

# HYDRO VISIONS

Volume 16, No. 4

GROUNDWATER RESOURCES ASSOCIATION  
OF CALIFORNIA

Winter 2007

## 26th Biennial Groundwater Conference and 16th Annual GRA Meeting "California's Water Future: Expanding the Role of Groundwater"

BY VICKI KRETSINGER

On September 18 and 19, 2007, at the Sacramento Convention Center in Sacramento, California, it was a time to reflect and discuss the expanding role of groundwater at the "26th Biennial Groundwater Conference and 16th Annual Groundwater Resources Association of California Annual Meeting and Conference." The Biennial Groundwater Conference could not have been more timely; on the heels of the conference, legislators were preparing for the special water session scheduled by the Senate Natural Resources and Water Committee, where groundwater played an important role in discussions of, and proposals for, 2008 water bonds to help address California's future water demands. Legislators participating in this session were State Senators Don Perata, Michael Machado, Darrell Steinberg, Dave Cogdill, and Dick Ackerman.

Tom Mohr, GRA's President, welcomed attendees to the conference on September

18, reminding them that this day was also "World Water Monitoring Day," an annual event coordinated by the Water Environment Federation and the International Water Association. Mohr invited "citizens of the global community" to help monitor the health of various water sources by testing four key indicators of water quality: temperature, pH, dissolved oxygen and turbidity. Mohr further remarked on the shift in the political landscape of only two

*Continued on page 13*

## GRA Repeats Its Environmental Information Management Systems (EIMS) Seminar

MARYLINE LAUGIER, MALCOLM PIRNIE, INC., TODD MILLER, MALCOLM PIRNIE, INC., ELIE HADDAD, LOCUS TECHNOLOGIES

In 2005, GRA held its first seminar on Environmental Information Management Systems (<http://www.grac.org/eims05.asp>). GRA has held its second EIMS seminar on August 22, 2007, in Irvine. The seminar, co-sponsored by Locus Technologies and Schlumberger Water Services, was organized in four sessions.

Mr. Elie Haddad, Vice President of Locus Technologies and chairman of the EIMS seminar, noted the recent surge in environmental interest, particularly in relation to sustainability and environmental responsibility. He mentioned that most practitioners use multiple, disconnected systems to store and manage their environmental information. Mission-critical information needed to make informed decisions is dispersed across multiple silos and data stores, not just enterprise applications. This situation has become a key focus as sites move to closure and long-term monitoring and stewardship. Possession

*Continued on page 17*

## INSIDE

President's Message	2
Upcoming Events	3
Technical Corner	4
Federal Legislative/Regulatory Corner	6
Chemist's Corner	7
Alliance Corner	8
Organizational Corner	9
Branch Activities	23

*The Groundwater Resources Association of California is dedicated to resource management that protects and improves groundwater through education and technical leadership.*



# President's Message

BY THOMAS K.G. MOHR

## GRA and Sustainability

California's groundwater resources are suddenly a lot more important. The ruling by Judge Wanger in the Fresno Federal District Court ordering a cutback of Delta pumping to protect the Delta ecology has forced many water supply agencies to reallocate their portfolios to a greater emphasis on groundwater. Those water suppliers fortunate enough to have groundwater to draw upon will likely pump more, while at the same time recharge less as their surface water deliveries are curtailed.

GRA has focused many of its symposia on groundwater issues connected to the big-picture questions surrounding sustainability and water supply reliability in the face of uncertain hydrologic futures caused by climate change, the failing delta, the ever-present threat of seismic disruption, and the growing demand for urban, agricultural, and ecological water. 2007 marked a shift by the state's water planners to emphasize groundwater storage as playing a critical role in solving the state's water puzzle. Our complex system of water delivery from the wet north to the populous south is only as strong as its weakest link. The Wanger decision forces us to carefully examine the infrastructure that we depend upon, and reawakens our awareness of the vulnerability of our water supply delivery network.

Levee maintenance and seismic protection are special challenges for asset management. While critically important,

they don't seem especially urgent until we experience a wake-up call like Hurricane Katrina or an earthquake. The magnitude 5.6 temblor just east of San Jose on October 30th prompted Delta levee inspections the next day. Within an hour after the quake, my colleagues at the Santa Clara Valley Water District completed inspections of more than a dozen dams and other critical infrastructure supplying water to Silicon Valley. The quake jolted us into action; the slower but nonetheless critical and urgent threat of climate change and its impacts on the quantity, timing, and locations of precipitation and runoff warrant a similarly resolute response. We still have the time and opportunity to address climate change proactively, unlike the reactive response we face with natural disasters and the short lead-time to prepare for cutbacks from Delta water deliveries. GRA's members in southern California face the triple threat of declining Delta deliveries, curtailed Colorado River allocations, and severe drought.

Most water supply planning scenarios account for reduced supplies due to drought or temporary interruption to deliveries caused by seismic disruption, levee failures, or other problems. The "regulatory drought" imposed on the recipients of imported water has forced a review of water supply reliability in all parts of the supply portfolio. Under ordinary circumstances, cost is the usual driver for determining which sources of water to contract for in a given year. But when reli-

*Continued on page 19*

*The statements and opinions expressed in GRA's HydroVisions and other publications are those of the authors and/or contributors, and are not necessarily those of the GRA, its Board of Directors, or its members. Further, GRA makes no claims, promises, or guarantees about the absolute accuracy, completeness, or adequacy of the contents of this publication and expressly disclaims liability for errors and omissions in the contents. No warranty of any kind, implied or expressed, or statutory, is given with respect to the contents of this publication or its references to other resources. Reference in this publication to any specific commercial products, processes, or services, or the use of any trade, firm, or corporation name is for the information and convenience of the public, and does not constitute endorsement, recommendation, or favoring by the GRA, its Board of Directors, or its members.*

**HydroVisions** is the official publication of the Groundwater Resources Association of California (GRA). GRA's mailing address is 915 L Street, Suite 1000, Sacramento, CA 95814. Any questions or comments concerning this publication should be directed to the newsletter editor at editor@grac.org or faxed to (916) 442-0382.

### EXECUTIVE OFFICERS

**President, Tom Mohr**

**Santa Clara Valley Water District**

**Phone: 408-265-2607, ext. 2051**

**Email: tmohr@grac.org**

**Vice President, James Strandberg**

**Malcolm Pirnie, Inc.**

**Phone: 510-735-3020**

**Email: jstrandberg@pirnie.com**

**Treasurer, David Von Aspern**

**Sacramento County EMD**

**Phone: 916-875-8467**

**Email: VonAspernD@sacounty.net**

**Secretary, William Pipes**

**Geomatrix Consultants, Inc.**

**Phone: 559-264-2535**

**Email: wpipes@geomatrix.com**

### DIRECTORS

**David Abbott, Todd Engineers**

**Phone: 510-595-2120**

**Email: jorysue@msn.com**

**Susan Garcia, Colin L. Powell Academy**

**Phone: 310-631-8794**

**Email: ssgarcia55@verizon.net**

**sgarcia@lbusd.k12.ca.us**

**Stephanie Hastings, Hatch & Parent**

**Phone: 805-882-1415**

**Email: shastings@hatchparent.com**

**Roy Herndon, Orange County Water District**

**Phone: 714-378-3200**

**Email: rherndon@ocwd.com**

**Ted Johnson, Water Replenishment District**

**of Southern California**

**Phone: 562-275-4240**

**Email: tjohnson@wrdr.org**

**Thomas M. Johnson, LFR Levine Fricke**

**Phone: 510-652-4500**

**Email: tom.johnson@lfr.com**

**Vicki Kretsinger, Luhdorff & Scalmanini**

**Phone: 530-661-0109**

**Email: vkretsinger@lsce.com**

**Brian Lewis**

**Cal/EPA, Dept. of Toxic Substances Control**

**Phone: 916-255-6532**

**Email: blewis@dtsc.ca.gov**

**Jean Moran**

**Lawrence Livermore National Laboratory**

**Phone: 925-423-1478**

**Email: moran10@llnl.gov**

**Tim Parker, Schlumberger Water Services**

**Phone: 916-329-9199**

**Email: tparker2@slb.com**

**Sarah Raker, MACTEC**

**Phone: 510-628-3234**

**Email: slraker@mactec.com**

**Eric Reichard, U.S. Geological Survey**

**Phone: 619-225-6134**

**Email: egreich@usgs.gov**

### EXECUTIVE DIRECTOR

**Kathy Snelson**

**Phone: 916-446-3626**

**Email: executive\_director@grac.org**

### EDITOR

**Floyd Flood**

**Email: editor@grac.org**

**WEB AND DATABASE MANAGER**

**Kevin Blatt, ihappi Web Design**

**Phone: 510-845-9623**

**Email: kblatt@ihappi.com**

## Register or Tell a Colleague

### “Introduction to Groundwater & Watershed Hydrology: Monitoring, Assessment & Protection”

January 22-23, 2008 - Davis, CA

*Co-Sponsored by the University of  
California Cooperative Extension  
Groundwater Hydrology Program*

#### Topics Include:

- ▲ Surface Water Hydrology and Watersheds
- ▲ Groundwater Hydrology
- ▲ Water Rights and Water Law
- ▲ Surface Water Quality
- ▲ Groundwater Quality, Sampling, and Monitoring
- ▲ Surface Water Contaminants
- ▲ Groundwater Contamination
- ▲ Defining Watersheds and Groundwater Recharge Areas
- ▲ Vulnerability Assessments
- ▲ Understanding Potentially Contaminating Activities
- ▲ Protecting Water Resources

Detailed Information:  
[www.grac.org/hydrology.asp](http://www.grac.org/hydrology.asp)

## Upcoming Events

### 17th GRA Annual Meeting and Conference

GROUNDWATER: Challenges to Meeting Our Future Needs

September 24-26, 2008

Hilton Orange County/Costa Mesa  
Costa Mesa, CA

An optional field trip is being organized that will include the world's largest indirect potable reuse facilities, Orange County Water District's new Groundwater Replenishment System.

## Call for Abstracts

### “Site Closure Strategies” Symposium

February 20-21, 2008 - Concord, CA

*Abstracts are due by December 20, 2007*

Topics to be covered during this symposium include, but are not limited, to the following:

- ▲ Case studies
- ▲ Applications of Triad Approach
- ▲ Applications of Containment Zones
- ▲ Applications of TI waivers
- ▲ Contingency plans for site closure
- ▲ MNA – success or long-term monitoring?
- ▲ Performance metrics and endpoints
- ▲ Reopening of closed sites
- ▲ Insurance-based approaches

Detailed Information: [www.grac.org/closure.asp](http://www.grac.org/closure.asp)

# Wells and Words

BY DAVID W. ABBOTT, P.G., C.H.G.  
TODD ENGINEERS

## Fractured rock aquifers — positive correlation between well depth and estimated hydraulic conductivity

During my on-the-job education in groundwater hydrology in the early 1970s, I was trained to install water supply wells no deeper than 300 feet in fractured rock systems unless I had a good, logical reason to drill deeper. That reason could range from subsurface geologic characteristics, to topography relationships, to surface water locations. Remarkably, questions are still posed about how deep to drill water wells in non-karst geologic settings in fractured rock systems.

This question was answered over 43 years ago by the work of Davis and Turk (Ground Water, 1964, vol. 2, no. 2, p. 6-11); little improvement in their applied geologic and economic conclusions has occurred since then. Davis and Turk recognized that water-bearing properties of crystalline rocks depend on the extent and depth of weathering

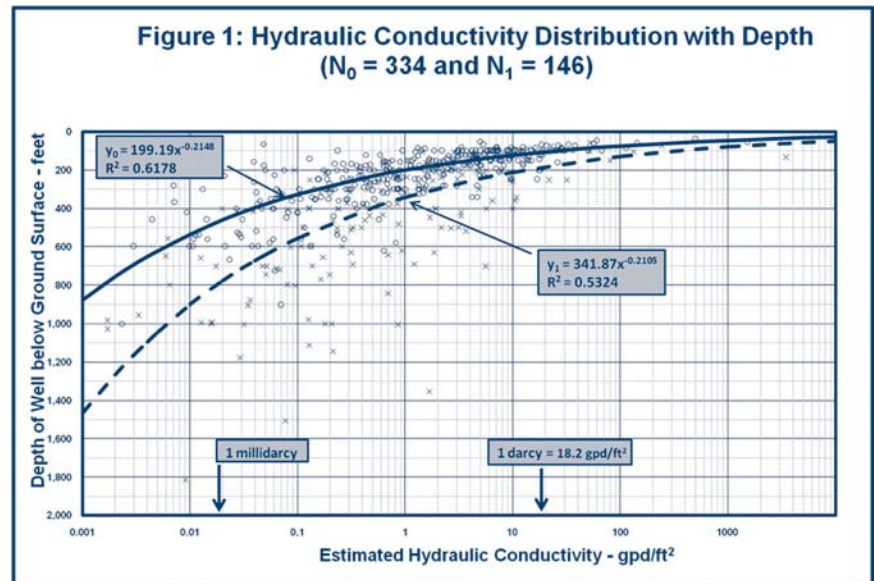
and the occurrence and orientation of joints and faults. In summary, well yield (i.e., yield per foot of well drilled below the static water level) decreases with depth because: (1) fewer fractures are encountered, (2) the aperture size of the fracture is smaller, and (3) aperture sizes along fault planes tend to decrease with depth. Weathering occurs typically to depths of no more than 100 feet, while

these other changes with depth are due to the overlying lithostatic pressures imposed on the fractured rock.

Davis and Turk concluded that unless geologic factors are favorable, wells in crystalline rocks should not be installed deeper than 600 feet and that domestic wells should be less than 250 to 300 feet. Note that the yield per foot of well drilled in gallons per minute (gpm) per foot applied by Davis and Turk should not be confused with the specific capacity of the well in gpm per foot of drawdown.

Two large sets of hydraulic data reported by drilling contractors were reviewed to assess the relationship between the hydraulic conductivity (K) and well depth in fractured rock. The data were collected from California Department of Water Resources Water Well reports. Area 1 is about 15 miles<sup>2</sup>, is located along the western flanks of the northern Sierra Nevada, and includes 334 wells (N<sub>0</sub>) installed in metamorphic and volcanic rocks. Area 2 is about 45

# Technical Corner



## RSI Drilling Services



- Geoprobe 5400's, 6600's, AMS Power Probe 9700's and Sonic Drill Rigs
- CME-75 HT, DPT/HSA Combo Rigs
- Remedial Injection Services
- Well Development & Abandonment
- Vacuum Extraction (Air Knife) & Concrete Coring

**Woodland**  
(530) 668-2424  
**Alameda**  
(510) 532-2424  
**Los Angeles**  
(714) 778-2424

220 N. East St., Woodland, CA 95776 • Ph: (530) 668-2424 • Fx: (530) 668-2429



miles<sup>2</sup>, is located in the Peninsular Range of San Diego County about 600 miles south of Area 1, and includes 146 wells (N<sub>1</sub>) installed in weathered and un-weathered granitic rocks.

K, a measure of the productivity of the aquifer, was estimated using the discharge, static and pumping water levels, and estimated aquifer thickness from the geologic logs. Pumping tests were conducted by airlift methods for 98% of the wells, which usually results in over-estimated K. The median depth for the wells in Areas 1 and 2 are 188 and 400 feet, respectively; while the number of wells exceeding 600 feet for Areas 1 and 2 are 5 and 43. It appears that the drilled depth of wells in Area 1 is driven by local contractor tradition or awareness of the Davis and Turk postulation, in contrast to Area 2. K varies by about six orders of magnitude for Area 1 (0.0023 to 1,500 gpd/ft<sup>2</sup>) and for Area 2 (0.0017 to 3,494 gpd/ft<sup>2</sup>). Aquifers with K-values >1 gpd/ft<sup>2</sup> can be developed into wells with yields of >25 gpm.

Figure 1 shows a positive correlation using a power trend-line of the form  $y = Cx^{-m}$  between the estimated K and the depth of the well below ground surface for both Areas 1 and 2 and suggests a correlation between Areas even though they are from different geographic provinces. Medians for both sets are 0.70 to 1.35 gpd/ft<sup>2</sup>, which is 2.3% to 11.7% of the means, respectively. The median K for wells exceeding 300 feet ranges from 0.09 gpd/ft<sup>2</sup> (Area 1) to 0.21 gpd/ft<sup>2</sup> (Area 2), while those drilled below 600 feet have lower median K ranging from 0.06 gpd/ft<sup>2</sup> (Area 1) to 0.08 gpd/ft<sup>2</sup> (Area 2). Combined, these two data sets show that only 23 wells (5%) with a depth >300 feet out of 480 have a K >1 gpd/ft<sup>2</sup>, while four wells (<1%) with a depth >600 feet have a K >1 gpd/ft<sup>2</sup>. This analysis ignores wells that were deemed “dry” by the contractors.

Summarizing, wells drilled deeper than 300 feet in fractured rock aquifers will yield insignificant amounts of additional groundwater. The odds of obtaining significant amounts of additional groundwater in fractured rock aquifers below 300 feet are low (about 5%) while the odds are even lower for wells installed below 600 feet. Reliable and realistic well yields in fractured rock aquifers typically range between 3 and 25 gpm. Well yields >25 gpm in fractured rock aquifers are the exception rather than the rule and should be thoroughly documented with rigorous hydraulic testing and analysis. 💧



It's 7:20 PM.

## Do you know where your groundwater data are?

- Open Systems
- “The Microsoft of EDD data checking..”
- GeoTracker EDF support
- Over 300 clients in CA



# EarthSoft

[www.earthsoft.com](http://www.earthsoft.com)

[info@earthsoft.com](mailto:info@earthsoft.com)

**(978) 369-2201**

# USEPA Happenings

BY JOHN UNGVARSKY, EPA

## Guidance on the Ground Water Rule

EPA recently posted three guidance documents to assist with implementation of the Ground Water Rule (GWR). The *Source Water Monitoring Guidance Manual* provides ground water providers, States, Tribes, and other primacy agencies a brief review of the source water monitoring provisions and provides criteria to assist in determining which fecal indicator is most appropriate to test for in each geographic region. The *Consecutive System Guidance Manual* describes the regulatory requirements of the GWR as it applies to wholesale ground water systems and to the consecutive ground water systems that receive and distribute that ground water supply. Lastly, *Complying with the Ground Water Rule: Small Entity Compliance Guide* targets small public water systems. It contains a general introduction and background for the GWR, describes the specific requirements of the GWR, and provides information on how to comply with those requirements. For

more information, see: <http://www.epa.gov/safewater/disinfection/gwr/compliancehelp.html>.

## Carbon Sequestration

EPA has announced plans to develop Underground Injection Control regulations for geologic sequestration, a process of injecting captured carbon dioxide, a greenhouse gas, in deep rock formations for long-term storage. The intent is to ensure consistency in permitting commercial-scale geologic sequestration projects. Proposed regulations are planned for the summer of 2008. Recent carbon sequestration documents have been posted on EPA's web site. These include a summary of, and presentations from, a July 2007 conference, *Geological Setting and Area of Review Considerations for CO<sub>2</sub> Geologic Sequestration*. For more information, see: [http://www.epa.gov/safewater/uic/wells\\_sequestration.html](http://www.epa.gov/safewater/uic/wells_sequestration.html).

## Results from the California GAMA Program

To assess the quality of groundwater from public-supply wells and establish

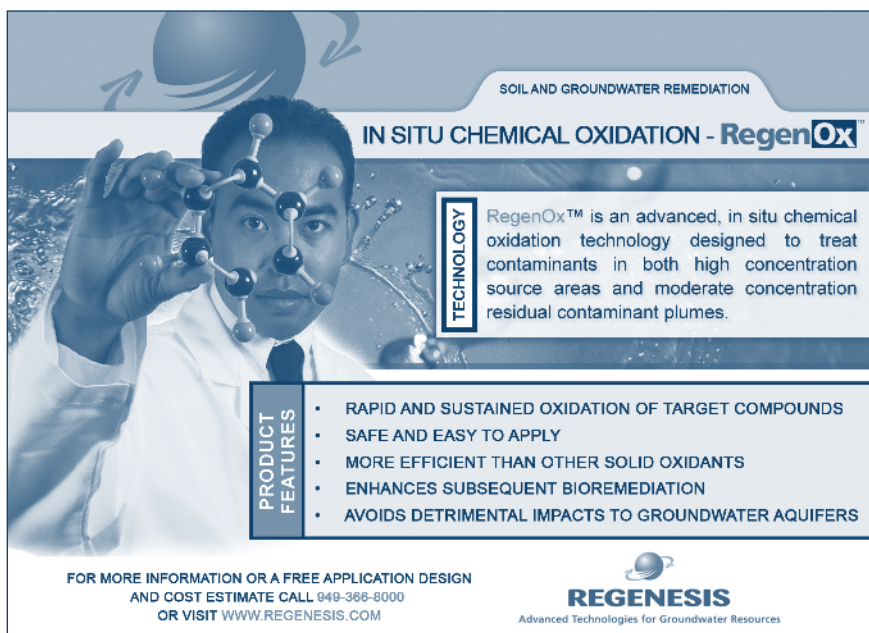
a program for monitoring trends in groundwater quality, the US Geological Survey, in collaboration with the State Water Resources Control Board and Lawrence Livermore National Laboratory, is implementing a statewide groundwater ambient monitoring and assessment program (GAMA). For more information, go to <http://ca.water.usgs.gov/gama/>. Results for the Monterey Bay and Salinas Valley Basins were recently posted at: <http://pubs.usgs.gov/ds/2007/258/index.html>.

## Treatment Technologies for Site Cleanup

The Twelfth Edition of *Treatment Technologies for Site Cleanup: Annual Status Report (ASR)*, published by EPA's Office of Superfund Remediation and Technology Innovation in September 2007, is available now. ASR documents treatment technology applications at more than 1,900 soil and groundwater cleanup projects at National Priorities List (NPL) sites, and is based on the analysis of over 3,000 Records of Decision signed since 1982 at 1,536 NPL sites. The online version includes new downloadable spreadsheets with the data for several of the key tables and figures in the report. For more information go to: <http://clu-in.org/asr/>.

*Technology News and Trends*, an EPA newsletter about soil, sediment, and groundwater characterization and remediation technologies is available for viewing, downloading, and/or subscribing at <http://clu-in.org/newsletters/>.

*John Ungvarsky is an Environmental Scientist at the U.S. Environmental Protection Agency, Region 9. He works in the Water Division's Ground Water Office and oversees source water protection efforts in CA and NV. For information on any of the above topics, please contact John and 415-972-3963 or [ungvarsky.john@epa.gov](mailto:ungvarsky.john@epa.gov).*



SOIL AND GROUNDWATER REMEDIATION

### IN SITU CHEMICAL OXIDATION - RegenOx™

**TECHNOLOGY** RegenOx™ is an advanced, in situ chemical oxidation technology designed to treat contaminants in both high concentration source areas and moderate concentration residual contaminant plumes.

**PRODUCT FEATURES**

- RAPID AND SUSTAINED OXIDATION OF TARGET COMPOUNDS
- SAFE AND EASY TO APPLY
- MORE EFFICIENT THAN OTHER SOLID OXIDANTS
- ENHANCES SUBSEQUENT BIOREMEDIATION
- AVOIDS DETRIMENTAL IMPACTS TO GROUNDWATER AQUIFERS

FOR MORE INFORMATION OR A FREE APPLICATION DESIGN AND COST ESTIMATE CALL 949-368-8000 OR VISIT [WWW.REGENESIS.COM](http://WWW.REGENESIS.COM)

**REGENESIS**  
Advanced Technologies for Groundwater Resources

# Another Chinese Quality Problem: Groundwater

BY BART SIMMONS

Recent reports of toxic ingredients have focused attention on the lack of chemical regulation in Chinese exports, and the extent of environmental and public health problems created by China's economic juggernaut is becoming evident. The impacts of coal mining used to power the accelerating industry are obvious, and the impacts to surface water, like the explosion of toxic cyanobacteria in Lake Tai, have been the targets of investigative reporting by *The New York Times* and other media. Around Lake Tai, rice paddies have been replaced by 2,800 chemical companies. The algal blooms, apparently caused by phosphate and nitrate runoff, bear obvious testimony to the industrial impact. Less obvious is the impact to China's groundwater resources.

Officially, it is estimated that China's renewable groundwater resource is 870 billion m<sup>3</sup>, accounting for 31% of its total water resources. Of that, 290 billion m<sup>3</sup> is considered by the government to be "exploitable." The supply is not distributed equally; 68 percent in the south and 32 percent in the north. China's arid northern areas and relatively developed eastern areas suffer the most pollution, while poverty-stricken areas in the northwest are plagued by extreme shortages. According to the *Asian Economic News*, groundwater in half of China's 600 cities is polluted, and 400 cities have insufficient supplies. However, according Zhang Lijun, deputy director of the State Environmental Protection Administra-

tion, groundwater is contaminated in about 90 percent of the nation's cities. Because of engineering problems, lack of rainfall and declining environmental quality, some cities' groundwater quality is in "crisis," the Beijing News said. It added that 136 cities face a "severe" groundwater shortage. The North China Plain, one of the largest agricultural areas in the world, is particularly sensitive; about 70 percent of the water used is groundwater. This has led to falling groundwater levels and land subsidence due to over-pumping. The World Bank and AusAid, the Australian government's foreign aid program, are sponsoring the development of groundwater management plans to return the groundwater pumping to a sustainable level.

The development of the North China Plain has been a factor in the economic development of China, but overuse of groundwater has led to dry wells, sea water intrusion, land subsidence over

vast areas, and groundwater salinization. Reportedly, groundwater levels in the shallow unconfined aquifers have fallen from 10 to 50m, at an average rate of 0.5 m/year. In the deep confined aquifers, levels have fallen 30 to 90m, at an average rate of 3 to 5m/year. A strategy has been developed to deal with water supply and quality issues, but the scope of the problems seem as vast as the Chinese economy. "China's groundwater management is about 20 years behind the world's most advanced levels," says Yin Yueping, an expert with the China Geological Survey (CGS).

While greenhouse gases emissions may be the most prominent of China's environmental issues, other serious long-term issues are not far below the surface.

*Bart Simmons can be reached at bartonps@aol.com.* ♠

## Chemist's Corner



**Geomatrix**

**SMART SOLUTIONS FOR A COMPLEX WORLD**

- Site Characterization
- Integrated Watershed Management
- Water Resources Engineering
- Groundwater Remediation
- Groundwater Modeling

Offices throughout the U.S.  
Please visit [www.geomatrix.com](http://www.geomatrix.com)  
for career opportunities - EOE





# California Groundwater Association/National Ground Water Association

BY MIKE MORTENSSON, CGA  
EXECUTIVE DIRECTOR

## DHS Waterworks Standards

For quite some time, CGA has been working with DHS (now CDPH) on waterworks standards involving well capacity testing for public water systems. The initial regulations provided for 72-hour and 10-day tests with specified reductions according to the test length. CGA and GRA sought the inclusion of an alternative that allowed the water systems to use groundwater professionals to conduct tests and determine well capacities that would not be subject to the specified reductions. After a lengthy process, the final language of the Waterworks Standards issued this fall include a section [64554 (g) (1)] that provides tests can be conducted by a CA registered geologist with 3 years experience, a CA registered civil engineer with 5 years experience with groundwater hydrology or a CA certified hydrogeologist.

## Got Your PA Toolbox? Use It for National Groundwater Awareness Week

CGA has been assisting NGWA with a Public Awareness Tool Box for members with tips on how to build awareness of the groundwater industry and your business. A description of the Toolbox is on the facing page in this issue.

Every week should be groundwater awareness week as we talk to clients and friends about the valuable water

*Continued on page 16*

# Alliance Corner

## Toolbox for NGWA Members to Raise Ground Water Awareness

BY CLIFF TREYENS, NGWA

The National Ground Water Association's Public Awareness Standing Committee has developed the *Public Awareness Toolbox: A Simple Guide to Raising Public Awareness*. This 20-page primer explains some basic tools used in communicating information to the public in easy-to-understand terms. Here is a glimpse inside the *Toolbox*:

### Setting Goals

This section examines the critical importance of first identifying clear public awareness goals and the natural questions that flow from that. For instance:

- What are you trying to accomplish?
- Who is your audience?
- What is your message?
- What tactics can be used to communicate with the target audience?
- How do I know my tactics are effective?

### The Tools

Since audience and message depend on the public awareness goal, most of the *Toolbox* focuses on the tools, or tactics, that can be used to raise public awareness. Some tactics involve working with the news media. One step away from news coverage is newspaper and radio ads, and public service announcements. The *Toolbox* points NGWA members to produced ads and public service announcements that are available to

them through NGWA. Other publicity tools highlighted in the *Toolbox* are a downloadable poster and flier, and downloadable consumer-friendly articles on a host of ground water and well ownership related issues.

Three other tools or tactics described in the *Toolbox* can be a little more challenging:

- Partnerships: Using natural allies to help deliver your public awareness message.
- Exhibiting: Putting together an effective display that will get your message across.
- Presentations: How to create an effective presentation that impacts the audience.

### Measuring Effectiveness

Often, where public awareness falls short is in evaluating the effectiveness initiatives. The *Toolbox* doesn't go into great detail about this subject, but does make this point: "Think about the results you want; then come up with a way to measure whether you're getting them. Get feedback from your target audience as to whether they're persuaded or motivated by your public awareness efforts."

*Cliff Treyens is the public awareness director for the National Ground Water Association.*



# A UNESCO-IHP Convened International Water Conference on "Water Scarcity, Global Changes and Groundwater Management Responses" in California

BY PROF. JEAN FRIED, UNESCO  
SENIOR CONSULTANT

UNESCO, USGS, and University of California, Irvine, are jointly convening an international conference entitled "Water Scarcity, Global Changes and Groundwater Management Responses." This conference will be held in December, 2008 at UC Irvine. It should be stressed that it will be the first international water conference convened by UNESCO-IHP in the US.

The conference will emphasize multidisciplinary approaches, combining science, technology, economy, sociology, institution building and policy-making. Information and communication methods and instruments will be discussed, stressing the societal role in project conception and implementation, and education and training as a critical connector of such approaches. Sustainable water management in stressed areas such as mega cities, coastal zones, small islands, and transboundary aquifers will be a key theme. Strong emphasis will be put on the unique role of groundwater in water-scarce areas and its significance in most other areas.

## Alliance Corner

An important outcome of the conference should be an action framework, management principles, and practical measures to manage water resources to cope with global changes impacts on water availability and quality. These findings will contribute to the IHP Phase VII and help to prepare for the 5th World Water Forum (Istanbul, Turkey, March 2009).

The International Hydrological Programme (IHP) is UNESCO's international scientific cooperative program in water research, water resources management, education and capacity-building, and is the only broadly-based science program of the UN system in this area. For three decades, UNESCO-IHP has contributed to the wide recognition of water being of principal concern to the economies of all countries and central to global ecosystems, hence fundamental to global sustainability. UNESCO-IHP is operating under the three pillars of "hydrological science; water resources assessment and management; and education and capacity building."

As global changes in population growth, climate variability, and expanding urbanization, often combined with pollution, severely affect water availability and lead to chronic water shortages in an increasing number of regions, a theme of the IHP Phase VII (2008-2013) concerns the impacts of global changes on river basins and aquifer systems.

Water scarcity is not always the result of a physical lack of water resources but also the result of inadequate institutional and managerial organization. According to the 2nd World Water Development Report, an estimated 26 countries, with a total population of more than 350 million people, suffer from severe water scarcity because of problems in water management and governance, even though there appears

to be adequate available water. Therefore another theme of the IHP Phase VII is strengthening water governance for sustainability.

Finally, it is evident that groundwater is one of the most important natural resources for countries as diverse as Denmark and Saudi Arabia. It is the main basis of irrigation worldwide, with more than one-third of the landmass irrigated by groundwater, and the main source of drinking water for a number of countries. Having stressed the lack of scientific knowledge about aquifers and lack of investment in developing appropriate groundwater resource management strategies, the IHP Phase VII recognizes the need to examine groundwater more closely.

*Prof. Jean Fried is UNESCO Senior Consultant and UCI Visiting Researcher, and is the Co-Chair of the Scientific Committee of the Conference. He may be reached at [jfried@uci.edu](mailto:jfried@uci.edu).*

**KIFF**   
Analytical LLC

**Your choice laboratory for**

- **Low Level Fuel  
Oxygenate and Volatile  
Organic Compound  
Testing**
- **Providing Personal and  
Proactive Customer  
Service**

**[www.kiffanalytical.com](http://www.kiffanalytical.com)**

**530.297.4800 phone  
530.297.4808 fax**

**Davis, CA 95618**

**Leaders in Analytical  
Science and Service**

# Organizational Corner

## GRA Extends Sincere Appreciation to its Chair and Co-Sponsors for its August 2007

### *Environmental Information Management Systems Seminar*

#### Chair

Elie Haddad, Locus Technologies

#### Co Sponsors

Locus Technologies  
Schlumberger Water Services

## GRA Extends Sincere Appreciation to its Co-Chairs and Sponsors for its September 2007 Annual Meeting

#### Co-Chairs

Vicki Kretsinger, Luhdorff  
Scalmanini Consulting Engineers  
Sarah Raker, MACTEC

#### Co-Sponsors

Instrumentation Northwest  
Layne Christensen  
Malcolm Pirnie  
National Ground Water Association  
RSI Drilling

#### Lunch Sponsor

West Yost Associates

## GRA Extends Sincere Appreciation to its Co-Chairs and Co-Sponsors for its November 2007 DNAPL 2: Source Zone Characterization and Remediation Symposium

#### Co-Chairs

Bettina Longino, Geomatrix  
Consultants, Inc.  
Sarah Raker, MACTEC

#### Co-Sponsors

Geomatrix Consultants, Inc.  
Geosyntec Consultants  
Malcolm Pirnie, Inc.  
RSI Drilling  
TerraTherm, Inc

## GRA 2008 Officers Elected

The GRA Board of Directors elected the following officers for 2008: Jim Strandberg, President; William Pipes, Vice President; Roy Herndon, Secretary; and David Von Aspern, Treasurer. Congratulations to all of you for being elected.

## Susan Garcia Honored for 10 Years of GRA Board Service

At the November 3, 2007 GRA Board meeting, Susan Garcia was honored for her 10 years of service on the GRA Board of Directors. Susan recently decided not to run for re-election, but stated she will remain very much involved in GRA activities. The time and effort that Susan put forth on behalf of GRA is reflected in the growth and programmatic depth that has occurred in the last ten years. Thank you Susan!

## Renew Your Membership Online - It's Quick and Easy

It's time to renew your GRA membership for 2008. You can renew online via GRA's Web site, [www.grac.org](http://www.grac.org), or you can request a hard copy dues renewal invoice from Kevin Blatt at [kblatt@ihappi.com](mailto:kblatt@ihappi.com). To save time and effort, GRA recommends that you renew online as the process is secure and seamless. It will also help GRA to keep related expenses to a minimum.

As GRA approaches 2008 with nearly 1,400 members, the goal of having 1,600 members by the end of 2008 is attainable. To make this happen, please renew your membership and recruit one new member to GRA. Recruiting a new member is a way to introduce your colleagues to a credible, innovative organization that provides many benefits for only \$100.

Thank you for your interest and continued participation in protecting and improving California's groundwater resources.

# Organizational Corner

## 2007 Contributors to GRA — Thank You

**Founder** (\$1,000 and up)  
Hatch & Parent

**Patron** (\$500-\$999)  
DrawingBoard Studios  
Geomatrix Consultants, Inc.

**Corporate** (\$250-\$499)  
David Abbott  
Luhdorff & Scalmanini  
Consulting Engineers  
Malcolm Pirnie  
Thomas Mohr

**Charter Sponsor** (\$100-\$249)  
Stanley Feenstra  
EMAX Laboratories, Inc.

**Sponsor** (\$25-\$99)  
ARCADIS Geraghty & Miller, Inc.  
Richard Amano  
Suzanne Baehr  
Chuck Bagi  
Thomas Ballard  
Jenifer Beatty  
Bryan Bondy  
Richard Booth  
Kate Burger  
James Carr  
Joyce Clarke  
Thomas Cooper

Crawford Consulting, Inc.  
Daniel B. Stephens & Associates, Inc.  
Nat Dellavalle  
H.R. Downs  
Scott Dressler  
Gilberte Duerig  
Earth Tech

Entech Analytical Labs, Inc.  
Environmental Resolutions, Inc.  
Richard Farquar  
Martin Feeney  
Fred Flint  
Avram Frankel  
Laura Frost  
Scott Furnas  
Susan Garcia

Geomatrix Consultants, Inc.  
Jane Gill-Shaler  
Elie Haddad  
Patrick Hourican  
Sachiko Itagaki  
Ted Johnson

Tom Johnson  
Carol Kendall  
Mark King  
Christian Knoche  
Roy Kroll  
Taras Kruk

Laboratory Data Consultants, Inc.

James Malot  
Gary Mann  
Robert Martin  
John McAssey  
Sally McCraven  
Peter Mesard  
Steven Michelson  
Greg Middleton  
Jean Moran  
David Moreno  
Bradford Newman  
Aaron O'Brien  
Kent O'Brien  
William O'Brien  
Frederick Ousey  
Oliver Page  
Mike Parkinson  
Stephen Quayle  
Peter Quinlan  
John Reay  
Eric Reichard  
George Reid

Roscoe Moss Manufacturing Company

Sandra Ross  
RSI Drilling  
David Sederquist  
William Sedlak  
Shaw Environmental  
Thomas J. Shephard, Sr.  
Schlumberger Water Services  
Jordan Smith  
Linda Spencer  
Robert Strahan  
Roland Tanner  
Chad Taylor  
Eddy Teasdale  
David Tompkins  
Kurt O. Thomsen  
Susan Trager  
David Tucker  
City of Visalia  
Ed Wallick  
Gus Yates  
Frank Yeamans  
William Zavora  
Mark Zeko

**Supporter**  
Bruce Marvin  
Tim Rumbolz

TO ADVERTISE IN HYDROVISIONS CALL 916-446-3626 TODAY

**HYDROVISIONS** 2008 Advertising Rates

4 Issues Annually

Blue & White cost per issue	1x	4x
Business Card	95.00	90.00 PER
1/4 page	185.00	160.00 PER
1/2 page	365.00	290.00 PER
Full page	750.00	600.00 PER

Color advertisements are additional based on current printing rates.

The above prices assume advertisements are received as high-resolution PDF files.

For additional information, visit GRA's Web site at [www.grac.org](http://www.grac.org) or contact Kathy Snelson, GRA Executive Director, at [executive\\_director@grac.org](mailto:executive_director@grac.org) or 916-446-3626.



# GRA Welcomes the Following New Members

AUGUST 10, 2007 – NOVEMBER 12, 2007

Anderson, Ryan  
Aboulafia, Isaac  
Bagi, Chuck  
Bechard, Scott  
Bonura, Carl

Boysun, Melissa  
Brun, Alyx  
Butler, Teresa  
Callaghan, Dennis  
Carr, Adrienne  
Clexton, David  
Collins, David  
Diserio, Matthew  
Escobar, Mauricio  
Fiorenza, Stephanie  
Flomerfelt, Jonathan  
Ghosh, Suman  
Girolamo, William  
Gray, Arnold  
Grosskopf, John

Wildermuth Environmental  
MECX, LLC  
Lancaster Labs, Inc.

Navy BRAC Program Management  
Office West  
Earth Tech Inc.  
TRC Solutions  
Wallace-Kuhl & Associates, Inc.  
Environmental Standards, Inc.  
Erler & Kalinowski, Inc.  
Regenesis  
MWH  
Water Asset Management, LLC  
ENVIRON International Corporation  
BP  
ATC Associates  
Mission Geoscience, Inc.  
Environmental Data Solutions Group  
Earthsoft, Inc.  
TRC

Hard, Edward  
Heppner, Christopher  
Hermann, Jasmin  
Heywood, Brian  
Hopfensperger, Karl  
Hourican, Patrick  
Hudelson, Peter  
Hui, Yuanyuan  
Keene, Emily  
Kirkpatrick, Glen  
Koehne, Virgil  
Kourda, Dina  
La Mori, Phillip  
Larsen, Mark

Laugier, Maryline  
Lister, Katie  
Loeb, Kimball  
Monteith, Carolyn  
Passarini, Mark  
Peabody, Jack  
Pongetti, Paul  
Puramsetty, Chandra  
Reiners, Steven  
Shannon, Heather  
Spaeth, Sean  
Specht, James  
Star, Ringo  
Studer, James  
Turner, Bryan  
Van Fleet, Michael  
Walton, Annette  
Williams, Grant  
Wilson, Larry  
Winell, Carol  
Wright, Sarah  
Yeh, Michelle  
Yoon, James  
Zviblemon, Barry

California Dept. of Food &  
Agriculture  
Erler & Kalinowski, Inc.  
WorleyParsons Komex  
CDM  
CDM

Boeing Remediation Group  
Earth Tech, Inc.  
CH2M Hill  
The Johnson Company, Inc.  
Town of Discovery Bay CSD  
DTSC  
FECC, Inc. of Orlando, FL  
Kaweah Delta Water Conservation  
District  
Malcolm Pirnie, Inc.  
HerSchy Environmental, Inc.  
EnviroSolve Corporation  
Lockheed Martin  
Trihydro Corporation  
Regenesis  
Dept. of Toxic Substances Control  
URS Corp  
MWH

Wood Rodgers, Inc.  
County of San Mateo  
AAA Engineering (test company)  
ChemRem International LLC  
Procter & Gamble  
Converse Consultants  
Stanford University  
GeoSyntec Consultants  
Santa Clara Valley Water District  
G.E.O. Inc.  
Earthsoft, Inc.  
Schlumberger Water Services  
Erler & Kalinowski, Inc.  
Onion Enterprises



**Roscoe Moss Company**  
*We make water work  
worldwide.*

No single screen type is appropriate for all wells. Roscoe Moss Company is the only manufacturer in the world producing shutter screen, continuous slot screen, bridge slot screen, and slotted pipe. This ensures that Roscoe Moss Company's customers receive unbiased technical assistance directed toward solving their specific problems.

 4360 Worth Street, Los Angeles, CA 90063  
Phone (323) 263-4111 • Fax (323) 263-4497  
www.roscoemooss.com • info@roscoemooss.com

© 2006 Roscoe Moss Company. All Rights Reserved.

## 26th Biennial Groundwater Conference and 16th Annual GRA Meeting "California's Water Future: Expanding the Role of Groundwater" — Continued from Page 1

years ago, reflective of the "broader understanding of the implications of climate change by the general populace, due in large part to Al Gore's film, *An Inconvenient Truth*, and Judge Wanger's decision to order the reduction of water transfers from the Sacramento-San Joaquin Delta in order to stop killing the Delta smelt. These events have conspired to underscore the critical importance of groundwater in California's water future."

In keeping with the conference theme, three invited plenary session speakers provided presentations on the role of groundwater from quantity, quality, and policy perspectives. The speakers were **Jerry Johns**, Deputy Director of Water Resources Planning and Management and Chief of the Water Transfers Office of the California Department of Water Resources; **Dorothy Rice**, Executive Director of the State Water Resources Control Board (SWRCB); and **Anne Schneider**, Partner of the law firm Ellison, Schneider, and Harris. Their presentations brought forward some extremely challenging issues that are bound to be with us for some time.

Johns highlighted the debate over water in the Delta that has escalated since the early 1980s; the need to convey water through the system from one part of the state to another still impacts fisheries, and presents difficult choices. In the water quality arena, Rice underlined the lack of support for collecting sufficient monitoring data. Consequently, she reports that if we were to evaluate ourselves on how we're doing on collecting information necessary to better understand the quality of our water resources, we would receive a "C grade." Lastly, as demonstrated by Schneider, we have the "Perfect Storm" developing on the horizon; streams must have adequate flow for biota protection, and somehow the chasm between surface water and groundwater will need to be addressed. Schneider noted that the SWRCB's interest in regulating groundwater extraction will continue, even in the face of increasing public sector pressure, and that "it is not clear how the technical surface water permitting issues relating to

groundwater recharge, conjunctive use, storage and recovery, and groundwater banking situations will be resolved."

Following the plenary session, the two-day conference featured concurrent sessions with technical and policy presentations on current and future roles of groundwater resources, and a final general assembly on preparing for climate change and how this relates to future water resources planning. Topics included in the conference are discussed below.

💧 **Salt Water Intrusion: Current Status and Future Implications** Presentations described how the condition of groundwater and surface-water resources can change concurrent with the development of coastal aquifers. Accordingly, associated water-management issues can be more effectively addressed by incorporating new understanding of the geologic,

hydrologic, and geochemical settings of these aquifers into water resources management strategies. Also key are implementation of new facilities (including spreading and injection facilities for artificial recharge) and coastal distribution systems, use of recycled water, and establishment of new institutions and policies that encourage conjunctive use of surface and groundwater resources. Water Replenishment District (WRD) estimates that during water year 2007-2008, 30,000 acre-feet of water will be required for injection along seawater-intrusion barriers at a cost of \$14.2 million. Currently, about half of the injected water is potable and the other half recycled. Eventually, it is expected that the recycled water may account for 100 percent of the injection supply, thus saving the potable water

*Continued on page 14*



**WEST YOST ASSOCIATES**

**It's Technical We Get It**

We give technical personnel room to grow.

High quality. Great solutions. Dynamic teams. Everyone benefits when they work with talented staff. We value technical experts and it shows.

Let us show you how...

Visit our website for more information on services or career opportunities:  
[www.westyost.com](http://www.westyost.com)

**WATER WASTE WATER STORM WATER**

## 26th Biennial Groundwater Conference and 16th Annual GWA Meeting "California's Water Future: Expanding the Role of Groundwater" — Continued from Page 13

for more direct uses. As injection water costs continue to rise, WRD faces challenges to maintain the barriers while minimizing cost impacts. Alternative methods for barrier effectiveness and control are being studied, using research and groundwater models, and other technologies such as reduced or optimized inland pumping, low-permeability cutoff walls, other sources of injection water, and inert gasses are being investigated.

◆ **Groundwater Resources and Land Use Planning** This session had presentations on how, under California law, the management of land use is the responsibility of local government. City and county general plans, and the associated goals, policies, objectives and programs, define land use planning requirements for each jurisdiction. Also by law, general plans guide land use decisions at the city and county level, and integrate land, water and natural resources management elements. Specific illustrations were also presented on the response to land and water use planning requirements in Sonoma County and dairy land use planning in other jurisdictions. A Superior Court decision has raised fundamental issues about groundwater analysis under

the California Water Code (i.e., Code resulting from SB 221/SB 610). The question is: "Do water suppliers have the discretion to determine by what method they will evaluate groundwater supplies to demonstrate supply reliability to meet future water demands?" Stay tuned -- the First Appellate District Court, Division Three, is addressing this question. This session also discussed upcoming issues concerning land-use planning near existing and proposed dairies.

◆ **Desalination for Groundwater Basin Management** This session included three creative approaches to expanding water supplies through desalination. One presenter described the technical and institutional challenges in recovering poor-quality groundwater (high TDS and nitrate) in the Chino Groundwater Basin for beneficial use. Two desalters are part of a larger groundwater pumping and recovery plan that will pump up to 40,000 acre-ft/yr of highly degraded groundwater from the southern Chino Basin, treat this water to drinking-water standards, and deliver it for municipal uses. In another area, the Eastern Municipal Water District (EMWD) adopted its West San Jacinto Groundwater Basin Management Plan

that includes recovery of groundwater utilizing demineralization and other treatment technologies, and protection of good-quality groundwater basins from the migration and intrusion of poor-quality groundwater. This Plan describes the implementation of the Perris Basin Desalination Program that will ultimately consist of three desalination plants treating 17,000 acre-ft/yr of brackish groundwater to impede the intrusion of poor-quality groundwater into adjacent good-quality groundwater basins. In order to expand local groundwater production, Sweetwater Authority is partnering with a number of other entities to develop the "South San Diego County Water Supply Strategy." With the support of Proposition 50 grants from DWR, a regional brine line is being evaluated; feasibility of developing a new brackish groundwater facility has been initiated; and expansion of an existing facility is underway.

◆ **Groundwater Quality: Does Better Analysis Equal Greater Risk?** Incorporating excellent perspectives on the "water quality/is there a risk?" dilemma, the presenters for this session related their talks to improved aspirations of analytical methodologies, and how water quality results can be considered with respect to potential effects on human health or the environment. Some of the well-known challenges are: confirming the chemical identity of Emerging Chemical Contaminants; sufficiently sensitive and trustworthy analytical methods; documenting environmental occurrence; understanding environmental behavior (notably fate and transport); exposure potential of human and ecological receptors; toxicity in both human and ecological receptors; and many other factors associated with characterizing risks.

◆ **Investing in Infrastructure: Pay Now or Pay Later** Presenters for this session discussed some of the significant challenges involved when conducting



**2008 Ground Water Summit**  
March 30–April 3 • Memphis, Tennessee

The 2008 Ground Water Summit will engage local, national, and international science partners in a venue that facilitates the exchange and dissemination of technical information and new science developments, allows a means for discussing policy and regulatory issues pertaining to ground water, and promotes goodwill among ground water professionals worldwide. Summit sessions cover a wide range of topics to allow recent issues and advances in ground water science, technology, and policy to be brought to the forefront. For more information, as well as to register for this conference, visit [www.ngwa.org/2008summit/index.aspx](http://www.ngwa.org/2008summit/index.aspx) or call customer service at 800 551.7379.



economic and technical feasibility evaluations and either direct or indirect benefit analyses to justify infrastructure investments. Discussion focused on numerical analysis tools that can aid decision-makers to better understand the consequences of climate change on water infrastructure, the potential economic impacts under a range of prescribed long-term drought conditions, the potential impacts on water storage, and the potential for the conjunctive management of the State's surface water and groundwater resources to limit adverse impacts of drought and snow pack reduction on water supply.

Assessing California's Groundwater Quality: What Have We Learned from GAMA? Preliminary Groundwater Ambient Monitoring & Assessment (GAMA) program results were discussed in this session, including results of focused investigations and findings from the sampling of about 1300 primarily public-supply wells. Preliminary data indicate that VOCs and pesticides are present in 25% to nearly 100% of the sampled wells, depending on the study unit, although concentrations were far below health-based benchmarks. Pharmaceutical compounds were also detected in some wells, but at very low frequencies and at concentrations far below therapeutic values. The preliminary findings also indicate that isotopic tracers and anthropogenic constituents effectively indicate the extent and distribution of "modern" water in the subsurface.

Assessing California's Groundwater Quality: Interpretation of GAMA Results This session included a discussion on the preliminary findings for five GAMA program areas investigated, including results for the Monterey Bay and Salinas Valley Basins; detections of anthropogenic compounds and their use as tracers in the Southern Sierra; processes affecting groundwater quality in the Central-Eastside region of the San Joaquin Valley; low-level VOCs in the Central Valley; and naturally occurring uranium in groundwater in the eastern San Joaquin Valley.

Expanding Groundwater Supply through Banking and Exchange Some

of the institutional innovations that have made banking projects possible in California were presented in this session, including basin adjudication, creation of special groundwater management districts, and dedicated monitoring schemes. Some recent innovations (and remaining challenges) were conveyed regarding new sources of water for recharge, including recycled water, stormwater runoff, and the early release of surface storage through re-operation of reservoirs.

Preparing for Tomorrow by Managing Data Today Presenters discussed the growing challenges faced by groundwater data managers where challenges continue to be data storage needs, post-processing analytical tools, technological advancements and constraints (e.g. software, hardware, time, and fiscal), and ultimately the challenge of synthesizing and communicating the information in a meaningful way. Newer data management tools were discussed, including a web-based GIS tool that DWR and WRIME, Inc. are developing to allow users to access and visualize water data in a new way

(Integrated Water Resources Information System). The panel also described a new MODFLOW data model that is an extension of the Arc Hydro groundwater data model, and can be used to store an entire MODFLOW simulation in a GIS database.

Preparing for Climate Change Presenters underscored the importance of new tools including simulation/optimization models and Integrated Regional Water Management (IRWM) planning approaches to address future climate-related uncertainties about California's water resources. It was discussed that deterministic multi-period optimization models can be useful to analyze and improve operation of regional water resource systems. They provide time series of optimal flows and storages throughout the water resource network that can be analyzed to infer promising approaches for managing the system. Research was described on the design and preliminary results for a hydro-economic monthly planning optimization model of California's Sacramento Valley that maximizes economic net benefits using

Continued on page 16

**EnviroTech** Quality Rentals  
Quality Environmental Products

Every Rental comes with the Enviro-Tech "Quality Guarantee."

This means every rental comes with...

- If Requested Calibration Kit, Video & CD, Tool Kit
- Instrument is Charged & includes Charger
- All Accessories as needed
- Clean Foam Packaging
- Instruction Manual and Rental Agreement
- Working Instrument and Certificate of Calibration

It Looks Sharp and Professional

Our Quality Guarantee - If we fail to provide any of this, your rental is Free\* until we fix it. \*The only condition is you need to notify us immediately.

www.envirotechonline.com

Toll Free 1-800-468-8921

MasterCard VISA DISC

## 26th Biennial Groundwater Conference and 16th Annual GRA Meeting

### "California's Water Future: Expanding the Role of Groundwater" — Continued from Page 15

a non-linear formulation and takes into account regional-scale groundwater pumping costs.

On September 18, we were pleased to have Jeffrey Kightlinger, General Manager for the Metropolitan Water District (MWD) of Southern California, as the featured luncheon speaker. Mr. Kightlinger's presentation highlighted recent activities of the MWD, and also discussed key strategies regarding current water supply conditions in California and plans relating to groundwater strategies in the future. An evening reception on the 18th provided networking opportunities with exhibitors and 19 poster presentations.

The luncheon program on September 19 included a brief overview of GRA's annual activities and an update of California's legislative actions relating to groundwater by Paul Bauer, GRA Legislative Advocate with Hatch and Parent. California Senator Darrell Steinberg of District 6, featured luncheon speaker on the 19th, gave a rousing talk on the role of groundwater in the proposed 2008 water bond, of which he is a co-author. Following Senator Steinberg's talk, GRA's annual awards were presented (see articles on pages 20 and 22).

### Conference Presentations Available Online

Presentations from the conference are available\* as PDF documents on-line at: [http://www.lib.berkeley.edu/WRC/WRC/GW26th\\_program.html](http://www.lib.berkeley.edu/WRC/WRC/GW26th_program.html) (\*presentations are online for those speakers who approved posting of their presentations; some approvals are still pending).

### We Couldn't Do It Without Them: Many Thanks to Our Organizers and Sponsors

Many thanks to all the organizers, sponsors, cooperating organizations, presenters, supporters and attendees of this year's event! For more than 50 years, the Biennial Groundwater Conference has provided policy-makers, practitioners, researchers, and educators the opportunity to learn about the current policies, regulations, and technical challenges affecting the use and management of groundwater in California.

Organizing groups for this year's conference included the University of California Center for Water Resources, California Department of Water Resources (DWR), Groundwater Resources Association of California (GRA), California State Water Resources Control Board (SWRCB), Water Education Foundation, and United States Geological Survey (USGS). Cooperating organizations include the International Association of Hydrogeologists (IAH), California Groundwater Association (CGA), and the Association of California Water Agencies (ACWA). Co-Sponsors included Instrumentation Northwest, Layne Christensen Company, Malcolm Pirnie, the National Ground Water Association, and RSI Drilling. Special thanks are also extended to the Biennial Groundwater Conference Committee; the Center for Water Resources staff, including Dr. Andrew Chang, the Director of the Center; GRA's Executive Director, Kathy Snelson, and her assistant, Mary Megarry.

### Save-the-Date for 2008!

Planning has begun for GRA's 2008 Annual Meeting. See the Announcement on Page 3 of this issue. Watch GRA's web site at [www.grac.org](http://www.grac.org) for more information. If you are interested in participating in Annual Meeting and Conference planning, or have suggestions you wish to offer for conference content, please contact the conveners: Ted Johnson [tjohnson@wrd.org](mailto:tjohnson@wrd.org) or Vicki Kretsinger [vkretsinger@lsce.com](mailto:vkretsinger@lsce.com).

*Vicki Kretsinger is Chief Hydrologist with Luhdorff & Scalmanini, consulting engineers. She may be reached for comment at [Vkretsinger@lsce.com](mailto:Vkretsinger@lsce.com)*

## California Groundwater Association/ National Ground Water Association —

Continued from Page 8

resource beneath them. In case you want a bit more emphasis, March 9-15 is National Groundwater Awareness Week. See a variety of activities at the NGWA website ([www.ngwa.org](http://www.ngwa.org)), [www.groundwateradventurers.org](http://www.groundwateradventurers.org) and at [www.wellowner.org](http://www.wellowner.org).

After doing some March activities, why not plan some May activities during Water Awareness Month in California? Check out the California Water Awareness Campaign's web site at [www.wateraware.org](http://www.wateraware.org) for information on educational materials about groundwater and other public awareness projects.

### Cga & Gra Members to Head to Washington DC

CGA and GRA members will again participate in the NGWA Fly-In in Washington DC, February 25-26, 2008. Past efforts have paid benefits ranging from funding for household wells to support for groundwater sustainability programs to training for well inspectors to tax credits. Join with others from California meeting with elected representatives on issues important to the groundwater industry. CGA Executive Director Mike Mortenson is a member of the NGWA Government Affairs Committee. Contact him at 707-578-4408 or [wellguy@groundh2o.org](mailto:wellguy@groundh2o.org) for more details on the Fly-In.

*Mike Mortenson is Executive Director of the California Groundwater Association.*



**Environmental Bio-Systems, Inc.**

[www.EBSinfo.com](http://www.EBSinfo.com) Nationwide, since 1989

**In-Situ Remediation: bench tests to full scale remediation**

- Chemical Oxidation
- Enhanced Bioremediation
- Geochemical Stabilization of Metals

**Jim Jacobs, RG, CHG, CPG**  
Hydrogeologist

Tel: (415) 381-5185  
e-mail: [augerpro@sbcglobal.net](mailto:augerpro@sbcglobal.net)

and real-time access to environmental data has become a necessity; many companies are facing greater scrutiny as shareholders demand accountability and accurate reporting.

**Session 1: Overview of Industry and Regulatory Tools** was moderated by **Richard Hammond** (U.S. EPA, Region 4). **Ted Hullar** (Locus Technologies) presented the changes affecting environmental information management. He described the different platforms available to support an EIMS, and their advantages and limitations. He also explained how new web-based approaches allow organization, manipulation, and presentation of data using a web browser, hence helping everyday users to quickly access and review environmental data.

**Shannon Similai** (Calif. Dept. of Toxic Substances Control) demonstrated the use of Envirostor, the DTSC's EIMS. Ms. Similai led the attendees through a live internet presentation of a contaminated site highlighting how DTSC project managers use internet resources to efficiently retrieve project information, and concluded with a glimpse into the future of Envirostor.

**Michele Hincks** (Enviance) discussed technology options for the environmental, health, and safety compliance EIMS for the refining and petrochemical industries. She presented four main technologies, Software-as-a-Service, Client-Server/Behind-the-Firewall, Application Service Provider, and Build-and-Deploy, and described the benefits, requirements, and security challenges of each. She also stressed the importance of clearly understanding the end-user's needs and risks prior to developing an EIMS.

**Derek Mitchum** and **Ms. Paris Edeburn**, from Trihydro Corp., provided an example of matching an EIMS to client needs. The steps involved include reviewing the information to be stored and presented, performing a "needs analysis," creating an importance matrix, defining success, selecting a vendor, and implementation. Conducting a "needs analysis" at the beginning of a project helps to clarify the customer's goals and risks.

**Sessions 2&3, on Case Studies**, were moderated by **Shannon Similai** (DTSC) and **Richard Amano** (Laboratory Data Consultants). **Dr. Kim Stagg** (Delta Environmental) showcased an EIMS used to manage data at over 450 petroleum facilities. Using Six Sigma project strategy, an environmental, health, and safety system, and a technical data module, the EIMS allowed for the efficient management of project preparation, implementation and reporting. Preparation activities included development and electronic notifications for many functions. Routine client and regulatory reports are largely automated. Time savings were estimated to be between 60% and 95%.

**Mr. Jamey Rosen** (GeoSyntec Consultants) presented a case study on desktop EIMS for legal and managerial decision making. He described how a user-friendly desktop database using a free desktop GIS viewer allows users to easily get access to site data. The end user is able to view data and generate reports "on the fly." In addition, this desktop database can be accessed from anywhere and the reports viewed by accessing the EIMS can remain non-discoverable.

**Dak Patel** (CH2M Hill) presented the results of a Six Sigma approach applied to data from 800 Federal and State Honeywell

remediation sites. Resulting improvements in data management included reduced turn-around times and/or holding times on samples, increased laboratory data quality, and lower unit costs. A return on investment analysis showed that monetary savings were achieved within a year of EIMS implementation.

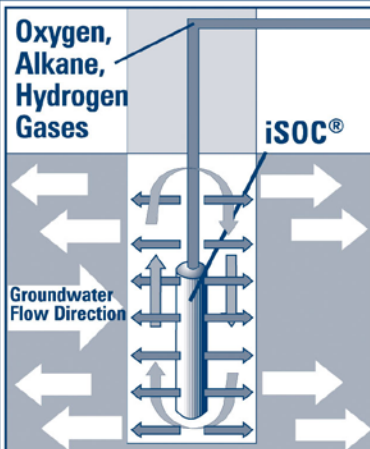
**Jennifer Hurley** (Schlumberger Water Services) discussed three case studies. Integrated solutions were provided using real-time data collection or a database linked to a web interface. Advantages of the integrated systems included quickly compiling and assessing large amounts of data, improving project efficiency and cost savings.

**Ryan Tombs** (MACTEC) presented two case studies on Project Dashboards using ArcGIS Server 9.2 for (1) the combined Security Transition Command in Afghanistan, and (2) a winery in Sonoma, California. He demonstrated that both applications had the same goal of displaying information summaries using the power of tabular and spatial data elements to manage and optimize their operations.

**Sarah Wright** (EarthSoft, Inc.) presented advancements in the automation of environmental data collection and analysis that result in time and cost savings, improve-

*Continued on page 18*

### Your Ultimate Managed Attenuation Tool



- Chlorinated Hydrocarbons
- Petroleum Hydrocarbons®
- Perchlorate
- Solvents
- MTBE
- BTEX
- TBA

**iSOC®**  
isocinfo.com

"Cost effective alternative for Groundwater remediation used in over hundreds of sites"

Northern CA: Jim Jacobs @ 415-381-5195  
Southern CA: Rey Rodriguez @ 626-852-1235



ments in data quality, reductions in data entry drudgery and liability, and increased protection of human health and the environment. Her case study showed how the USEPA Region 5 database interfaces with other common software applications.

**Christine Lew** (Tetra Tech) described the DTSC Stringfellow Superfund Site Automated Data Management System, which includes chemistry, geology, remediation processes, site documents, and historical reference points. Using real-time collection strategies, QA/QC is automated in the field; assessment and reporting are completed via SQL Server Reporting Services, Site Interface for Data and Documents, and built-in interfaces to engineering/geology tools. This EIMS is fully customizable and easily accessible.

**Mr. Jeroen Preiss** (Kennedy/Jenks Consultants) presented the Groundwater Basin Management Objective Info. Center (BMOIC) created for the Butte County Dept. of Water and Resource Conservation. The BMOIC gathered information on geology, groundwater, well locations, and well logs for more than 100 monitoring wells to establish a monitoring network for groundwater quality and elevations, and land subsidence. The EIMS operates on both sides of a firewall, which protects sensitive data from general access, yet provides important information to the public.

**Session 4: XMLs and EDDs and Panel Discussion – What is Next?** Part 1 of this session was a presentation by **Richard Hammond** (U.S. EPA, Region 4), who provided an overview of markup language as a tool to organize and understand data. He showed how the Extensible Markup Language (XML) can be a useful tool for EIMS, especially to manage and visualize data. The USEPA Environmental Data Registry is an example of an XML application that serves the environmental industry.

The second part of this session was a panel discussion moderated by Mr. Elie Haddad (Locus Technologies). The panelists were **Richard Amano** (Laboratory Data Consultants), **Ms. Paris Edeburn** (Trihydro Corp.), **Michele Hincks** (Enviance), **Ted Hullar** (Locus Technologies), and **Shannon Similai** (DTSC). Panelists discussed the following topics:

(1) Will globalization of EIMS occur as it becomes more common and cost-effective? More applications will be added, and EIMS are becoming more comprehensive to address users' needs.

(2) Will standards from regulatory agencies help promote the development and adoption of EIMS? There are no EIMS standards planned for the near future; however, EIMS are often developed in response to regulatory compliance requests.

(3) Is there a growing preference to generate smart data, as opposed to more data, to streamline data management and provide more useful EIMS solutions? Yes. For example, although technically possible, there is generally no need to record hourly water levels. Smart data would save on costs of generating, storing, and evaluating such information.

(4) Will development of, and reliance on, EIMS become more commonplace with the shift towards open source code? This is doubtful. EIMS development is led by private developers who are reimbursed for the cost of research and development.

(5) Will EIMS be a must-have within the next five to ten years? Yes. Users are realizing that EIMS are essential even now. Without using EIMS, there is an increased chance for non-compliance, and consultants may lose their competitiveness.

(6) Who will lead technology innovations and interface and integration options? At this point, it is private developers that are at the forefront of EIMS development.

After conclusion of the seminar, attendants enjoyed a networking reception. During breaks in the seminar, attendants visited displays by several exhibitors, including Columbia Technologies, Earthsoft Inc., Instrumentation Northwest, Locus Technologies, ProHydro Inc., and Schlumberger Water Services.

This article has been edited for length; the complete article may be found on the GRA website, [www.grac.org](http://www.grac.org).

*Maryline Laugier is a Project Engineer and Todd Miller is a Senior Hydrogeologist at Malcolm Pirnie, Inc., Emeryville, CA. Elie Haddad is Vice President of Locus Technologies, Mountain View, CA.* ♠



**KB-1<sup>®</sup> Plus Works on My Client's Most Stubborn TCE and 1,1,1-TCA Sites**

KB-1<sup>®</sup> bioaugmentation has been applied at more than 80 sites in the United States and Europe to reduce cis-DCE accumulation stall during PCE and TCE dechlorination, making it the most widely used culture of its type.

KB-1<sup>®</sup> Plus now provides the ability to jointly treat 1,1,1-trichloroethane (1,1,1-TCA) along with PCE and TCE. Derive the benefits of bioaugmentation at an even wider range of sites. Use KB-1<sup>®</sup> Plus.

**The gold standard just got brighter.**

contact SiREM for more information...  
Phone: 519-822-2265  
or toll free: 866-251-1747  
[www.siremlab.com](http://www.siremlab.com)

## President's Message — Continued from Page 2

ability is considered, the value of a water investment may change considerably. A recent paper written by SWRCB Director Gary Wolff, while serving as the Pacific Institute's Principal Economist and Engineer, provides an interesting analysis of how to value reliability when comparing the costs of water supply alternatives. For example, advanced treatment of recycled wastewater can appear tremendously expensive – about \$800 per acre foot. This option falls to the bottom of the list on the basis of cost alone, but when accounting for reliability for meeting demand, it has a high value, as do voluntary and contracted conservation, water banking, and reoperating reservoirs and groundwater basins. As we face uncertainty in water supply futures, water districts and water utilities will invest more in the most sustainable and reliable supplies. Groundwater development in the form of storage projects, enhancing existing conjunctive use and aquifer storage and recovery projects, and reclaiming low-quality groundwater will all acquire different valuations when reliability of supply is included in the analysis.

GRA will focus on these issues in 2008 and beyond. Our ability to continue to bring together the leading state and national experts on these topics depends on the reliability and sustainability of GRA itself. GRA's reputation as California's premiere association for groundwater professionals rests upon the dedication of those members who have stepped forward to act on their passion for groundwater stewardship. GRA's Board of Directors is foremost among the volunteers who make GRA's association model reliable and sustainable, but there are many whose contributions to GRA's branches, events, and committees keep GRA strong.

GRA's Board is comprised of fifteen Directors nominated to serve two-year terms. Most on the Board continue to serve additional terms, much to GRA's benefit as they accumulate experience to better serve the membership. This year we bid a fond farewell to retiring Director

and Past President, Susan Garcia. Susan was GRA's President in 1995 and 1996; she has been a staunch advocate for earth science education in the K-12 curriculum, and has provided dedicated service to the Board for 12 years. The Board is bringing a candidate slate for five Directors to the membership to vote upon, including four renewals and one new Director candidate. This year, we received five new nominations from excellent candidates for Director, any one of whom will make a fine addition to GRA's Board.

November is also the time the Board elects officers. In 2008, we welcome Jim Strandberg, a Vice President at Malcolm Pirnie's Emeryville office, as GRA's Presi-

dent. Bill Pipes, currently GRA's Secretary and Vice President of the Geomatrix Fresno office, will be GRA's Vice President. GRA's new Secretary will be Roy Hurdon, Chief Hydrogeologist of the Orange County Water District. David von Aspern, a geologist with Sacramento County, will continue as GRA's Treasurer. I will continue to serve on the Board as GRA's past President. I shall remember my term as President fondly. In particular, I have enjoyed the camaraderie, the passion for good groundwater stewardship, and the contagious enthusiasm for GRA shared by GRA's Directors, Branch Officers, and staff. It has been a privilege to serve the membership and the Board. 💧

### OBITUARY

## William J. LeMessurier — A Lesson in Ethics

BY MARTIN STEINPRESS, BROWN & CALDWELL

If he had only left behind imposing buildings that reign in urban landscapes from Boston to Japan, William J. LeMessurier's reputation would have been secure. But a decision he made 29 summers ago left a more resounding legacy when he sounded the alarm after realizing there were dangerous flaws in the structural framework he had designed for the Citicorp tower in New York City. "Your career achievements are many and stellar," the University of Massachusetts at Dartmouth said in a citation when it gave Mr. LeMessurier an honorary doctorate in 2002. "They are, however, secondary to your ethical prowess." "You reached your finest hour when you risked all you had accomplished to reveal, take responsibility for, and correct flaws in the bracing system of New York's Citicorp Center tower whose structure you had designed," the university's citation said. "By valuing human life above your career and reputation, you prevented a cataclysmic event, the collapse of the tower and the loss of countless lives, and became a striking exemplar of the ethical conduct so needed in today's world." Mr. LeMessurier's decision to set aside career concerns in the service of safety only came to light years later, in a 1995 article in *The New Yorker*. By then, he was using the Citicorp example to inspire aspiring engineers in classes he taught. "You have a social obligation," he told a class at Harvard, according to the *New Yorker* article. "In return for getting a license and being regarded with respect, you're supposed to be self-sacrificing and look beyond the interests of yourself and your client to society as a whole. And the most wonderful part of my story is that when I did it nothing bad happened." For the complete CitiCorp Center story, go to: <http://www.duke.edu/~hpgavin/ce131/citicorp1.htm>. Mr. LeMessurier passed away June 14th at the age of 81. Source: *The Boston Globe*, July 22, 2007

*Martin Steinpress is Chief Hydrogeologist with Brown & Caldwell in Walnut Creek, and is a former Board Member of GRA.* 💧

# 2007 Lifetime Achievement Award: Dr. Herman Bower

BY MARTIN STEINPRESS, BROWN & CALDWELL

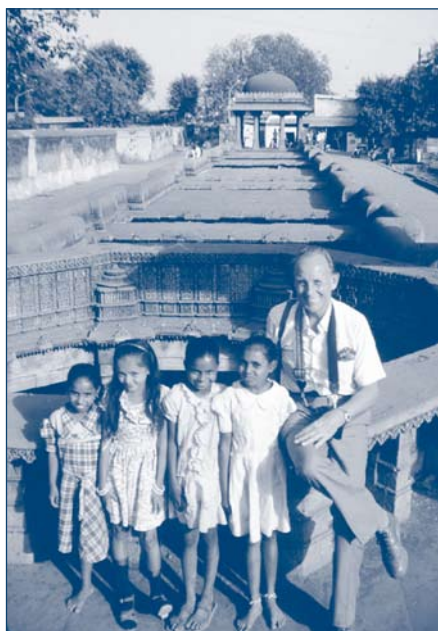
GRA's Lifetime Achievement Award is given annually to individuals who have dedicated their lives to the groundwater industry and are pioneers in the field. At GRA's Annual Meeting in Sacramento, Doug Bartlett presented the 2007 award to Dr. Herman Bower for his outstanding career in education, pioneering work in soil-aquifer treatment (SAT) and artificial recharge, and dedication to providing clean water to the people of the world.

Bower is Dutch for "Builder." Herman grew up in the lowlands of Holland near Amsterdam, and his ancestors were builders of dikes. He was surrounded by dikes and canals, and even sewage infiltration ponds used for soil-aquifer treatment to artificially recharge the groundwater drinking water supply (he is modest, and always pointed to this as evidence that he didn't invent SAT!). He wanted to work outdoors in the Dutch Colonies, so he studied water drainage and irrigation at Agricultural University in Wageningen. He then sailed on the Queen Mary for graduate work at Cornell University, where he received a Ph.D. in agriculture engineering, agronomy and soils, and civil engineering.

Herman began his career teaching at Auburn University in Alabama. During that time a well being drilled for the football team had gone 100 feet in fractured granite, but hit no water. They called Herman for advice, and he said to go deeper. Soon they hit 100 gpm, and after finding water for the # 1 football team in the



*Dr. Herman Bower receiving the GRA award from Doug Bartlett at ISMAR.*



*Dr. Herman Bower with children at a step wall in Gujarati, India, 1985.*

nation, his reputation as a groundwater hydrologist was established.

In 1959, he started work at the new U.S. Water Conservation Laboratory of the USDA in Phoenix, AZ. Herman and his team began modeling surface/groundwater interaction, groundwater mounding of artificial recharge basins, and infiltration rates. He developed the double-tube method of measuring vertical hydraulic conductivities, and the "Bower and Rice" slug test method for measuring aquifer hydraulic conductivity in wells.

Recharge and reuse was the focus of much of the rest of his career. He became adjunct professor at Arizona State University in 1970, and published his "Groundwater Hydrology" textbook in 1978. Herman became director of the U.S. Water Conservation Lab in 1972. He was also the founder of Biennial Symposia on Artificial Recharge in Arizona. Herman retired in 2002 after 42 years with the USDA and over 300 publications. His full autobiography can be found in the September-October 2003 issue of the journal Groundwater.

## The kind response from Herman Bower:

Thank you so much for the Lifetime Achievement Award [from the] Groundwater Resources Association of California that was recently presented to me by Doug Bartlett, Chairman, at the 6th Symposium on Managed Aquifer Recharge in Phoenix, Arizona. I feel deeply honored, particularly since it came from California which to me is still the "mecca" for groundwater rechargers from which I have learned a lot.

The beautiful trophy has a prominent place in our living room.

My regards and thanks go to all the California people with whom I have worked over the years.

Herman Bower

*Martin Steinpress is Chief Hydrogeologist with Brown & Caldwell in Walnut Creek, and is a former Board Member of GRA. ♻️*

**DUDEK** ENGINEERING + ENVIRONMENTAL

**Creatively solving water supply challenges for California cities and water districts.**

Plan | Design | Construct | Manage

WWW.DUDEK.COM  
800.450.1818

San Diego | Los Angeles | Riverside  
Orange | Santa Barbara | Sacramento



# Exploring the Depths of your Data



Designed for hydrogeologists by hydrogeologists, Waterloo Hydrogeologic Software (WHS) features powerful yet easy-to-use environmental software products focusing on groundwater data management, analysis, plotting, modeling, and visualization.

## Waterloo Hydrogeologic Software is used for:

- 3D Geologic Modeling
- 3D Flow and Transport Simulation
- Natural Attenuation and Remediation
- Parameter Estimation and Statistics
- Pumping Test Analysis
- 2D and 3D Visualization
- Water Quality and Data Management

With over 14,000 registered software installations, WHS has become a trusted, reliable brand used by environmental consultants, regulatory agencies, and educational institutions around the world. Call (519) 746-1798 to learn how WHS can help you deliver your environmental projects.

©Schlumberger \* Mark of Schlumberger



[www.water.slb.com](http://www.water.slb.com)  
[sws-sales@slb.com](mailto:sws-sales@slb.com)

# The 2007 Kevin J. Neese Award

BY JEAN MORAN, LAWRENCE LIVERMORE NATIONAL LABORATORY

The 2007 Kevin J. Neese Award was presented to University of California Cooperative Extension (UCCE) Groundwater Hydrology Program at the Biennial Groundwater Conference & GRA Annual Meeting on September 19 in Sacramento. The Kevin J. Neese Award recognizes significant accomplishment by a person or entity within the most recent 12-month period that fosters the understanding, development, protection and management of groundwater. The UCCE Groundwater Program was chosen in recognition of its efforts to engage scientists, regulators, farm advisors, dairy industry representatives, and dairy farmers to better understand the effects of dairy operations on water quality. Thomas Harter, a professor and Cooperative Extension Specialist in the Department of Land, Air, and Water Resources at UC Davis, leads the UCCE Groundwater Hydrology Program and accepted the award from GRA Director Jean Moran. He credited the program's success to the dedication of students and staff at UC Davis, co-principal investigators Marsha Campbell-Matthews, Stu Pettygrove, Roland Meyer, Brian Bergamaschi, Rob

Atwill, and Carol Kendall, the cooperating dairymen who opened their farms to UCCE researchers, the numerous Cooperative Extension and research faculty colleagues engaged in this issue on campus and in the counties, and the outstanding contributions and cooperative spirit of colleagues at other research, government, and industry institutions.

GRA's membership places a high value on the application of sound science to the regulation and management of groundwater resources, and nitrate contamination has been a key focus. One fifth of all dairy cows in the United States are in California, generating 2.5 million lbs of nitrogen per day – the potential impacts to groundwater quality and consequences of regulations and policies are enormous. Research carried out by the UCCE Groundwater Program centers on understanding the role of dairy manure management on groundwater pollution with nitrate, salts,



Dr. Thomas Harter, right, accepts the Kevin J. Neese Award from GRA Director Jean Moran, left.

pharmaceuticals, hormones, and pathogens, and includes extensive field studies and hydrologic modeling.

The recent research carried out by Dr. Harter and collaborators in the UCCE Groundwater Program is invaluable to dairy farmers as well as regulators as they make operational, regulatory, and management decisions that will have significant impacts on water quality. In giving the Kevin J. Neese award, GRA recognizes the group's persistence in engaging both regulatory agencies and the agricultural community, thus allowing scientific findings to drive those decisions. The UCCE Groundwater Program is at the forefront of building a strong connection between scientific research and improved management of California's water resources.

*Dr. Jean Moran is a researcher in the Isotopic Tracers and Transport group at Lawrence Livermore National Laboratory.* ♪

**THE SNAP SAMPLER™**  
BY PROHYDRO, INC.



**Passive Sampling...  
...Sealed In Situ**

- » **Save Money**
- » **Improve Data Quality**
- » **Test Any Analyte**

**WWW.SNAPSAMPLER.COM**



## Sacramento Branch Highlights

BY STEVE LOFHOLM,  
BRANCH SECRETARY

The Sacramento Branch of the GRA hosted a field trip on Saturday July 28 to the Sutter Gold Mine located on Old Highway 49, and one of the few operating gold mines located along the historic Mother Lode. The California Mother Lode is a 120 mile long series of gold-bearing quartz veins extending from Georgetown in El Dorado County on the north, through Amador, Calaveras, and Tuolumne counties, and south to Mormon Bar in Mariposa County. It was discovered in the early 1850s and prospered until World War II. During the California gold rush, the Mother Lode contained hundreds of mines, and was one of the most productive gold districts in the United States.

The field trip was attended by 82 people, including many family members and friends of GRA members, and included a guided mine tour, barbecue, and activities for kids (including the big kids). A delicious barbecue dinner was prepared for all the guests by chefs Rodney Fricke and Julie Friedman. Following dinner, we donned hardhats and were taken underground in open vehicles. Once underground, the guided tour included driving about ½-mile into the mine on a 12 percent grade and walking through a classic mine stope where a gold-bearing quartz vein had been mined. The mine tour provided a rare chance to view gold-bearing quartz veins that were the source for most of the gold mined along the Mother Lode. The tour also included viewing numerous pieces of antique and contemporary mining equipment.

The August meeting featured Val Siebal, the new Director of the Sacramento County Environmental Management Department (EMD). Mr. Siebal provided an overview of the programs administered

by the EMD, which include 35 programs designed to protect human health and the environment. From Wells and Septics, through USTs and Incident Response, to Pools and Restaurants; EMD Programs touch nearly every citizen and business within the County. EMD operates as a dynamic department that revises their programs in order to better serve the residents of Sacramento County. The Environmental Health Division recently initiated the Red, Yellow, Green placarding of food facilities; and inspects public pools and spas. Mr. Siebel explained that while GRA members are probably best-associated with the seven major programs administered by the Water Protection Division, it is actually the smallest of the three divisions that comprise the department. Managing small public water systems is becoming increasingly difficult as the EPA lowers the threshold on contaminant concentrations, and the State Model (Septic System) Ordinance that will be created by AB 885 will change how on-site sewage is handled. ♪



## Stop gambling with your environmental information.

Join the world's largest  
on-demand environmental  
information management system.



ENVIRONMENTAL SOFTWARE & CONSULTING

(650) 960-1640  
[www.locustec.com](http://www.locustec.com)



# Dates & Details

## GRA MEETINGS AND KEY DATES

(Please visit [www.grac.org](http://www.grac.org) for detailed information, updates, and registration unless noted)

GRA Course <i>Introduction to Groundwater &amp; Watershed Hydrology: Monitoring, Assessment &amp; Protection</i>	January 22-23, 2008 Davis, CA	GRA Board Meeting	April 5, 2008 Sacramento, CA
GRA Board Meeting	February 2, 2008 Fountain Valley, CA	GRA Symposium <i>Emerging Contaminants</i>	June 2008 No. CA
GRA Symposium <i>Site Closure Strategies</i>	February 20-21 2008 Concord, CA	GRA Course <i>Groundwater Modeling</i>	September 22-24, 2008 Redwood City, CA
GRA Legislative Symposium & Lobby Day	March 19, 2008 Sacramento, CA	GRA 17th Annual Meeting & Conference	September 24-26, 2008 Costa Mesa, CA



GROUNDWATER RESOURCES ASSOCIATION  
OF CALIFORNIA

915 L Street, Suite 1000  
Sacramento, California 95814

Presorted  
First Class Mail  
U.S. Postage Paid  
Sacramento, CA  
Permit No. 316