

## Report for 2001AZ1401B: Information Transfer

- unclassified:
  - Arizona Water Information Directory. WRRC April 2001. Combined 5th updates of Where to get Free (or almost free) Information About Water in Arizona (Issue Paper 9) and Where to Find Water Expertise at Wtate Universities in Arizona (Issue Paper 13)
  - Water Resources in Pima County. Sonoran Desert Conservation Plan Report. Pima County. 2001
  - Water Conservation in Pima County. Sonoran Desert Conservation Plan Report. Pima County. 2001
  - Environmental Justice in Pima County. Sonoran Desert Conservation Plan Report. Pima County. 2002
  - Invasive exotic species in the Sonoran region. University of Arizona Press. Tucson. 2002. WRRC staff edited and also authored two chapters in the book.
  - Currently researching and writing Environmental History of the Upper San Pedro River under contract to the U.S. Bureau of Reclamation and Cochise County in conjunction with the Arizona State Museum. Publication date Oct. 2002.

Report Follows:

# **WATER RESOURCES RESEARCH CENTER**

## **Public Outreach and Education**

### **Community speakers**

Water center staff continued its visibility with the community by providing 20 presentations to various organizations around the state, discussing water issues confronting communities and the state. Staff communicates with local newspapers, such as the “Arizona Daily Star” to provide information to reporters on water-related issues.

WRRC staff also gave six presentations on the historic navigability of Arizona rivers as part of a seven-state Moving Water Program, sponsored by the Council on Humanities. Presentations were at Tucson Public Library, Salome Public Library, Parker Public Library, Buckskin Mountain State Park, Western Arizona College, Yuma Public Library, and the Southern Arizona Engineering Society.

### **Water Conference**

Water Conference Water Planning for the Future, the conference highlighted the efforts of the Governor’s Water Management Commission to make suggestions to revise the Groundwater Management Code and get Arizona on the road to sustainable use of water. The conference was designed to help inform legislators, water professionals and citizens about water issues addressed by the Water Management Commission.

### **Binational Water Management Planning**

Two WRRC staff participated in Border Institute IV: Binational Water Management Planning: Consideration of Opportunities, Costs, Benefits, and Unintended Consequences, Secure and Sustainable Water in the Border Region by 2020. The Southwest Center for Environmental Research and Policy (SCERP) sponsored the Institute. The WRRC also arranged for a field trip to allow institute participants to view water resources in Nogales, Sonora, Mexico.

### **Arizona Water Map Poster**

Revisions were made to update the popular Water Map Poster that the Center first published in 1994. Copies of the map, which was very popular with schoolteachers, state and federal agencies, as well as the general public, have been distributed and is now out of print. The new Water Map Poster includes revised and updated text, map, graphics, and photographs. As the previous one, the new map presents complex subject matter in a format suitable

## **Revision of the WRRC's Desert Landscaping Compact Disk.**

*Desert Landscaping: Plants for a Water-Scarce Environment* is a truly useful CD-ROM plant selector covering over 600 low water-use plants. Users can search by plant name, browse award-winning landscapes, compare groups of similar plants, or use the plant selector to precisely describe the plants you seek. The rich multimedia database includes plant size and growth rate, soil and sun requirements, irrigation needs, place of origin, allergens, wildlife interactions, and dozens of other useful factors. Additional information is provided through links to landscaping tips and a bibliography. The original CD-ROM was produced in 1996 and was very popular throughout Arizona. The revised version will operate more quickly and efficiently, have more and newer photos, and provide vastly more information on desert landscaping plants.

## **Nogales Revegetation Project**

In November 2001 personnel from the Water Resources Research Center installed a demonstration water catchment system in Covarrubias Elementary School in Nogales, Sonora, the first of its kind known to exist in the city. WRRC personnel gave an overview of some theory and practice of water catchment. The catchment system was designed to be used to water new plants which were being used to revegetate areas of Nogales, Sonora to reduce the impacts of hillside runoff.

## **Pima Association of Government, Environmental Planning Committee**

WRRC staff serves as a representative center on the Pima Association of Governments, Environmental Planning Advisory Committee (EPAC) and Water Quality Subcommittee. WRRC staff participated in the development of the EPAC strategic plan.

## **Field Manual for Water Quality Sampling**

WRRC staff are collaborating with the Arizona Department of Environmental Quality, the University of Sonora and the Technological Institute of Sonora to revise the bilingual Field Manual for Water Quality Sampling. The field manual will serve as a field reference guide for the collection of water quality samples from surface water and ground water. The objective of the manual is to provide consistent field sampling protocols for the numerous agencies and individuals who require water quality information.

## **Water Education Programs**

The WRRC Education Program Coordinator is the state representative for the National Project WET (Water Education for Teachers) program. As such, the WRRC Education Program Coordinator is responsible for promoting an understanding of water and water-related issues statewide. Project WET activities provide an opportunity for people of all ages in all places to better understand the water resource issues facing their community and the world.

WRRC has an ambitious and productive water education program for classroom teachers and educators. WRRC coordinates a network of 30 trained facilitators that lead teacher training workshops for over 600 teachers per year and reach thousands of K – 12 students. This program reaches classroom teachers in public and private schools, youth groups leaders, tribal governments, environmental education centers (including gardens), community colleges and state universities.

The Education Program Coordinator for WRRC supervises a cooperative for the Phoenix metropolitan area, Environmental Educator whose job is to teach and promote the Project Learning Tree (PLT), natural resources-based program. Three student assistants also report to me as the Education Program Coordinator.

### **Project WET (Water Education for Teachers)**

Teachers and educators trained this year in Project WET workshops numbered 632 with the capacity to reach a minimum of 18,000 students about water resources. Considerable effort has gone in to obtaining grant with ADWR to train 20 new facilitators who will then reach out to 2,250 teachers with the capacity to reach more than 50,000 students. The 6-day intensive Arizona water resources training will be held in July 2002. As a result of an interagency agreement grant, sixteen-hour teacher training workshops are conducted for City of Phoenix Schools including 24 School Districts. In addition, I have facilitated workshops through Cooperative Extension specialists, the Science Coordinators and/or the Staff Development Coordinators for many School Districts in Arizona, Arizona State Parks, and the Natural Resource Conservation District Education Centers.

Considerable coordination efforts were involved in the successful 2-day workshop held in cooperation with the NAU Institute for Tribal Environmental Professionals (ITEP) and the Cooperative Extension Office in Shiprock on the Navajo Reservation. Water Education training workshops have been coordinated for the Arizona Sonora Desert Museum and Tohono Chul Park docents incorporating hands-on groundwater flow model training with in-depth discussion of local water issues.

### **National Water Education Day – Water Festival**

The Project WET coordinator, is responsible for planning, organizing and implementing an annual Water Festival for National Water Education Day. The Arizona water festival is one of the simultaneous water festivals being held in all 50 states. In this and other efforts, the coordinator has a responsibility to stay connected to the education community as well as the water community.

The Water Festival celebrating National Water Education Day, held in September 2001, benefited from the sponsorship of the U.S. Bureau of Reclamation, Arizona Department of Water Resources, Salt River Project, Central Arizona Project, Intel, Keller Equipment, Empire Southwest, Brown and Caldwell, Carollo Engineers, and Mesa School District

Elementary Schools. An extraordinary, interactive educational opportunity was offered to 1000 4<sup>th</sup> grade students and their teachers in Arizona and 38,924 nationwide.

### **Tucson Interactive Water Education Exhibit**

The Tucson Interactive Water Education Exhibit was created to offer schools state of the art information on water in the Tucson AMA. The exhibit was set up at elementary schools so that librarians and teachers could lead students through the exhibit over the course of a week or two. The color-coded sections of the Tucson Interactive Water Education Exhibit included:

- I. Water in the Desert
- II. Water Cycle
- III. Sources of Water
- IV. Water Uses
- V. Water for the Future
- VI. Water History

In 2000, the Tucson Interactive Water Education Exhibit was hosted in four different school districts and been toured by more than 5,472 student s. The response from teachers and librarians was so overwhelmingly positive that the Tucson AMA funded a new grant cycle for 2002. During the summer months, the Interactive Water Education Exhibit will be set up at the Arizona Sonora Desert Museum.

### **Groundwater Flow Model Demonstrations**

As a resource for teachers seeking water resources education information, the Project WET coordinator trains teachers to use water oriented teaching tools. The groundwater flow models are an incredibly good tool for teaching about groundwater and aquifers. Groundwater flow model demonstrations are conducted with visiting scientists, government employees, and at all educator workshops. Groundwater presentations conducted with WRRC flow models reached 1,810 students and 507 adults this year. Groundwater flow models are maintained by WRRC staff for use by teachers and for use at training workshops.

### **Arizona-specific Educator Resources distributed by the WRRC include:**

- \$ National Project WET K-12 Curriculum & Activity Guide**  
*- 6-hour Educator Training Required*
- \$ Conserve Water Educators Guide**  
*- Educator Training available*
- \$ WOW the Wonder of Wetlands Educators Guide**  
*- Educator Training available*
- \$ Arizona WET K-8 Guide with Student Activities**  
*- Educator Training available*
- \$ Arizona WET K-6 Nonpoint Source Water Pollution Curriculum**  
*- Educator Training available*

\$ **Arizona WET Grade 9-12 Curriculum On Nonpoint Source Water Pollution**

- *Educator Training available*

\$ **Groundwater Flow Models**

- *Educator Training and*
- *Available on a loan basis*

\$ **EnviroScape Water Pollution Awareness Model**

- *Educator Training and*
- *Available on a loan basis*

\$ **Liquid Treasure Water History Trunks**

- *Available on a loan basis*

\$ In addition, the WRRRC Education Program Coordinator organized and coordinated a statewide ***Water Resources Education Assessment*** effort for University of Arizona, Cooperative Extension.

## **WATER CASA**

Formed in 1997, the Water Conservation Alliance of Southern Arizona (Water CASA) provides a means for member water providers to augment their individual conservation programs and to improve the region's overall water conservation efforts. Water CASA's membership includes Avra Water Co-op, Community Water Company of Green Valley, Flowing Wells Irrigation District, Town of Marana Water Department, Metro Water District, Oro Valley Water Utility, Pima County Wastewater Management, and the U.S. Bureau of Reclamation.

This alliance has rapidly become an organization effectively using economies of scale and providing a strong, unified voice on water conservation issues regionally. Summaries of Water CASA's services, activities, and accomplishments over the past four years follow. More detailed information is available on the Water CASA website: [www.watercasa.org](http://www.watercasa.org).

### **Water on the Web**

Water CASA is currently piloting a program that enables its members=customers to access individual water consumption and conservation information via the web. The goal of Water on the Web is to provide water customers a convenient way to review their monthly water consumption in a format that most importantly enables them to compare their usage with that of their neighbors and the community. Water CASA believes that this pilot program creatively and effectively promotes water conservation by allowing customers to make comparisons through seasons, from year to year, and to similar households.

The analytical comparison of consumption will promote customer water awareness resulting in additional, voluntary conservation. Customers also receive water savings tips

and a pat on the back, depending on their water usage. Water on the Web is a valuable service to Water CASA members that lack the ability to provide this information as part of their water bills. This pilot program, funded by the U.S. Bureau of Reclamation, will operate for a year. Following an effective evaluation, the program will be available to all Water CASA members for their customers.

### **Conservation Devices**

Bulk orders of conservation devices are made for, and divided among, the members of Water CASA. This is a good example of Water CASA's effectiveness in the use of economy of scale. Water CASA is able to purchase conservation devices at the lowest possible price by bulk ordering. In addition, the US Bureau of Reclamation supports this program with \$10,000 toward the purchase of the showerheads and faucet aerators. These conservation devices are included in Welcome Packets for new customers moving into older homes and are also available to water customers on request. Field staff who respond to customer questions or complaints also hand out devices, which has proved to be an effective customer service.

### **Dual Metering Study**

Exterior residential water use as a percent of overall use has never been accurately measured in the Tucson area, and the modeled estimates of exterior water use have proven increasingly inaccurate through time. Additionally, annual landscape water use has not been studied relative to the needs of landscape plants during the establishment, maturation, and climax stages. Water providers, regulators, and planners have repeatedly expressed the need for a study that accurately tracks indoor and outdoor water usage beginning with new construction and continuing for many years. In response to these data needs, Water CASA has embarked on a long-term project to install second meters in two large samples of single family residences to measure indoor and outdoor water use in a variety of subdivisions: starter homes, mid-range homes, and high end.

The Dual Metering Study began when Water CASA, the Genesee Company, and Flowing Wells Irrigation District partnered to install second meters for outdoor water use in 38 units of the Sagewood development. Funded by the U.S. Bureau of Reclamation, this study will provide data on actual water use pattern variations for both indoor and outdoor water use through seasons and over years as landscapes mature. The water use patterns in each of the three subdivisions will be compared among a variety of socio-economic levels. The results will be used to develop the most effective and efficient water conservation program for Water CASA members, and inform decisions makers for public policy and community design.

## **Graywater B Water Harvesting Workshops**

The Arizona State Land Department awarded Water CASA one of sixteen Urban and Community Forestry Grants. With the \$4,530 grant funds, Water CASA developed and organized a series of workshops demonstrating the how and why of water harvesting and graywater reuse for residential landscape irrigation with an emphasis on urban trees. The workshops were held throughout the Tucson area in the service areas of Water CASA members.

## **Collaboration with Jordan**

The Center for the Study of the Built Environment invited Water CASA to travel to Amman, Jordan to participate on a team of water experts to provide water conservation and appropriate plant material information to their counterparts there in Amman, Jordan. The Association for Educational Development, the U.S. Embassy, and the Center for the Study of the Built Environment sponsored the trip. Water CASA shared the results of its Residential Graywater Reuse Study. A portion of the trip included an extensive tour of Jordan's centuries old water harvesting structures and techniques.

This unprecedented trip established a relationship with the Center and successfully resulted in an exchange of ideas and information beneficial to both groups. The Center has again invited Water CASA to visit in January 2002 to continue the exchange of information and explore opportunities for collaboration on a demonstration water conservation garden.

## **News Articles & Press Releases**

Water CASA staff draft press releases and news articles on its activities and water conservation topics for use by the regional media throughout the year. These items are either used as is by local newspapers, adapted as features by the print media, or are used in Water CASA member newsletters to customers.

## **Ordinances**

At the request of Pima County, Water CASA drafted and submitted to the County, ten potential water conservation ordinances. Those ordinances are awaiting adoption within the County's Sonoran Desert Conservation Plan. Pima County's adoption of our suggested water ordinances will strengthen conservation efforts not only in Water CASA members service areas but will benefit the entire County as well.

## **Safe Yield Dialogue**

Water CASA has consistently promoted development of a dialogue within the region and throughout the State to look at overall effective water management. Water CASA Manager, Val Little, continues to serve as co-chair of the Conservation subcommittee and is a member of the TAMA Safe Yield Task Force. Water CASA Board Member, Alan

Forrest, serves on the statewide Technical Advisory Committee for the Water Management Commission.

### **Conservation Information Sharing Meeting**

Water CASA hosted the September 2001 Conservation Information Sharing Meeting, which brought together more than 30 representatives of water providers and water conservation programs to exchange information on programs, activities, and policy. Water CASA members attended the meeting and participated in sharing information on Water CASA's programs and activities. Water CASA also arranged for tours of recharge facilities as a morning activity.

### **Hot Topics Cool Solutions Conference**

In the Fall of 2001, Water CASA participated on the Graywater & Rainwater Harvesting panel of the Hot Topics Cool Solutions Conference. This Conference address sustainability issues for communities and focuses on solutions to these issues. Val Little of Water CASA presented the exchange of information between Water CASA and Jordan and the results of the Residential Graywater Reuse Study. With standing room only, this panel was one of the most popular of the Conference.

### **Tohono Chul Landscape Awards**

In August 2001, Water CASA sponsored the Tohono Chul Landscape Award for a Water Efficient Garden. The Award recognized and promoted efficient water use in residential, commercial, institutional landscapes in several categories.

## **THE ARIZONA WATER RESOURCE NEWSLETTER**

The Arizona Water Resource Newsletter is a 12-page newsletter presenting general news, events and issues analysis for the Arizona water community. Sections include: Water Vapors, News Briefs, AZ Water Community News, Guest View, Legislation and Law, Publications, Special Projects, Announcements and Outside Readings. Below are the feature articles for the past year.

### **March-April 2001 Issue.**

#### **FEATURE ARTICLES**

“New Arizona Power Plants Pose Water Questions, Raise Issues”

“Urban Ecology, Nature in an Urban Setting”

**May-June 2001 Issue**

**FEATURE ARTICLE**

“Settling Water Rights is Peer Review Process in Santa Cruz AMA”

**July-August Issue**

**FEATURE ARTICLES**

“Do Waterborne Pathogens Pose Risks to Wastewater Workers”

“Earliest North American Canals Found in Tucson”

**September-October Issue**

**FEATURE ARTICLE**

“Governor's Water Management Commission Ponders Replenishment”

**January-February 2002 Issue**

**FEATURE ARTICLES**

“Is That My Groundwater or Your Surface Water”

“Managing water Outside AMAs Gains Interest, Some Support”