THE CONDUIT

Building understanding of karst through interdisciplinary action
The Conduit

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Front cover: Graduate students exploring a passage of Blue Spring Cave, White Country, Tennessee. This cave is the longest surveyed cave in the state of Tennessee, and one of the longest in the USA, at over 37 miles. Photo by Annette Summers Engel.
Welcome to The Conduit

This e-newsletter is distributed twice a year to over 750 karst enthusiasts globally. 2011 was an active year for KWI. This issue of The Conduit contains a summary of the successful “Carbonate Geochemistry: Reactions and Processes in Aquifers and Reservoirs” conference in Billings, Montana, an announcement for the upcoming January 7-11, 2013, conference, “Carbon & Boundaries in Karst” in Carlsbad, New Mexico, and announcements for other karst-related conferences and sessions at meetings in 2012 and 2013. There are also plans for a KWI meeting in 2014 in The Bahamas. We hope that you find something interesting to participate in, and that you will join us in the coming years at one (or all!) of these events.

The 2012 Karst Award Banquet will take place in Albuquerque, New Mexico, in March, and will honor Jim Goodbar. The award banquet is one way that KWI honors important contributions to karst research and promotes its educational mission by announcing the William Wilson Scholarship award recipient. But, the banquet is also a way for KWI to raise some operating funds. KWI is a non-profit organization, and operating expenses are supported from proceeds resulting from our annual banquet, conferences, and publication sales, as well as from tax-deductible donations and research grants. For more information about the banquet, publications, and conferences, as well as how to make a donation to KWI, please see the website www.karstwaters.org for more details. Finally, KWI wishes you a successful and prosperous 2012.

-- Annette Summers Engel

Upcoming 2012 Karst Award Banquet – March 3, 2012

The 2012 KWI Karst Award banquet will be held in Albuquerque, New Mexico, the evening of March 3, 2012, on the University of New Mexico campus in the Science and Mathematics building. This year’s honoree is Jim Goodbar, and he will speak on the topic of “There and Back Again (well not quite): A Cavers Tale.” Other awards will also be given.

Jim began caving at 9 years old with his parents and two sisters in central Texas where the “bug” bit him and he was infected with a lifelong desire to explore, understand, and protect underground resources. Much of his 32+ year career with the Bureau of Land Management has been developing their national Cave and Karst Management Program where he currently serves as the Senior Cave and Karst Specialist for the Washington Office. He assisted in writing the Federal Cave Resources Protection Act, their regulations, and implementation procedures and was instrumental in developing their national cave and karst management policies, manual and handbook, cave management training courses, national and local agreements, national cave safety standards, and guidelines for oil & gas drilling in karst areas. Jim is an Honorary Life Member, Fellow, and past board member of the National Speleological Society, a Fellow of the Cave Research Foundation, and a Charter Life Member of the American Cave Conservation Association. His interests, education, and career have led him into all aspects of cave exploration, science, and karst management. Caving and cave management have taken Jim to 16 foreign countries. Jim has authored over 25 publications on cave and karst management and geology. He earned his BS in Park and Recreation Management from Texas A&M University and conducted his graduate studies in Cave/Karst Geology/Geomorphology at Western Kentucky University in 1979-81.

The banquet will begin at 6:00pm with a reception. On the menu, your choice of a flat iron steak topped with cabernet infused blue cheese or a seasoned chicken breast with mushrooms garlic sautéed in Marsala wine. Both will be served with redskin garlic mashed potatoes and sautéed vegetables, and a seasonal garden salad. A vegetarian option will be available. For dessert, we will indulge on chocolate velvet cake. Beer and wine will also be provided, as well as tea and coffee. Reserve your seat(s) by sending a check for $50/person to the Karst Waters Institute, PO Box 4142, Leesburg, VA 20177 by February 25. Please note your dinner selection choice. For more information, see www.karstwaters.org, or contact Bill Jones, wkj30@hotmail.com

Request for Participation to Plan Upcoming Meeting

KWI agreed to entertain a proposal for a conference on Hypogene Cave Morphologies for February, 2014, in The Bahamas. If anyone wishes to become involved in planning for this potential conference, please contact Dr. John Mylroie, Professor of Geology, Department of Geosciences, Mississippi State University, Mississippi State, MS 39762 mylroie@geosci.msstate.edu
**KWI Happenings**

**Institute and Board Members meet in Minneapolis, Minnesota**

The Fall Institute meeting was held October 8 at the Hilton in Minneapolis, prior to the annual Geological Society of America meeting. More than half of the Board members and Institute officers, Associates, and guests, were in attendance. Some Board members were included by conference call. The fall meeting is a planning meeting for KWI, as well as a mechanism to summarize summer activities.

The meeting started with a summary of the “Carbonate Geochemistry” conference in Billings, Montana, by one of the co-organizers, Annette Engel (see report in this issue of *The Conduit*), followed by an update of KWI finances from Treasurer Harvey DuChene. As part of the discussion of these two topics, heated debate started regarding the use of Acteva, a 3rd party organization, to manage future conference registrations. The co-organizers of the “Carbonate Geochemistry” meeting expressed frustrations with Acteva, including difficulties they had obtaining timely and frequent releases of funds to KWI from Acteva for the conference attendees. Although there was support for the ease of the online system that could take any foreign and domestic credit cards, the online management of different registration cost structures (e.g., full, late, or student registrations), and the relatively low overhead costs for the use of the online system, the strain of being within a week of the conference and field trip, and not having received the funds to pay bills, was more than distressing. There was no consensus reached from the discussion, and the subject will be revisited for future conferences. Registration for the 2013 “Carbon & Boundaries in Karst” meeting will likely be handled by the National Cave and Karst Research Institute in Carlsbad, New Mexico.

Details for the March 2012 KWI Awards Banquet were discussed, and there were circular and budget updates announced for the 2013 “Carbon & Boundaries in Karst” conference (see announcement in this issue of *The Conduit*). There was some dialogue, initiated by John Mylroie, about a possible 2014 conference in The Bahamas on the topic of hypogene speleogenesis, and there was general support for such a conference. A full proposal for the conference, following more research, will be presented at the 2012 Institute meeting.

The possibility of KWI submitting a Research Coordination Network proposal to the National Science Foundation was also discussed by Carol Wicks, Vice President for Research. This issue has been discussed at length during previous Institute meetings, and, again, the consensus opinion was reached that such a proposal is a great idea, but the organizational structure and mechanisms by which KWI will write, coordinate, and submit such a proposal were points of concern. One of the highlights of the discussion happened after the meeting, when Bob Cronk circulated a long list of topics that he heard during the discussion that related to coordination needs for karst science, including ways to use and leverage already existing geospatial, visualization, and social media resources. This will certainly help to focus the proposal for a future submission.

**The next Institute and Board meeting will be in Albuquerque, New Mexico, on March 3.**

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**William Wilson Scholarship Funding Available**

To stimulate the development of new, energetic, motivated, and creative karst scientists, and to remember the person of Bill Wilson and his dedication to karst science, the scholarship has been established in his memory. The value of the scholarship is a one-time award of $1,000. To apply, the applicant must be currently enrolled in, or have been accepted into, a masters degree program at an institution of higher education in the United States. PhD students are not eligible. A written proposal, limited to 1000 words or less for the narrative, must be submitted. The research topic should concern karst science, from the field of geochemistry, geology or hydrology. A very simple budget indicating how the funds would be used should also be included (it does not count in the 1000 word limit). Applicants should not recycle master's thesis proposals as applications. Academic transcripts of undergraduate, and any graduate work, are required (copies issued to the student are preferred, and can be sent as e-mail attachments). Two letters of recommendation, with one of them from the student's advisor or mentor, should be sent electronically as e-mails by the letter writers. **Applications are due by February 15** of each year, electronically as a single pdf file to Dr. John E. Mylroie (mylroie@geosci.msstate.edu). Applicants will be notified in early March. Publications derived from supported research should acknowledge the Karst Waters Institute and the William L. Wilson Scholarship.
Future Karst-Related Conferences and Other News

**JVB's “Historic” HydroDays**
Oklahoma State University will host HydroDays, April 12-14, 2012, in Pontotoc, Oklahoma. Included during the meeting will be a tour of the EPA groundwater lab, a trip through the surface of the Arbuckle-Simpson aquifer, and the Geological Society of America’s Birdsall-Dreiss lecturer, Dr. Jay Famiglietti. For more information, contact Dr. Todd Halihan (OSU, Dept. of Geology) todd.halihan@okstate.edu

**National Speleological Society, 2012**
The annual convention of the National Speleological Society will take place June 25-29 in Lewisburg, West Virginia. See www.caves.org or http://nss2012.com/ for more information.

**21st International Conference on Subterranean Biology**
This conference will be held September 2 – 7, 2012, in Kosice, Slovakia, under the auspices of International Society of Subterranean Biology (SIBIOS). You are kindly invited to participate in this event. www.icsb2012.eu for more information.

**Anchialine Ecosystem Meetings and Publications Available**
The Inaugural International Symposium on Anchialine Ecosystems was convened in Palma de Mallorca, Balearic Islands, Spain, in November 2009 under the auspices of the Karst Waters Institute, the Mediterranean Institute of Advanced Studies, and the Western Australian Museum. Some papers resulting from this meeting were published in November 2011 as a special issue of Hydrobiologia that addresses aspects of geology, paleontology, microbiology, ecology, hydrology, geochemistry, exploration, phylleogeography, limnology and chemical speciation [Wicks, C & Humphreys, W.F. (eds) (2011) Anchialine Ecosystems: reflections and prospects. Hydrobiologia 677(1): 1-168].


**13th Multidisciplinary Conference on Sinkholes and the Engineering and Environmental Impacts of Karst**
This meeting will be held in Carlsbad, New Mexico May 6-10, 2013. This will be the westernmost conference location since the series began in 1984, and the conference will be hosted by the National Cave and Karst Research Institute, an affiliate of the New Mexico Institute of Mining and Technology. A call for abstracts will go out in January 2012. Please check the website of the National Cave and Karst Research Institute (www.nckri.org) for updated information about the conference.

**A Karst Session at the Fall AGU Meeting**
-- Submitted by Matt Covington (University of Arkansas; Karst Research Institute, Slovenia)

While karst research has become a mainstay at Geological Society of America conferences, the presentation of karst research at American Geophysical Union (AGU) meetings has typically been much more limited. In recent years, a handful of karst researchers have expended some effort to increase the karst presence at AGU.

At the 2011 Fall AGU Meeting, a successful karst session, entitled “Hydrological, Geomorphological, Biological, and Geochemical Processes in Karst Aquifers,” was convened. The session focused on the quantification of karst processes and included contributions from a wide variety of fields. It was organized by Matt Covington, Jason Gulley, Katrina Koski Henry, Barbara Mahler, Nicholas Massei, and Corinne Wong. The session featured eight oral presentations and 17 posters. Invited speakers included Martin Sauter, who presented “Water resources management in karst aquifers — concepts and modeling approaches,” Carol Wicks, who presented “Combining data to assess the habitat suitability of patches of streambed,” Darryl Granger, who presented “Evolution of Hang Son Doong, Vietnam: the largest cave passage in the world,” and Jon Martin, who presented “Blue holes: Windows into chemical and physical hydrogeologic processes in karst of modern carbonate platforms.” Other contributions covered topics such as speleogenesis, CO₂ dynamics, sediment transport, water quality, statistical characterization of karst aquifers and geochemistry, flow and transport modeling, and geophysical techniques. The session drew a number of international contributions, and we are thankful to our overseas colleagues who chose to make the long trip to present at AGU.

On the evening after the session, many of us convened again for the 2nd annual Friends of Karst – AGU meeting. This congenial gathering took place at Kennedy's Irish Pub and Curry House, a fine establishment that somehow manages both to be an Irish pub and to serve excellent Indian food. Over 30 people gathered for Friends of Karst, and several of us noted with excitement the high percentage of students and young researchers present. A number of attendees expressed interest in organizing a session or two for next year. Matt Covington (speleophysics@gmail.com) will coordinate efforts, so if you are interested in helping organize a session, contact him. Otherwise, keep an eye out for upcoming AGU karst sessions, and we hope to see you there.
2013 KWI Conference – Carbon & Boundaries in Karst

-- Submitted by Co-organizers Daniel Fong and David Culver (American University)

January 7 to 11, 2013, Carlsbad, New Mexico

There is growing interest in the dynamics of both inorganic and organic carbon in karst systems, and especially in the flux of carbon and nutrients between the surface and subsurface and between different components in the karst subsurface. This upcoming Karst Waters Institute symposium is especially timely because of both the rapid advances in the field and the importance of carbon sequestration in global climate change. It will highlight recent advances in biology, geology, and hydrology that are helping us to understand the dynamics of karst ecosystems, especially with respect to carbon.

There will be both invited lectures and contributed posters covering the following topics:

- Fluxes and reservoirs in and through epikarst
- Fluxes and reservoirs in and through the phreatic zone
- Lateral inputs into karst - insurgences
- Lateral outputs in karst - resurgences
- CO₂ storage in karst
- Organic carbon sources and carbon quality in karst
- Large scale models and synthesis

The meeting will be co-sponsored by, and held at the new headquarters of, the National Cave and Karst Research Institute (NCKRI), in Carlsbad, New Mexico. NCKRI and KWI share a similar mission, and this will be the first co-sponsored meeting by the two organizations.

Post-Conference Publication

All participants will be invited to submit a paper, due at the end of the conference, January 11, 2013. The paper must be in accordance with the style requirements of *Acta Carsologica*. Each paper will be limited to 5000 words and 8 tables/figures, without prior arrangement with the editor. Review papers are especially welcome. All papers will be subject to peer review and submission does not guarantee publication. There will be a two step acceptance procedure - first acceptance by the Special Editor (David Culver), then by the journal editor (Franci Gabrovšek). The anticipated publication date is October, 2013.

Scientific Program

Two distinguished scientists will give plenary lectures that will set the framework for the meeting:

**Dr. Jack Stanford**, Director of the Flathead Lake Biological Station (FLBS) in Montana and Professor of Ecology at the University of Montana, is one of the discoverers of the hyporheic zone, and co-editor of the “bible” of groundwater ecology, aptly titled *Groundwater Ecology*. Jack has conducted research at FLBS since 1971 and became Director in 1980. His research and education activities have taken him all over the world, and he has worked on everything from microbes to grizzly bears. He is the past president of the Organization of Biological Field Stations and the North American Benthological Society. He is a Fellow of the American Association for the Advancement of Sciences, and is a panelist for the U.S. National Academy of Sciences and the National Research Council. For more information about his work, see www.umt.edu/flbs/People/Stanford~1296/default.aspx

**Dr. John L. Wilson**, Professor of Hydrology in the Department of Earth and Environmental Science at the New Mexico Institute of Mining and Technology in Socorro, New Mexico, is a leading expert on stream-aquifer interactions and the movement of materials through groundwater. He is a current or former member of many professional society, university and government science advisory panels and committees, including the National Research Council’s Committee on Hydrologic Sciences. John is a Fellow of the American Geophysical Union and of the Geological Society of America, and is a member of the Board of Directors of the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI), and was the former Board Chair. John’s current research focuses on contaminant source identification, stream-aquifer interaction, including the hyporheic zone, and recharge to mountains. For more information about his work, see http://www.ees.nmt.edu/jwilson.
As is the tradition with KWI meetings, the symposium will be aggressively interdisciplinary and international. There will be seven thematic sessions with invited speakers. The program is being developed by the program chair, Daniel Fong and the conveners/chairs for the sessions:

- The Upper Boundary – Epikarst, convened by Dr. Tanja Pipan, Karst Research Institute at ZRC-SAZU, Postojna, Slovenia
- The Lower Boundary – Vadose Phreatic Interactions, convened by Dr. Franci Gabrovšek, Karst Research Institute at ZRC-SAZU, Postojna, Slovenia
- Lateral Inputs, convened by Dr. Kevin Simon, Department of Environmental Sciences, University of Auckland, Auckland, New Zealand
- Lateral Outputs, convened by Dr. Carol Wicks, Department of Geology & Geophysics, Louisiana State University, Baton Rouge, Louisiana
- CO₂ in Karst, convened by Dr. Janet Herman, Department of Environmental Science, University of Virginia, Charlottesville, Virginia
- Sources and Quality of Organic Carbon, convened by Dr. Annette Summers Engel, Department of Earth and Planetary Sciences, University of Tennessee, Knoxville, Tennessee
- Synthesis, convened by Dr. Daniel W. Fong, Department of Biology, American University, Washington, D.C.

In addition to the invited sessions, there will be two evening poster sessions.

Registration Details
Registration fee for the meeting will be $500 ($300 for students), which includes all lunches, a Monday evening reception, a Friday banquet, and the Wednesday excursion to Carlsbad Caverns National Park. Participants will also be provided with the special issue of Acta Carsologica. The program and book of abstracts will be made available to participants on a digital memory stick. Housing in nearby hotels in Carlsbad is not included, and information on local motels and rates will be provided in the second circular. Plans are in the works to offer a post-conference excursion to Grand Canyon National Park, with a return to the El Paso airport on Friday, January 20. Additional fees will be charged for the excursion.

June 1, 2012 - registration opens          November 1, 2012 - abstracts due          December 1, 2012 - registration closes

Venue
In Carlsbad, the meeting site is close not only to Carlsbad Caverns National Park, but also Guadalupe Mountains National Park. The location is an ideal starting place for a visit to the many parks and features of the desert southwest. The nearest major airport is El Paso, Texas, ~2.5 hours from Carlsbad. Shuttle buses to and from the El Paso airport will be available on January 6 and 12 for a cost of $50 one way. Smaller airports are located in Hobbs and Roswell, New Mexico, ~1 hour’s drive from Carlsbad. Rental cars are available at all airports. There is an U.S. Immigration and Naturalization checkpoint between El Paso and Carlsbad, so be sure to have identification with you.

Mid-Conference Excursion
On Wednesday, January 9, we will have an all-day excursion to Carlsbad Caverns National Park, a World Heritage Site, for a tour of Carlsbad Caverns and either a hike in Slaughter Canyon or a tour of Slaughter Canyon Cave. Carlsbad Caverns National Park is one of three national parks developed around a cave, the other two being Wind Cave and Mammoth Cave. Carlsbad Caverns is specially known for the beauty and extent of its formations, and the large flights of Mexican free-tailed bats that occur in the summer. The park contains excellent examples of southwestern American desert landscape.

http://karstwaters.org/conferences/

Additional details regarding invited speakers, and conference and field trip logistics will be provided soon. Direct immediate questions to Daniel Fong (program chair, dfong@american.edu) or David Culver (meeting chair, dculver@american.edu), or general questions to carbonboundariesconference@karstwaters.org
Recent KWI Conference

Carbonate Geochemistry: Reactions and Processes in Aquifers and Reservoirs
Billings, Montana, 6-11 August 2011

Carbonate geochemistry is a central component in the carbon cycle that spans inquiry of ancient, modern, and future geological settings. A meeting for academe and industry was organized by the Karst Waters Institute at the Crowne Plaza in Billings, Montana, with funding from the Geochemical Society, National Cave and Karst Research Institute, and Edwards Aquifer Authority. The novel gathering of 67 attendees from the petroleum industry, federal and state agencies, energy consultants, water managers, and university researchers focused on the current state of knowledge supporting the investigation of reservoirs for water and petroleum resources. Attendees came from 16 states, seven countries (USA, Canada, Slovenia, Czech Republic, Great Britain, Saudi Arabia, Australia), and one US Territory (Guam). The development and preservation of porosity in carbonate rocks became one prominent theme during the four days of research presentations, leading one attendee to quip that this event was a “Meeting in the Void.”

Invited 30-minute presentations covered a range of topics, including modern depositional environments and traits that favor preservation, experimental and theoretical approaches to study carbonates, the chemical and physical changes that take place during diagenesis that lead to porosity development, and the measurement and modeling of fluid circulation within mature limestone formations. The theme of carbonate geochemistry resonated throughout these expositions, addressing the great sensitivity of the chemical evolution of groundwater that arise from water-rock interactions that may leave only modest physical alteration of the limestone formation. Yet, a significant connection between water and chemical flux includes recognition that the fluids collected from aquifers and reservoirs come from the permeable portion of the rock formation, leaving many challenges to flow modelers.

The remote characterization of rock properties of buried formations, and the ability to connect attributes of a modern environment to the ensuing rock, challenged all attendees to construct mental relationships spanning long stretches of time and space that could not be observed directly. This intellectual challenge, in fact, provides the nexus of great potential for research involving carbonate geochemistry. The karst hydrologists looking at the processes of cave development in shallow bedrock had much to offer petroleum reservoir geophysicists focusing on reservoir characterization. This connection is not commonly explored in the professional activities of either karst hydrogeologists or petroleum geologists. This meeting, similar to the 2009 Karst Waters meeting focusing on paleokarst, “Karst From Recent to Reservoirs” in Rapid City, South Dakota, continued to make forward steps toward strengthening the association.

Throughout the conference, participants were constantly confronted by the problems of communicating across disciplines, each of which tends to have a unique vocabulary and implicit set of assumptions about processes. For instance, one petroleum geophysicist admitted not ever thinking of karst formation as a process as karst scientists do; one karst scientist admitted not ever considering caves as vugs as petroleum geologists do. Numerous discussions about porosity development revealed implied assumptions about temperature conditions, tectonic relationships, and geochemical reactions that seemed to line up by discipline. The last day of the conference included presentations by graduate students from several universities, whereby almost all of their presentations dealt with modern carbonate geochemistry and dissolved organic matter, using terminology about carbon macromolecules and isotope geochemistry unique to any of the earlier presentations. Their talks demonstrated how diverse current research is, and how exciting future carbonate geochemistry research will become. Amy Brown from the University of Florida in Gainesville received the Best Student Presentation award.

After several days of pouring over research findings, struggling with vocabulary, and developing an appreciation for other perspectives on holes in limestone rocks, a multi-day field trip
departed for the northern Big Horn basin in Wyoming and Montana to observe spectacular structural geology and outcrops of the Madison Formation. The field trip was organized by conference co-organizers and a field trip committee, including Bob Stewart and Lori Summa of ExxonMobil and Mark Sonnenfeld from Whiting Petroleum. The team gave a superb overview of Bighorn basin petroleum geology, particularly in relation to carbonates. Many of the carbonate reservoir issues discussed during presentations in Billings were illustrated by outcrop and cores seen in the field. The group hiked into the core of the Big Sheep Mountain anticline to glimpse details of the Madison Formation carbonate sequence stratigraphy. They went on a half-day house boat trip through the Bighorn Canyon on the north end of the Bighorn Mountains to view spectacular paleokarst and have lively discussions on the origin of this prominent and wide spread karst interval. Field trip participants also visited Elk Basin oil field and Torchlight Dome, where slabbed core from the Madison Formation from local basins was on display. This gave an opportunity to compare the section viewed from outcrop earlier on the trip to the subsurface rocks. On the final day, field trip participants visited impressive and enigmatic structural features exposed north of Cody, Wyoming, including Heart Mountain, before returning to Billings.


Visit www.karstwaters.org to stock you personal & professional libraries in 2012!
Photo mosaic from “Carbonate Geochemistry” conference

-- All photographs by Annette Summers Engel

Crowne Plaza registration table.
Opening plenary session.
The active main session room.
Opening reception with drinks.
View of paleokarst from the boat ride during the field trip.
A lively banquet table discussion.
Continental breakfast every morning.
No one went hungry at the banquet.
Up-close & personal look at the Madison Limestone in Big Sheep Mountain canyon.
Hiking into Big Sheep Mountain canyon.
We were lucky enough to only get one flat the whole trip!
Core laid out at Torchlight Dome.
Some of the field trip participants.
Frequent circle around a map.
Lots of photography and discussion in the boat on the Bighorn River.