business Research.



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Develop Water Management Methods for Watersheds Subject to Intensive Development (A-069-ARIZ). S. Resnick, Water Resources Research Center.

Effects of Groundwater Pumpage on Surface and Groundwater Flows in Adjoining Basins (A-070-ARIZ). E. Simpson, Hydrology and Water Resources.

An Index for Predicting Surface Water Quality Based on the Vegetation of the Watershed (A-071-ARIZ). E. Stull, Department of Ecology and Evolutionary Biology.

### NEW RESEARCH ON TRICKLE IRRIGATION

A trickle irrigation experiment using Colorado River water was established in the spring of 1975 at Tacna, Arizona, by the U.S. Water Conservation Laboratory, Phoenix, Arizona, in cooperation with the University of Arizona. The study is aimed primarily at identifying emitter plugging problems which might develop using the river water and in developing methods for preventing or correcting such difficulties if they should occur. Investigations are being conducted by D.A. Bucks, Agricultural Engineer; R.G. Gilbert, Soil Microbiologist; and F.S. Nakayama, Chemist.

### UPCOMING EVENTS

#### Groundwater Conference

Dates and location of California's 10th Biennial Conference on Groundwater have been announced. The conference is set for September 11-12, 1975, in the Holiday Inn, Ventura, California.

Sponsoring the event are the California Department of Water Resources and the Water Resources Center, University of California. Program details will be announced soon.

#### Annual UCOWR Meeting

The Challenge of Water Resources Education will be the theme when the Universities Council on Water Resources (UCOWR) holds its 1975 Annual Meeting July 27-30, 1975, at Auburn University, Auburn, Alabama. Workshops and speeches featuring "The Future of University Educational Programs . . .," "Approaches to Educational Problem Solving . . .," "Exploring Problems in Teaching and Learning Methods," and other areas will highlight the meeting.

The registration fee, which includes a copy of the proceedings, poolside buffet on Monday and banquet on Tuesday, is \$30.00.

For additional information or preregistration forms (due July 10, 1975) write to Water Resources Research Institute, 205 Samford Hall, Auburn University, Auburn, Alabama 36830.

#### Call for Papers

The International Association on Water Pollution Research (IAWPR) will hold its 8th International Conference in Sydney, Australia, October 17-22, 1976. The Conference will cover both freshwater and marine pollution. For information about the program and/or submission of papers (due September 15, 1975) write to Chairman of Program Committee, IAWPR, Headington Hill Hall, Oxford OX3 0BW, England.

### SECRETARY PROPOSES ALLOCATION OF CAP FOR RESERVATION IRRIGATION

The Secretary of the Interior in the April 18, 1975 Federal Register proposed an Allocation of 257,000 acre-feet of Central Arizona Project water for irrigation of Indian Reservation lands. Assuming that the project is completed in 1985, that is a guaranteed amount of water for the first 20 years of project operation. When used along with other available surface and groundwater supplies, this will permit irrigation of 100% of land developed on the reservations.

A full supply for the CAP may not be available in all years after the year 2005 and the Indian Reservations will then receive either 20% of all irrigation water delivered by the CAP or 10% of water delivered for all uses, whichever is greater.

The reservations may also contract with the Secretary for municipal and industrial water that has not been contracted to other users for those purposes, in addition to the allocation of water for irrigation.

Had it been based on the percentage of Indian population (1%), or presently developed lands (10%) in the area, the Secretary pointed out the Indian allocation would have been much smaller.

The State of Arizona, the Bureau of Reclamation and the Indian tribes presented data which the Secretary considered in arriving at his allocation to the reservations. In the recommendations, the State recommended an allocation of 194,000 acre-feet, the Bureau 252,700 and the Indian tribes 395,000. He accepted the Bureau's recommendation and rounded it to 257,000.

The accepted recommendation by the Bureau was developed by a five-step procedure:

1. The total acreage of presently developed lands was determined.
2. The total water requirement for each reservation was computed on the basis of 4.59 acre-feet per acre.
3. The number of acre-feet of nonproject surface and groundwater available to each reservation was estimated.
4. The number of acre-feet of project water required for each reservation was then obtained by subtracting the available surface and groundwater from the total water requirement.
5. The number of acre-feet to be delivered to each tribe at the turnout points on the project canals was the amount determined in step 4 multiplied by 1.176 to allow for a 15% distribution system loss.

For the first 20 years of project operation, based on the 257,000 acre-foot annual allocation, four reservations will receive the following canalside deliveries for irrigation use: Ak-Chin 59,300 acre-feet; Gila River 176,000; Papago 8,200; Salt River 13,500. The Fort McDowell Reservation was not allocated any because it already had a supply adequate for irrigation of its 1,300 acres of developed land. The Secretary noted, in his official announcement published in the April 18 *Federal Register*, that delivery of the 257,000 acre-feet to Indian Reservations through year 2005 will be on a guaranteed annual basis; whereas irrigation water deliveries to non-Indians will fluctuate from year to year depending on hydrologic conditions. "If the project is unduly delayed the guaranteed amount may be available for less than 20 years through the year 2005," he said.

The Indian tribes were already considering "political and legal protests," according to an April 22 *Arizona Republic* story.

The period for submitting written comments, suggestions or objections regarding the proposed allocations closed June 17, 1975. The Secretary has not yet made public his final allocation.

## REVIEWS ON VEGETATION MANAGEMENT FOR WATER YIELD IMPROVEMENT

*Vegetation Management for Increased Water Yield in Arizona*, by Peter F. Ffolliott and David B. Thorud, Arizona Agricultural Experiment Station, Technical Bulletin 215, 38 pp., 1974.

This state-of-the-art assessment of the potentials for increasing water yield in Arizona by means of vegetation management is based on a review of the Arizona Watershed Program, which began in 1957. Published documents, source data, and summaries were reviewed, and unpublished reports and personal communication were also employed.

The first part of Technical Bulletin 215 is a brief description of the vegetation zones in Arizona (i.e., alpine, mixed conifer, aspen, ponderosa pine, pinyon-juniper, chaparral, grassland, desert shrub, and riparian), with information on the characteristics of each zone and their water yield improvement opportunities. A second section discusses the potential for water yield improvement. In this section, Arizona is divided into 15 drainages and estimates of runoff which might occur after treating portions of each drainage are made. In determining runoff estimates, only the mixed conifer forest, ponderosa pine forest, and chaparral vegetation zone were hypothetically treated.

This study provides specific estimates of the potential to increase water yield based on stated assumptions pertaining to the applicability of research results and available vegetation descriptions. The authors caution that users of these estimates should recognize that the values have a hypothetical structure and are presented only for the purpose of demonstrating potentials.

Some recently issued USDA Forest Service publications related to this same topic of vegetation management for increased water yield are:

- Horton, J.S. and C.J. Campbell. 1974. Management of phreatophyte and riparian vegetation for maximum multiple use values. USDA Forest Service, Research Paper RM-117, Fort Collins, Colorado, 23 pp.
- Hibbert, A.R., E.A. Davis, and D.G. School. 1974. Chaparral conversion potential in Arizona. Part I: Water yield response and effects on other resources. USDA Forest Service, Research Paper RM-126, Fort Collins, Colorado, 36 pp.
- Brown, T.E., P.F. O'Connell, and A.R. Hibbert. 1974. Chaparral conversion potential in Arizona. Part II: An economic analysis. USDA Forest Service, Research Paper RM-127, Fort Collins, Colorado, 28 pp.
- Clary, W.P. *et al.* 1974. Effects of pinyon-juniper removal on natural resource products and uses in Arizona. USDA Forest Service, Research Paper RM-128, Fort Collins, Colorado, 28 pp.
- Brown, H.E. *et al.* 1974. Opportunities for increasing water yields and other multiple use values on ponderosa pine forest lands. USDA Forest Service, Research Paper RM-129, Fort Collins, Colorado, 36 pp.
- Rich, L.R. and J.R. Thompson. 1974. Watershed management in Arizona's mixed conifer forests: the status of our knowledge. USDA Forest Service Research Paper RM-130, Fort Collins, Colorado, 15 pp.

Copies of *Vegetation Management for Increased Water Yield in Arizona* are available from Peter Ffolliott, School of Renewable Natural Resources, College of Agriculture, University of Arizona, Tucson, 85721. Copies of the Forest Service publications can be obtained from the Publications Department, Rocky Mountain Forest and Range Experiment Station, 240 West Prospect Street, Fort Collins, Colorado 80521.

## WATERSHED MANAGEMENT INFORMATION SYSTEM BIBLIOGRAPHY

A bibliography has been prepared by the School of Renewable Natural Resources, University of Arizona, to show the types of references which are retrievable through the Watershed Management Information System (WAMIS). WAMIS is a bibliographic information system which covers natural resource management, particularly for Arizona.

Three searches were chosen for the bibliography: wildlife habitats in wooded or shrub areas; burning effects on vegetation in Arizona and New Mexico; and water quality of surface water in the Rocky Mountain Region. The latter search mainly identifies publications about soil erosion.

Copies of *WAMIS Abstracts No. 2* (144 pp.) are available by contacting L.M. White, School of Renewable Natural Resources, College of Agriculture, University of Arizona, Tucson, 85721.

## IDENTIFYING BIBLIOGRAPHIC INFORMATION SYSTEMS

Computers are being used increasingly to help individuals keep up with the proliferation of scientific literature. Private citizens, scientists, researchers, consultants, laymen, businessmen, and students can use computer based information systems to help identify appropriate documents to meet their information needs. These systems have been developed by governmental agencies and departments, by abstracting and indexing companies, by national or regional libraries, by professional societies, by universities, by public libraries, or by private businesses. Bibliographic information systems provide for the user either references or references and document copies.

In an article written for *Progressive Agriculture in Arizona*, six computer based systems are described: The Cataloging and Indexing System of the National Agricultural Library (CAIN); the Office of Water Resources Research's WRSIC (Water Resources Scientific Information Center); the Smithsonian Science Information Exchange; the National Technical Information Service; the Arid Lands Information System; and the Watershed Management Information System. These six systems were chosen for their general usefulness to persons in agriculture and natural resources (including water) in Arizona. For each, information is given on the developing organization, scope of the system, type of product, and contact source. Hopefully, this information will help direct potential users to an appropriate system.

Copies of the article "Access to Scientific Information Through Computerized Information Systems" are available from L.M. White, School of Renewable Natural Resources, College of Agriculture, University of Arizona, Tucson, 85721.

## PROJECT REPORTS SOLICITED

In the near future an Arizona Water Resources Project Information Bulletin will be published which will announce the availability of water research project reports recently received by or reported to the Water Resources Research Center, University of Arizona. The editors would like to encourage State University departments, governmental agencies, and other organizations to provide a list of recent publications and reports to be included in the Bulletin. If there is adequate response an issue of the Bulletin will be devoted to this purpose on a yearly basis and should make a valuable reference for our readers.

Lists of reports and publications should be submitted to one of the editors by August 20, 1975. Please include the report title, principal investigator, date of completion, address, availability, cost, and any other pertinent available information. If there are any questions, please feel free to contact one of the editors.

## FLOOD STUDY FOR PALO VERDE AND CIBOLA VALLEYS COMPLETED

Availability of a Bureau of Reclamation report pointing out areas subject to flooding by the Colorado River in the 88 miles between Palo Verde Diversion and Imperial Dams was announced by Lower Colorado Regional Director, Edward A. Lundberg.

The report will be useful to local governments, planners, developers, and builders, to provide flood-safe housing and meet the needs of new Federal legislation, Lundberg explained.

A result of an extensive study, the report defines floodways in the Palo Verde and Cibola Valleys where no construction which would retard riverflows is acceptable. The report also outlines the floodway fringe where construction may be permitted if suitable precautions are taken to protect people and property from floods.

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Lundberg said the information in the report will be particularly valuable in identifying areas and risks to be covered by flood plain insurance. The report meets an urgent need for such information, he added.

Similar reports covering Colorado River sections from Davis Dam to Topock, Arizona; Parker Dam to Headgate Rock Dam; and Imperial Dam to the southern Mexican boundary previously have been issued by the Bureau of Reclamation. Copies of these and the Palo Verde Diversion Dam to Imperial Dam report may be obtained without charge from the Regional Director, Lower Colorado Region, Bureau of Reclamation, P.O. Box 427, Boulder City, Nevada 89005.

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

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