



# ARIZONA HYDROLOGICAL SOCIETY

February, 2007

## FROM THE SOCIETY MANAGER

Jeanie Merideth

Now that I have my feet *wet* I feel like I am *swimming* in AHS matters. (Please forgive the water puns).

The web site is coming along and any suggestions from the members is always welcome. If you suggest something and don't see the changes right away please remember that a lot of it has to be run by the Corporate Board. Some things are set by board policy such as what is viewed by the Public vs the Members Only area. Don't give up and if you feel strongly about something just let me know and I'll pass it on to the board.

Our online membership renewal is operational now and if you have not renewed your membership please do so ASAP. If you are in doubt please send me an email and I will check your record. All those who have not renewed will be receiving a "REMINDER" email from me soon.

The Corporate Board will be meeting February 10th in Tucson and the new Officers will be

elected. Watch your email box for that announcement.



The Annual Symposium has their web page launched and ready to view. When you are visiting the AHS site at [www.azhydrosoc.org](http://www.azhydrosoc.org) be sure and click on the "Annual Symposium" link and take a look. The call for Abstracts has gone out and are due February 2nd.

The 2007 Herman Bouwer Intern Scholarship application is now posted on the web site under the link: Scholarships

There are several job postings on the JOBS page that can be viewed in the "Members Only" area.

Have a great February and don't forget your favorite Valentine.



*Jeanie Merideth,  
Society Manager*

### 2007 MEMBERSHP DUES

Dues, payable to AHS (\$40.00, \$15.00 for students) should be sent to:

Arizona Hydrological Society  
Jeanie Merideth, Association  
Manager  
PMB 139; 3305 N. Swan Road  
#109  
Tucson, AZ 85712  
Phone: (520) 299-6787

*Dues may also be paid using our  
"Online Payment" system. Go to  
[www.azhydrosoc.org](http://www.azhydrosoc.org)  
And click on "Join or Renew  
Online"*



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## ADHS Surface Water/Groundwater Sampling

Arizona Department of Health Services  
 Surface Water/Groundwater Sampling and Analysis Workshop  
 March 13-15, 2007  
 Arizona Department of Health Services  
 State Laboratory  
 250 N. 17<sup>th</sup> Avenue  
 Phoenix, AZ

Sponsored by: ADHS Bureau of State Laboratory Services

**Up to 21 PDHs will be offered for completion of the workshop. Partial PDHs may be given.**

Environmental samples collected for monitoring and compliance purposes must be collected using specific criteria to obtain reliable and defensible data.

This workshop is designed to give an overview of sample planning, collection and analysis of surface water or ground water samples. It is recommended for environmental samplers, consultants, engineers, laboratory technicians and analysts, laboratory directors, inspectors and water system operators.

This workshop will introduce the following topics:

- Sample plan development
- Interpretation of laboratory data
- Evaluating a laboratory for environmental analysis

- Sampling and preservation of surface water/ground water
- Working with your laboratory to get required data
- Safety in sampling and sample handling
- Proper documentation and standard operating procedures throughout the entire project
- Discuss legal (evidentiary) requirements of environmental samples, chain of custody for samples
- Provide participants with an orientation of laboratory equipment and analysis
- Tour of the Arizona Department of Health Services Laboratory

**PROGRAM AGENDA**

March 13, 2007  
 Laboratory Quality Assurance  
 Data Interpretation/Evaluation  
 Drinking Water Rules  
 Sample Plan Preparation  
 Legal Aspects/Chain of Custody  
 Laboratory tour and orientation

March 14, 2007  
 Groundwater Sample Collection  
 Aquifer Protection Permit Standards  
 How to use your Analytical Laboratory  
 Field Demonstrations - Groundwater and Drinking Water Sampling Techniques

March 15, 2007  
 Surface Water Sample Collection Techniques  
 Water Quality Standards / Regu-

lations.  
 AZPDES Regulations  
 Biomonitoring  
 Field Demonstration - Surface Water and Biomonitoring Sampling Techniques

ADHS anticipates awarding approximately 21 PDHs for this workshop. In the event of unforeseen circumstances, agenda items and total number of PDHs offered may change without notice. Partial PDHs may be given.

Registration fee: \$225.00 Includes lectures and printed materials.  
 Registration deadline is February 23, 2007.

There will be NO on-site registration.

Class size is limited to 40.

For registration information, please contact ADHS:  
 Michelle Melendez at (602) 542-1197  
 David Winters at (602) 364-0732  
 Joe Harmon at (602) 364-0673

Directions, parking instructions, map and agenda will be mailed with a confirmation letter prior to the workshop.

**Donations to AHS Foundation are considered charitable 501(c)(3) for tax purposes.**

**Donations of any amount may be sent to the AHSF Treasurer or the AHSF President.**

**AHSF; A. Michael Geddis, Treasurer; 3845 N Business Center Dr #115; Tucson, AZ 85705**

## Halpenny Scholarship Recipient: Aida Arik (University of AZ)

It felt great to be a hydrologist during the 2006 monsoon season for many reasons. On my first day at the US Geological Survey Kyle Blasch took me out to Rillito Creek at Dodge, where the bridge had been closed due to flooding, on July 31<sup>st</sup>. We were able to go out onto the bridge and overlook the river roaring underneath us—we were looking at the river flowing about 37,900 cfs. Hydrologists would say that this kind of flow only comes around about once in about 300 years for the Rillito.

However, that was not the only extraordinary opportunity that I had the chance to experience this summer. I was the fortunate recipient of the 2006 AHS Leonard Halpenny Intern Scholarship. Tucson Water, Clear Creek Associates (CCA), the US Geological Survey (USGS), and Errol L. Montgomery & Associates (M&A) were the four agencies who graciously hosted me for this internship. This was an incredible experience for me as a junior in Hydrology & Water Resources at the University of Arizona.

Tucson Water gave me a little taste of bureaucracy with my first stop on the list. With the ongoing Southern Avra Valley Storage and Recovery Project (SAVSARP), I was able to be outside in the summer heat much of the time learning about wells, much of which I would not learn about or be able to see in a class. It is difficult to describe in this amount of space the knowledge I acquired from the time I spent at Tucson Water, but now I realize the hard work that goes into bringing quality water to my faucet.

Just down the street, CCA exposed me to the consulting side of hydrogeology. I learned about Active Management Areas (AMA) and the analysis behind the pumping tests which I saw at Tucson Water. I was introduced to Modflow, as well as GIS through basic modification of figures. While at Tucson Water, I was given a tour of the Price Service Center remediation project, and was given a similar tour by CCA—an interesting contrast between government and consulting. In addition, I was given a project to complete my own hydrogeological analysis for the construction of a new well.

The next stop of the internship was with the USGS, where I worked on a modeling project of the hydrogeology of the upper and middle Verde River watersheds. I was given some leads to relevant hydrological or geological information for parts of the Verde River and was given the task of hunting down the information. I also collected well logs from New Mexico in order to record the lithology for later analysis. Since the Tucson monsoons were in full swing while at the USGS, there was also great opportunity for field work.

The last of the sixty hours was spent with M&A, where I had the opportunity to see hydrogeological consulting on the local, national, and international levels. At M&A, I was able to get more experience with GIS, including basic analysis. My exposure to several different ongoing projects allowed me to learn basics of such software as Surfer, gINT, and Winflow. I was able to contribute preliminary analysis and help out with figures that would

be included in hydrogeologic reports.

There are many to thank at Tucson Water, everyone I met made sure that my experience was worthwhile. Thanks especially to Ralph Marra who allowed me to spend time with Tucson Water. Also, Dee Korich and Joe Huerstel who made sure that I always had something to do, somewhere to go, and someone to teach me about the behind the scenes; they managed to keep me out of the office during the entire three weeks that I was there.

Thanks to CCA for giving me their time, Mike Alter for giving me the opportunity to work with the company, Greg Hess, Jamie Kennealy, and Alex Yiannakakis for their time.

Thanks to John Hoffman for allowing me to work with the USGS. Also, Kyle Blasch for letting work on his project and James Callegary for getting me out into the field.

Marla Odom was the first recipient of the Halpenny Intern Scholarship. Thanks to her for helping manage my stay at M&A. Also thanks to Mike Rosko and Mark Cross for allowing me to work with them.



## PHOENIX CHAPTER NEWS

### February Phoenix Chapter Dinner Meeting

Our next meeting will occur on February 13<sup>th</sup> at Pizzeria Uno's in Tempe. Our speaker will be Jeff Trembly of Mogollon Environmental Services. Jeff's talk will be:

#### *Multi-Pump, Multi-Phase Extraction Utilized to Remediate a Leaking Underground Storage Tank Site in Young, Arizona*

A multi-phase extraction system was designed and installed at a leaking underground storage tank site in Young, Arizona to recover free product, treat groundwater contaminated with BTEX and 1, 2-DCA, and cleanup fine-grained soils impacted by gasoline. The system utilizes a standard, trailer-mounted catalytic-oxidizer soil vapor extraction (SVE) unit to extract and treat the vapor stream. Fluids are extracted using multiple air-driven, on-demand groundwater pumps. Fluids are routed through an oil/water separator, an aeration sump, and carbon canisters before being utilized to irrigate an orchard that produces delicious plums, pears, and apples. Significant progress has been made in cleaning up the site and complying with USDA recommendations for fruit intake.

Jeff Trembly, RG  
BA from Colgate University  
MS from U of Arizona  
5 years at ADWR in Adjudications  
5 years at ADEQ in UST and RCRA  
10+ years consulting in the water resources and environmental fields  
Founding partner of ASL Hydrologic & Environmental Services  
Founding partner of Fluid Solutions  
Principal and only staff member at Mogollon Environmental Services LLC where the global headquarters is located in his backyard

**Where:** Uno's Restaurant, Tempe

**When:** February 13<sup>th</sup>, 5:45 Dinner and Socializing, 7:15 meeting

Cost: \$15 for members and \$5 for students

RSVP with Beth Proffitt by Feb. 12<sup>th</sup> at [eproffitt@transgeo.com](mailto:eproffitt@transgeo.com) or (602) 437-0330.

### **January Meeting Summary**

The Phoenix Chapter held its annual kickoff meeting in Tempe on Jan. 9<sup>th</sup>. Thanks to all those who attended to discuss the direction and focus of the chapter this coming year. Excellent discussions were held regarding the reasons we participate in AHS. Marketing, networking, education, advocating high professional standards, and giving back to the community were all highlighted. The upcoming year's events were also discussed. A desire to initiate chapter fundraising activity was brought out. In addition, the idea of seeking sponsors for monthly dinner meetings was also raised. Sponsorship of monthly meetings would help the chapter reduce annual operational expenses and potentially increase chapter contributions to the Bouwer Intern Scholarship and the AHS Foundation. Sponsors would be granted a brief presentation in advance of the dinner speaker. If you are interested in sponsoring an upcoming dinner meeting, please contact Mike Hulst at [mhulst@eecphx.com](mailto:mhulst@eecphx.com) or Ted Lehman at [ted@jefuller.com](mailto:ted@jefuller.com).



**Phoenix Chapter Kickoff Meeting 2007**

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## Phoenix Chapter cont.

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### **CARSEF – Judges Needed**

March 19-21 will be the Central Arizona Regional Science & Engineering Fair at the Mesa Convention Center. The Phoenix Chapter has provided awards to outstanding projects in water related sciences. With the help of the Central Arizona Project we have given out \$800 over the past two years. We are looking for assistance to review and select award winners in for three grade levels. The judging will require about a half day's time on the March 20<sup>th</sup>. If you are interested, please contact Paul Plato at [pplato@clearcreekassociates.com](mailto:pplato@clearcreekassociates.com) or 480-659-7131.

### **Speakers Needed**

We've filled out the schedule for 2006, but we are always looking for dinner speakers for future meetings. If you are interested in speaking at a dinner meeting sometime next year, or know someone who could give a good talk, please contact Mike Hulst at [mhulst@eecphx.com](mailto:mhulst@eecphx.com) or 602-248-7702.

### **2007 Tentative Schedule**

March and beyond – maybe you?!



### **Phoenix Chapter Officers**

#### **President:**

TED LEHMAN  
JE FULLER HYDROLOGY & GEOMORPHOLOGY  
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## TUCSON CHAPTER NEWS

### AHS TUCSON MONTHLY MEETING

Tuesday, February 13, 2007

Time: 6:00 Social Half Hour

6:30 Presentation

Location: Errol Montgomery & Associates, Inc.,  
1550 East Prince Road

The Onset and Development of Monsoon Thunderstorms in Southern Arizona

Presenter: Joe Zehnder, Arizona State University

#### Abstract:

The regular development of thunderstorms over the mountains in southern Arizona makes them an ideal location to study the onset and transition from shallow to deep convection. The convection develops over the peaks a few hours after sunrise and development occurs slowly and in stages despite the presence of sufficient available energy. One explanation is that the initial shallow convection evaporates through entraining dry environmental air, but in process moistens the environment and conditions it to support further, deep convection.

This notion was explored during summer 2006 with support from the National Science Foundation. The Cumulus Photogrammetric In-Situ and Doppler Observations (CuPIDO) program utilized a network of surface weather stations, 2 mobile sounding systems, stereo pairs of digital cameras and an instrumented aircraft to examine the onset and evolution of monsoon thunderstorms.

This talk will describe the CuPIDO 2006 field program and present some preliminary results.

#### Bio:

Joseph A. Zehnder, Ph.D. has 16 years of experience in performing state-of-the-art meteorological and numerical model studies of phenomena related to the semi-arid southwest and tropical East Pacific. Dr. Zehnder's areas of expertise include large and mesoscale tropical meteorology, observations and modeling of moist convection, and urban meteorological modeling. Dr. Zehnder is the Director of the Southwest Consortium for Environmental Research and Policy, which is a consortium of ten universities in the United States and Mexico that is funded by the EPA to engage in applied environmental research related to the US/Mexico border. He has earned Bachelor and Master of Sci-

ence degrees in Physics from the University of Illinois and a doctorate degree in Meteorology from the University of Chicago. Dr. Zehnder has also completed post-doctoral training in dynamic meteorology at the NASA Goddard Space Flight Center's Laboratory for Atmospheres.

### DECEMBER MEETING SUMMARY

The Tucson Chapter hosted its December meeting at Errol L. Montgomery & Associates and the speaker was Staffan Schorr, formerly with Pima Association of Governments (PAG) and now with Errol L. Montgomery & Associates. Staffan's presentation was "Hydrogeologic Assessment of Arivaca Sub basin." This research topic was his Hydrology masters thesis at the University of Arizona which was funded by Pima County Flood Control District and PAG. The study resulted in a PAG publication that can be downloaded at [http://www.pagnet.org/WQ/DocumentIndex/reports/wq\\_report\\_104.htm](http://www.pagnet.org/WQ/DocumentIndex/reports/wq_report_104.htm)

Staffan's talk first focused on the thesis goals. Pima County was concerned about conversion of ranch lands to urbanization dependent upon groundwater supplies in the small Arivaca watershed. This study was conducted to support Pima County's Sonoran Desert Conservation Plan, which aims at preserving the long-term survival of native plants and animals and meeting the requirements of the Endangered Species Act. The County believes that protecting water resources is an important part of preserving riparian habitat and the species associated with them. The primary purpose of this study was to provide information about the hydrology of Arivaca so policy-makers and the community have a better understanding of the area when making land use and water resource decisions. One goal of the project was to assemble available hydrogeologic information for developing a groundwater flow model.

The watershed is about 43 square miles with a shallow, isolated groundwater basin of approximately 14 square miles. The watershed includes portions of the Buenos Aires National Wildlife Refuge. The Arivaca Cienega at the Refuge is the discharge point for the groundwater basin. Shallow bedrock under the cienega forces groundwater

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## Tucson Chapter cont.

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to the surface, creating the cienega and perennial streamflow in Arivaca Creek. Upstream is Arivaca dam which regulates runoff into the Arivaca sub-basin.

Natural recharge is comprised of mountain front and channel infiltration. Forty-five percent of the runoff from the contributing watershed is captured by the dam. Estimated annual recharge rates ranged from 350 to 1,900 acre-feet per year with a long-term average of 945 acre-feet per year.

Staffan inventoried 215 wells in the sub-basin with the majority as exempt wells (187). Domestic wells now comprised 80 percent of the total wells and irrigation wells were 11 percent. Irrigation was the predominant water use in Arivaca during the 1970s and 1980s. Since that time, irrigation water use decreased and domestic water use increased. Average annual pumpage between 1998 and 2002 was estimated to be 110 acre-feet for domestic uses, 30 acre-feet for irrigation uses and 20 acre-feet for municipal uses. Mr. Schorr found that grandfather irrigation rights in the sub-basin totaled 650 acre-feet per year, but only 90 acre-feet was recorded in 2003.

He noted that the riparian areas in the watershed have grown since the 1970s, especially near the cienega, and was likely associated with a change of land use. Cattle grazing was eliminated from the cienega with the creation of the Refuge and the upstream dam was constructed.

Staffan used the groundwater flow model MODFLOW to evaluate potential urban growth impacts to groundwater levels. Pre-1975 was selected for steady state calibration. The model grid was 150 meters by 150 meters with no flow boundaries, except at the cienega outflow. Outflow from the sub-basin includes well pumping, evapotranspiration, streamflow, and subsurface flow through the cienega; the sole inflow to the sub-basin is recharge.

The model predicted groundwater declines will likely impact riparian areas and streamflow in Arivaca Creek if continued urbanization occurs. Given the limited hydrogeological data, Staffan's thesis included several recommendations. Additional data needed included delineation of bedrock,

aquifer tests, groundwater levels, and riparian studies. Mr. Schorr also recommended that further education occur locally on the water supply issues to better manage the local resource.

The Tucson Chapter would like to thank Mr. Staffan Schorr for his time and informative presentation.

### Tucson Chapter Officers

**President:**

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ERROL L MONTGOMERY & ASSOC INC  
E-Mail: modom@elmontgomery.com

**Vice President:**

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E-Mail: mgeddis@watermc.com

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## Inflow and Outflow, Flycatchers and Chubs: Reservoir Operations and the Endangered Species Act on the Salt and Verde Rivers

John Keane, Ruth Valencia and Charles Paradzick  
Salt River Project

Wednesday, February 7, 2007 from 12:00-1:30  
Brickyard Orchid House, Room 175  
21 E. 6th St., Suite 126B, Tempe



### Water supply reservoirs are essential for large scale human occupation of most of the western US.

These reservoirs also by necessity must inundate riparian habitat and change the downstream flow and sediment regimes. SRP operates six reservoirs on the Salt and Verde Rivers to maximize renewable water supplies to the Phoenix area. Reservoir management has become much more complicated and expensive in recent years as SRP and the US Fish and Wildlife Service have worked to recognize water demand imperatives while addressing biological impacts to species under the Endangered Species Act. Past and present issues will be reviewed. Experience on the Salt and Verde so far indicate the following points:

- Reservoirs can have both positive and negative impacts on a species.
- It is often difficult to separate (scientifically or politically) the impacts of reservoirs from other factors impacting the species, and cooperating agencies often have conflicting wildlife or fisheries management goals.
- Lack of data and uncertainty about these complex biological systems are major factors.
- The public demanding and depending upon these water supplies often has little understanding of either reservoir system impacts or the cost and complications of ESA compliance.

John Keane is a Senior Environmental Scientist with SRP. He has held a variety of water management and environmental planning and permitting positions with SRP since 1981. He earned his M.S. in Watershed Management and Hydrology from the University of Arizona and his Ph.D. in Geography from ASU. Keane teaches as a faculty associate at ASU's School of Planning and School of Geographical Sciences.

Ruth Valencia is a Senior Environmental Scientist who has been with SRP since 2001. She works as project lead for the Roosevelt Lake Habitat Conservation Plan, assisted in development of the Horseshoe HCP, and works on a variety of issues related to riparian management, endangered species and water resources. She holds an M.S. in Environmental Management from the State University of New York at Buffalo and a B.S. in Natural Resource Management (minor Biology) from Allegheny College, Pennsylvania.

Charles Paradzick is a Senior Ecologist who started with SRP in the summer of 2005 to work on the Horseshoe Habitat Conservation Plan and other ESA issues. Prior to his position at SRP, he worked for 10 years with the Arizona Game and Fish Department within their Habitat, Non-Game, and Fisheries programs. He earned his Master of Natural Science from ASU in 2005, and his B.S. in Wildlife Conservation Biology from ASU in 1994.

The Roosevelt Lake Habitat Conservation Plan and the corresponding environmental impact statement can be found in the ASU Library.

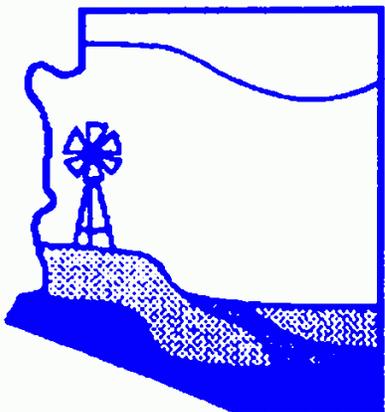
**A reservation is required for this event, as lunch will be served.**

Please contact DCDC at (480) 965-3367 or [DCDC@asu.edu](mailto:DCDC@asu.edu).



ARIZONA STATE UNIVERSITY

This lecture is presented by Arizona State University and the Decision Center for a Desert City.



# Arizona Hydrological Society

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**ARIZONA HYDROLOGICAL SOCIETY**, c/o Jeanie Merideth Association Manager  
PMB #139; 3305 N. Swan Rd #109, Tucson, AZ 85712  
Membership Application (Dues: 1 year \$40, \$15 for students)

Name: \_\_\_\_\_ Position: \_\_\_\_\_

Company: \_\_\_\_\_ Email: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Work Phone: \_\_\_\_\_ Home Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

*In addition to my dues, I am enclosing*

\$ \_\_\_\_\_ Herman Bouwer Intern Scholarship fund (Phoenix),  
\$ \_\_\_\_\_ Leonard C. Halpenny Intern Scholarship fund (Tucson),  
\$ \_\_\_\_\_ for the SARSEF Scholarship fund,  
and/or \$ \_\_\_\_\_ for the state-wide AHS General Scholarship fund.

Total amount enclosed: \$ \_\_\_\_\_

Chapter Affiliation:

\_\_\_\_\_ Tucson

\_\_\_\_\_ Phoenix

\_\_\_\_\_ Flagstaff