WATER RESOURCES EDUCATION ASSESSMENT

UNIVERSITY OF ARIZONA COOPERATIVE EXTENSION

EXECUTIVE SUMMARY

Water resource education conducted through the University of Arizona Cooperative Extension is currently provided by six water resource education specialists as well as a whole host of other individuals who teach water resource education indirectly as a part of their programs. In July, each of the six educators was asked to report on their water resource activities, as well as the water related activities of the counties closest to them.

This report is the resulting assessment of the water resource education programs being conducted by or in conjunction with Cooperative Extension in Arizona. Water quantity and/or quality issues affect every county and every person in Arizona. The education programs outlined in this report cover water resources in a broad sense, ranging from water quality to water supplies, from irrigation to conservation and beyond.

The Cooperative Extension County Offices provide education outreach in proximity to the people that they serve. This allows them to experience and understand the issues of importance first hand. The reader will find unique programs, which have been developed to address specific county needs, outlined in this report.

In Yavapai County, Cooperative Extension has developed a water testing and education program, which has identified six areas within the county experiencing increasing nitrate trends. In a County experiencing rapid growth and increasing water supply demands, this program has opened up conversations between private well owners and local governmental agencies.

Innovative teaching tools facilitate an understanding of new concepts for adults and youth. In primarily rural Mohave County, a septic tank model has been engineered to teach septic tank owners about proper design, operation, and maintenance. In addition, a Bureau of Reclamation grant allowed for the production of simplified groundwater flow models to be given to classroom teachers participating in water education workshops.

In Cochise County, a dual approach to water conservation has been taken with the Water Wise Program. For the community, the audit/outreach program has shown that direct one-on-one contact is what produces water conservation behavior. Within the schools, the Water Wise program, in its first year of operation, has students focusing on water conservation in twelve of the thirteen targeted district and county schools.

Cooperative Extension has created an Adopt-A-Watershed program, which uses a local watershed as the living laboratory for making science directly applicable and relevant to

student's lives in twelve school districts in Navajo County. A Master Watershed Stewardship Program is being developed in Yavapai County to provide a local/regional, volunteer, citizen-component to assist Cooperative Extension in providing accurate insight, distributing information, and increasing local public involvement on watershed issues.

By working in conjunction with the Cooperative Extension, Water Education workshops for teachers and educators have been offered this year in more counties than ever before. The Cooperative Extension County Network is an invaluable resource for education outreach programs that seek to target the whole state.

In recent years a number of watershed groups have been formed in rural portions of Arizona as a result of the need to address specific water-related issues. These watershed groups, which are often facilitated by county extension people, are outlined at the end of the county by county assessments.

This report provides an overview of water resource education programs statewide as well as valuable contact and resource information. The University of Arizona's Cooperative Extension is a unique network of education programs and trained educators.

COUNTY BY COUNTY ASSESSMENT (in alphabetical order)

APACHE COUNTY

Name of Program/Location/Point of Contact:

Apache County Cooperative Extension
Joyce Alves, County Director
P.O. Box 369
St. Johns, AZ 85936-0369
(520) 337-2267
e-mail: jalves@ag.arizona.edu

At this time there are no programs focusing specifically on water resources education.

Description of Program:
Wonderful Water Day: Youth education day to introduce water resource education to students in St Johns. Included a walk down to the Little Colorado River as well as simple water flow and water quality measurements.

Audience: Upper Elementary to Middle School students

Current Status: This was a special event not an annual event planned by the Education Program Coordinator at the Water Resources Research Center.

Impacts: Water resources were brought to the student's attention focusing on the Little Colorado River.

Lessons Learned: Students signup ahead of time and pay a small fee to ensure attendance.

Supply list: Contact Joyce Alves

COCHISE COUNTY

Name of Program/location/point of Contact:

Water Wise Program
Cochise County Cooperative Extension
Susan Pater, County Director
450 S. Haskell
Willcox, AZ 85643
(520) 3843594
e-mail: spater@ag.arizona.edu
Web Site: ag.arizona.edu/cochise/waterwise/wwise.htm

Description of Programs:

A. The **Water Wise Community** program is a water conservation program designed to assist area residents and businesses in the Sierra Vista Sub-Watershed with good stewardship of our natural resources. Water Wise provides educational outreach in the form of extension bulletins; a phone "hotline" for questions; free on-site visits called Water Audits; workshops; newspaper, radio and television information; and community presentations.

B. The **Water Wise Schools** program is a curriculum-based educational water conservation program targeting 5 district and 7 county grade schools (K-8). The goal is to assist teachers in incorporating water education in the classroom while addressing the Arizona standards in Language Arts, Math and Science. This has been accomplished through use of specific curriculum materials and lesson plans developed by The University of Arizona Cochise County Cooperative Extension faculty. An Instructional Specialist is available for presentations in area classrooms. Water Wise Family Science Nights have afforded parents the opportunity to learn with their children. A Water Conservation Poster Contest is held in the spring and there are plans for a Water Festival to coincide with Water Awareness Week and Earth Week.

C. Water Wise and Energy Smart is a water and energy conservation program on Fort Huachuca. Ongoing programs include residential landscaping consultations, school presentations (K-8), Self-Help Briefings, Water Wise Demonstration Projects, self-guided tours of xeriscaped demonstration areas, public speaking, displays at special events, educational bulletins and a phone hotline for questions.

D. The **Plant Sciences Center** is a native plant salvage and revegetation facility for locally displaced native plants due to development pressures.

Audience:
The Water Wise programs serve all communities within the Sierra Vista sub-watershed; Whetstone, Tombstone, Huachuca City, Bisbee, St. David, Naco, Sierra Vista, Hereford, Palominas and the military community, including soldiers and civilians working at Fort Huachuca. The various programs include educational opportunities for adults and youth.

Current Status:
The Water Wise programs currently employ ones full time educator and four part-time educators. Three agents provide oversight to the programs and develop materials for the programs. The Water Wise programs are on a year-to year funding basis.

Impacts:
A. Water Wise Community: No public figures for water conservation are available, as the water companies are all privately owned. One of the largest companies has reported continual declines per meter in water use since 1996, one year after the implementation of the program. A recent survey of auditees indicated that approximately 90% adopted some kind of water conservation measures due to the on-site visit. Water is a very visible issue with the continued growth in the area and the desire to maintain the quality of our current ecosystems.

B. Water Wise Schools: In the first year of operation (1999-2000), twelve of the thirteen targeted district and county schools have participated in the water conservation program with requests for classroom presentations or to co-sponsor a Family Science Night. The program's resources are most used during April and May when standardized testing is completed. Comments, letters and cards have been positive from principals, teachers and students. The local newspapers have supported the program with feature stories and photos.

C. Water Wise and Energy Smart: Since military families do not pay utility bills, measurable impacts are difficult to assess. The number of people requesting low-flow fixtures and low water use landscape audits has increased due to the implementation of the self-help orientation briefings. School children and soldiers are responsive to the message of water conservation through the media and education programs. Reduced pumping rates on the fort can be attributed in some part to the educational program, but specific figures are not available.

D. Plant Sciences Center: After the construction of the Plant Sciences Center, the Arizona Department of Transportation used the yard to house over 2500 native plants displaced from a major road construction project. The City of Sierra Vista adopted a native plant ordinance that required developers to salvage native plants before construction. The Plant Sciences Center has participated in several community replanting projects, one of which saved the city from installing an irrigation system, resulting in a cost savings of $95,000 and saving approximately 9.47 acre feet a year in water.

Lessons Learned:

A. Water Wise Community: The audit/outreach program has found that direct one-on-one contact is what produces some kind of water conservation behavior. Certainly the constant message of water conservation in the news, radio and other public information outlets is important to keep the message in the forefront of people's minds. However, it is our opinion, that it is the change of habits or landscape watering techniques that yields results and therefore the on-site audit is the most effective part of the Water Wise Community program.

B. Water Wise Schools: The success of the program depends, not only on the quality of the resources and presentation, but also on the constant networking with various schools and personnel. Teachers in Cochise County are feeling pressured more than ever to raise test scores. Time is precious and requests for the water education curriculum are often seen as a reward at the end of the year to give teachers a break and let kids learn through hands-on activities. The Science Family Night is one approach that allows teachers, students and parents to interact in a positive way in a short period of quality time.

C. Water Wise and Energy Smart: Military personnel do not request water or energy audits for their homes. Teachers initially needed constant reminders that the Water Wise and Energy Smart curriculum caters to their objectives for addressing Arizona State Education Standards in several subject areas. Attending school staff meetings at the beginning of the year is important to introduce the program and teacher surveys have prompted a good response. Mandated self-help briefings are a good way to capture the military family and get the conservation message across.

D. Plant Sciences Center: Many things have been learned from the handling of salvaged native plants, and in the education of the public and city workers. The Plant Sciences Center has a good working relationship with local developers, resulting in the city ordinance being followed and developers learning the value of previously discarded plants. Succulents with spines are not always the plants of choice in city maintained landscapes, but some have recognized their usefulness in areas without a ready source of water. The response from the general public is positive; the city's ordinance is a good public relations effort but more plants need to be reused in area landscapes.

Curriculum/Supplies List:

Various Extension bulletins on water conservation including watering shrubs, trees, and

lawns; water harvesting; backyard wildlife habitat; etc.

For use with Water Wise Schools - Groundwater Flow Model, Enviroscape, Cochise County Water History Trunk, Water Basics Learning Lab (3-4-5 grades), and classroom lesson plans tailored to specific age groups based on the Water Wise lessons (e.g. *Go to the Head of the Cloud*, *Water Web of Life*, *Water Watch*, *Dr. Drip's Water Trivia* and appearances by *Wettie the Waterdrop*).

COCONINO COUNTY

Name of Program/Location/Point of Contact:

Coconino County Cooperative Extension
Beth Tucker, County Director
2304 North 3rd Street
Flagstaff, AZ 86004-3605
(520) 774-1868
e-mail: tucker@ag.arizona.edu

There are no specific efforts being made or implemented in regards to water resource education provided by UA-Cooperative Extension faculty/staff in Coconino County. Water resource education as it relates to plants and irrigation is included in the horticulture program and master gardener activities as described in other county descriptions.

An extensive review of the water resource education programs outside of Cooperative Extension has been conducted for Coconino County. Perhaps the extensive network of water education initiatives may explain why Coconino Cooperative Extension has not been called on for water resources education. These programs are outlined below.

A. Project Life
Purpose and Description: Project Life is a one week camp at Camp Colton at the foot of the San Francisco Peaks, surrounded by the Coconino National Forest. At Project Life students learn outdoor living skills and environmental appreciation. "As the students participate in specific activities, their instruction is integrated to include elements of geology, botany, zoology, meteorology, astronomy and history as well as specific lessons on the unique wildlife of the peaks and the delicate balance of life on the edges of ponds and streams." Specific water related activities include description and discussion of the water cycle, examination of aquatic life within and immediately adjacent to nearby ponds, as well as some basic water quality parameters. Water system development and water use are both presented for the general Flagstaff area, as well as that for Camp Colton. Heavy emphasis is placed on water conservation (students are usually limited to one brief shower during the five days, due to system capacity).

Audience: Students in grade 6 from all elementary schools within District.

Current status: Approximately 1000 students per year along with their teachers, each for a one-week session during fall and spring months.

Impacts: Student evaluations have shown better than 95 percent student approval. They report enjoying learning about wildlife, water, etc. Students become very conscious of water wastage and vigilant in reporting any leaks or drips in the system, no matter how small. The program has been in effect for nearly years and has strong community support.

Funding: Currently, the program is half funded from the school district budget and half from outside sources, such as grants and donations. District direction is to convert it to 100 percent outside funding over the next five years. A major source of outside funding is in-lieu state income tax donations (the Arizona program, which allows up to $200 of state income tax obligation to be donated to educational or charitable institutions in lieu of being paid to the state). Other sources have included private foundations and government agencies, e.g., the Forest Service.

Lessons learned: The program has proven to be beneficial to teachers, as well as students, as they must also spend a week at the camp and participate in instruction.

Copies of materials:

Project Life descriptive flyer.

Contact: Cameron Kern (520) 527-6198 ckern@flagstaff.apscc.k12.az.us

B. Northern Arizona Environmental Sciences and Education at Northern Arizona University

Purpose and Description: a degree program at Northern Arizona University. One part of the degree requirements is an internship/fieldwork experience. Some of these internships are in the field of environmental education. The program sponsors an Environmental Science Day Camp during the summer for students of middle school age. It is a one-week long camp and has been held in the Fort Valley Experimental Forest area. A portion of the camp curriculum has been related to the aquatic and riparian features of some nearby ponds. In addition the program has a resource outlet, the Northern Arizona Environmental Education Resource Center which provides a wide variety of educational materials for use by teachers.

The program is also working with NAU's Science and Mathematics Learning Center in tailoring science curriculum of the Full Option Science System (FOSS) to local conditions and resources or "connecting FOSS to northern Arizona". The FOSS system resource kits have been adopted by many schools in the area, rather than traditional science textbooks.

Audience: university students for the degree program, middle school students (number variable) for the summer day camp, and teachers for the resource center.

Impacts: very positive feedback on the summer day camp, interns from the degree program have been quite helpful in a number of environmental education programs and some have gone on to employment in this field. Use of the resource center has not been as great as hoped.

Funding: Funding was/is derived from basic university program. However, a portion has also been funded from the environmental education funds derived from the (optional) Arizona environmental license plate.

Lessons learned: Classroom teachers are very busy and have varying degrees of comfort with, and interest in, environmental science. Programs that minimize time impacts on teachers (e.g., don't require them to spend extra time in logistics) tend to be more used.

Web site: www.nau.edu/~envsci

C. Environmental Education Outreach Program

Purpose and Description: The Environmental Education Outreach Program is a part of the Institute for Tribal Environmental Professionals at Northern Arizona University. Its purpose is to interest Native American students in environmental careers and to assist schools in improving environmental science literacy. Much of this is done through working with teachers and providing them with workshops and access to teaching resources. Water related areas include facilitation of participation in Project GLOBE and teachers in Project WET. In addition, coordination with NAU's Civil Engineering Department is helping rural tribal communities access practical technology for onsite wastewater treatment. The Institute also operates a summer program for Native American students considering environmental careers.

Audience: Native Americans from a wide area, including tribes in Arizona, New Mexico, Washington, and Wisconsin, primarily through educators.

Impacts: Growing use and participation reflects favorable response.

Contact: Mansel A. Nelson (520) 523-1275

Web site: http://jan.ucc.nau.edu/~man5/eeop/

D. Glen Canyon National Recreation Area (Field Science Partnership)

Purpose and Description: This is a math and science partnership between the National Park Service (NPS) at Glen Canyon National Recreation Area and the Page Unified School District, along with the U.S. Fish and Wildlife Service, the Utah Department of Wildlife Resources, and the Page Unified Golf Course. The NPS provides a Science Education Specialist to work directly with the Page High School in

co-teaching their Research Biology Class. Students gain hands-on field experience working in the field of biology. Students monitor water quality at popular Lake Powell swimming beaches for fecal coliform and E. coli during the months of October to April (NPS does the monitoring during the heaviest use season of May-September). In addition they are participating in a project to grow razorback suckers, a listed species, in ponds at the Page Unified Golf Course. The purpose is to grow the fish large enough that they can be released in the inflow rivers of Lake Powell. The ponds use reclaimed water so that water conservation and water quality principles are also learned. A recent addition to the program was working with middle school (grades 7-8) science classes on a comprehensive study of zonation in the transition area between high and low water elevations of the lake.

Audience: High school students, approximately 20-30 per year, in the Research Biology Class. Middle school students in the lake's transition area study.

Impacts: Program very well received in the community and has received a variety of awards and recognition, not only locally but also regionally and nationally, e.g., coverage in the New York Times.

Funding – NPS provides a major portion of the funding. Other funding comes from grants, etc. This is a continuing part of the job for the Science Education Specialist.

Lessons Learned – A program like this requires a continuing commitment of staff to fully maintain coordination and momentum, especially with the number and variety of partners. The Science Education Specialist on the NPS staff is integral to achieving the program ends.

Contact: Stephanie Dubois (520) 608-6263

Web site: www.nps.gov/glca/partner

E. Resource Center for Environmental Education

Program Purpose and Description: a private, nonprofit organization sponsored by the Coconino NRCD. Full spectrum of environmental education topics with water modules being one part. Provide classroom presentations, teacher workshops, and resources for use by teachers in their classrooms. Also work on cooperative programs with numerous other entities in the area, e.g., City of Flagstaff on water history, Arizona Game & Fish Department, etc. The program has a director plus five instructors who make presentations and lead field trips. Water oriented field trips include Oak Creek, nearby riparian sites at Griffith Springs, and constructed wetlands used in wastewater effluent treatment at Kachina Village.

Audience: Students in grades K-12 with approximately 85 percent being in the elementary grades (K-6). Currently work with five school districts within Coconino County -- Flagstaff Unified, Williams Unified, Maine Consolidated, Grand Canyon, and Fredonia-Moccasin.

Current status: Of 1,100 classroom programs or field trips last year, approximately 25 were with water modules, with approximately 25 students per class. Ten of the 60 field trips were to riparian and wetlands areas. One of the teacher workshops was Project Wet, with 13 teachers participating.

Impacts: There is a heavy demand from classroom teachers. Requests for classroom programs and field trips are greater than can be accommodated by the staff. Teacher workshops have formal evaluations from participants, but there has not been a formal evaluation of other programs.

Funding: The largest source of funding is from Forest fees and other federal land in-lieu-of-taxes. By law, 25 percent of the revenue, from National Forest use, is returned to the county for schools and roads. In addition, a federal in lieu of taxes payment is made to the county for other federal lands to make up for property taxes foregone by government ownership. For many years the Resource Center has received an allocation of $30 thousand per year from the schools' portion. The next most important segment of funding is from Arizona's environmental license plate program. Grants from private foundations and the City of Flagstaff supplement these. In recent years the payments from National Forests have declined due to reduced timber harvests, putting greater pressure on school system budgets, and raising concern about the long-term certainty of this source of funding.

Lessons learned: It is important to give students a basic understanding of water – the natural water cycle, plus human development and use of water. This should include what happens locally, i.e., where does their water come from, how is it treated, what happens after it goes down the drain, etc. In the future they plan to expand into more explanation of watersheds and land use influences. Both classroom presentations and field trips need to be tailored to knowledge level and attention span.

Copies of materials:

Fall 2000 program brochure
Example of school skit on Flagstaff water situation

Contacts: – Glo Edwards, Mary Balagna (520) 779-1745

Web site – www.nrcd.org/coconino/RCEE.htm

F. Arizona State Parks - Northern Region

Water Resource Education programs at Slide Rock State Park in Coconino County are generally developed and coordinated by the Northern Region of Arizona State Parks. Slide Rock State Park, on Oak Creek, is only a few miles upstream from Red Rock State Park (in Yavapai County). Dead Horse Ranch State Park, on the Verde River, is also nearby in Yavapai County. All three have a focus on streams and associated riparian areas.

Purpose and Description: Slide Rock State Park offers an annual Riparian Area Day with special emphasis on the riparian features and guided walks. They also have a program called "Oak Creek is Unique" with water kits which can be borrowed by teachers for use with classes who visit the site. Slide Rock is a widely known swimming and wading site and maintenance of water quality is very important. Red Rock State Park has a special emphasis on environmental education and has developed curriculum based school programs, which include site visits with ranger led talks and activities.

Audience: The Oak Creek is Unique programs at Slide Rock State Park are for elementary schools. Recently about 100 students per year have participated, primarily from Sedona and the Verde Valley. The curriculum at Red Rock State Park is developed for elementary through High School and receives extensive use from schools in Sedona and the Verde Valley, plus some from other parts of the state, e.g., some schools in the Phoenix area who bring groups up for programs.

Impacts: Very positive feedback on the value and usefulness of the programs.

Funding: Because Red Rock State Park has a primary emphasis on environmental education, funding comes from the Arizona State Parks operating funds. Heritage funds (from the Arizona lottery) are used as a supplement and have enabled hiring additional staff for provision of the school programs.

Lessons learned: the importance of teaching stewardship of natural resources, especially for water and riparian resources.

Contact: Barbara Hart (520) 282-2202
Web site: www.pr.state.az.us

G. City of Flagstaff

Program Purpose and Description: Achieving reduced water consumption is the goal of the water conservation program of the City of Flagstaff. Planned and coordinated by the City's Water Conservation Committee, the education portion of the program has a strong emphasis on reaching students in the school system, plus some general public outreach. In cooperation with the Resource Center for Environmental Education, a teaching module, "The Wonder of Water", was produced in 1986 and updated in 1996. It contains individual grade level lessons for grades 1-6 which incorporate general water education principles and add specific information on the Flagstaff area and its water and wastewater collection, treatment and distribution systems. To add interest and excitement to learning, Children's theatre companies have been used in school presentations. Most recently the National Theatre for Children, based in Minneapolis, came to town and presented skits and messages highlighting the need for water conservation, tailored to Flagstaff's situation.

To reach the broad public audience, water conservation messages are presented through newspaper articles and inserts, TV and radio spots, and exhibits at special events such as the Flagstaff Home Show and the Festival of Science. Many of these

efforts are combined with messages about solid waste recycling, a program operated by the City's Public Works Department. Information on xeriscaping to reduce the irrigation requirements of landscaping is also provided.

Audience: Formal school presentations are for elementary school students, water system users for other messages.

Impacts: Difficult to assess effects of this portion of conservation program, alone. Other portions of the program include a reclaimed water plant and distribution system, inverted rate structure (higher per unit costs as water use increases) and low flow toilet conversion rebates. However, since the program was instituted in 1986 the peak water use has increased only slightly while population has increased by close to 50 percent.

The National Theatre for Children presentations were given an approval rating of better than 95 percent by teachers.

Funding: The program is funded as a regular part of the City's Utility Department budget, which relies on user fees for water and sewer service.

Lessons learned: It is necessary to keep the message regularly in the public's eye. You can't just present it once or twice a year and forget it.

Contact: Paul Raczkowski (520) 556-1301

FOR MORE INFORMATION SEE ATTACHMENTS FOR COCONINO COUNTY.

GILA COUNTY

Name of Program/location/point of Contact:

Gila County Cooperative Extension
Ruth Carter, County Director
1177 Monroe Street
Globe, AZ 85501-1415
(520) 425-7179
e-mail: rcarter@ag.arizona.edu

There are no specific efforts being made or implemented in regards to water resource education provided by UA-Cooperative Extension faculty/staff in Gila County. Gila County Extension is heavily involved in habitat improvement/management of riparian areas but has no educational outreach programs dedicated specifically to water resource education. There are also some opportunities for informal inclusion of water resource information in related horticulture and master gardening activities.

GRAHAM COUNTY

Name of Program/Location/Point of Contact:

Graham County Cooperative Extension
Carol Willis, County Director
P.O. Box 127
Solomon, Arizona 85551-0127
(520) 428-2611
email: cwillis@ag.arizona.edu

Description of Programs:

A. Water Education Field Day: Each class participated in 4 activities at the Mt. Graham Golf Course and a nearby park. Through interactive activities, students explored wastewater treatment, groundwater flow, water's importance to all lifeforms and the process of erosion.

Audience: Both Graham County events were for students and their teachers. Lafe Nelson Elementary School in Safford participated in the Water Education Field Day with 240 4th grade students and their teachers. Approximately 600 6th grade students and their teachers from Graham and Greenlee Counties attended the Cotton Field Days event.

Current Status: This was the first Water Education Field Day in Graham County. It is hoped that this event will become an annual event**.**

Impacts: The special session on water education at Cotton Field Days was a new addition this year.

Lessons Learned: Require teacher and parent volunteers involvement in the field trip. A lot of information is share in a very short time so keep them active and moving through activities.

B. Cotton Field Days – Water Education: At the annual Cotton Field Days at the Safford Agricultural Center, a session on water resource education is taught. In each session, the importance of water to all forms of life is stressed. The groundwater flow model was used to demonstrate how pollutants move into and through our groundwater. Potential sources of contamination were discussed, from common chemicals around the house, to animals and factories. Students left with a Water Wise Yard Audit containing many useful facts and tips on where water usage outside the home could be decreased.

Audience: The Cotton Field Day started as a program for the Safford School 6th grade, but quickly expanded to the other schools in the valley. It has grown to include schools from Bonita, Fort Thomas, Morenci and a local charter school. The 2000 event was attended by approximately 600 students, and their teachers, from Graham and

Greenlee Counties.

Current Status: Cotton Field Day began as Ag in the Classroom in 1985. It switched to a cotton emphasis in about 1989 and has been an annual event ever since. Since its inception there has always been a water education component to the Cotton Field Day.

Impacts: Students learn about an important agricultural crop to the state of Arizona. They also learn how water resources affect and are affected by agriculture.

Lessons Learned: When conducting outdoor education it helps to be flexible enough to change course if one lesson doesn't seem to be working with a particular class.

Curriculum/supplies list: Contact Carol Willis

- For a full description of the excellent water education activities done at these special events see the attachments for Graham County: *Water Education Field Day* and *Cotton Field Days*.

GREENLEE COUNTY

Name of Program/Location/Point of Contact:

Greenlee County Cooperative Extension
Michael Schneider, County Director
HCR Box 60
Duncan, Arizona 85534
(520) 359-2261
email: mikeschn@ag.arizona.edu

Description of Programs:
***Two Weeks of Water* Curriculum:** Greenlee County has conducted water education using the *Two Weeks of Water* curriculum, mainly targeting all 4th graders in Clifton and Duncan schools. The curriculum consists of 10 lessons: 5 dealing with water quality and 5 with water conservation and includes numerous hands-on activities.

Audience: The *Two Weeks of Water* curriculum is for 3rd and 4th grade students and in Greenlee County was used to target 4th graders in Clifton and Duncan Schools.

Current Status: The program is inactive due to staffing difficulties and 4-H related priorities.

Impacts: Encouraged teachers to emphasize water resource education as part of their science curriculum.

Lessons Learned: Direct communication with the teachers and a free copy of the curriculum provided enough incentive to interest teachers in this program.

Curriculum/supplies list: Contact Michael Schneider

- *Two Weeks of Water* Curriculum, by Kim Gressley Pinal County 4-H Youth Development and Catherine Williams Gila County
- Games and videos that are available to teachers for in-classrooms use.

LA PAZ COUNTY

Name of Program/Location/Point of Contact:

La Paz County Cooperative Extension
Janice Shelton, County Director
P.O. Box 3485
Parker, Arizona 85344-3485
(520) 669-9843
email: shelton@ag.arizona.edu

Description of Programs:

A. Water Management/Conservation Program: This program is intended to increase community awareness of best management practices (bmp's) for indoor and outdoor water use. Master gardener programs are delivered as training workshops or demonstrations at garden centers throughout the county.

B. Water Quality Program: This program is directed primarily at onsite water treatment systems (e.g. septic tank and drain field).

Audience: The above programs serve the La Paz County communities. Water education programs in La Paz County emphasize youth and Colorado River Indian Tribes. These programs are also directed to underserved areas of the County. Upon request, La Paz County personnel also conduct these programs for residents living along the Colorado River in California.

Current Status: The University of Arizona La Paz County Cooperative Extension employs one part time instructional specialist focusing on water. This agent works in partnership with many individuals and agencies to continue the programs as described. The funding for these programs depends upon grants from local, state and federal agencies.

Impacts: Public outreach and other education programs improve residents understanding of water resources and water quality issues. The water quality waste water treatment system program increases citizen awareness of problems associated with onsite septic system failures.

Lessons Learned: Developing an education program, writing educational material or

offering workshops do not constitute an effective community outreach program. The key to effective community outreach is person to person communication and follow-up. Effective community outreach requires an aggressive marketing effort.

Curriculum/supplies list: Contact Janice Shelton

- Visual aids have been produced for landscape irrigation practices.
- Low water use plant guide and water facts bulletin have been produced (included as an enclosure)
- Limited grey water research has been conducted and results published in a bulletin (included as an enclosure)
- Two thirty-minute television programs have been produced and are available on video tape.
- Groundwater flow model and septic model available for check out.

MARICOPA COUNTY

Name of Program/location/point of Contact:

Maricopa County Cooperative Extension
Stanley Farlin, County Director
4341 E. Broadway Road
Phoenix, AZ 85040-8807
(602) 470-8086
e-mail: sfarlin@ag.arizona.edu

There are no specific efforts being made or implemented in regards to water resource education provided by UA-Cooperative Extension faculty/staff in Maricopa County (excluding UA-MAC Complex). Water resources information is being provided in the horticulture, landscaping, and Master Gardener programs of the county. Please see Pima County for an overview of these programs.

MOHAVE COUNTY

Name of Program/Location/Point of Contact:

Mohave County Cooperative Extension
Robin Grumbles, County Director
101 E. Beale Street, Suite A
Kingman, Arizona 86401-5827
(520) 753-3788
email: grumbles@ag.arizona.edu

Description of Programs:

A. **Water Management/Conservation Program:** This program is intended to increase community awareness of best management practices (bmp's) for indoor and outdoor water use. These programs are delivered as presentations workshops and demonstrations in schools, civic groups and special forums. Master gardener programs are delivered as training workshops or demonstrations at garden centers throughout the county.

B. **Water Quality Program:** This program is directed primarily at onsite water treatment systems (e.g. septic tank and drain field).

Audience: The above programs serve the Mohave County communities. By adapting the delivery method, these programs are offered to people from age 10 to seniors. Mohave County personnel conduct education programs in Laughlin, Nevada upon request.

Current Status: The University of Arizona Mohave County Cooperative Extension employs one part time instructional specialist focusing on water. This agent works in partnership with many individuals and agencies to continue the programs as described. The funding for these programs depends upon grants from local, state and federal agencies.

Impacts: Public outreach and other education programs improve residents understanding of water resources and water quality issues. The water quality waste-water treatment system program increases citizen awareness of problems associated with onsite septic system failures.

Lessons Learned: Developing an education program, writing educational material or offering workshops do not constitute an effective community outreach program. The key to effective community outreach is person to person communication and follow-up. Effective community outreach requires an aggressive marketing effort.

Curriculum/supplies list: Contact Robin Grumbles

- Visual aids have been produced for landscape irrigation practices.
- Low water use plant guide and water facts bulletin have been produced (included as an enclosure)
- Limited grey water research has been conducted and results published in a bulletin (included as an enclosure)
- Two thirty-minute television programs have been produced and are available on video tape.
- Groundwater flow model and septic model available for check out.

NAVAJO COUNTY

Name of Program/ Location/ Point of Contact:

Navajo County Cooperative Extension
Stephen J. Campbell, Asst. Agent, AG/NR
402 East Hopi Drive
Holbrook, Arizona 86025
Phone: (602) 524-6271
Fax: (602) 524-2416

Description of Programs:

A. Environmental Education Program: A memorandum of understanding between local, state and federal agencies was put into effect three years ago for the purpose of initiating public outreach programs. One such "School to Work" program selected the Mineral Basin Education Project to achieve ecosystem management objectives through hands-on activities, creation of a permanent environmental demonstration site and field trips to study various aspects of the program. The community college encourages students to explore careers in natural resources such as Watershed Management, Stream and Fish Restoration, Riparian Habitats and Monitoring Streams.

B. Blue Ridge Natural Resources Working Group: This group is composed of a cross section of community members; local state and federal government representatives, environmentalists, ranchers, timber industry, business people, academics and others from the urban areas as well as cooperative extension agents working together to find solutions to local problems. Topics of interest are Forest Restoration, Fuel Reduction in the Urban Interface and Community Forest, Re-utilization of Restoration by-products, Watershed Improvement and Sustainable Natural Resources Stewardship. The Blue Ridge Demonstration Project is one the collaborative efforts of this group with the goal of sharing outcomes with those who could most benefit from the information.

C. Adopt-A-Watershed: An articulate, thematic, integrated science curriculum for grades K-12 using a local watershed as the living laboratory for making science directly applicable and relevant to student's lives. Twelve school districts in Navajo and Apache counties are working together on this project in addition to various federal, state and county agencies. One school district, Blue Ridge, has adopted this curriculum for the district.

D. A **Leadership Institute** trains educators in building their own community Adopt-A-Watershed programs. Training is also offered in GLOBE and River of Words programs.

Audience: The above programs serve the Navajo County communities. In addition the outcomes and implementation of these programs are being shared with other

communities both in and outside Arizona.

Current Status: The University of Arizona Navajo County Cooperative Extension employs one agent working in partnership with many individuals and agencies to continue the programs as described. Much of the funding for these programs depends upon grants from local, state and federal agencies.

Impacts: Community leaders are developing solutions to social, environmental and economic problems by committing their time and energy in a cooperative effort with local, state and federal agencies. Public outreach and other education programs have fostered improvements in the community's stewardship of the county's natural resources.

Lessons Learned: Grassroots efforts are very important to the success of the programs. Patience is a key virtue in evaluating progress. Intuition in seeing how different parts of the community can work together effectively is helpful.

Curriculum/supplies list: Contact Steve Campbell

PIMA COUNTY

Name of Program/ Location/ Point of Contact:

Pima County Cooperative Extension
Cynthia Flynn, County Director
4210 North Campbell Avenue
Tucson, Arizona 85719-1109
Phone: (520) 626-5161
Fax: (602) 626-5849
Email: cflynn@ag.arizona.edu

Description of Programs:

A. **Water Education Program –** Project WET (Water Education for Teachers) is an interdisciplinary, inquiry-based water education program for Arizona educators. The goal of the Arizona WET is to promote the awareness, appreciation, and knowledge of Arizona's water resources through the development and dissemination of Arizona specific, classroom-ready teaching aids. **Though the State Project WET coordinator is in Pima County, this program is a statewide program and has been implemented in all Arizona counties with the exception of Graham and Greenlee.**

Audience: Mainly classroom teachers and other educators interested in educating adults and youth. Project WET activities and teaching tools can be used to educate Kindergarten age children through adults.

Current Status: Project WET in Arizona is well-established and thriving program. Though the State Coordinator is in Pima county there are Project WET facilitators statewide. In 2000, there was a great effort made to introduce this water education program to all of the various counties of the state. This effort will be continued in the next year especially to offer workshops in Graham and Greenlee counties. Also there will be an effort made to expand the facilitator network so that more workshops can be conducted statewide.

Impacts: Arizona WET will further the development of an environmentally literate and conscientious citizenry and provide quality educational experiences for Arizona's youth. An understanding of Arizona's water resources leads to caring about, and eventually stewardship for water resources.

Lessons Learned: Have participants signup ahead of time and pay a small fee to ensure attendance.

Curriculum/Materials:

$ National Project WET K-12 Curriculum & Activity Guide
$ Conserve Water Educators Guide (Grades 6^{th} – 12^{th})
$ Arizona WET K-8 Guide with Student Activities
$ Arizona WET K-6 Nonpoint Source Water Pollution Curriculum
$ Arizona WET Grade 9-12 Curriculum On Nonpoint Source Water Pollution
$ Groundwater Flow Models - educator training and availability (up to six at a time) on a loan basis
$ EnviroScape Water Pollution Awareness Model - educator training and availability on a loan basis
$ Liquid Treasure Water History Trunks - Available on a loan basis

Contact: Kerry Schwartz at (520) 792-9591 ext. 22 or email: kschwart@ag.arizona.edu

B. Low 4 Program: The Low 4 Program promotes attractive landscaping with water conservation. Watersmart workshops help the homeowner, whether they are going to hire an installation crew, do the install themselves, or have an existing system that needs maintenance or upgrades.

Audience: Residents of the city or county.

Current Status: This program will continue to be offered in the coming years.

Impacts: This program has the goal of promoting water conservation and reducing water consumption in urban landscapes.

Lessons Learned: Go to your audience don't expect them to come to your one workshop location.

Curriculum/Materials/supply list: Contact: Patsy Waterfall (520) 622-7701 or patwater@ag.arizona.edu.

C. **Smartscapes Program:** The main objective of the Smartscapes Program is to teach individuals how to create and maintain beautiful low-water use low maintenance landscapes that are compatible with the climate of the Sonoran Desert.

Audience: Individuals in the landscape and nursery related professions. The workshops are geared toward entry level and beginning landscape maintenance personnel, however many "experienced professionals" also attend. This program is also valuable for property managers, homeowner association board members, and landscape chairpersons. The program is offered in Tucson and Phoenix.

Current Status: Each series consists of nine workshops taught by professionals from a variety of landscape specialties. The workshops are held twice a week for five weeks. This program will continue in the years to come.

Impacts: Increased knowledge of landscapes and plants compatible with the Sonoran Desert. This program has the secondary goal of promoting water conservation and reducing water consumption in urban landscapes.

Curriculum/Materials/supply list: Contact: Patsy Waterfall (520) 622-7701 or patwater@ag.arizona.edu.

D. **Urban Horticulture:** Landscape Water Conservation/Xeriscaping – Ten programs were presented to urban clientele, four programs presented to commercial clientele at Low 4 Water Conservation programs. Five newspaper columns focusing on water conservation were authored and published in the Arizona Daily Star. Low volume irrigation and water harvesting practices were demonstrated in the gardens at the Pima County Extension Center.

Audience: 417 urban adults and 103 commercial clientele

Current Status: These programs are well established and will be conducted in the years to come as well.

Impacts: Out of 66 surveys returned, 50 (75%) indicated that as a result of their participation in Extension programs they will adopt one or more water conservation practices. These practices included: watering on an as-needed basis, watering desert adapted plants only during establishment, watering to the effective rooting depth using a soil probe to adjust irrigation applications, and increasing irrigation efficiency by matching drip emitters and adding emitters as plants grow.

Lessons Learned: To increase survey returns, get attendees to commit to filling out a follow-up survey.

Contact: John Begeman (520) 626-5161 or email jbegeman@ag.arizona.edu.

F. Arizona Certified Nursery Professional: A fifteen credit course educating professionals in the field of commercial horticulture covering everything from turf grass to low water use plants to citrus trees. These professionals in turn educate the public on their home landscaping needs.

Audience: Professionals at nurseries and garden stores across the state.

Current Status: Successful first course. Second course offered in the Spring.

Impacts: This program focuses on educating those that deal with the public on all aspects of horticulture including advocating native and/or low water use plants.

Lessons Learned: Subsequent to the first course it was recognized that more time was required to cover the field of botany extending the class from 4 to 5 weeks in length.

Curriculum/supplies list: Contact Cynthia Flynn

Contact: Jack Kelly (520) 626-5161 or email jackelly@ag.arizona.edu.

PINAL COUNTY

Name of Program/Location/Point of Contact:

Pinal County Cooperative Extension
Rick Gibson, County Director
820 E. Cottonwood Lane, Bldg. C
Casa Grande, AZ 85222-2726
(520) 836-5221
Fax: (520) 836-1750
e-mail: gibsonrd@ag.arizona.edu

Cooperative Extension in Pinal County focuses on non-formal educational programs in Family and Consumer Sciences, 4-H Youth Development and Agriculture and Natural Resources. Though no formal water resources education programs exist in Pinal County, water conservation and protection is often interwoven into educational programs in each area. As population growth in Pinal County, which is just now beginning in earnest, causes finite water resources to become more strained, public water education programs will increase in importance.

In irrigated agriculture, various research and outreach activities have developed and presented to clientele information about the timing and frequency of irrigations. In an area where every drop of water counts for maintaining a sustainable living environment, efficient use of irrigation water is a critical management tool for agricultural producers. Research-based recommendations for timing irrigations allows producers to comfortably

delay the next irrigation until conditions actually warrant the application. Over the course of a growing season, the number of irrigations and subsequently, the total amount of water applied, is reduced.

Project CENTRL, a rural leadership program conducted by Cooperative Extension, focuses major sections of its two year curriculum cycle on water issues, including water conservation. Graduates of this program often find themselves after graduation working on rural issues where an understanding of water issues is important.

Family and Consumer Science and 4-H Youth Development faculty often employ water issues, including conservation, in curricula presented to audiences of all ages. These audiences can have a major impact in effecting the conservation of water resources at home.

SANTA CRUZ COUNTY

Name of Program/Location/Point of Contact:

Santa Cruz County Cooperative Extension
Dean Fish, County Director
2150 N. Congress Dr., #106
Nogales, AZ 85621
(520) 761-7849
e-mail: dfish@ag.arizona.edu

At this time there are no programs focusing on water resources education. County Director Dean Fish sees a definite need for programs that focus on Youth Development (K-8) and their understanding of water issues in Santa Cruz County. He sees a need for studies in the following areas:

- water quantity (currently the Friends of the Santa Cruz River monitors river flows),
- how to feed and water available cattle,
- how water tanks work and their value in water management,
- development of an International Waste Water Treatment Plant,
- water quality for residential and environmental uses, and
- water conservation and pollution.

Other ideas include:

- High school students taught to mentor their classmates and the community in Water Conservation and Natural Resource Preservation.
- A Low Water Use Demonstration Garden located at the County Complex.
- There are at least ten elementary schools, three middle schools and three high schools in Santa Cruz County that could benefit from a Youth Development

Program.

YAVAPAI COUNTY

Name of Program/Location/Point of Contact:

Yavapai County Cooperative Extension
Jeff Schalau, County Director
P.O. Box 388
Yavapai, Arizona 86302-0388
(520) 445-6590
email: jschalau@ag.arizona.edu

Description of Programs:

A. On-Site Advisor/Speaker: To provide accurate, research-based information to local and regional community groups:

Advisory

Verde Watershed Association
Education Outreach Committee (10X-advisory)
General Membership Meeting (10X-advisory, outreach, and Septic System Presentation)
Natural Resources Committee (4X-advisory)
Yavapai County Water Advisory Committee (3X- advisory)
Northern Arizona Math and Science Consortium (11X-advisory)
Glassford Hill Preservation Committee (8X advisory committee Member) and GH Natural Resources Committee (ad hoc)
Cornville Flood Control Re-Hab Project (on-going)
UA Water Resources Advisory Group / Conference
UA Riparian Advisory Group (on-going)
Peking World Village -USDA (filming facilitator/ contributor)

Presenter

Arizona Small Utilities Association (2X)
Water Conservation / Decision-making Presentation - Laughlin
Water Conservation/ Decision-making Presentation - Prescott
Verde River Watershed Train Trip (2X - 200, Trip Guide)
National Outreach Conference Presenter (Well Testing Presentation)
Lower Verde River-SRP Watershed Advisory (Outreach Presentation)
VWA Outreach & Septic System Workshops

Audience: Adult Community, Educators, Municipal leadership and technical support.

Current Status: Presentations and participation on demand/call. VWA and NAMSC meetings are monthly and ongoing advisory commitments

Impacts: Presentations are usually evaluated by requesting group. Feed-back is usually readily available. An Evaluation Sheet is used if other feed back is not available.

Lessons Learned: Very time consuming. No assurance of number of participants you will reach. Serving on committees or presence in public meetings is not subject to formal evaluation and is politically risky if you say what needs to be said, not what they want to hear.

Materials / Supplies:

- Overlays for Water Conservation / Decision-making.
- Physical Props, maps, images, photos and A/V Equipment required for visual presentations.
- Outreach Collection available upon request (6" thick notebook of outreach materials.

B. Water / Natural Resource Information: Provide "hard copy" fact sheets for use by the general public for a better understanding of water resources and issues.

Audience: General public and reference

Current Status: On-going review, upgrading and preparation of current documents

Impacts: No formal assessment. Direct feed-back is consistently complementary of materials provided. All materials are subject to peer-review prior to distribution.

Lessons Learned: Few if any publications are "etched-in-granite". Although all contain information that maintains long-term validity, there is a multitude of newer (some debatable better) and more current/relevant from Internet sources. Cost of producing great-looking periodicals and fact sheets is questionable. Template and laser printing may be a way to centralize and keep information current.

Materials / Supplies: See Attachments for more commonly requested samples.

C. Classroom / Public Presentations: To provide on-site visitations with a real person providing credible water resource information to students, regardless of age and ethnicity.

Classroom

Montessori School (2X -86)	Chino Valley (28)
Del Rio Elementary (62)	Heritage M.S. (500)
East Valley Elementary (76)	Abia Judd Elementary
Mountain View Elementary(400)	Camp Gan Israel (42)
Bradshaw Mountain HS(28)	Camp Verde HS

Mayer Elementary(38) Melchizedek (18-Private)
Bradshaw Mountain Open House(800)

Field Clear Creek (2X -24)
V Bar V Field Trip / Open House (200)
Beaver Creek Field Day (60)
Watson Lake CampOut (24)

College Yavapai College Field Trip(16)

Community Verde River Days(2000+) Young's Farm Garlic Festival(500+)
Mayer Kiwanis (14) KCAY-AM (2X)
Earth Day - Cottonwood (240) Prescott Courier
Farmer's Market(250) Prescott Valley Courier
Expo,2000 (150) Chino Valley Flyer
Prescott AMA Open House (150)

Audience: Students K -12, Adults

Current Status: Occasional and dependent on teacher requests for classroom demonstrations and presentations. Newsworthy articles and interviews dependent on solicitation by media or per public service announcements.

Impacts: Classroom Presentations evaluated by direct teacher debriefings and/or Cooperative Extension evaluation form. UA -Ground water Model Use Form completed with appropriate audience age and demographics. Based on direct requests and media involvement with activities /programs regarding water issues generate significant public interest. Requests for materials increase as result of presentations.

Lessons Learned: Direct, personal contact is probably one of best vehicles for providing positive image of UA services. Supplementing presentations with handouts hands-on activities, direct involvement and active participation re-enforce learning experience

Materials / Supplies:

Groundwater Model and Kit Contents
Septic System Model
Watershed Model
Water Test Kits (Hach, LaMotte, Pur-Test Strips, pHydrion)
Clear Glass/Plastic Bottles
USGS Images, Topographies, Photo's, Slides
Worksheets, White Boards,
Water-soluble / Permanent Markers, Visa-Visa's
White Paper (Reams)
Props (Self designed &As Needed / Appropriate)
Arizona Reference Materials/Visuals/Maps

Project ties“WET” Curriculum Activities
Field collection equipment (hand lens, clipboards pans, etc.
HISTORY TRUNK - UA-WRRC Materials

D. Developing Curricula and Projects: To assist teachers in integrating water resources and related issues into curriculum (Create-A-Watershed Activity Sheet, Landsat Visual, Science Fair, 2000 Projects/Themes).

Audience: Professional Educators, K-12 Students

Current Status: An on-request service, provided as needed (relatively unused service). AIM curriculum has pretty well defined content**.** Services currently used by schools/staff at Chino Valley, Prescott Valley, Excell Schools, Cottonwood, Sedona Elementary, Bradshaw Mt. HS, Yavapai College adjunct faculty.

Impacts: No evaluation and/or feed-back available regarding effectiveness of assistance as of this date.

Lessons Learned: Teachers appear to be pretty swamped by demands of implementing curriculum. Most elementary teachers are *very uncomfortable* doing WR activities and/or using equipment without training. All teachers appear to need to go through the use of GW and Septic Model activities at least once prior to working with students to increase working knowledge of terms and technical vocabulary. No teachers were comfortable with just being handed materials or models without some in-service preparation. Real need to provide in-service in “basic scientific methods” and creative learning. Most teachers in K-13 are not well prepared to provide unassisted water resource elements integrated into current curriculum.

Environmental education (the term/concept) is suspect in many educational settings/ schools (with names like: ”treehuggers”, ”Bambi’s”, “warm and fuzzies” and ”environmentalist” surfacing) by both teachers and administrators. AIMS Compliance is a major concern and priority and a factor which precludes implementation of water resource curriculum. I market it to teachers as an enhancement...not a replacement or additional. Actually can reduce work and delivery.

Materials / Supplies:

- Project “WET” Resource Book, Internet information (modified)
- Basic laboratory equipment found in elementary/high schools.
- Common household glassware materials (in lieu of lab “stuff”).

Note: 40 years of professional / educational experience helps.

E. Ground Water Model: To provide an effective way to communicate hydrological properties and concepts of groundwater. Excellent teaching tool to demonstrate hydrological problems and issues such as water mining, nonpoint source pollution, water table/ aquifer dynamics.

Audience: Students K-12, College, Educators, Adults

Current Status: Very popular and in almost constant use. Only used 3X by three independent, non-assisted, teachers. **Regularly used in nearly all water resource activities**. Serves well as a key piece or secondary role to support other activities.

Impacts: By far, one of the most popular and effective devices used in working with water resource concepts. Kids, teachers and adults "love' it! Everybody can't wait to squeeze a dye bottle or run the pump. "Please bring the ground water model" regardless of the presentation by repeat users. Rated high on Coop Evaluation form ...frequently. **Never leave home (the office) without it.**

Lessons Learned: Use of the Ground Water Model really requires in-service and a lot of experimenting on the part of the teacher-presenter. Experience and creativity really enhance the effectiveness of the student experience. Cleaning/flushing requires time. There is a need to air-fracture the models sand from time to time. Paper clip or fine needle-probe useful to open up holes in lake and pond elements. Don't use too much food coloring. Five drops to 2/3 squeeze bottle very good. Clean/wax outside surface with Lemon-Pledge to reduce scratch marks. **NEVER** use permanent markers. Use water-soluble overhead markers. Visa-visa OH markers are preferred.

Materials/Supplies: Self contained as equipped. Food coloring is the only expendable item and is readily available in markets.

F. Septic System Owners Guide, Models and Information: To provide septic system owners with current, useful and appropriate information to successfully operate, understand, maintain and service privately owned septic systems.

Audience: Private Septic Owners of Yavapai County (50,000 licensed systems)

Current Status: Very successful and on going offering through our office. Over 600 units have been distributed since it was introduced in1999. 600 more are currently available.

Impacts: Currently there is high interest in septic systems in the county (over 50,000 licensed septic system) as a source of non-point source pollution. Nitrate elevation trends in six areas of the county support need to educate septic system operations.

Enhanced cooperative efforts with Environmental Services

Lessons Learned: As a cost recovery item (Currently $3.00 +S&H), this was an excellent buy. Three dollars worth of information could save an owner thousands of dollars in repairs and replacement. The guide/packet organizes of septic system information well. As the current document/packet evolved, redundancy was reduced.

New, most-recent version is very AZ centered and is reasonably close to local requirements/needs. Users may want to check specs with local Yavapai County Environmental Services.

Materials / Supplies:

- Packets containing current and old documents plus CE Disclaimer are available.
- Use of WA produced Septic System A/V packet (1X) and currently being modified and adapted to AZ (Kitt Farrell-Poe)
- Supplemented with Internet resource and private sector information

G. "Almost Free" Well Water Testing: Private well water testing is provided during National Drinking Water Week as a community service. This service increases the knowledge and awareness of private well water owners and shifts the responsibility of annual water testing to owners. Arizona law places sole responsibility on owners.

Audience: Private Well Owners (20,000 in Yavapai County)

Current Status: Annual public service activity for the past 4 years with the following participation record: 1997 282; 1998-126; 1999-170; 2000-403. In 2001, this program may be offered for cost recovery with or without grant.

Impacts: Has had a significant impact on county politics. Identified 6 county areas with increasing nitrate trends. Identified a number of contaminated wells and CE has assisted owners in dealing with problem or procuring safe water source. Increased communications with local governmental agencies and personnel. Survey (attached) in 2000 provides positive insight and confidence in program. There has been considerable media involvement in this project. Encouraged well owners to take pro-active role in monitoring well water qualities and quantities. Has contributed to considerable dialogue between CE and citizens.

Lessons Learned: Logistically, a very time consuming and demanding activity. Great public relations for Extension Office and enhancing public contact/communications. Local real estate and some public officials dislike program (i.e. increased owner/buyer knowledge in real estate transactions, increased public participation in local water issues). Identified Internet kit providers. This year's program was labor intensive due to increased number of parameters and survey data.

Materials / Supplies:
Collection Bottles
"Shirt Pocket" Test Kit
Forms! Forms! Forms!
Telephone(s) Person
Computer for handling data

H. Master Watershed Stewardship Program: To develop a local/regional, volunteer,

citizen-component of water resource "experts" to assist CE in providing accurate insight, distributing information and increasing local public involvement and dealing with water resource issues. (Similar to Master Gardeners Program)

Audience: General public / adult volunteers

Current Status: Currently in planning and development stage. Implementation to be delivered in 2001. An 8-10 week training for 15-20 volunteers is envisioned. Advisory Committee members are being selected as of this date. Reviewing, researching, prioritizing appropriate curricula content.

Impacts: Currently unknown. Eighty-four people have expressed interest in participation.

Lessons Learned: People, in general, appear to be very cautious/time-protective, regarding volunteer programs.

Supplies / Materials: Curricula to be developed using materials developed internally and based upon nationally-established, proven environmental / water resource education material/curricula using Natural Resource Wonders Curricula as primary and including supportive curricula (e.g. Project WET, Project Wild, Project Learning Tree, etc.)

I. Water Conservation: To provide a 45 minute Visual / Narrative Program advocating Water Conservation methods, justification issues and decision-making processes.

Audience: Adult Groups

Current Status: Currently in B/W overhead format. Conversion to PowerPoint in process.

Impacts: Presented 2X at Arizona Small Utilities Conferences in Laughlin, NV and Prescott, AZ. Above average to excellent reviews by sponsoring group surveys.

Lessons Learned: Overhead presentations more effective and greatly enhanced with manipulatives, audience participation and on-going dialogue.

Materials / Supplies:

- Creative overhead pointers, laser pointer
- WET Water Resource Stick/ Water Resources Demo Activity

J. Water Resources Newsletters: To communicate current water resource issues, tips, events, local activities, resources, information and develop a local network of "getting the water resource word out."

Audience: General Public, Educators, especially as a follow-up device for those

participating in water resource programs, inquiries, and word of mouth requests to be included. Widely distributed to UA faculty, staff, county educators, state and federal agency personnel. Some out of state mailings.

Current Status: Currently distributing 1005 newsletters bimonthly.

Impacts: Lots of feed-back in form of phone calls, interview requests, radio interviews and local newspapers, using newsletter topics as focal points for feature articles. Mailing was "pruned" to 650 in mid-2000 and is back up to just over 1000 due to requested participation in mailings.

Lessons Learned: Costly in time to write, proof, print and mail (reason why it is now bimonthly). Logistically demanding to prepare for bulk-mailing (office secretarial work load) Color was cost prohibitive [B&W was $0.34+ /copy including printing & postage. Newsletter was a monthly document in1999]..

Materials / Supplies: Year 2000 published newsletters attached.

K. Office, Phone Contacts, E-mail: To provide opportunities for client inquiries, questions, resource information and assistance at a local, state and regional level.

Audience: General public access at all age levels.

Current Status: Phone Inquiries regarding water resource information currently run at 10 -15 calls per week (Estimate 600+ phone inquiries/year excluding well water testing calls) Written Inquiries via common mail are infrequent. E-Mail Inquiries are seldom more that 2-3 per month. Direct Office Contacts (excluding WW testing program) 8-10 per week.

Impacts: Critical element for providing CE services, participation in public and municipal meetings/events. Contacts often lead to referral to other program elements of CE services.

Lessons Learned: Loss of answering/voice mail services have resulted in a decrease in client requests. Quick response is crucial on all communications.

Materials / Supplies:
Yavapai CE has Website which is advertised in Newsletter and UA website.

K. Project "WET" Workshops: To provide and deliver national Project WET (Water Education for Teachers) curriculum training to local educators

Audience: Public, charter and private school educators

Current Status: Eight workshops were planned and scheduled. Only one Project WET Workshop materialized (July / Dead Horse Ranch State Park on the Verde River) with

21 participants. This was a program organized by WRRC and State Park personnel.

Our Cooperative Extension requirement to financially justify the workshops is 15 participants minimum. The largest interest number was 7.... most were 3-5.

Impacts: Little feedback is provided to our office regarding current use and/or integration of Project WET materials in current curriculum. Members of Northern Arizona Math Science Consortia (NCAMSC) have indicated that "environmental education" is of a low priority if provided by most county school districts. Some individual teachers have "pet" topics that seldom include water as a priority. Only one school has had continuing water resource curricula elements.

Lessons Learned: Project WET doesn't offer academic credit only CEU credits through school districts. State certification demands such so teachers chose alternatives. Most teachers I have talked with take selected elements and activities to enhance science curriculum.

Materials / Supplies: Materials as required recommended by Project WET curricula and Arizona focused/ supportive materials.

L. Field Trip Facilitation: To provide opportunities for field experience and activities which complement Water resource activities or Yavapai County - UA- Cooperative Extension.

Beaver Creek Field Day (60 MS Students)
Watson Lake CampOut (24 HS Students)
Granite Basin Watershed Field Trip (90 MS students)
Clear Creek Field Trip (2X - 28 At-Risk MS Students)
Verde River Rail Road Field Trip (2X -Political VIPs, Local Adults)
Peking Global Village - USDA Filming of Bar Heart Ranch and Young's Farm (Sustained Agriculture Practices)

Audience: Students, Adults, VIP's

Status: Each activity is self-standing and dependent on funding provided by school district, U A Water Resources Program, Verde NRCD. CE of Yavapai County facilitated program and implementation for requesting groups. CE received very positive commendations as a result of our efforts.

Lessons Learned: A lot of work! Great satisfaction and rewards!

Materials / Supplies: Provided by requesting group. Supported by in-house resources of Yavapai CE Program.

FOR MORE INFORMATION SEE ATTACHMENTS FOR YAVAPAI COUNTY.

YUMA COUNTY

Name of Program/Location/Point of Contact:

Yuma County Cooperative Extension
Barry Bequette, County Director
2200 W. 28th Street, Suite 102
Yuma, Arizona 85364-6928
(520) 726-3904
email: shelton@ag.arizona.edu

At this time there are no programs focusing specifically on water resources education.

Description of Programs:
Desert Landscaping Kiosks: Kiosks are touch screen CD ROM on desert landscaping developed by the Water Resources Research Center. The CD-ROM has full information on 600 low water use plants. The multimedia database includes plant size and growth rate, soil and sun requirements, irrigation needs, place of origin, wildlife interactions and dozens of other useful factors. There is one stationary and one mobile model in Yuma County.

Audience: Adults interested in native plants and/or low water use plants for landscaping.

Impacts: These kiosks encourage the use of native low water use plants thus reducing water consumption.

WATERSHED GROUPS

In recent years a number of watershed groups have been formed in rural portions of Arizona with help and facilitation in start-up from the Arizona Department of Water Resources and/or the Arizona Department of Environmental Quality. They have usually been a result of water-related issues and the need to develop programs to address issues.

Purpose and description: A typical mission statement of one of the watershed groups is: "*This group is founded on the principle that wise and sustainable use of water resources is best accomplished by a voluntary association of members of the watershed communities, working together to understand both the watershed and each other. Such understanding will be the basis for resolving conflicts and promoting cooperative use of the water resources.*"

Participants include interested private citizens, interest and user groups, businesses,

and representatives of local, state, and federal agencies having water and watershed responsibilities in the area. An outreach effort is used to identify issues that are important to stakeholders; then an approach is developed to address these issues. Often this requires obtaining additional scientific data on water and watershed resources. Recently, the Arizona Rural Watershed Initiatives program has been providing some funds for these scientific studies. The eventual goal is development of water management plans by local interests who will be affected by the plans.

Outreach includes providing general water resource information, as well as up to date information on specific issues that currently exist or which are expected to develop with projected growth. A variety of methods have been used, including public open houses, workshops, seminars, exhibits at fairs or other public events, presentations to interest or civic groups, newspaper articles, radio and TV spots or interviews, watershed group newsletters, web sites, etc.

Audience: In addition to the general public, it is important that elected officials receive the information, e.g., city councils, boards of supervisors, local legislators. Some information is provided through schools; however, the primary efforts are usually at the general (adult) public and decision-makers. There are currently 15 watershed groups covering most of the rural portions of the state. Their age varies from 7-8 years or more to some just formed. Outreach has been more detailed and comprehensive in those with a longer tenure.

Impacts: Outreach through the watershed groups has been successful in reaching the state legislature and obtaining funding for scientific studies. For example in FY 2001, an off-budget year (the Arizona legislature appropriates two-year budgets), out of only $6 million available for all discretionary activities by state agencies (and more than $100 million in agency requests) the legislature appropriated $500 thousand for the Rural Watershed Initiative. Outreach in educating the general public and obtaining participation has had variable success. In areas of the more active and longer tenured watershed groups the general public understanding of water resources and issues has been enhanced and citizens commonly discuss the water situation with their local officials and each other.

Funding: Outreach and education programs are funded in a variety of ways. In several of the longer tenured groups external funding has been used to supplement local contributions or revenues generated from memberships. Considerable volunteer labor has commonly been a part of the effort.

Lessons learned: A coordinated and combined effort from the watershed groups working together can be effective in educating elected officials, even though more than 80 percent of the state's population and legislators are from urban areas. Most members of the general public are quite busy and prefer methods of communication, which allow them to access it from home and at their convenience. Newsletters, newspaper articles, and web sites seem to reach many more people than public meetings or displays.

Specific information is provided for two of the longer tenured groups.

A. Upper San Pedro Partnership: the Upper San Pedro Partnership was formed so that local citizens, groups, and government agencies could work together to develop and implement a San Pedro Conservation Plan. Maintaining the San Pedro as a free flowing river while increasing growth in the basin expands the use of ground water is a primary issue. The partnership organization includes an outreach committee, which develops and implements the outreach plan. Newspaper articles, public information sessions, etc. have been used. Currently an aggressive effort is scheduled for the next six-month period. It includes development of tri-fold informational brochures, preparation of an annual report for distribution to the public and media, condensation of the annual report into a newspaper insert, followed by a series of public workshops throughout the watershed.

Audience: general public and decision-makers. Want to inform those interested in and affected by water resource decisions so that they can participate if they choose.

Impacts: outreach efforts to elected officials have resulted in Congressman Jim Kolbe obtaining federal funding for both study and implementation portions of the effort. Although there is not a uniform agreement on solutions, there is an enhanced public awareness of water resource issues.

Lessons learned: the Upper San Pedro group reported on a recent public survey to determine preference for means of receiving information. The survey found web sites to be the most favored with newspapers second, radio and TV intermediate, and travel to a location to view exhibits or hear presentations being the least favored. Having implementation of some specific implementation projects approved or underway helps to maintain public interest and participation in the effort.

B. Verde Watershed Association: through its Education and Outreach Committee the Verde Watershed Association (VWA) provides education on water and watershed resources and issues in the Verde watershed. For the last several years this has included a monthly newsletter which includes brief “capsules” of water news, reports of VWA activities and “white papers” providing more in-depth coverage of selected issues or water topics. In addition there is a web site with linkage to a number of other water resource sites. The VWA has also worked to further public education by facilitating and hosting public meetings on several water issues, including presentations on TMDL studies (Total Maximum Daily Load) by ADEQ, and Southwestern willow flycatcher critical habitat under the Endangered Species Act with the U. S. Fish & Wildlife Service.

Officers of the VWA have given presentations on water resources and issues to a wide variety of groups in the area. In one six month period the chairman and vice-chairmen gave presentations to audiences totaling more than 2,000 people. Meetings of the VWA are held monthly in locations throughout the watershed from Prescott to the Verde

Valley to Pine. Educational presentations on water topics are usually a part of these meetings. The Natural Resource Committee also holds monthly meetings across the watershed and addresses technical water items. These meetings are also open to the public with some general public attendance, depending on the particular subject and meeting location.

Audience: the general public and, most especially, those interested in and/or affected by water resource activities and decisions. With the help of outside funding, the mailing list for the monthly newsletter grew to about 4,000. Currently, with that funding gone, the mailing list of paid members has been sharply reduced.

Impacts: favorable verbal and written responses to monthly newsletter. Public interest in water issues has led to Yavapai County formation of a Water Advisory Committee, representing local governments and Indian Tribes, with an associated Technical Advisory Committee. Several members of the leadership of VWA were appointed to the Technical Advisory Committee.

Funding: For several years, funding of the newsletter came from a grant with the Bureau of Reclamation. Currently, funds are derived through paid memberships from individuals, businesses, and governmental agencies. VWA has attained nonprofit status through the IRS and can receive grants and tax-deductible donations.

Lessons learned: Most members of the general public are more likely to attend public meetings and actively participate if they feel threatened in some way and feel a need to mobilize. If they believe that someone is adequately representing their interests, they are less likely to take the effort to come to meetings. Convenience is important in terms of receiving information. The newsletter has been widely read and the web site used frequently. However, only a small fraction of the individuals who receive information in this manner attend public meetings or presentations.

Web site: http://vwa.southwest-water.org

ATTACHMENTS

COCONINO

Containing 18,600 square miles, Coconino County is the largest county in Arizona and the second largest in the United States. However, surface water is very limited, except for the most well known, the Colorado River through Grand Canyon. Glen Canyon Dam and a small portion of its impounded Lake Powell are located upstream, just within the Arizona boundary. With a 1995 population of 108,000 the county is very sparsely populated. Indian reservations comprise 37 percent of the land, and are home to Navajo, Hopi, Paiute, Havasupai, and Hualapai tribes. The U.S. Forest Service and Bureau of Land Management manage 32 percent of the land, the state of Arizona owns

10 percent; other public lands comprise 7 percent; and the remaining 14 percent is privately owned. General information can found at http://co.coconino.az.us.

Flagstaff, with a population of about 60,000, is the trade and population center of the county and the location of the majority of the water resource education efforts. Within this area, a number of organizations provide some form of environmental education. Coconino County boasts landmark studies in both geology and biology and has a wide variety of cultural and historic resources. The Grand Canyon has long been a premier showplace for field geology and is commonly used in textbook illustrations. Sunset Crater, SP Crater and other features of the San Francisco Peaks volcanic field are also well known and widely studied. In the field of biology, pioneer ecologist C. Hart Merriam used the San Francisco Peaks as an example in his writings on life zones. Prehistoric inhabitants' use of the area was dominated by the presence (or absence) of water and nearly every museum or park exhibit related to these cultures emphasizes the role of water resources and how the cultures adapted to water in their environment. One of the prehistoric cultures has been named Sinagua, which is Spanish for "without water". The most recent high school in Flagstaff is named after this culture.

Because of its limited supply and critical importance, information and education relating to water is included in a very wide variety of programs and activities. Water resource education is a portion of many of the general environmental education programs, with varying degrees of detail and emphasis. Providers include educational institutions, government agencies, and nonprofit institutions. For the area encompassing Flagstaff and environs there is a mechanism for coordination – the Resource Education Network of Northern Arizona -- which meets monthly for information sharing and which has recently published a Resource Booklet (directory). This booklet has greatly helped to facilitate knowledge of other programs and led to referrals and coordinated efforts. The majority of its participants are from Coconino County. The Resource Education Network's mission "is to promote and encourage communication and cooperation among individuals, organizations, and agencies to improve and expand resource education in Northern Arizona."

Information is summarized for the county and then specifically for a few of the major providers.

Purpose and Description – Providing a broad general education on water including the water cycle, the ecological role of aquatic and riparian systems, the development and use of water by humans, and the importance of water conservation. Coordination and partnerships, helped and facilitated by the Resource Education Network, result in consistent and compatible messages – especially in the Flagstaff area.

The school systems are the primary outlets for water resource education – primarily through the science curriculum, but with some associated information from social studies such as of geography, history and anthropology. Besides the regular teaching staff there are a number of supporting resources, both direct for guest teaching and field trips, and indirect through teacher workshops and physical/teaching resources to aid in

education. Private nonprofit groups such as the Resource Center for Environmental Education and the Arboretum at Flagstaff offer a variety of support. Government agencies provide a variety of direct and indirect efforts. A notable example is the Field Science Partnership which the National Park Service at Glen Canyon National Recreation Area has with the Page Unified School District and several other participants. The Environmental Education Outreach Program of Northern Arizona University provides resources to facilitate programs for Native American students. A number of agencies participate in broad environmental education efforts, with specific water resource education efforts on a demand or request basis from staff specialists.

The City of Flagstaff operates a continuing and wide-ranging education program in water conservation. The City of Williams provides some water conservation education directly with its customers.

There is a considerable amount of water resource education which is a part of, or incidental to, ecotourism, especially in the Colorado River corridor in Grand Canyon National Park and the Glen Canyon National Recreation Area. Visitor Center exhibits, ranger interpretive talks, interpretation by commercial guides and outfitters – e.g., raft companies, backpacking tours, etc. – all contain some portion of water resource education relevant to the particular area being visited. Though less visible and dramatic, parks and museums in the Flagstaff area also contain a water component.

Audience – Programs target all ages; however, the greatest effort is students, especially in elementary school. Some specialized programs address high school students. The general population is a target audience for water conservation programs.

Impacts – It is difficult to quantify impacts. However, educators contacted reported having positive feedback. The few quantified evaluations of programs reported better than 90 percent approval. The City of Flagstaff's overall water conservation program, of which education is one component, has resulted in per capita water consumption declining significantly. The Flagstaff School program of Project Life has such public support that when budget shortfalls threatened to eliminate it, the public rallied and through fund raising and direct donations kept it in operation until school district finances improved. However, this success has led the school district to phase it into an off-budget item so that all funding must come from outside sources.

Funding – Program funding is variable and often unsure, resulting in a significant portion of environmental educators' time being spent in fund raising. The most secure is the water conservation program of the City of Flagstaff where the program is a part of the budget derived from user fees. Outside sources of funding include: in-lieu state income tax donations (the Arizona program allows up to $200 of state income tax obligation to be donated to educational or charitable institutions in lieu of being paid to the state); funds from the Arizona environmental license plate fund; and the state Heritage Fund from lottery revenues. Outside grants are used heavily, however, oftentimes they are just for start up and other funds must be found to continue a program. A consistent message from educators was that greater stability in funding is

needed.

Lessons Learned - It is important to teach the basics about water – the water cycle, the significance of riparian and aquatic ecosystems, human use of water and water conservation needs. The programs need to be consistent and continuous with information integrated into all relevant education activities. Effective communication, coordination and development of partnerships are key to implementation.

Individual Programs – Information on some of the primary individual programs is presented in detail. Following that is a list of some of the programs which provide water resource education but for which it is a lesser emphasis. This list is not a totally comprehensive list as there are others responsible for some aspect of water resource education. For example, regulatory agencies such as the Coconino County Health Department provides information on waterborne diseases and prevention, and the Arizona Department of Environmental Quality provides specific information on on-site wastewater treatment systems and general water quality information. Water conservation information is also provided to customers by local water companies.

Flagstaff Unified School District

Water resource education is integrated into the basic curriculum, specifically as a part of science classes and social studies – geography and history. Specific projects emphasizing components of water resources may be included in school science fairs, the Envirothon, and specific class presentations and field trips.

Interests and backgrounds of individual teachers may result in additional specific water education. For example, an Advanced Placement Biology class at Sinagua High School took on a project of studying water quality at Fossil Creek.

Other Water Resource Education Providers

Federal Government

National Park Service

Grand Canyon National Park – exhibits, interpretation by concessionaires conducting commercial raft trips, ranger talks
Web site: www.nps.gov/grca/education

Sunset Crater, Walnut Canyon, Wupatki National Monuments – exhibits, interpretive specialists. Water resources in relation to prehistoric cultures at Walnut Canyon and Wupatki National Monuments.
Web site: www.nps.gov/wupa

U.S. Geological Survey – presentations by water resource staff based on requests, exhibits and educational resources on site
Contact: Sue Priest 520 556-7148
Web site: www.flag.wr.usgs.gov

U.S. Forest Service

Coconino National Forest – cooperate with Resource Education Network (REN) activities, some water resource education resources available
Contact: Karen Malis-Clark 520 527-3600
Web site: www.fs.fed.us/r3/coconino

Kaibab National Forest – cooperate with REN activities, some resources available
Contact: Sharon Waltrip 520 635-5646
Web site: www.fs.fed.us/r3/kai

Rocky Mountain Research Station – cooperate with REN activities. Have recently constructed a 100 meter long artificial stream for research purposes. Will be incorporating some water resource education efforts with selected student groups.
Contact: Brenda Strohmeyer 520 526-2160
Web site: www.rmrs.nau.edu/lab

State Government

Arizona Game & Fish Department – cooperate with REN activities, educator workshops in Aquatic Wild, some riparian and aquatic ecosystem resources available
Contact: Bill Watt 520 774-5045
Web site: www.azgfd.com

Non-governmental Nonprofit and Private Organizations

The Arboretum at Flagstaff – cooperate with REN activities, Arboretum site includes a pond and school tours with a wetland habitat module for 3rd grade students.
Contact: Steve Yoder or Nancy Nahstoll 520 774-1442
Web site: www.thearb.org

Grand Canyon Field Institute – guided backpack trips in Grand Canyon and short raft trips on Colorado River. Interpretation includes some water resource information.
Contact: Jan Koons 520 638-2481
Web site: www.grandcanyon.org/fieldinstitute

Museum of Northern Arizona – cooperate with REN activities. Some water resource education a part of museum exhibits and with interpretation on guided backpack trips and river raft trips.
Contact: Rachel Edelstein 520 774-5211

Web site: www.musnaz.org

GRAHAM

Water Education Field Day
May 2, 2000

Fourth grade students from Lafe Nelson Elementary School in Safford were invited to a water education field day. Approximately 240 students and their teachers attended. Each class participated in 4 activities at the Mt. Graham Golf Course and a nearby park.

The students learned where the water goes after it disappears down the drain. An employee of the local water company gave a tour of the waste water facilities at the golf course. Wastewater is pumped from the main settling ponds to treatment ponds at the golf course. There treatment is completed and the final product is used to irrigate the golf course greens.

The groundwater flow model was set up and used to demonstrate the effects of pollution on our water supply. Different colors of dye were added to the model to show the movement of "pollution". They could also see how pumping too much water can effect nearby lakes, streams and other wells. We tied these ideas into discussions about how much water we have (the same amount as when the earth began) and the age of water (as old as the earth, just recycled over and over in the water cycle).

Each student learned how important water is to life. Each was instructed to draw a picture of a person, estimate what portion of our bodies is water and color in their picture. Most were amazed to find that they were composed of 65-70% water. They were given an equation for figuring out how many pounds of water each of them is composed of. An orange was used to demonstrate how the water is contained within the cells of their body. That's why they don't hear the water sloshing when they jump up and down! They were told that most living organisms contain at least 50% water and can only go for short periods of time without water.

The students also participated in an activity designed to illustrate water movement over ground. Some were asked to act out the role of water running down a slope. Other students acted out the role of vegetation or other physical obstructions, such as rocks or fallen logs. The time taken by the "water" to move down the slope without any obstructions was compared to the time taken on a slope with vegetation and rocks. The "vegetation" was unable to move around (they were "rooted") but could reach out and tag the "water". The "water" then had to circle the "vegetation" five times before continuing down the slope. The "water" had to go around or jump over the "rocks". The students learned that barren or cleared land allows water to run off swiftly with little soaking in and allowing the soil to wash away with it. Too much erosion causes loss of soil fertility and the build up of sediments in lakes and streams, which can be harmful to

aquatic life. The addition of plants, rocks and berms can slow the water movement, allowing it to soak in, and will hold the soil in place.

Water Education - Cotton Field Days
October, 2000

In conjunction with the annual 6th grade Cotton Field Days at the Safford Agricultural Center we provided a session on water education for each group. Approximately 600 students and teachers from Graham and Greenlee Counties attended.

In each session we stressed the importance of water to all forms of life. Questions were asked to make the point. We talked about the age of water and the quantity of drinking water available to us. Because of the limited amount of water we have available and because we cannot make more, it is imperative that we take care of the water we have. We used the groundwater flow model to demonstrate how pollutants move through our groundwater and can wind up in drinking water. We talked about all the kinds of things that can pollute our water, from common chemicals around the house to animals and factories. We wound up each session with a brainstorming session on how to conserve water at home. Based on the questions asked by the students and teachers they seem to have a good grasp of the points being made and showed some good independent thinking. Students were sent home with a Water Wise Yard Audit to take home and fill out with their parents. The audit contains many useful facts and points out where water usage outside the home could be decreased.

Some of the questions posed and discussed:
How long can a human go without food?
How long can a human go without water?
How much of the water that was here when the earth began do we still have today?
Who can explain the water cycle?
How much of the water on earth is drinkable?

YAVAPAI

There has been an extensive effort to develop and implement water resources in Yavapai County. Responsibility has been assigned to a Natural / Water Resources Program Coordinator (Staff). The position began as a half-time position, eventually to three-quarters time and ultimately to a full-time position in January of 2000. The current position is filled by a professional educator, B.A., M.S. with an emphasis on environmental field biology and considerable/extensive environmental education experience in public schools. Although the water resource program coordination is primarily assigned to staff, there is a close and cooperative effort by the county agent to participate and contribute actively in elements of the programs.

Community outreach efforts focused (but not limited to) on providing water resource insight and information via:

- On-site Speakers
- Water / Natural Resource Information
- Classroom / Public Presentations and Displays
- Assistance in developing lesson plans, classroom and in-service training
- Developing curricula and projects
- Ground Water Classroom Models
- Watershed Models
- Septic System Guides, Models and Information
- “Almost Free” Well Water Testing
- Water Conservation
- Water Resource Newsletters
- Office and Phone Contacts
- Project “WET” Workshops
- Field Trip Facilitation

Each of the above categories are discussed as follows and include supportive information. If additional information may be required please feel free to contact the Yavapai Cooperative Extension office.

Yavapai Contacts: Russ Radden, Program Coordinator
Natural (Water) Resources

Jeff Schalau, County Director / ANR

NOTE: Supportive information, document copies and other reference materials used in the preparation of this evaluation are available from the UA Cooperative Extension Yavapai County or the State Project WET Coordinator - UA - WRRC, Tucson.

SUMMARY:

The year of 2000 has been both busy and challenging. Public contacts have exceeded 5ooo contacts through participation in a number of public events and providing, personal, on-site experiences for Yavapai County residents. Contacts included students, teachers, educators, municipal personnel, leaders, VIP’s and the general public.

Topics were diverse. Well water testing participation doubled and expanded to 7 parameters, “shirt-pocket” kit. Local laboratories became participants in facilitating bacterial testing for the first time in the four year programs history. Nitrate elevation trends were re-confirmed by data gathered.

Septic system guides were exhausted early in the year and a new and improve South Western version has been recently made available. Over 700 packets have been distributed in Yavapai County since being made available in 1999. A slide program was used for the first time for a public presentation at A VWA meeting in Chino Valley.

Educational efforts became more focused on Watersheds, Water Quality and Groundwater. A net of participating schools is slowly identifying the UA - CE as a valuable resource in assisting with the enhancement of their curricula.

The Water Resources Newsletter continue to and has provided over 1000 local residents with current issues and insight into water resources, water awareness and related services.

The UA-CE of Yavapai County continues to participate and contribute to local water interest and educational groups in an advisory status. One effort, the preservation of Glassford Hill State lands, currently appears to have resulted in it's protection and preservation as an extensive green belt project between the communities of Prescott and Prescott Valley.

Classroom activities and presentation have expanded throughout the Counties schools. Field trips and our first camp out are providing more access to real-world opportunities for local students to become more familiar and skilled in dealing with water issues affecting their lives.

A major effort is underway to develop a Master Watershed Stewardship program designed to identify and train local residents to provide local, leadership and accessability to water resource information and services through our area.