

International Association of Hydrogeologists U.S. National Chapter Newsletter

Vol. 38, no. 1: January, 2009

Editor: Dave Kreamer, University of Nevada, Las Vegas



CONTENTS

EDITOR'S NOTE – *Dave Kreamer*

OUTGOING CHAIRPERSON'S REPORT – *Jack Sharp*

INCOMING CHAIRPERSON'S REPORT – *Mike Wireman*

ARTICLES, NOTICES AND ANNOUNCEMENTS

- IAH's *Hydrogeology Journal* - Expanding International Outreach, New Features, and a Sneak Preview of the 2009 Theme Issue
- In Memoriam – Philip LaMoreaux, Sr.
- In Memoriam – Leonard A. Wood
- UNESCO/ IAH – Irvine Framework Summary
- Report on the International Conference on Nonrenewable Ground Water Resources
- Earth Science Literacy Initiative
- USGS Releases New Circular *Ground-Water Availability in the United States*
- The IAH Burdon Groundwater Network – Hydrophilanthropy in Action
- Geoscientists Without Borders
- Congressional Geoscience Fellowship: Apply Now
- Goldscheider to Lead IAH Karst Commission
- New Edition of *Groundwater and Wells*
- American Geological Institute - Critical Needs for the 21st Century: The Role of the Geosciences
- International Year of Planet Earth, 2007-2009 Earth Sciences for Society – IYPE's Successes and Invitation for Scientific Project Proposals
- Green Chemistry: Integrating Environmental Health Research and Chemical Innovation

CONFERENCES AND ASSOCIATED SOCIETIES

- NGWA Groundwater Summit, Tucson, Arizona, April 19-23, 2008 – IAH CoSponsorship
- NGWA Groundwater for the Americas Conference: June 8-10, 2009, Panama City Panama – IAH CoSponsorship
- Joint International Convention, 8th IAHS Scientific Assembly and 37th IAH Congress, Hyderabad, India, September 6-12, 2009
- Geological Society of America (GSA) Annual Meeting, Portland, Oregon, October 18-21, 2009 - USNC IAH to Co-sponsor Three GSA Sessions and Three GSA Field Trips "Volcanoes to Vineyards: Living with Dynamic Landscapes"
- Joint 2010 Annual Meeting Cordilleran Section of GSA — Pacific Section of AAPG May 27-29, 2010
- Announcements and Conference Notes for the Groundwater Resources Association of California (GRA) –IAH CoSponsorship



IAH/US NATIONAL CHAPTER: EXECUTIVE COMMITTEE 2009-2012

Chairman	Michael Wireman (US EPA) (303) 312-6719 wireman.mike@epa.gov
Vice President, North America	Leonard F. Konikow (USGS) lkonikow@usgs.gov
Past-Chair:	John M. (Jack) Sharp (Univ. Texas, Austin) jmssharp@mail.utexas.edu
Secretary:	Dave Kreamer (University of Nevada, Las Vegas) kreamer@nevada.edu (702) 895-3553
Treasurer:	Victor Heilweil (USGS) heilweil@usgs.gov
Director:	William Alley (USGS)
Director:	Vicki Kretsinger Grabert (Luhdorff & Scalmanini, Consulting Engineers)
Director:	Jim LaMoreaux (PE LaMoreaux & Associates, Inc.)

EDITOR'S NOTE

Welcome to IAH! In our first newsletter of 2009, we have a variety of announcements and information to share with you. Enclosed is an update on ongoing activities of the U.S. National Chapter (USNC) of the IAH, information on upcoming meetings, reports on international collaborative efforts, a calendar of events, and other information as well.

A great deal of thanks and gratitude goes to Vicki Kretsinger Grabert who helped get this issue off the ground, as well as many contributors and advisors, including Todd Halihan, Jack Sharp, Mike Wireman, Vic Heilweil, Lenny Konikow, Colin Booth, Rula Deeb, Mike Campana, Stavros S. Papadopoulos, Todd Jarvis, Bill Alley, Chris Groves, and Lorne Everett.

I want to invite everyone to submit any appropriate articles or announcements for publication in future newsletters – just contact me at the telephone number or email address listed above. If you are new to IAH, please get involved to the extent you can. If you are not yet a member of IAH, I urge you to consider joining. It is a little known secret that it is *less expensive* to join IAH, get all the benefits of membership, and receive the *Hydrogeology Journal*, than it is just to order the Journal alone!

The hydrogeologic challenges in the world continue to grow. The United Nations estimates that over 1.1 billion people do not have ready access to safe, potable water, and that 2.6 billion do not have access to basic sanitation, such as toilets or pit privies. By our work in understanding and helping to provide good quality groundwater, we in IAH can help to make the world a better place. Best wishes for a great new year!

- Dave Kreamer



OUTGOING CHAIRMAN'S REPORT

Colleagues,

I wish you a healthy, prosperous, and hydrogeologically stimulating 2009. This is my final chairman's note. I have been most honored to serve as your chairman and I deeply appreciate the assistance and counsel you have provided me. In the last year, I think we have moved forward on a number of areas.

First, we have a very active and enthusiastic group on the new Board of Directors. This bodes very well for IAH.

Second, we are indeed a nonprofit organization - registered by both the State of Colorado and, as a non-profit 501 (c) (3) corporation, by the Internal Revenue Service. I urge you consider charitable donations to the U.S. National Chapter of the International Association of Hydrogeologists. Your donation will be put into a (conservative) investment and the proceeds used to increase scientific awareness of groundwater issues nationally and internationally. We also discussed at our corporate meeting in Houston, in conjunction with the GSA annual meeting, funding student memberships as well as sponsorship of members from third world countries.

Third, we co-sponsored with the University of California at Irvine and UNESCO the conference on Water Scarcity, Global Changes and Groundwater Management Responses. See incoming Chairman Mike Wireman's report on the conference. Conferences on special groundwater issues should continue to be one of our focuses, both in conjunction with other organizations or as the conference lead.

Finally, we are becoming more active with the annual meeting of the Geological Society of America in the fall and the National Ground Water Association's Ground Water Summit in the spring. At these events, we have had more attendance at our US IAH meetings than any that I can recall. We are sponsoring several sessions at the GSA Conference in Portland, Oregon, next fall. Those of you who are interested in addressing the groundwater issues at either meeting, please join us for discussions at Tucson next spring (see page 19 below) or Portland in the fall (see page 23 below).

The health of our chapter is basically good, although we always are looking for new members. The fact that the Spanish and Australian chapters are slightly bigger than the US chapter is often brought to our attention on the international stage. This is probably due to the fact that we have more water-oriented professional and scientific societies in the USA with which we in some sense compete. However, IAH is the international groundwater organization. Our *Hydrogeology Journal* is a wonderful resource, now available either on line or in paper, and IAH is the place where hydrogeologists from across the globe confer. I hope to see some of you at the IAH Congress in Hyderabad next September.

- Jack Sharp



INCOMING CHAIRMAN'S REPORT

Colleagues,

I am honored and excited to be the new Chair for the US National Chapter (USNC) of the International Association of Hydrogeologists. First, let me introduce myself. I am with the US Environmental Protection Agency in Denver, Colorado where I serve as a National Ground-Water Expert. I have more than 25 years of experience as a practicing hydrogeologist with a wide portfolio of experience in the USA and Eastern and Central Europe. My work primarily involves providing technical and scientific support to several EPA programs, other Federal agencies, International programs, ground-water protection/management programs in several western states; directing applied research projects and teaching. I can be reached at 303-312-6719 or wireman.mike@epa.gov.

I want to send a very heartfelt thank you to Jack Sharp, the outgoing Chair of the USNC. Under Jack's leadership, our Chapter has been very active in developing strong partnerships with NGWA and GSA. Jack has also completed the tedious task of establishing the USNC as a non-profit corporation in Colorado. As a non-profit organization, we will have a number of benefits, including the ability to accept donations, establish endowments, and establish student sponsorship funds. This is an important change for the USNC, and I want to thank Jack for his hard work.

The members of the Executive Board for the new term include: Secretary - Dave Kreamer, University of Nevada at Las Vegas; Treasurer – Vic Heilweil, USGS, Salt Lake City; Director –Bill Alley, Chief of the Office of Ground Water for USGS; Director - Vicki Kretsinger Grabert, Luhdorff & Scalmanini Consulting Engineers; and Director- Jim LaMoreaux, PE LaMoreaux & Associates. Jack Sharp, as past Chair also stays on the Executive Board. I am pleased to be working with this impressive group; there is no doubt that this will be a very active Board.

My initial set of goals for this new term includes the following:

1. expand membership
2. sponsor a session at the NGWA Summit and the GSA annual meeting
3. continue discussions regarding the USNC sponsoring a future conference in the US
4. establish a website
5. make decisions regarding the investment and expenditures of USNC funds
6. establish a closer relationship with the Canadian and Mexican Chapters
7. work more closely with IAH International Office
8. generate more active member involvement

These goals are numerous and ambitious, but I am confident that we can make significant progress on many, if not most of them.

Please feel free to contact me or any of the Executive Committee members with any issues /ideas regarding the activities of the US National Chapter. Have a great year in 2009!

- Mike Wireman, Chair – US National Chapter - IAH



Some of the IAH US Chapter Members at the Joint Meeting of the Geological Society of America/ Soil Science Society of America/ American Society of Agronomy/ Crop Science Society of America/ Gulf Coast Association of Geological Societies / Houston Geological Society, in Houston Texas, Oct. 7, 2008. Pictured are from left to right (Back Row) Ray Johnson, Wes Danskin, Lenny Konikow, Bill Alley, Jim LaMoreaux, Suzanne Pierce, Noel Krothe; (Front Row) Dave Kreamer, Vicki Kretsinger Grabert, Victor Heilweil, and Jack Sharp

ARTICLES AND REPORTS



IAH's *Hydrogeology Journal* – Expanding International Outreach, New Features, and a Sneak Preview of the 2009 Theme Issue

by Vicki Kretsinger

Expanding International Outreach and Globally Applicable Content

The *Hydrogeology Journal* (*HJ*) continues to grow and evolve. Since its inception, each journal article includes French and Spanish abstracts. In concert with the journal's international nature, the *HJ* soon adds Chinese and Portuguese as two new standard languages for abstracts. Authors, when invited, may also provide translations in their preferred language as selected from the 32 languages currently available.

Theme issues with fabulous collections of manuscripts gathered by Guest Editors constitute truly book-like editions. The eight *HJ* issues produced each year contain a wealth of content. Upcoming, and further described below, is the 2009 theme issue on "Hydrogeocology and Groundwater Dependent Ecosystems." In 2010, the theme issue focuses on "Coastal Aquifers and Seawater Intrusion"; the 2011 theme issue focuses on "Natural Tracers in Hydrogeology."



New Features: Free Color and Time Capsule Profiles

The *HJ* also contains new exciting features. The Editors created the following new benefits:

- 1) **Free Color:** starting in 2008, authors pay no additional cost for color figures; and
- 2) **Time Capsule Profiles:** interviews of eminent hydrogeologists are available on the website <http://timecapsule.ecodev.ch> and an accompanying Profile article is included in an *HJ* issue (the Profile articles are available to members and nonmembers).

SNEAK PREVIEW – 2009 *HJ* theme issue: “Hydrogeoecology and Groundwater Dependent Ecosystems”

Three Guest Editors, Peter Hancock of Ecosystem Management of the University of New England, Armidale, New South Wales, Australia; Randall Hunt of the U.S. Geological Survey, Wisconsin Water Science Center, Middleton, Wisconsin; and Andrew Boulton also of Ecosystem Management of the University of New England, rallied papers for the 2009 *HJ* theme issue that address groundwater’s importance to ecosystems. Several years ago, the term ecohydrology made its way into the scientific literature to address water resources and ecologic issues. More recently, the term ‘hydrogeoecology’, used by the Guest Editors to highlight groundwater-ecology interactions, also appears in the literature.

The January-February 2009 *HJ* theme issue further explores the critical role that groundwater plays to ecological communities. Essential ecosystem linkages, including ecological, hydrological, physical, chemical, and biological processes, to their groundwater counterpart reside at the brink of understanding. Interdisciplinary partnering constitutes a central theme in this volume; there exists an exciting journey ahead that commands multidisciplinary approaches to explore and unravel the greater mysteries and underpinnings of these linkages.

The Guest Editors focused this theme issue on examples that illustrate the current state and breadth of truly interdisciplinary studies concerned with hydrogeoecology. The Guest Editors emphasize their intentions to “raise awareness among hydrogeologists of the importance of groundwater to a range of ecosystem-related questions, and to promote more effective consideration of the ecological consequences of hydrogeological decisions.” The theme issue’s objectives also include encouraging biologists that work with groundwater systems to become more familiar with the hydrogeological literature and to consider ‘ecological’ questions in hydrogeological terms. The issue also highlights the global diversity of groundwater dependant ecosystems and the interdisciplinary collaborations assembled to investigate these systems.

Historically, such studies generally focused on local scales of analysis, e.g., aquifers or local sites, which limited the data available to develop a comprehensive understanding of the diversity and significance of groundwater dependant ecological processes. Hydrogeoecological studies continue to gain momentum in breadth and innovation. The Guest Editors and authors promote future collaborative research on spatial and temporal scales relevant to the hydrogeological and the ecological processes being studied to improve the understanding of the linkages between groundwater and ecosystems.

Importantly, the 2009 theme issue distills the following foundational elements necessary for future hydrogeoecological endeavors:

- 1) Societal problems are often hydrogeoecological in nature;
- 2) Identifying, interpreting, and resolving future hydrogeoecological issues requires appropriate approaches;
- 3) Development of such approaches calls for the coalescing of scientific methods used by hydrogeologists and ecologists; and
- 4) Interdisciplinary inquiry and collaboration promises exciting developments for future research.

Stay tuned – the 2009 *HJ* theme issue presents hydrogeoecological papers that explore new questions, describe novel research approaches, and bridge scientific disciplines!



In Memoriam



In Memoriam - Philip LaMoreaux, Sr.

By Dr. Jim LaMoreaux

Father, colleague, mentor, friend. How many of us are fortunate enough to have a relationship like this? I was one of the very few to have that honor although many people said that Dr. Philip E. LaMoreaux was a “father figure” to them in addition to having served in the other roles as well.

In Thailand he was honored with the title “Father of Hydrogeology”. He loved to regale people with the story of an early ground-water investigation in the 1950’s with his Thai counterpart, Chumchet, when they were riding on an elephant and encountered a tiger. The elephant threw Chumchet into the jungle and dad could not shoot the tiger for fear of hitting Chumchet. Chumchet and dad lived to tell the story which of course was just one of many he told.

Dr. LaMoreaux lived his life to the fullest and shared his enthusiasm for life and his work with all of us. Our family received condolences from people all over the world that helped us know how many lives he touched. One student of his recalled a meeting during which dad told him if the student took his course in ground-water hydrology it would change the student’s life and it did.

My mother, brother, sister and I and other members of the family and of PE LaMoreaux & Associates, Inc. (PELA) would like to thank the families of the International Association of Hydrogeologists (IAH) for making us part of their families over the years. Many of dad’s and mom’s best memories shared with us were about their interactions with IAH colleagues and friends.

Dr. LaMoreaux was honored to serve as the first American President of the IAH and considered it one of the highlights of his career. It provided many contacts for the company he founded, PELA, to build its reputation as an internationally recognized consulting company, a legacy which continues today. Many of the people he met also came to study at the University of Alabama where Dr. LaMoreaux was an Adjunct Professor or to work with the US Geological Survey (USGS), the Alabama Geological Survey, or PELA. To perpetuate this effort Dr. and Mrs. LaMoreaux established the LaMoreaux Geology Scholarship to help international students come to the University of Alabama to study in the field.

Dr. LaMoreaux began his career with the USGS as a hydrogeologist in 1943 and worked his way up to Chief of the Ground-Water Branch. In 1961, he became Alabama State Geologist and Oil and Gas Supervisor where he built the



survey into one of the largest and most respected in the country. When Dr. LaMoreaux retired from the Alabama Survey, he founded PELA. Dr. LaMoreaux loved his work so he never really retired; he just went from one project to the next. His enthusiasm was commemorated in PELA's Christmas parties as an award named "Have I got a Project for You" that was given every year.

The work that he was doing when he passed away in June of 2008 was serving as Editor in Chief of the international journal, *Environmental Geology*, published by Springer Verlag. He brought the journal from a publication issued four times a year to one published twelve times a year along with supplemental special issues on wide ranging topics of critical interest. In 2009 *Environmental Geology's* name is being changed to *Environmental Earth Sciences*; its aims and scope are being expanded and it will be published in full color. All of these were things that Dr. LaMoreaux worked to bring to fruition and knew that they were being implemented before he died.

Throughout his life Dr. LaMoreaux wrote or edited numerous technical publications in addition to the journal. Many of these related to karst hydrogeology. One of these of which he was primary editor, *Hydrology of Limestone Terranes—Annotated Bibliography of Carbonate Rocks*, was published by IAH after publication of its initial volumes by the Alabama Geological Survey. He also served as Chairman of IAH's Karst Commission and as a member of the Commission on Mineral and Thermal Waters (CMTW). In fact his last field trip and IAH conference was the one sponsored by IAH's CMTW to Romania in 2007.

Dr. LaMoreaux' book on *Springs and Bottled Waters of the World* had contributions from many of his IAH colleagues who provided summaries of famous springs of the world for the book. Environmental hydrogeology was one of the other primary loves of Dr. LaMoreaux' life and he was able to see the second edition of his book *Environmental Hydrogeology* to fruition before he passed away.

In addition to his regular jobs, dad took on many voluntary responsibilities with numerous professional organizations in addition to IAH. He served in various officer positions and chairmanships of committees where he left his mark as well.

Through these publications and his professional and personal activities, Dr. LaMoreaux was able to educate and encourage professionals in the field and those considering a career in the earth sciences. He also emphasized communicating with the public through the written word and perhaps even more importantly graphically to help them understand the world we live in and better appreciate how geology and hydrogeology relate to the environment and our everyday lives.

Dad lived his life enthusiastically and with compassion. He inspired all who knew him and would want us to do the same.

In Memoriam

LEONARD A. WOOD
(1922 – 2008)

Leonard A. Wood, Chairman of the U.S. Committee of the International Association of Hydrogeologists between 1977 and 1980, passed away on November 10, 2008.

Leonard was born in Michigan in 1922, and obtained his B.S. degree in Geology from Michigan State University in 1946. Leonard's first position as a hydrogeologist was with the Ground Water Branch of the U.S. Geological Survey (USGS) at Lansing, Michigan where he started working in 1947 under the supervision of John G. Ferris. His career with the USGS lasted for over 40 years until he took an early retirement in 1980. During his years with the USGS,





Leonard served in the Houston and Austin, Texas offices (1952-63), where one of his accomplishments was the development of a multi-layer electric analog model of the Houston area, in the Denver, Colorado office (1963-67), where he was in charge of groundwater studies conducted in cooperation with state agencies, and in the Reston, Virginia headquarters office (1967-80) where he assisted the Chief Hydrologist and/or the Director in responding to inquiries from the U. S. Congress, other federal agencies, or the public. His many contributions to the USGS were recognized in 1975 by the presentation of the U.S. Department of Interior's Meritorious Service Award.

Leonard's education and early career with the USGS were interrupted by military service. First, during the Second World War when he was a fighter pilot in Europe between March 1943 and September 1945, and then during the Korean War in the early 1950s when he served again for 21 months.

After retiring from the USGS, Leonard joined S. S. Papadopoulos & Associates, Inc. (SSP&A) in Bethesda, Maryland where he worked until his second retirement in 1996. During his years with SSP&A, Leonard worked in numerous investigations that involved groundwater contamination and remediation, including superfund sites such as the Chem-Dyne Site in Ohio and the Lone-Pine Site in New Jersey. Leonard's responsibilities during these years ranged from the supervision and implementation of field investigations to data interpretation and report preparation.

In addition to his service to the International Association of Hydrogeologists, Leonard was also very active in the Hydrogeology Division of the Geological Society of America (GSA) and served as the Chairman of the Division between 1981 and 1982. The Hydrogeology Division of GSA presented Leonard the Award for Distinguished Service in Hydrogeology, on October 21, 1997, during the Annual Meeting of the GSA in Salt Lake City, Utah, for his many contributions to hydrogeology and to the Division.

Stavros S. Papadopoulos

UNESCO/IAH -- Irvine Framework Summary

By Mike Wireman

The US National Chapter of IAH was a co-sponsor of the International Conference on Water Scarcity, Global Changes, and Groundwater Management Responses held at the University of California, Irvine from December 1-5, 2008. More than 250 people from at least 55 countries attended the conference. The conference format included numerous breakout sessions (oral papers) and summary plenary sessions (panel discussions) surrounding five major themes: 1. Adapting to the impacts of global changes on river basins and aquifer systems; 2. Strengthening water governance for sustainability; 3. Ecohydrology for sustainability; 4. Water and life support systems; and 5. Communication, education and capacity. These are the themes included in the UNESCO International Hydrological Programme –VII. The most significant discussions related to the need for better governance of water resources at all levels and the need for increased understanding of the impact of global change on the availability of water resources. A key product of the conference is the “Irvine Action Framework”. This framework is a statement of the key actions that are needed to proactively address the growing and interconnected world water-energy-food crisis, emphasizing those related to governance, communication, and groundwater management responses. The Framework will be carried forward to UNESCO for implementation. (A copy of the Irvine Action Framework is available from the US Chapter Chair (wireman.mike@epa.gov). Thanks are extended to Lenny Konikow, Vic Heilweil, Dave Kreamer and Suzanne Pierce who helped me in my role as a member of the scientific committee and the drafting committee for the Irvine Action Framework and presented oral papers at the conference.



Report on the
International Conference on Nonrenewable Ground Water Resources

The Sociotechnological Aspects of Nonrenewable Ground Water Resources:

Half-empty, Half-full, Top-down, Bottom-up, and Some Paths Forward

13-14 October 2008 - Portland, OR

National Ground Water Association

Co-sponsored by the Institute for Water and Watersheds at Oregon State University, the International Association of Hydrogeologists, the World Bank, and UNESCO-IHP

Conference report by Todd Jarvis and Michael E. Campana of the Institute for Water and Watersheds at Oregon State University (water.oregonstate.edu)

*“All water discharged by wells is balanced by a loss of water somewhere...This loss is always to some extent and in many cases largely from storage in the aquifer.
Some ground water is always mined.”*

-- C.V. Theis, 1940

Conference Introduction

Building upon the United Nations Educational, Scientific, and Cultural Organization (UNESCO), in concert with The World Bank, published *Non-renewable Ground Water Resources – A Guidebook on Socially-sustainable Management for Water-policy Makers*, fifty-five water experts from five countries and ten US states presented a suite of international case studies, US case studies, economic and legal aspects, and mitigation measures. The term “nonrenewable ground water” is controversial because it refers to ground water resources where present-day replenishment is limited but aquifer storage is large (Foster and Loucks 2006), where replenishment is very long (100s to 1000s of years) relative to the time frame of human use (Foster and others 2003), where the use of ground water storage is at a rate much greater than the renewal rate, essentially “mining” the ground water (Llamas and Custodio 2003), or the ground water resources are essentially “decoupled” from the hydrologic cycle due to changes in the climatic conditions in the watershed (Polak and others 2007). Yet in his keynote address, T. N. Narasimhan indicated that the definition of nonrenewable ground water extends beyond these “traditional” definitions, and includes aquifers where the storage characteristics of the aquifer have been permanently changed due to pumping, often referred to as “transient storage”.

International Case Studies

International case studies included Crevillente and La Mancha, Spain; Alberta, Canada; and the North China Plain. Lucia De Stefano and her colleagues at the Universidad Complutense de Madrid, Universidad de Alicante, the Royal Academy of Sciences of Spain and the Universidad de Almeria, chronicled the impacts of agricultural use on non-renewable ground water and the challenges associated with developing new policies to address the “silent revolution” of the thousands of unregistered wells. Eloise Kendy of The Nature Conservancy described the importance of integrating evapotranspiration from irrigated crops into the equation to determine “sustainable” pumping rates (see Kendy, 2003). Kevin Parks of the Alberta Geological Survey cited the challenges in classifying and regulating nonrenewable ground water, especially in light of the tar sand “oil boom” underway near Fort McMurray.

United States Case Studies – Part I

The first session on case studies in the US was initiated by John Shomaker, who described his concept of “mining” the Albuquerque basin through a perpetual pumping scheme (Shomaker, 2007). Susan Stover of the Kansas Water Office presented the state’s efforts at conserving the High Plains Aquifer by leveraging a Conservation Reserve Enhancement Program (CREP) in partnership with the USDA. David Morgan of the USGS showed the technical approach to their ongoing assessment on ground water availability in the basalt aquifer systems comprising the Columbia Plateau. Ken Rainwater of Texas Tech and Judy Reeves of Cirrus Associates discussed the increased use of the little-used Dockum Aquifer as a replacement for the Ogallala aquifer in the Texas Panhandle region.



While the deep aquifers within the Denver Basin of Colorado are being mined at an alarming rate, Bob Reynolds of the Denver Museum of Nature and Science described many different methods of “geovisualization” to portray the architecture and dewatering of the ground water systems. Stephen Ragone, consultant to the NGWA, built upon his Post-Modern Water Balance concept and the Alicante Declaration (Ragone, 2007a and 2007b) with the notion that ground water management can be an agent of social change.

Sociotechnical Aspects

Engineer and water ethicist Professor Ramón Llamas of the Universidad Complutense de Madrid built upon his seminal work on water ethics (Llamas, 2004), where he proffered that the ethics of ground water mining must be tied to: (1) quantification of ground water reserves with acceptable capacity; (2) long periods of the rate of depletion, say from 50 to 100 years; (3) the fact that environmental impacts can be assessed and considered less significant than the socio-economic benefits from ground water mining; and (4) solutions envisioned for the time after the ground water has been mined.

A group of graduate students with the Water of the West (WOW) Program at the University of Idaho described the decision making process in the Palouse Basin in Idaho and Washington. The project is still underway but appears likely to offer lessons learned which could be transferred to other settings (see webpage for project at <http://water.uidaho.edu/pbcs.htm>).

Rima Petrossian of the Texas Water Development Board provided an update on the Ground Water Management Area (GWMA) process in Texas where a “desired future condition” for relevant aquifers must be in place by 2010. One GWMA overlying the Ogallala aquifer elected to dismiss “sustainability” as a desired future condition because they wanted to derive economic benefits now.

Denise Fort of the University of New Mexico School of Law indicated that state policies regarding mining of ground water are minimal, and those state policies that do address mining of ground water are “comically dysfunctional”. Todd Jarvis of the Institute for Water and Watersheds addressed the concept of “unitization” used in the oil and gas industry and how it might be applied to ground water building upon the work of Libecap (2005). Gabriel Eckstein of the School of Law at Texas Tech University discussed international law and nonrenewable ground water, also discussing the corollaries between the management of oil and gas versus water and the discussion between water as a commodity versus a human right, and that the recently introduced draft Convention on Transboundary Aquifers vaguely addresses nonrenewable ground water.

United States Case Studies - Part II

Victor Heilweil of the USGS described the ongoing work on the Great Basin Carbonate Aquifer System which the Southern Nevada Water Authority anticipates pumping tens of thousands of acre-feet per year into a multi-billion dollar pipeline to Las Vegas. John Porcello of GSI Water Solutions, Inc. showed a southern California case study where modeling of different land use and growth scenarios lead to future water development planning so the ground water system would not become nonrenewable. John Tracy of the University of Idaho Water Resources Research Institute presented work on Walker Lake in Nevada, where decades of issuance of water rights and ground water pumping captured the ground water discharge leading to a dramatic degradation of the lake water quality.

Mitigation of Nonrenewable Ground Water

Bruce Thomson of the University of New Mexico Department of Civil Engineering discussed sources of “new” water such as treated wastewater, brackish ground water and, by-product water from oil and gas or mineral extraction. One problem with the brackish water resource is that it is also nonrenewable. Thomson’s work with Kerry Howe on inland desalination technologies revealed that brackish water might be potentially more problematic due to the geochemistry of the brackish waters (more dissolved silica among other divalent analytes) as opposed to the primarily monovalent seawater.



Jason Keller and colleagues with GeoSystems Analysis, Inc. presented a case study of using stormwater runoff in urban areas in California as a tool to mitigate loss of nonrenewable ground water. Their work is especially relevant to the ongoing interest in utilizing abandoned aggregate quarries as potential managed recharge sites in California.

Barry Hibbs of California State University, Los Angeles discussed the role of induced infiltration in unlined portions of the Rio Grande. In related work, he also discussed the unintended consequences of lining the All-American Canal on wetlands and associated habitat at the Dos Palmas Preserve.

Closing Statement

The excellent presentations and degree of speaker and audience interaction were exceptional and comparable to smaller venues such as the Theis Conferences offered by NGWA. The audience was in general agreement that the topic needs to be revisited in two years, perhaps at a venue experiencing the direct influences of developing nonrenewable ground water.

References

1. Foster, S., M. Nanni, K. Kemper., H. Garduño, and A. Tuinhof. 2003. Utilization of Non-Renewable Groundwater. Briefing Note Series No. 11. Washington, DC. The World Bank. (<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTWRM/0,contentMDK:20424251~pagePK:210058~piPK:210062~theSitePK:337240,00.html>).
 2. Foster, S. and D.P. Loucks (editors). 2006. *Non-Renewable Groundwater Resources: A Guidebook on Socially-sustainable Management for Water-policy Makers: IHP-VI*, Series on Groundwater No. 10. United Nations Educational, Scientific and Cultural Organization, Paris, France.
 3. Kendy, E. 2003. The False Promise of Sustainable Pumping Rates. *Ground Water*. 41(1):1-4.
 4. Libecap, G.D. 2005. The Problem of Water. Essay prepared for the University of Arizona, Tucson and National Bureau of Economic Research. <http://www.u.arizona.edu/~libecap/downloads/TheProblemOfWater.pdf>
 5. Llamas, R., and E. Custodio. 2003. Intensive use of ground water: a new situation that demands proactive action. In *Intensive Use of Groundwater: Challenges and Opportunities*. R. Llamas and E. Custodio, editors. A.A. Balkema Publishers, Leiden, The Netherlands, pp.13-31.
 6. Llamas, R. 2004. *Water and Ethics – Use of Groundwater*. International Hydrological Programme and World Commission on the Ethics of Scientific Knowledge and Technology Series on Water and Ethics, Essay 7. United Nations Educational, Scientific and Cultural Organization, Paris, France. <http://unesdoc.unesco.org/images/0013/001363/136322e.pdf>
 7. Polak, M., R. Klingbeil, and W. Struckmeier (editors). 2007. *Strategies for the Sustainable Management of Non-renewable Ground water Resources*. Federal Institute for Geosciences and Natural Resources (BGR), Hannover, Germany.
 8. Ragone, S.E. 2007a. The Alicante Declaration: Steps Along the Pathway to a Sustainable Future. *The Global Importance of Groundwater in the 21st Century: Proceedings of the International Symposium on Ground water Sustainability, January 24-27, 2006, Alicante Spain*: The National Ground Water Association Press, Westerville, OH.
 9. Ragone, S.E. 2007b. The Post-Modern Water Balance and Its Role in Ground water Management. *The Global Importance of Groundwater in the 21st Century: Proceedings of the International Symposium on Groundwater Sustainability, January 24-27, 2006, Alicante Spain*: The National Ground Water Association Press, Westerville, OH.
 10. Shomaker, J. 2007. What Shall We Do with All of This Ground Water? *Natural Resources Journal*. 47(4):781-791.
 11. Theis, C.V. 1940. The Source of Water Derived From Wells – Essential Factors Controlling the Response of an Aquifer to Development. *Civil Engineering*, pp. 277-280.
-



Earth Science Literacy Initiative

By Vicki Kretsinger

The Earth Science Literacy Initiative (ESLI), an effort funded by the National Science Foundation (NSF), aims to gather and summarize the underlying principles of Earth Sciences that span a wide variety of research fields into a document that ultimately has broad-reaching applications. These fields include geobiology and low-temperature geochemistry, geomorphology and land-use dynamics, geophysics, hydrologic sciences, petrology and geochemistry, sedimentary geology and paleobiology, and tectonics. It identifies the “Big Ideas” along with supporting concepts that represent the current state of knowledge and research in Earth Sciences. The ESLI intends to succinctly present what all citizens should know about Earth Sciences.

A public-review draft of the ESLI was developed through an NSF-supported, 350-participant online workshop held in May 2008 and a 35-participant, in-person writing workshop held in July 2008. These workshops brought together scientists from a broad representation of the geosciences, including mineralogists, petrologists, resource explorationists, sedimentologists and stratigraphers, paleontologists, tectonicists, geophysicists, geomorphologists, low-temperature geochemists and biogeochemists, continental dynamicists, volcanologists, geohazard specialists, and hydrologists. The draft ESLI was initially released for public comment in October.

ESLI’s Big Ideas

ESLI sets forth the following **Big Ideas** in the initial draft document:

1. Earth is 4.6 billion years old and the rock record contains its history.
2. Earth is a complex system of interactions between rock, water, air, and life.
3. Earth is a continuously changing planet.
4. Earth is the water planet.
5. Life evolves on a dynamic Earth and continuously modifies Earth.
6. Humans depend on Earth for resources.
7. Earth science reduces the impacts of natural hazards.
8. Humans have become a significant agent of change on Earth.

Your Comments are Important

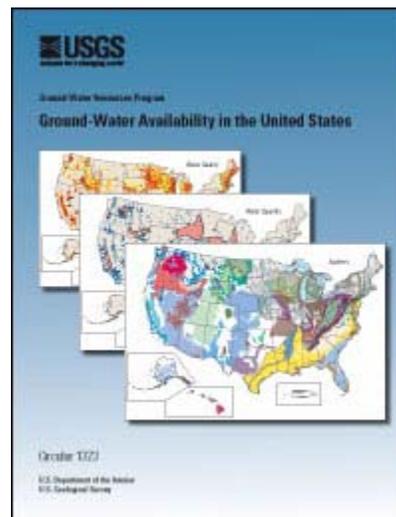
Preliminary comments on the draft ESLI from the October review period were incorporated in a revised draft ESLI. As of December 15, the revised draft document is available for final review and comment. The final document will be printed toward the end of January.

This is a critical time for communicating the role that geosciences plays in helping society meet the challenges of natural hazards and human impacts on the environment. To check the status of the ESLI development, and opportunities for further comments on the revised draft, go to www.earthscienceliteracy.org.



USGS Releases New Circular: Ground-Water Availability in the United States

A new Circular, titled *Ground-Water Availability in the United States*, has been released by the U.S Geological Survey (USGS). Circular 1323 examines what is known about groundwater availability in the United States and places the regional studies by the USGS Ground-Water Resources Program as a long-term effort to understand groundwater availability in major aquifers across the Nation. The report is written for a wide audience interested or involved in the management, protection, and sustainable use of groundwater resources. The report is available online at <http://pubs.usgs.gov/circ/1323/>.



The IAH Burdon Groundwater Network – Hydrophilanthropy in Action

The IAH Burdon Network is working to support hydrogeologists in developing countries, to increase access to safe water, and to support the realization of the United Nations' Millennium Development Goals. The initial focus of the Network is sub-Saharan Africa, where the majority of rural inhabitants have no access to potable water, and the need for sustainable supplies is the greatest. This network is a true instance of hydrophilanthropy in action – for more information, newsletters, updates and how you can help go to: <http://www.iah.org/burdon/default.htm>

Geoscientists Without Borders

According to a recent Press Release from SEG (Society of Exploration Geophysicists), the SEG Foundation has launched a new “Geoscientists *Without* Borders” program. The first two funded projects will be in India and Thailand, and hydrogeophysics will play a major role in both projects.

One of the initial projects will address the severe water crisis in rural India. Clemson University and the Foundation for Ecological Security (an India non-profit organization) will use electromagnetic induction to map soil moisture and shallow aquifers in the Salri watershed in the State of Madhya Pradesh, India. The scarcity of fresh water is a longstanding problem central India that impacts the health, productivity, and quality of life for millions of people. Even though the annual rainfall for the area is usually between 45 and 60 inches per year, most of it falls in only three months of the year. The goal of this project is to increase the water supply through water capture, storage, and usage management. Geoscientists *Without* Borders will provide tools and knowledge that will assist villagers in making water management decisions that will favorably impact water supply throughout the year. Schlumberger provided a major grant to initiate the program. The foundation plans to support two projects per year.

For more information about Geoscientists Without Borders please visit their web site at <http://seg.org/gwb>.



Congressional Geoscience Fellowship: Apply Now

The American Geological Institute (AGI) announces the William L. Fisher Congressional Geoscience Fellowship. The successful candidate will spend 12 months (starting September 2009) in Washington, DC, working as a staffer for a Member of Congress or a congressional committee. The fellowship is a unique opportunity to gain first-hand experience with the legislative process and contribute to the effective use of geoscience in crafting public policy. Minimum requirements are a master's degree with at least three years of post-degree professional work experience or a Ph.D. at the time of appointment. The fellowship carries an annual stipend of up to \$56,000. All application materials must be transmitted by February 1, 2009. For more details on this and other fellowships, please visit <http://www.agiweb.org/gap/csf/index.html>

Goldscheider to Lead IAH Karst Commission

In December, IAH President Willi Struckmeier invited Dr. Nico Goldscheider of the Centre d'Hydrogéologie at Switzerland's Université de Neuchâtel to become the new chair of the IAH Karst Commission. Goldscheider is well known to the international karst science community, having long been an active member of the Commission with a distinguished record of accomplishments in karst hydrogeology, with special interest in innovative methods for tracer studies and groundwater vulnerability mapping. Dr. Neven Kresic, Senior Principal Hydrogeologist with MACTEC Engineering and Consulting in Atlanta, Georgia will co-chair the Commission.

The Commission has been ably led for many years by Dr. Heinz Hötzl of the University of Karlsruhe and Dr. David Drew of Ireland's Trinity University. Under their leadership the Commission made numerous significant contributions to international communication in the karst sciences, most recently with the 2007 publication of *Methods in Karst Hydrogeology*, edited by Goldscheider and Drew. The Commission extends a warm thank you to Professors Hötzl and Drew for their years of excellent service. During this time understanding and appreciation for the importance of karst hydrogeology have improved.

Karst aquifers have been estimated to cover some 15% of the earth's land area, and supply water to 25% of the world's population. At the same time, there are many challenges to the successful development of karst groundwater resources. Because of the nature of these systems, with much of the groundwater flowing with high velocities through well-developed conduits, they are typically very vulnerable to contamination. Study of karst systems also requires a somewhat different set of techniques than those used in porous and fractured media aquifers.

A new website is under construction, and the Commission will continue working to enhance international communication among karst scientists. IAH members interested in learning more about the Karst Commission and its activities can contact Dr. Goldscheider at <nico.goldscheider@unine.ch>.

Submitted by Chris Groves, Hoffman Environmental Research Institute, Western Kentucky University



New Edition of *Groundwater and Wells* Robert Sterrett, Editor

Johnson Screens® has provided the water well industry with the *Groundwater and Wells* books since the First Edition (Briggs) was published in 1966, followed by the Second Edition (Driscoll) in 1986. Now, more than forty years after the initial publication, the long awaited *Groundwater and Wells* - Third Edition was released in June 2008 and is now available to book stores, libraries, and the public. The Third Edition (Robert Sterrett, editor), focuses on the practical aspects of design, maintenance, and drilling methods associated with a well. Theoretical concepts are discussed, but the emphasis is on everyday applications. The book contains an information-packed DVD with interactive programs. These programs include a well-design program, a well-maintenance program, and a water well logging program. Other information included on the DVD are extensive appendices and electronic copies of all issues of the historic *Johnson Driller's Journal*, printed between 1929 and 1984. Lastly, there is a field guide for logging water well boreholes that is contained in the back of the book. For more information, or to order a copy, visit www.johnsonscreens.com/book.



Blueprint for the Future *Critical Needs for the Twenty-First Century: The Role of the Geosciences*

USNC of IAH is an AGI Member Society

The United States National Chapter of IAH is a *Member Society* of the American Geological Institute (AGI). AGI is a nonprofit organization of 45 geoscientific and professional associations. AGI provides “information services to geoscientists, serves as a voice of shared interests in our profession, plays a major role in strengthening geoscience education, and strives to increase public awareness of the vital role the geosciences play in society's use of resources, resilience to natural hazards, and the health of the environment.” One of the direct benefits to IAH members is a discount on AGI publications, including their popular *Directory of Geoscience Departments* (46th Edition released in 2008), the *Glossary of Geology* (5th edition), and the *Glossary of Hydrology*.

AGI has an active Government Affairs Program (GAP), which serves as an important link between the federal government and the geoscience community. “Through Congressional workshops, testimony, letters, and meetings, GAP ensures that the voices of the AGI Member Societies are heard on Capitol Hill and in the executive branch.” Importantly, the GAP is actively engaged in improving the flow of geoscience information to policy makers and also in providing federal science-policy information back to the Member Societies and the geoscience community at large. The GAP distributes a monthly *Government Affairs Review*. The November 2008 Review was distributed December 5 and is available online at <http://www.agiweb.org/gap/index.html>. You can also sign up to receive these by e-mail.

Recently, the GAP with the guidance and input of AGI's Member Societies prepared a blueprint, or transition 2008 document, for new federal leadership in the United States. The document, "*Critical Needs for the Twenty First Century: The Role of the Geosciences*," lists seven critical needs and relevant national policy actions for the nation to meet these needs with the help of the geoscience community:



1. **Energy and Climate Change:** How do we secure stable energy supplies in an increasingly carbon-constrained world?
2. **Water:** Will there be enough fresh water and where will it come from?
3. **Waste Treatment and Disposal:** How will we reduce and handle waste and provide a healthy environment for all?
4. **Natural Hazards:** How will we mitigate risk and provide a safer environment?
5. **Infrastructure Modernization:** How will we develop and integrate new technology and modernize aging infrastructure?
6. **Raw Materials:** How will we ensure reliable supplies when they are needed and where will they come from?
7. **Geoscience Workforce and Education:** Who will do the work to understand Earth processes and meet demands for resources and resiliency? Who will educate the public and train the workforce?

Each of these needs is described in detail and is followed by “need-specific” recommended actions. The document is on AGI’s web site at <http://www.agiweb.org/gap/geotrans08.pdf>.

Ultimately, as we go forward in the 21st Century, the AGI Blueprint document emphasizes three key recommendations for the new federal leadership **and** the geoscience community:

- ▶ Establish a Natural Resource Advisor within the White House Office of Science and Technology Policy to advise the President on stewardship of natural resources based on scientific understanding and technological advances.
- ▶ Invest in mapping, monitoring, assessments, and state and federal surveys of natural resources. Ensure that data are integrated to provide the context for understanding climate change, supply and demand scenarios on global to local scales, and risks from hazards.
- ▶ Invest in research and development to understand Earth processes because sustainable consumption and conservation of resources, enhancement of environmental quality, and resilience from risk depend on living *with* our dynamic planet.

International Year of Planet Earth, 2007-2009 Earth Sciences for Society

IAH an Associate Partner



IYPE’s Successes and Invitation for Science Project Proposals

Running through the triennium from 2007-2009, the International Year of Planet Earth (IYPE) began as a joint initiative by UNESCO and the International Union of Geological Sciences (IUGS) (<http://www.yearofplanetearth.org/>). Eleven Founding Partners, 25 Associate Partners (including the International Association of Hydrogeologists [IAH]), and 23 International Partner organizations embarked on this initiative. At the outset, the IYPE objectives strove to ensure greater and more effective use of the cumulative knowledge held by



the world's 400,000 Earth scientists. National and international outreach and science programs constitute IYPE's core emphasis. As expressed in its subtitle, '*Earth Sciences for Society*', the IYPE hopes that collective science efforts lead to a safer, healthier, and wealthier society. The IYPE also aims to encourage youth to explore careers in the Earth sciences.

November 2008 IYPE Business Plan

IYPE's November 2008 *Prospectus and Business Plan* (Plan)

(<http://www.yearofplanetearth.org/content/downloads/BP-Nov2008.pdf>) informs sponsor organizations, associate partners, and donors about the essential characteristics of the IYPE, including its organization, accomplishments, its interface with the United Nations, financial aspects and fundraising, and commitments necessary to attain IYPE's objectives.

The Plan describes the IYPE's ten science themes selected based on their societal relevance. One science theme is 'Groundwater' led by Science Implementation Team leader Tony Jones of the United Kingdom. One of IYPE's flagship projects is *OneGeology*, a joint global effort by the world's Geological Surveys to produce a digital, interoperable world map of the subsurface at a scale of 1:1 million. Eventually, the IYPE envisions making a (shallow) transparent subsurface and adding a third dimension to global positioning programs.

The IYPE invites scientists to submit Expressions of Interest and Project Proposals for work within the ten science themes and that address special topics therein. Selection criteria include: geoscience based, truly international, holistic and multidisciplinary, human impact, potential for developing countries, and for outreach. The Science Implementation Teams will evaluate project proposals. As the IYPE's financial resources are limited at this stage, the IYPE would be interested in providing moral support to selected projects only.

Beyond 2009

The IYPE formally concludes at the end of 2009. However, interest may compel the IYPE spirit to continue beyond 2009 as its successful outreach programs often exceeded expectations. The public wants to hear about solutions to current problems rather than repeated expressions of concern. Accordingly, the IYPE endeavors to promote and continue to identify approaches that provide scientific and technological solutions.

The IYPE program results thus far provide a springboard for continued initiatives, including a thriving program of science and outreach for sustainable development. Consequently, the IYPE Board is considering whether and how to embark on a new initiative for beyond 2009. The world requires an educated population that understands the operational constraints necessary for Earth's long-term health. Planet Earth represents the ultimate mechanism for informing and educating the citizens about Earth sciences and their application to societal needs. Solutions to global problems continue to be discovered, and these create the underpinning for a healthier, safer, and wealthier world for all living things.

-- article adapted from excerpts of IYPE's "Earth Sciences for Society International Year of Planet Earth, Prospectus and Business Plan, November 2008"



Green Chemistry: Integrating Environmental Health Research and Chemical Innovation

Dr. Lorne G. Everett, Co-Chair of the World Federation of Scientists Pollution Panel will co-chair a General Assembly session and workshop on the theme of: **Green Chemistry: Integrating Environmental Health Research and Chemical Innovation** to be held at the Ettore Majorana, Foundation and Centre for Scientific Culture, in The Science City--Erice--in Italy starting August 19, 2009. This is the 19th year in a row that Dr. Everett has been invited to Italy by the Science Advisor to the Pope to work on groundwater pollution issues. The Symposium Organizers are Dr. Stefano Parmigiani, Dr. Lorne Everett, Dr. John P. Myers and Dr. Fred vom Saal. The thrust of the program is to get toxic pollutants out of the manufacturing system before they appear in groundwater.

This workshop is a follow up to the 2006 workshop, titled "The Plastic World", which led to a series of publications in the journal *Environmental Research*. By invitation of the editor, manuscripts from the present workshop will be published in the journal *Environmental Health Perspectives*, the leading journal in the field of environmental health.

The "Plastic World" workshop drew attention to the growing world-wide problem of plastic pollution. Advances in the environmental health sciences are revealing that the impacts of current plastics are pervasive and much more severe than old approaches to assessing toxicological impacts would have suggested. Emerging collaborations between environmental health scientists and green chemists, however, indicate that it may be possible to redesign plastics to obtain needed material characteristics while avoiding toxicity. The plenary symposium and satellite workshop that we propose will provide an overview of the two fields of science, green chemistry and environmental health, and the enormous potential that collaboration between them may yield for public health and materials innovation.

Conferences



NGWA GROUND WATER SUMMIT

The Groundwater Community is Set to Evolve with the Changing Climate for Groundwater Management

**Tucson, Arizona
April 19-23, 2009**

The 2009 National Ground Water Association (NGWA) Ground Water Summit titled "Adapting to Increasing Demands in a Changing Climate" will occur April 19-23, 2009 at the Hilton El Conquistador Resort just north of Tucson at a fabulous location nestled at the foot of spectacular Pusch Peak. The International Association of Hydrogeologists (IAH) is among the co-sponsors of this event.



The 2009 Summit program addresses evolving groundwater management challenges. These include adapting to changing regulations; meeting increased water demands; informing public and policy opinions and awareness; and responding to unpredictable hydrologic changes. The Summit also recognizes the growing need and common interest in promoting and utilizing integrated, regional water resources management approaches.

The unique Summit venue brings together the full spectrum of decision makers, practitioners, regulators, and researchers from a wide variety of sectors and disciplines. Over the past two decades, the groundwater industry has transitioned from a period of specialized and local interests to an interdisciplinary era that emphasizes integrated, regional resource management. The 2009 Summit provides an opportunity for this diverse group to engage in programming and forums designed to address emerging global, regional, and local water resources management challenges.

The Summit features a stellar program with over 220 technical papers in 4 technical tracks, 23 sessions, poster sessions, the Darcy Forum, the NGWA Darcy and Geological Society of America (GSA) Birdsall-Dreiss distinguished lecturers, short courses, and field trips. The technical tracks include:

- **Track A:** Towards More Sustainable Use of Groundwater Supplies: Availability, Access and Allocation Issues;
- **Track B:** Groundwater Management, Groundwater-Surface Water Interactions, Ecosystem Support, Aquifer Protection, and Groundwater Remediation;
- **Track C:** Modeling of Groundwater Systems, Decision Support Systems, and Data/Information Management
- **Track D:** Specialty Sessions

The Summit features keynote plenary presentations by Henry Vaux, Jr. of the University of California Berkeley, Ramón Llamas of the Complutense University Spain, and Margaret Catley-Carlson of the Global Water Partnership. The Darcy Forum addresses the “Multi-Dimensional Challenges of Dealing with Uncertainty for Decisions in Aquifer Management.” Forum panelists include the 2009 NGWA Darcy lecturer, Peter Cook with CSIRO Land and Water, Australia; John Wilson of New Mexico Tech; Lenny Konikow of the U.S. Geological Survey; and Tom Meixner of the University of Arizona. Arizona, Nevada, and California water policy leaders comprise a panel that prepares to discuss interstate groundwater banking and transfers, including current developments between these three states. Darcy Lecturer Peter Cook will present “Environmental Tracers in Modern Hydrogeology: Reducing Uncertainty in Ground Water Flow Estimation” (<http://www.ngwa.org/ngwref/darcy/future.aspx>). The 2009 Birdsall-Dreiss lecturer, Chunmiao Zheng of the University of Alabama, will present “Will China Run Out of Water?” (http://gsahydro.eas.ualberta.ca/Zheng_2009_BirdsallDreiss.pdf).

The Summit also creates valuable networking opportunities. A new evening event includes a "Leaders Reception" where you can meet and hear perspectives from key leaders in the groundwater community.

Early Registration Deadline – March 22, 2009

Please join your colleagues and meet new contacts at the Ground Water Summit. For details and to register, please see the website at www.ngwa.org.



Co-Sponsors



NGWA Groundwater for the Americas Conference:
June 8-10, 2009, Panama City Panama

Submitted by: Cliff Treyens, NGWA Public Awareness Director

The National Ground Water Association (NGWA) would like to announce the *Groundwater for the Americas* conference to be held June 8-10, 2009 in Panama City, Panama. The conference is co-sponsored by the International Association of Hydrogeologists (IAH) and La Asociación Venezolana de la Industria de las Aguas Subterráneas (AVIAS). Abstract submissions are currently being reviewed, and the discounted registration fee has been extended to March 23, 2009.

This three-day event provides an opportunity for all who work in the groundwater community to address a broad spectrum of issues that inhibit efficient and effective groundwater management strategies. The conference is intended to foster dialogue among peoples of the Latin American region about how they can best manage water resources in the context of socioeconomic and cultural realities.

At first considered a virtually endless or renewable source of supply, many recent examples of contamination and overdraft have cast doubt on the sustainability of groundwater use. Efforts to protect groundwater from further degradation and extend its period of use traditionally have focused on improved water management. As enunciated in the United Nations International Hydrology Programme IHP-VII themes and the proposed actions of the Alicante Declaration, effective groundwater management must take into consideration the broader socioeconomic and cultural conditions that affect societal well-being.

The scope of the conference will be determined by people of the Latin American region and is expected to include topics such as:

- Environmental and ecological impacts on groundwater sustainability
- Groundwater, rain forests, and watersheds
- Salt water encroachment conditions caused by natural and man-made activities
- Identifying potable water supplies
- Groundwater contamination resulting from natural and man-made activities
- Pollution prevention of water resources and remedial solutions
- Transboundary groundwater issues including groundwater/surface water interaction
- Proper water supply well construction and well development
- North, South, and Central American country-by-country summaries of specific groundwater issues
- Community-based water resources management planning
- Managed aquifer recharge and conservation as components of sustainable water resources management.

Workshops and expert table sessions will be integrated into the conference sessions and be designed specifically for practitioners. These sessions will be crafted to maximize networking and discussion by all engaged in groundwater



activities. The complete program offers participants opportunities to enjoy special attractions and experiences native to Panama. Visit www.ngwa.org and click on conferences for more information.



Joint International Convention
8th IAHS Scientific Assembly and 37th IAH Congress

Hyderabad, India
September 6-12, 2009



Water: A Vital Resource Under Stress -- How Science Can Help

The International Association of Hydrological Sciences (IAHS) and the International Association of Hydrogeologists (IAH) are pleased to announce the Joint International Convention of the 8th IAHS Scientific Assembly and the 37th IAH Congress in Hyderabad, India during September 6-12, 2009. IAHS and IAH welcome the world scientific and professional community and policy makers, essentially all persons comprising the world 'hydrological community', to participate in this event. The Convention's overall theme emphasizes "Water: A vital resource under stress--How science can help," while IAH sessions concentrate on "Hydrogeology of Hard Rocks" with four comprehensive symposia.

The Joint International Convention covers a myriad of subjects and scientific approaches to address unprecedented water resources stresses. Globally, we face future challenges and risks emerging from existing water scarcity, contamination (including salts, synthetic chemicals, and microbiological concerns), and a burgeoning population that further stresses an already stressed resource despite global efforts to implement conservation and management strategies. In developing nations, these issues warrant special attention. Climate change contributes to new dilemmas either directly or indirectly, affects every aspect of the hydrologic cycle, and results in uncertain water resources availability. Groundwater stresses have been magnified in hard rock terrain due to the subsurface heterogeneity and groundwater's dynamic occurrence and behavior in this environment. The above challenges exemplify the need to implement appropriate scientific approaches in coordination with local and national policymakers and the community at large.

The Joint International Convention in Hyderabad, India provides an excellent opportunity and forum for the world hydrological community to interact, discuss their experiences and issues of mutual interest, deliberate these complex issues in an exotic location, and also initiate joint research programs to address varied hydrological problems of local and global importance. The Convention location also provides a model setting as, similar to elsewhere across the world, the Indian subcontinent's diverse hydrogeological and hydrometeorological conditions present many new and also unresolved hydrological problems.

Deadline for Joint Workshops, IAH Symposia, and IAHS Workshops

Additional information about the Joint International Convention is posted at <http://www.appliedhydrology.org/iahs/iahshome.view>. Although the abstract deadline has already passed for the Joint Symposia and IAHS Symposia sessions, the deadline for submitting abstracts for the Joint Workshops and IAH Symposia is **January 31, 2009** and the deadline for the IAHS Workshops is **May 31, 2009**. Please consider attending and submitting a technical paper for presentation at the meeting.



2009 Geological Society of America (GSA) Annual Meeting Portland, Oregon October 18-21, 2009

USNC IAH to Co-sponsor Three GSA Sessions and Three GSA Field Trips "Volcanoes to Vineyards: Living with Dynamic Landscapes"

As an Associated Society of the Geological Society of America (GSA), the United States National Chapter (USNC) of the International Association of Hydrogeologists (IAH) is pleased to co-sponsor three sessions and three field trips at the 2009 GSA Annual Meeting and Exhibition in Portland, Oregon during October 18-21, 2009. This year's overall conference theme "Volcanoes to Vineyards: Living with Dynamic Landscapes" evokes visions of geoscapes ranging from the clusters of Cascade volcanoes near Portland and basalt lava flows that spilled down the Columbia River to the stunning vistas in Oregon's wine country. The sessions and field trips co-sponsored by IAH certainly represent opportunities for varied, informative, and palate-stimulating hydrogeologic experiences.

SESSION AND FIELD TRIPS - Terroir and a Tribute to George Moore

The topical session titled "Terroir and a Tribute to George Moore" is being co-convened by Scott Burns at Portland State University, Alan Busaca and Eric Pogue from Whitman College in Washington, and Vicki Kretsinger of Luhdorff & Scalmanini, Consulting Engineers. The session co-sponsors include the USNC IAH, GSA Hydrogeology Division, GSA Quaternary Geology and Geomorphology Division, GSA Engineering Geology Division, GSA Cordilleran Section, and the Groundwater Resources Association of California.

Contemplation of a session on terroir began before George Moore died in a tragic car crash on October 4, 2007. He retired from the United States Geological Survey in 1987; and, at the time of his death, he was a courtesy professor of geology at Oregon State University (OSU). He implemented the famous Condon Lecture series that brought renowned earth scientists to Corvallis to present public lectures in honor of Thomas Condon, Oregon's first geologist. George's intrigue of the influence of soils and geology and the overall influence of terroir on wines produced in Oregon led to writing his book titled *Oregon's Phenomenal Wine: the Subsoil of Geology*, soon to be published by the OSU Press.

In concert with the many interpretations of "terroir", the tribute session embodies many geoscience subjects, including the wealth of data and analyses that vintners utilize when producing their wine and the many factors that influence their final product. What *is* terroir? The concept developed through centuries of French winemaking denotes the special characteristics that geology, soils, hydrology, and climate impart on the grapes grown in a specific region. The term also includes the linkages between the vintner and how the vintner interfaces with Earth's processes to produce wines with a "sense of place."



IAH is also co-sponsoring the three 1-day field trips being organized by Scott Burns. Before the meeting, on October 16 and 17, two field trips (each visiting different wineries) occur in the Northern Willamette Valley. This is one of the best places in the world to taste the terroir; the distinguishing characteristics of the area's major bedrocks (Columbia River Basalts and marine sediments) and their associated soil groups result in distinctly different wines. The third trip occurs on October 22 to the Columbia River Gorge. Here, climate plays a huge role in the difference in the terroir experienced in the Gorge compared to the Northern Willamette Valley. Following the conference, Alan Busaca and Eric Pogue are also organizing a two-day field trip to eastern Washington for Washington terroir (they report that Washington heavy red wines are very good).

SESSION Applied Hydrogeology: In Honor of Dr. Roy Williams

The topical session "Applied Hydrogeology: In Honor of Dr. Roy Williams" is being convened by Gerry V. Winter of the Idaho Department of Environmental Quality and Neil Coleman of the U.S. Nuclear Regulatory Commission. The session co-sponsors include the GSA Hydrogeology Division, the USNC IAH, the International Mine Water Association, and the GSA Geology and Health Division. The memorial session in honor of Dr. Roy Williams, founder of the Hydrology Program at the University of Idaho, is offered to provide past and current students and former associates and friends of Dr. Williams an opportunity to provide a brief retrospective on how Dr. Williams or the Hydrology Program influenced their lives and an example of applied hydrogeology they performed during their career. Potential topics include groundwater flow and/or transport modeling, interpretations of groundwater hydraulics, mining hydrology, radioactive waste disposal, groundwater monitoring, groundwater remediation, geothermal resources, applications of statistics to hydrogeology, groundwater/surface water interactions, and hydrochemistry.

SESSION Groundwater in Ecosystems: Effects of Physical, Chemical and Biological Processes and Feedback Mechanisms

The topical session "Groundwater in Ecosystems: Effects of Physical, Chemical and Biological Processes and Feedback Mechanisms" is being convened by Randall Hunt of the US Geological Survey, Wisconsin Water Science Center, Middleton, Wisconsin and Masaki Hayashi of the University of Calgary, Canada. The session co-sponsors include the GSA Hydrogeology Division and the USNC IAH. As described elsewhere in this issue, Randall Hunt is one of the co-authors of the 2009 *Hydrogeology Journal* theme issue that addresses groundwater's importance to ecosystems.

This session focuses on methods for characterizing groundwater-ecosystem interaction, the effects of human activities on this interaction, and potential ramifications for resource sustainability. Groundwater is a connector, not just in the aquifer itself, but within, across, and between surface waters and many terrestrial ecosystems. Where the water table intersects or comes close to the land surface, contributions of water and nutrients to plant roots and aquatic ecosystems can be critical to their persistence. Moreover, many societal questions are not direct hydrogeological questions ("should the drawdown be limited to 0.1 m?"), but they are often ecohydrological questions ("will this pumping rate harm the birds/bugs/plants that are valued by society"). This session will highlight and explore the linkages between groundwater and ecosystems will provide perspectives on the state-of-the-science of current work, offer examples of ecohydrology that can be used by others in the future, and help increase the relevancy of our science.



Save-the-Date

**Joint 2010 Annual Meeting
Cordilleran Section of GSA — Pacific Section of AAPG
May 27-29, 2010**

The 2010 Joint Annual Meeting of the Cordilleran Section of the Geological Society of America (GSA) and the Pacific Section of the American Association of Petroleum Geologists (AAPG) is scheduled for May 27-29, 2010 at Anaheim, California. The Cordilleran Section host is California State University Fullerton. A call for technical session proposals will be forthcoming in Summer 2009 with an expectation of a number of technical sessions on various aspects of hydrogeology.

Suggestions for session topics are welcomed! Please contact Jeffrey Knott (Technical Program Chair), Associate Professor at the Dept. of Geological Sciences, California State University Fullerton at jknott@fullerton.edu; or Phil Armstrong (Joint Meeting Chair), Associate Professor of Geology, Department of Geological Sciences, California State University Fullerton, parmstrong@exchange.fullerton.edu; or Vicki Kretsinger Grabert (GSA Hydrogeology Division Representative for the Cordilleran Section), Principal Hydrologist, Luhdorff & Scalmanini, Consulting Engineers, vkretsinger@lsce.com.

Groundwater Resources Association of California (GRA)
An Associated Society of the Geological Society of America

**Planned 2009 and 2010 Events
by Vicki Kretsinger**

The USNC/IAH has been a cooperating organization for a number of Groundwater Resources Association of California (GRA) events. As members of a cooperating organization, IAH members enjoy GRA member rates to attend these events.

IAH members are welcome to express their interest in assisting with the planning of 2009 or 2010 events or participating as a session organizer or presenter by contacting GRA. Learn more about GRA, or the programs in which IAH is participating with GRA as a cooperator, on the GRA web site at <http://www.grac.org> , or by telephone, 916-446-3626.



Groundwater Resources Association of California (GRA) Continued

Upcoming Conferences

Groundwater Monitoring – Design, Analysis, Communication & Integration with Decision Making

Co-Sponsored by IAH

February 25-26, 2009; Orange, CA

Web Page: <http://www.grac.org/monitoring.asp>

Groundwater is a major component of the Nation's water supply, and groundwater monitoring is an essential tool for characterizing and managing this vital resource. The goal of this conference is to showcase recent developments in all phases of groundwater monitoring, including the design of monitoring networks, the analysis and interpretation of monitoring data, the communication of monitoring findings, and the role of monitoring in groundwater management and groundwater policy. Should you have any questions, or for a list of conference topics, please feel free to contact the Conference co-chairs, Eric Reichard (egreich@usgs.gov) or Brian Wagner (bjwagner@usgs.gov). For the program agenda please visit <http://www.grac.org/monitoringagenda.pdf>

Groundwater Salinity: A Groundwater Dilemma

Joint GRA and University of California Center for Water Resources Conference

Co-Sponsored by IAH

March 24-25, 2009; Sacramento, CA

Web Page: <http://www.grac.org/salinity.asp>

Almost every time water is used, released water has higher salt content than intake water, thus contributing to a growing salinity problem. This phenomenon is illustrated in many groundwater basins, especially those that have a very limited ability to discharge salts. Salts generated in and imported into these basins are accumulating in soil and water, and salinity impacts are gradually increasing. Impacts of groundwater salinity are being felt throughout California, the semi-arid lands of the southwest and elsewhere globally from increasing chloride concentrations in groundwater used for municipal supplies, to retirement of hundreds of thousands of acres of agricultural land due to saline-sodic soils, and drainage problems from highly saline shallow groundwater. Meanwhile, more and more resources are directed toward monitoring, treatment, and management of salinity by agricultural, industrial, and municipal dischargers. Conference sessions will cover a variety of topics, including but not limited to: impacts of groundwater salinity, characterization and fate and transport, regulatory management strategies, and technical management strategies. Please contact Michael Steiger (510-452-1549; msteiger@EKIconsult.com) or Jean Moran (925-423-1478; jean.moran@csueastbay.edu) if you have any questions.

Micropol and Ecohazard 2009

6th International Water Association/GRA Specialized Conference on Assessment and Control of Micropollutants/Hazardous Substances Control in Water

Co-Sponsored by IAH

June 8-10, 2009; San Francisco, CA

Web Page: <http://www.grac.org/micropol.asp>

This three-day international event will profile the latest developments in the detection, risk assessment, treatment, and regulation of micropollutants and hazardous substances in water systems. The focus of the conference is the fate, effects and treatment of micropollutants in natural and engineered systems. In addition to two concurrent oral sessions, poster sessions and social activities we are pleased to have several of the world's leading experts as plenary speakers: Professor Damia Barcelo, IIAQAB-CSIC, Barcelona; Professor Martin Jekel, Technical University of



Berlin; Professor Michael Plewa, University of Illinois-Champaign; and Dr. Shane Snyder, Southern Nevada Water Authority. Sessions will be organized around the themes of Environmental Chemistry, Toxicity and Risk Assessment, Wastewater Treatment and Water Reuse, Drinking Water Treatment, Regulations and Management, and Emerging Issues. More details and examples are included on the conference website.

If you have questions, please contact any of the following conference organizers:

Rula Deeb, Malcolm-Pirnie (co-chair); RDeeb@pirnie.com
Susan Richardson, USEPA; Richardson.Susan@epamail.epa.gov
David Sedlak, UC Berkeley (co-chair); sedlak@ce.berkeley.edu
Thomas Ternes, Federal Institute of Hydrology; Ternes@bafg.de

Other GRA Events Being Planned/Considered for 2009

- **Groundwater and Watersheds.** Short course. This short course will review the principles of groundwater and watershed hydrology, water quality, and water contamination. It will provide an overview of the most common tools for measuring, monitoring, and assessing groundwater and surface water resources. It will also review current local, state, and federal programs dealing with groundwater and watersheds. February 23-24, 2009.
- **Model Calibration and Predictive Analysis Using PEST.** Short course. This intensive short course will instruct participants on the automated calibration of environmental models, and on the analysis of the predictive uncertainty associated with such models. The principal instructor is the developer of PEST, the industry standard software package for model-independent, automated calibration and predictive uncertainty analysis. Spring 2009.
- **Isotope Geochemistry Short Course** – Winter/Spring 2009.
- **Integrated Water Resources Planning/Water Banking**
- **27th Biennial Groundwater Conference and 18th GRA Annual Meeting and Conference.** October 6-7, 2009. Sacramento, California.
- **Forensic Geochemistry**
- **Enhanced In-Situ Remediation Using Nanomaterials.** The goal of this conference is to present the research, development, and application of innovative, engineered nanomaterials as a promising new technology for enhanced *in situ* remediation of organic and inorganic contaminants in groundwater. Because of the high specific surface area of nanomaterials, the technology achieves treatment rates that are significantly faster than other micro- or macro-scale treatment media. Moreover, the small size of the particles is thought to facilitate cost-effective delivery of the reactive particles to contaminated porous or fractured media via direct injections or recirculation techniques.
- **Geophysics for Groundwater Resources.** Workshop and class. Early Fall 2009.

GRA Events Being Planned/Considered for 2010

- **Agriculture and Groundwater**
- **19th GRA Annual Meeting and Conference.** Fall 2010.



Summary Calendar of Upcoming Events and Deadlines (see above for more information)

2009

January 31 - Deadline for submitting abstracts for the Joint Workshops and IAH Symposia for the IAH International Convention, 8th IAHS Scientific Assembly, and 37th IAH Congress in Hyderabad, India, (September 6-12, 2009).

February 1 - Congressional Geoscience Fellowship Application Deadline.

February 25-26; Orange, CA. Groundwater Resources Association of California Conference, Co-Sponsored by IAH, *Groundwater Monitoring – Design, Analysis, Communication & Integration with Decision Making*.

March 22 - Early Registration Deadline for NGWA Groundwater Summit Tucson, AZ, (April 19 -23).

March 23 - Early Registration Deadline for *Groundwater for the Americas* conference, (June 8-10, 2009) in Panama City, Panama.

March 24-25; Sacramento, CA. *Groundwater Salinity: A Groundwater Dilemma*, Joint Groundwater Resources Association of California and University of California Center for Water Resources Conference, Co-Sponsored by IAH.

April 19-23; Tucson, Arizona. NGWA Ground Water Summit Meeting - “*Adapting to Increasing Demands in a Changing Climate*”, Co-sponsored by IAH.

June 8-10; San Francisco, CA. *Micropol and Ecohazard 2009, 6th International Water Association/GRA Specialized Conference on Assessment and Control of Micropollutants/Hazardous Substances Control in Water*, Groundwater Resources Association of California Conference, Co-Sponsored by IAH.

May 31 - Deadline for the IAHS Workshops - IAH International Convention 8th IAHS Scientific Assembly and 37th IAH Congress Hyderabad, India, (September 6-12, 2009).

June 8-10; Panama City, Panama. NGWA *Groundwater for the Americas* conference; Co-sponsored by IAH.

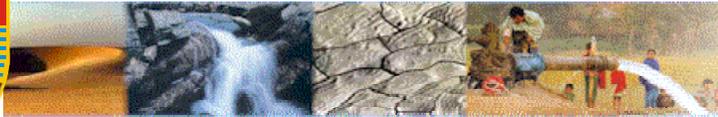
August 19 - Ettore Majorana, Foundation and Centre for Scientific Culture, in The Science City—Erice, Italy; *Green Chemistry: Integrating Environmental Health Research and Chemical Innovation*.

September 6-12 - International Convention 8th IAHS Scientific Assembly and 37th IAH Congress Hyderabad, India.

October 18-21; Portland, Oregon. 2009 Geological Society of America (GSA) Annual Meeting.

2010

May 27-29; Anaheim, California. The 2010 Joint Annual Meeting of the Cordilleran Section of the Geological Society of America (GSA) and the Pacific Section of the American Association of Petroleum Geologists (AAPG).



International Association of Hydrogeologists

2009 IAH MEMBERSHIP AND U.S. NATIONAL CHAPTER SUPPORT FORM

Last Name:			
First Name & M.I.:			
Title:			
Organization/Company:			
Mailing Address:			
Telephone:		Fax:	
E-mail:			

Membership includes a 1-year Subscription to the *HYDROGEOLOGY JOURNAL* (8 issues).

Type of IAH Membership being Applied for or Renewed:

- Full member: \$102 USD (includes hard copies of the *Journal*)
- Full member: \$88 USD (for the *Journal* online only)
- Student member: \$51 USD (includes hard copies of the *Journal*)
- Student member: \$37 USD (for the *Journal* online only)
- Retired member: \$51 USD (does not include the *Journal*)
- Corporate member: \$560 USD (includes 3 free members plus up to 3 additional members at \$85 USD each)
[Attach list with member names and contact information.]

Member Sponsor Opportunities:

- Sponsor Student member: \$51 USD (includes hard copies of the *Journal*)
- Sponsor Student member: \$37 USD (for the *Journal* online only)
- Sponsor Developing Country Member: \$48 USD [For more information about the sponsorship of a Developing Country Member, see http://www.iah.org/join_sponsorship.asp. Please enclose the Sponsored Member Application Form at <http://www.iah.org/downloads/Sponsorship%20Form%202008.pdf>.]

I want to Help Support U.S. National Chapter Activities

These may include Chapter support of student memberships, development of scholarship funds, Chapter alliances with and support of developing country members, and other activities that promote international activities that further the advancement and application of hydrogeology, including research, education, outreach, and training.

\$25 \$50 \$100 \$200 \$Other _____

The USNC of IAH is a non-profit, tax-exempt, 501(c)(3) organization. Federal tax ID #30-0438977.

Thank you for your tax-deductible contribution!

Total Amount Enclosed for Membership and/or Support: \$ _____

For those who wish to directly sponsor Student or Developing Country Members, or Support the Chapter's Activities, mail this form along with your check (made payable to International Association of Hydrogeologists) to:

Victor Heilweil, US Geological Survey, 2329 Orton Circle, Salt Lake City, UT 84119 heilweil@usgs.gov

For on-line membership application or renewal on a secure server, go to: <http://www.iah.org/payonline>

For additional information about IAH, go to the Web page at: <http://www.iah.org/>