

*Water Trivia*

- Is it possible to drink water that was part of the dinosaur era? *Yes*
- What were the first water pipes made from in the U.S.? *Fire charred bored logs.*
- If all community water systems had to be replaced, what would be the cost? *In excess of 175 billion.*
- What does it cost to operate the water systems throughout the country annually? *Over \$3.5 billion.* <http://www.cabq.gov/water/trivia.html>

*Water Conservation*

- Water heating consumes 15 to 20% of a home's energy needs. Selection of an appropriate and efficient model can provide significant savings to a household.
- By draining a quart of water from a water heater approximately every three months, sediment buildup and related energy costs can be reduced.

[http://www.sahra.arizona.edu/programs/water\\_cons/home/utility\\_heater.htm](http://www.sahra.arizona.edu/programs/water_cons/home/utility_heater.htm)

## Large Crowd Attends VWA Mini-Seminar "The Great Drought of the 21st Century"

COTTONWOOD – Are people in the Verde watershed in the midst of a megadrought— a phenomenon that covers wide areas of the western United States over a prolonged period of time? Might a couple of wet years fool inhabitants into thinking the megadrought is over? The Verde Watershed Association presented renowned U.S. Geological Survey scientist Dr. Julio Betancourt and SRP Water Resources Operations Manager Charlie Ester to a standing-room-only crowd at their June mini-seminar.

Of late, Dr. Betancourt said he has been "on a mission to spread the word about the risks of North American drought." Dr. Betancourt said scientists better understand the El Niño/La Niña effect, when temperatures in the eastern Pacific Ocean around the equator affect U.S. weather. El Niño brings wetter weather to the southwestern U.S. La Niña heralds drier conditions. Climatologists can use the El Niño Southern Oscillation (ENSO) to predict the severity of the Southwest fire season a year in advance, Dr. Betancourt said. Scientists are also learning about Pacific Decadal Oscillation (PDO). The central and western Pacific Ocean is colder than usual when PDO is positive, and the eastern Pacific is warmer. Negative PDO causes the opposite. ENSO events last about a year. PDO events may last 20 to 30 years. Another recently learned drought phenomenon

is that temperatures in the North Atlantic influence long-term U.S. weather patterns even more than the PDO. Historic droughts in the U.S. have been associated with warmer North Atlantic temperatures, or positive Atlantic Multi-

Decadal Oscillation (AMO). Dr. Betancourt said scientists now believe that AMO causes longer-term droughts than PDO, taking 40 to 70 years for the North Atlantic ocean to cycle through to cooler temperatures. North Atlantic warming trends matched droughts of the 1930s, 1950s and 1995 to

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*"It remains to be seen whether comparable rates of growth can be sustained without renegotiating water agreements."*

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*Dr. Julio Betancourt*

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the current drought.

A research scientist with the USGS in Tucson and adjunct Professor with the University of Arizona, Dr. Betancourt uses slow (decadal) variations in Pacific and Atlantic Ocean temperatures to assess the risk of long-term droughts, their severity and duration. How does predicted global warming affect a megadrought? Should community members prepare for a change in vegetation and the hydrologic cycle? "Megadroughts reset ecosystems," Dr. Betancourt said. He indicated that the Southwest's economy experienced phenomenal growth from the 1960s to 1990s, a period that in the tree-ring record



## VWA Officers

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*John Munderloh*  
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Middle Verde  
*Greg Kornrumpf*  
Lower Verde

## Other Organizations

Yavapai County Water  
Advisory Committee:  
(WAC)

[www.co.yavapai.az.us](http://www.co.yavapai.az.us)

Citizens Water Advisory  
Group:  
[www.cwagaz.org](http://www.cwagaz.org)

Verde River Citizens  
Alliance:  
[www.verderivervrca.org](http://www.verderivervrca.org)

Cocopai Resource  
Conservation & Develop-  
ment: [www.cocopai.org](http://www.cocopai.org)

Stewards of Public Lands  
[www.verdeconnections.com](http://www.verdeconnections.com)

To submit an article, photo  
or calendar event for *the  
Verde Currents*, e-mail Edi-  
tor Diane Joens at  
[dianej@sedona.net](mailto:dianej@sedona.net) or call  
928-634-4112.

# Habitat Conservation Plans Featured at VWA September Mini-Seminar

Water is without a doubt a key ecological resource, linking humans to the environment in a complex arrangement. Keen concern has been raised by groups and individuals about the potential impacts that growth and water demands may have on the environment. Specifically, in recent years, concerns have been raised about potential impacts to the Upper Verde River from proposed pumping by Prescott area communities. The Verde Watershed Association explored ways to satisfy communities' thirst and still provide water for ecological resources at their September mini-seminar. Luella Roberts, Albuquerque U.S. Fish and Wildlife Service, described one key piece of federal legislation called the Endangered Species Act (ESA), intended to protect endangered species and their habitats. Roberts said the ESA is not designed to obstruct people from meeting their needs, but only to prevent the means to meet those needs from damaging key ecological resources. The key device that allows projects to move forward without damaging ecological resources is called a Habitat Conservation Plan.



*Luella Roberts*

Pima County's Nicole Fyffe presented an exciting documentary of how Pima County has developed a regional Habitat Conservation Plan to help protect the unique Sonoran Desert ecosystem — as well as their economy. The plan is not about whether Pima County continues to grow, it is about where the county grows. The challenge faced by citizens of the county is how to direct growth and protect the lifestyle and quality of life that makes the county a unique place to live. Work on the Sonoran Desert Conservation Plan fulfills three areas of need: a science-based conservation plan, an update of the comprehensive land use plan, and compliance with federal regulations that protection of endangered species be addressed through a multiple species conservation plan. The plan, mindful of the factual correlation between growth and the consumption of natural resources, gives high priority to preserving and protecting the most important natural resources. Growth is directed to areas with the least natural, historic and cultural resource values.



*Nicole Fyffe*

Pima County has made broad participation by many agencies, organizations and interested citizens a top priority for its conservation planning effort. Public participation included more than 400 public meetings. More than 150 scientists contributed their expertise and the award winning plan has incorporated nationally recognized peer reviews.

The Sonoran Desert Conservation Plan is implemented continuously. Principles guide future county land use decisions, where public money is spent to conserve open space, how cultural and historic resources are protected, and assists Pima County residents to continue their western lifestyle. Nicole Fyffe, Sonoran Desert Conservation Plan, Pima County Administrator's Office, 130 West Congress, 10th Floor, Tucson, AZ 85701, Ph: 520-740-8162, [www.pima.gov/sdcp](http://www.pima.gov/sdcp) Luella Roberts, Fish & Wildlife Biologist - Endangered Species Act - Section 10 US Fish and Wildlife Service, Southwest Region P.O. Box 1306 Albuquerque, NM 87103, Ph: 505-248-6654, Fax: 505-248-6788. <http://endangered.fws.gov/esb/2002/03-06/toc.html>

**"Great communities are no accident. They are born out of natural strength and beauty and have a deep respect for ecology, history, culture and diversity. They are inspired by the vision of residents drawn to them. They are brought to maturity through hard work and investment. And they survive because of compromise and consensus. In a sense they achieve balance. Such balance is at the heart of the Sonoran Desert Conservation Plan."**

**Pima County Board of Supervisors**  
<http://www.co.pima.az.us/cmo/sdcp/index.html>

## VWA and WAC Change Nov. Meeting Dates

*WAC and VWA*- Normally the Yavapai County Water Advisory Committee and the Verde Watershed Association meet the third Wednesday of the month. November meetings have been postponed to Dec. 1. WAC will meet in joint session with the Yavapai County Board of Supervisors in the BOS meeting room at 1015 Fair Street, Prescott at 9:30 a.m. WAC will hold its regular meeting at 1:30 in the afternoon, and the VWA meeting will follow, same locations. WAC: John Munderloh Ph: 928-771-3200 Email: [john.munderloh@co.yavapai.az.us](mailto:john.munderloh@co.yavapai.az.us) VWA: Loyd Barnett, Ph: 928-284-0161 Email: [lbarnett@npgcable.com](mailto:lbarnett@npgcable.com).

# Flood of 2004



Photo courtesy Yavapai County Flood Control District

The Little Chino and Big Chino subbasins meet at the normally dry Sullivan Dam near Paulden, Ariz. The Verde River headwaters begin two miles downstream.

## *Upper Verde Watershed Storm Event Presented at VWA October Meeting*

The "Upper Verde Watershed Storm Event Sept. 18, 2004" was presented by Yavapai County Development Services Director Ken Spedding during VWA's October meeting. Yavapai County Flood Control Senior Hydrologist Mark Massis and Flood Control Project Engineer Charlie Cave assisted in the development of the presentation about the unexpected flood event that began with heavy rains in the Walnut Creek area of the Upper Verde Watershed. The flood remained under 20 thousand cubic feet per second. Spedding says the event would be considered a "10 year flood event."



Photo courtesy Peter Atonna

On Sept. 18 the Walnut Creek area in the upper Big Chino subbasin received more than 7 inches of rain. The normally dry Big Chino Wash became the Big Chino River, flowing a half mile wide near the Big Chino Road in Paulden.



Photo courtesy Yavapai County Supervisor Chip Davis

Mingus Avenue Extension Bridge, under construction in Cottonwood, Ariz.

Gage	Date of Peak	Time of Peak	Peak Stage	Peak Flow
Granite Creek@ White Spar Campground	19-Sep-04	11:53 AM	0.50	4
Granite Creek@ Sundog Ranch Road	19-Sep-04	12:30 PM	2.20	356
Walnut Creek@ Williamson Vally Road	19-Sep-04	6:09 AM	8.64	7,900
Williamson Valley Wash near Paulden	19-Sep-04	02:30 PM	7.99	7,070
Verde River near Paulden	20-Sep-04	2:45 AM	13.08	18,230
Verde River@ Clarkdale	20-Sep-04	8:30 AM	12.63	15,500
Verde River@ Camp Verde	21-Sep-04	1:15 AM	12.24	10,900
Verde River below Tangle Creek	21-Sep-04	12:20 PM	14.02	10,200

# Verde Watershed Association Currents

## Highlights of the Verde River Watershed

### **Payson's Karen Probert Shares Drought Planning Techniques at VWA Meeting**

PAYSON – Payson's Water Quality Specialist Karen Probert provided an engaging presentation on drought planning resources at the July VWA meeting. The seven steps to a successful program include inventorying available resources; defining demand; identifying potential supply shortfalls; adopting measures in response to projected shortfalls; creating a mechanism to forecast event dates; developing the necessary authority, rules and procedures; and implementing a comprehensive public outreach and education program. Probert said the Payson Town Council is sometimes forced to make unpopular development decisions because of the community's water constraints. *Karen Probert, Town of Payson Water Department, 303A North Beeline Highway, Payson, AZ 85541, (928) 474-5242, Ext. 235, <http://www.ci.payson.az.us/Departments/Water/water-index.htm>*

### **Chino Valley Withdraws from Tri-cities Agreement to Purchase JWK Ranch**

CHINO VALLEY – The town of Chino Valley has decided not to pursue a tri-cities intergovernmental agreement to pump water from the Big Chino Basin. The city of Prescott and town of Prescott Valley continue to collaborate on a plan to purchase the Paulden area ranch to supplement their communities' water resources. *Bill Pupo, Town Manager, 1020 W Palomino Rd, Chino Valley, AZ 86323, Ph: 928-636-2646, Email: [bpupo@chinoaz.net](mailto:bpupo@chinoaz.net)*

### **Extension Sponsors Master Watershed Stewards**

YAVAPAI COUNTY – A better informed public and greater participation in decision-making processes are key goals of the University of Arizona Cooperative Extension's Master Watershed Steward Program in Yavapai County. The Yavapai MWS program serves as the model for the recent state-wide implementation of the Arizona MWS program which was funded in 2003 by the Arizona Department of Environmental Quality.

Participants are trained to become knowledgeable about watersheds and the water resources of Yavapai County and Arizona. Graduates are expected to donate 40 hours of volunteer community service.

Curriculum includes studies in climates and meteorology, geology and soils, mapping, Global Positioning Systems (GPS) and Geographic Informational System (GIS) applications and interpretation, hydrology, water quality and chemistry, plant and animal communities, ecology, conservation and land uses, and water law and policies. For more information about future MWS opportunities, contact the Cooperative Extension Office in Prescott or Cottonwood. *Russ Radden, Program Coordinator, Natural Resources, Ph: (928) 445-6590, Ext. 254 E-mail: [rradden@ag.arizona.edu](mailto:rradden@ag.arizona.edu)*

### **City of Cottonwood Purchases Three Water Companies Oct. 20**

The city of Cottonwood finalized the acquisition of three local private water companies Oct. 20 pricing the bonds at \$13.5 million. They sold within two hours. Water Company Acquisition Supervisor Robert B. Hardy reports that this project has taken almost five years and involves three water companies. He reports amassing 14 four inch binders of materials, plus computer system models, and thousands of emails. Hardy plans to create a presentation about the acquisition process used, things done well, things others might want to consider, bumps in the road, costs, etc.

The city of Cottonwood is preparing the engineering design RFPs with the anticipation of beating the arsenic deadline of January, 2006. Hardy believes that by completing these improvements ahead of the deadline the city will again show the benefits of municipal ownership. They have developed cost estimates for both capital and annual operating and maintenance to comply with the new standard. Cottonwood's first priorities are to meet this goal and begin a very aggressive and needed rehabilitation program on the systems. The first three years' expenditures of the program were included in the initial bond offering. *Robert B. Hardy, 827 N. Main, Cottonwood, AZ 86326, Ph: 928-634-5526, Email: [rhardy@ci.cottonwood.az.us](mailto:rhardy@ci.cottonwood.az.us)*

### Price Per Gallon

**Tap water** continues to be one of the only items that can be purchased for under one cent per gallon.

#### Cost per gallon:

- Chanel No. 5 Parfum: \$45
- Revlon Nail Enamel: \$983.04
- Visine Advanced Eye Drops: \$741.12
- Vicks 44D Cough Syrup: \$96.67
- Coppertone SPF 45 sun-block lotion: \$90.11
- Pepto-Bismol: \$58.52
- Evian bottled water: \$21.19
- Mocha at Peaberry coffee (tax included): \$22.28
- Corona beer: \$12.89
- Snapple: \$10.32
- Tide liquid detergent: \$8.39
- Coca-Cola: \$2.64
- Tap water, City of Prescott - .00333 cents per gallon for 6,000 gallons, including monthly service charge; City of Cottonwood - .00248 per gallon for 10,000 gallons (tiered rates) <http://www.awwa.org/Advocacy/learn/info/PricePerGallon.cfm>

The Environmental Protection Agency reports Americans spend an average of three times more per year on bottled water than what they pay on their water bills.

ranks among the wettest in the last millennium. Economic reconsiderations may be necessary for a drought-impacted future.

Dr. Betancourt has studied climate variability and its effects on the natural and human ecosystems for more than 20 years in research locations in both North and South America, with much of his work focused on the Southwestern United States. He employs various methodologies to reconstruct landscape and vegetation histories, including repeat photography, tree rings, plant macrofossils from pack-rat middens, isotopes, and even ice bodies from lava tubes.

Mini-seminar co-presenter Charlie Ester said, "Already in its ninth year, this drought is showing no signs of ending." Since the summer of 1995, the Salt and Verde watersheds—the sources for the majority of the surface water used in the Phoenix area—have experienced far below normal precipitation. In fact, four of the five driest years of the past 100 years have been recorded since 1996. The two lowest runoff years for inflow into the SRP system have occurred in 1996 and then 2002.

"According to tree ring researchers, 2002 was the driest year in Arizona of the past 1400 years," Ester says. To conserve water, SRP has reduced the allocation of water to its shareholders from 3.0 acre feet/acre to 2.0 acre feet/acre since 2003. Back-to-back allocation reductions have not occurred at SRP since 1950-51. "The prognosis for a return to wetter conditions anytime soon is not good," Ester told the audience. Salt River Project's tree ring research reconstructed the Colorado River's flows back to 1564 and determined its highest flow was at the time water was being allocated in 1922. The river's average flow from 1564 to the present was 13 million acre-feet, but it was flowing at 16.5 million acre-feet when the states allocated the water, Ester said, adding, "We have a built-in water crisis in the West."

Ester said normal winter precipitation (December through March) the past nine years should have measured 74.25 inches. "We've received only 39.05 inches," he said. "We're 4.5 years behind on precipitation."

Dr. Betancourt concurred, "Nature is going to be working in ways we haven't seen before." He advised seminar participants that droughts remain largely unpredictable. He suggested, however, that science indicates this drought may be only half over, and expressed concern that community members not be lulled into complacency by a couple of wet years. History indicates that several wet years did not bring

overall relief from large-scale, long-lasting droughts in the United States.

A recent release from Dr. Betancourt said, "In the context of longer, hotter growing seasons and greater resource demands, ...droughts will exacerbate current predicaments in international and interstate water agreements, urban growth, fuels and fire management, rural lifestyles, tourism and conservation. Statistical analyses of both instrumental and reconstructed precipitation histories, and their relation to ocean temperatures, yield useful insights about patterns and sources of U.S. drought."

Dr. Betancourt remains concerned. "Finally, strong evidence for de-

cadal-to-multidecadal, climate persistence in both the instrumental and tree-ring record underscores the risk assumed by water resource managers. For example, the probability increases with time that water allocations or extraction leases authorized in periods of water surplus will carry over into deficit periods. Much of the urbanization in the western U.S. was accomplished during one of the wettest periods (1965-1995) of the last millennium. In the event of continuing drought, it remains to be seen whether or not comparable rates of growth can be sustained without renegotiating water agreements. Charlie Ester, Water Resources Manager, SRP – PAB120, P.O. Box 52025, Phoenix, AZ 85072-2025, Ph: (602) 236-2587, E-mail: ceester@srpnet.com

Julio L. Betancourt, U.S. Geological Survey, Desert Laboratory, 1675 W. Anklam Rd., Tucson, AZ 85745, Ph: (520) 670-6821 ext. 107, Fax : (520) 670-6806, E-mail: jlbetanc@usgs.gov, Web: [http://www.paztcn.wr.usgs.gov/julio\\_cv.html](http://www.paztcn.wr.usgs.gov/julio_cv.html)

Presentations are available on the VWA Web site, <http://vwa.southwest-water.org>, compliments of Dr. Julio Betancourt and Charlie Ester. File sizes are large and may take time to download.

### **Why Watch Wildlife? Edward Carillo Cottonwood Elementary School**

"It is important for people to watch wildlife. For scientists, it's important because they could find a new species or learn something cool about the wolf or another animal. I like to watch wildlife because I like animals no matter what they are. I like dogs the best of all. Scientists track animals by clipping animals' ears or putting a radar type of necklace which transmits radio waves to the scientist's lab. Some animals are endangered because of overhunting, taking their homes and building on it, and taking their food away."

### **About Verde Currents and VWA**

The VWA Currents is published by volunteer members of the Verde Watershed Association (VWA), a 501(c)(3) nonprofit organization. This document is also available on the VWA Web site at <http://vwa.southwest-water.org>.

The Verde Watershed Association was founded in 1993 with the mission of its members to develop cooperation, communication and consensus to ensure sufficient water supplies to maintain a healthy river ecosystem. The Association membership is a coalition of towns, cities, counties, organizations and individuals working toward these common goals. VWA brings people and science together. Individuals are encouraged to attend and participate in all VWA functions.

### **Dues Paid for 2004 Thank You!**

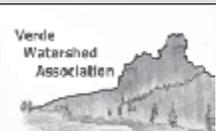
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- Elson Miles

**Verde Watershed Association**

**P.O. Box 4595  
Camp Verde, AZ 86322**

**We're on the Web!**

<http://vwa.southwest-water.org>  
*Robert B. Hardy, Webmaster*  
[verdewatershed@yahoo.com](mailto:verdewatershed@yahoo.com)



*Verde Currents*

Help us update our mailing list! E-mail corrections to Joel Staadecker, Secretary, [jstaad@ix.netcom.com](mailto:jstaad@ix.netcom.com) or mail to P.O. Box 4595, Camp Verde, AZ 86322

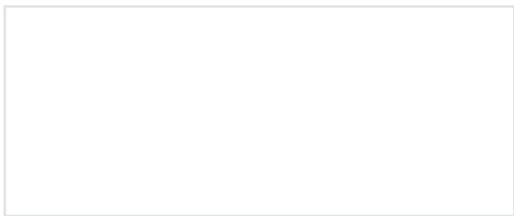
*Verde Currents*

*If you have an item you'd like listed in the Verde Currents' calendar, please contact Editor Diane Joens at [dianej@sedona.net](mailto:dianej@sedona.net) or Ph: 634-4112*



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