

Minnesota Ground Water Association

www.mgwa.org

Newsletter

June 2009
Volume 28, Number 2

Featured:

- ◆ Ghana Drinking Water Wells Project, page 1
- ◆ Data Matter(s): Continuous water level measurements in Edina and St. Louis Park, page 5
- ◆ MGWA Web Page Redesigned, page 12



— MGWA President
Scott Alexander

President's Letter

By Scott Alexander, MGWA President

Once again it is newsletter time. As I take the time to make my small contribution in the form of the President's Letter, I am reminded of the excellent work Norm Mofjeld and his crew put into each and every newsletter. They continue to put out an excellent product that informs our members of the broad reach of Minnesota groundwaters. If you haven't paged through a whole issue recently consider doing so. You may be surprised by the wealth of current information presented. While Norm's efforts have been incredible it is also important to develop new talent. In this regard we would like to continue our search for new editorial staff. Our hope is to bring new people on board to keep this enterprise running smoothly. Please consider offering your talents as we pursue this important endeavor. Contact

me at alexa017@umn.edu or Norm at Norman.Mofjeld@state.mn.us if you have questions or would like more details.

In the preceding paragraph you may have noted an apparent typographical error. It is a seemingly small detail yet has generated voluminous discussion and even controversy for years. Have you spotted it yet? It is combination of ground and water into one word. As of 1 August 2009, the US Geological Survey (USGS) is officially going to the one-word version of groundwater. The official memo can be found at water.usgs.gov/admin/memo/GW/gw09.03.html. While this change will certainly make life easier for editors who have contended with one word, two words and hyphenated versions for decades, it will almost certainly not end the controversy. For an update on the ground water/groundwater

— continued on page 3

Ghana Drinking Water Wells Project

By Collins Ofori-Amanfo, Member of Presbyterian Church of the Way (PCOTW), Shoreview, Minnesota

At any given time a significantly large percentage of the people living in developing countries are suffering from water-related diseases. Surface water in Ghana is contaminated by human and animal waste and by parasitic infestations borne by the dirty water. When cholera bacteria are ingested, the small intestines begin to pass off volumes of water and dehydration results. Cholera is a killer! Through surface water children suffer disease, dehydration, and even death. A reliable source of safe, clean water can be the difference between death and life.

Climate change, deforestation, or other unexplained human activities have caused most of the rivers and streams that hitherto

— continued on page 4



Drilling a well in a rural community in Ghana.

Inside:

Member News	2
Professional News	3
Capillary Fringe: Ground Water R.I.P.	6
Karst Preserve Yields Ice-Age Mammal Bones	8
Reports and Publications	9
Association Business	11
Upcoming Events	14
New MDH Fees	15
MGWA Foundation	16
MGWA Board Minutes	18

MGWA Newsletter Team

Editor-in-Chief
Norm Mofjeld
current issue editor
Minnesota Dept. of Health
(651)201-4593
norman.mofjeld@state.mn.us

Tom Clark
Minnesota PCA
tom.p.clark@pca.state.mn.us

Jan Falteisek
Minnesota DNR
jan.falteisek@dnr.state.mn.us

Steve Robertson
Minnesota Dept. of Health
steve.robertsonstate.mn.us

Tedd Ronning
Xcel Energy
tedd.a.ronning@xcelenergy.com

Kurt Schroeder
Minnesota PCA
kurt.schroeder@state.mn.us

Eric Tollefsrud
AMEC Geomatrix
eric.tollefsrud@amec.com

Advertising Manager
Jim Aiken
Barr Engineering Co.
(952)832-2740
jaiken@barr.com

MGWA Management & Publications
Dr. Jeanette Leete
WRI Association Mgmt Co.
(651)276-8208
office@mgwa.org

MGWA Web Page
Visit www.mgwa.org for MGWA information between newsletters and to conduct membership and conference transactions.

Newsletter Deadlines

Issue	Due to Editor
September '09	8/07/09
December '09	11/06/09

© **Minnesota Ground Water Association. ISSN: 1098-0504**
Material in this publication may be reprinted if appropriate credit is given. Views expressed in this publication do not reflect official MGWA policy unless expressly stated as such.

MEMBER NEWS

Linda Bruemmer directs MDH Environmental Health Division

Linda Bruemmer has been appointed to the Director's position for the Environmental Health Division of the Minnesota Department of Health (MDH). Linda is a career public servant having worked for the MDH, the Minnesota Water Planning Board, the Office of Waste Management, the Minnesota Pollution Control Agency, the University of Minnesota's Institute of Technology and the Legislative Commission on Minnesota Resources. She has an extensive range of experiences and professional contacts in environmental health, pollution control/prevention, natural resources management and public administration that will serve her well in leading the MDH Environmental Health Division. Linda received her bachelor's degree from Smith College in Massachusetts and earned a master of science from the University of Minnesota's School of Public Health in 1977 and a master of public administration from the Kennedy School of Government at Harvard University in 1995.

Jessica Collin-Pilarski Joins Washington County

Jessica Collin-Pilarski has been hired as a water planner with the Washington County Department of Public Health & Environment. She has a lot of experience with surface water resources and she also has background and education in groundwater resources. She is a professional engineer and a Certified Professional in Storm Water Quality who previously worked for environmental consulting firms. Jessica will serve as a liaison between the watershed management organizations and the county.

Barb Liukkonen Retires

On May 31, after 23 years with the University of Minnesota Extension, Barb Liukkonen retired. During her career with Extension, Barb has worked on a range of water issues from ground water, shoreland, and stormwater to volunteer monitoring, aquatic invasive species and safe drinking water. Barb says, "I've been blessed in working with partners in nearly every county in the state and have really enjoyed the opportunity to travel around Minnesota and learn more about our water resources."

Before joining Extension, Barb worked at the U.S. Environmental Protection Agency in Duluth on acid rain research and taught high school science. Within Extension she held positions in northeastern and northwestern Minnesota and has been based out of St. Paul for the past 13 years. She served on the Steering Committee for the Minnesota Water Line, which was a phone line in the late 1990s intended to provide citizens with a "one-stop" access to answers to their water-related questions. Some of her favorite programs centered around private well testing clinics, offered in about 25 counties across Minnesota over the years. The "How Well's Your Well?" programs included low-cost water testing for nitrate and bacteria coordinated through an Extension office or a Soil and Water Conservation District, followed by an educational program where owners received their water test results, learned what those results meant, and heard about potential health risks, well maintenance, and water treatment options. In the early 1990s, such a program in Gully, Minnesota (Polk County), identified that about 50% of the 35 private wells in town had elevated nitrate levels; follow-up analysis indicated there was also pesticide contamination in some wells. More recently, Barb worked with dairy producers in west central Minnesota and Wisconsin, and with University animal science and veterinary medicine researchers to study whether elevated arsenic in dairy cattle's drinking water affects dairy products. They investigated hair, hoof, blood and urine as biomarkers for arsenic exposure and identified urine as the most reliable biomarker. In the study, arsenic was not detected in milk or processed dairy products, even when arsenic concentrations in the drinking water were up to ten times the maximum contaminant level.

— continued on next page



Bay West, Inc. Announces Opening of Duluth Office

Bay West, Inc., an environmental and industrial services company, has opened an office in Duluth, MN. The office is managed by Greg Prom, CHMM, Project Manager, who brings 14 years of experience in the environmental industry. Mr. Prom will be working with government, municipal, and commercial customers throughout northern Minnesota and western Wisconsin to provide environmental investigation and remediation services.

Bay West is very familiar with the Duluth area, having been founded there in 1974. During the 1980's, Bay West consolidated into a new facility in the Twin Cities, and continued to build its customer-base throughout the State. "A Duluth office is an integral part of Bay West's growth plan and our desire to be more accessible to our northern Minnesota and western Wisconsin customers," said Bryan Murdock, Environmental and Industrial Services Manager.

Celebrating its 35th year, Bay West provides environmental consulting, remediation, industrial cleaning, waste transportation and disposal, and emergency response services to government and commercial customers nationally, and has offices in St. Paul, MN (HQ), Duluth, MN, Seattle, WA, Spokane, WA, Kalamazoo, MI, Kalispell, MT, Goldsboro, NC, Grand Island, NE, and Cincinnati, OH. For more information, contact Bryan Murdock, Group Manager, at (651) 291-3473 or bryanm@baywest.com.

President's Letter, cont.

discussion see the article by Tom Clark in this issue.

At present there is no consideration of changing the MGWA to the MGA. Besides, the Many Lettered Acronym (MLA) of MGA is already claimed by the Minnesota Golf Association. Perhaps a different possibility would be to consider the Minnesota Water Association (MWA), which is available. Attendees of the MGWA Spring Conference did learn of the multitudinous adjectives used with water. While the "ground" version of water dominates in volume, purity and drinkability, water can take many forms (vapor, liquid and solid) and can be found in all variety of environments and containers. As Jim Almendinger pointed out at the Spring Conference, in the end it is all just "water." For more on the Spring Conference see the report in this newsletter. Perhaps, however, the simplest remedy would be to drop the space and make it the Minnesota GroundWater Association retaining the MGWA MLA.

As professionals in this field all of us should

recognize the importance of groundwater and be proud that it might be considered as a one-word noun without hyphens or adjectives. None of the other potential forms of water have as yet been elevated to one-word status. We at the MGWA will continue to support groundwater professionals throughout Minnesota. Our quarterly newsletter is one important part of keeping you up to date on groundwater issues. A second part is to conduct spring and fall meetings on current topics. A long time goal has been to keep the cost of these meetings low, allowing our members to maintain professional certification at a reasonable cost. The MGWA also supports field trips and workshops on an irregular schedule. All of these education and training opportunities are even more important as we face difficult economic times. Considering the many benefits the MGWA has provided over the years perhaps you should consider what you can do for the MGWA. In addition to newsletter support we are always looking for assistance with field trips, meetings and yes, even future board members.

Barb Liukkonen retires, cont.

Barb's efforts have been recognized with several awards over the years, including the University of Minnesota Extension Dean's Award for Distinguished Faculty, many state and national team awards, the 2008 national Outstanding Extension Program Award, and the Outstanding Individual of the Year award from the Minnesota Association of Resource Conservation and Development Councils in 1992.

After retirement from her current position, Barb will continue to work on grants related to water resources, but will have more time to garden, read, travel and begin work on a new (retirement) home along the Stewart River up in Lake County.

MGWA Newsletter June 2009

2009 MGWA Board

Past President
Stu Grubb
(651)351-1614
grubbss@aol.com

President
Scott Alexander
University of Minnesota
(612)624-7822
alex017@umn.edu

President-Elect
Steve Robertson
Minnesota Dept. of Health
(651)201-4648
steve.robertson@state.mn.us

Secretary/Membership
Jon Pollock
Frontline Environmental
(952)892-0367
jp.frontline@frontiernet.net

Treasurer
Craig Kurtz
3M Company
(763)757-6876
craigkurtz@msn.com

The primary objectives of the MGWA are:

- ◆ Promote and encourage scientific and public policy aspects of ground water as an information provider.
- ◆ Protect public health and safety through continuing education for ground water professionals;
- ◆ Establish a common forum for scientists, engineers, planners, educators, attorneys, and other persons concerned with ground water;
- ◆ Educate the general public regarding ground water resources; and
- ◆ Disseminate information on ground water.

MGWA's Corporate Members for 2009

Pace Analytical

Barr Engineering

AMEC Geomatrix

Interpoll, Inc.

Northeast Technical Services

Soil Engineering Testing, Inc.

Leggette, Brashears & Graham, Inc.

Links at www.mgwa.org

Save the Date!

**MGWA's
Fall Conference**

November 12, 2009

Drinking Water in Ghana, cont.

served as sources of water supply to small towns and rural communities to dry up almost completely. This alarming rate of surface water depletion has increased the need for underground water as an alternative source of potable water supply, especially in rural communities. Underground water is preferred because of its minimized risk of contamination.

With additional financial support from corporate and individual donors, the Presbyterian Church of the Way has constructed fourteen wells to provide safe drinking water for over 20,000 people in seven rural communities in the Ashanti Region of Ghana. Each well costs about \$7,500. The project benefits rural communities that

entirely depend on fetching runoff water from dangerously polluted streams miles away despite the inescapable truth that "Water is the centerpiece of the life support cycle." Wells are drilled, fitted with manual pumps, tested, and turned over unconditionally to rural communities, which are otherwise last in line for international assistance.

The rural communities commit to maintenance and ongoing security. The water is tested annually to assure compliance with World Health Organization standards and the physical condition of the wells is monitored by independent reviewers in Ghana to preserve the construction investment. The communities' gratitude is humbling and overwhelming. The communities erect signs

thanking US donors and during emotional dedication ceremonies children and adults sample safe, clean water for the first time in their lives. It is a thoroughly exciting project!

With the success of the project (and the gratification experienced by donors) there is consideration for continuing the project in other needy communities where the desperate need persists. It is a need we can continue to address together! Life is furthered when we unite to provide healthful, clean water to another rural community. For more information on this project please contact Collins Ofori-Amanfo at 612.868.5221 or cofori-amanfo@wje.com. Additional project information is available at info@pcotw.org.

— *Editor's note: Both the editor and author serve on the Ghana Drinking Wells Committee at the Presbyterian Church of the Way (PCOTW). This project is one of numerous groundwater-related projects (some of which have been described in recent newsletters) that MGWA members are involved in across the world.*



Beneficiaries pumping water from a drinking water well in Ghana.



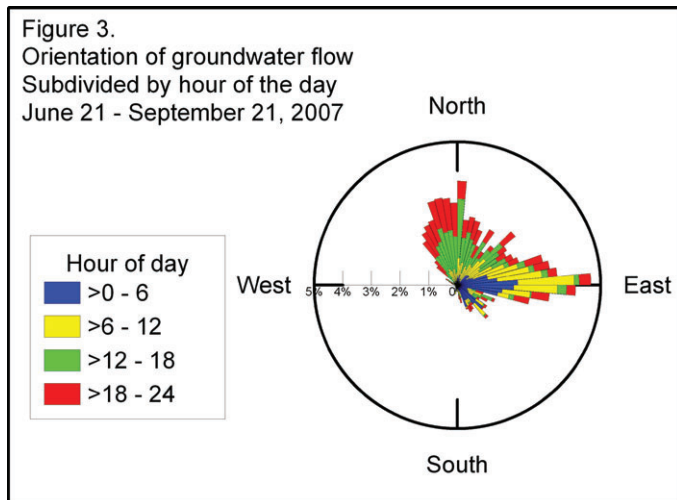
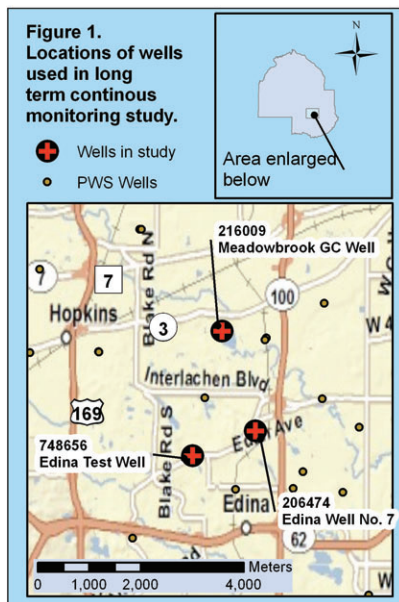
Dedication ceremony following the completion of a drinking water well in a rural community in Ghana.

Data Matter(s)

Hydraulic Gradient Fluctuations: Prairie du Chien – Jordan Aquifer System, East-Central Hennepin County June 2007 – March 2008

By P. Rzepecki (AECOM) and S. Robertson (Minnesota Department of Health)

Long term continuous groundwater elevation measurements from three Prairie du Chien-Jordan wells in southeastern Hennepin County (Figure 1) reveal seasonal differences in groundwater flow direction and magnitude. State and local authorities collected these data in response to ongoing groundwater quality investigations in the area. Elevation data were collected from unpumped wells at 30-minute intervals and were analyzed (classic three point problem, cf. Pinder and others, 1981) to determine the hydraulic gradient over the course of nine months (Figure 2). Groundwater flow is



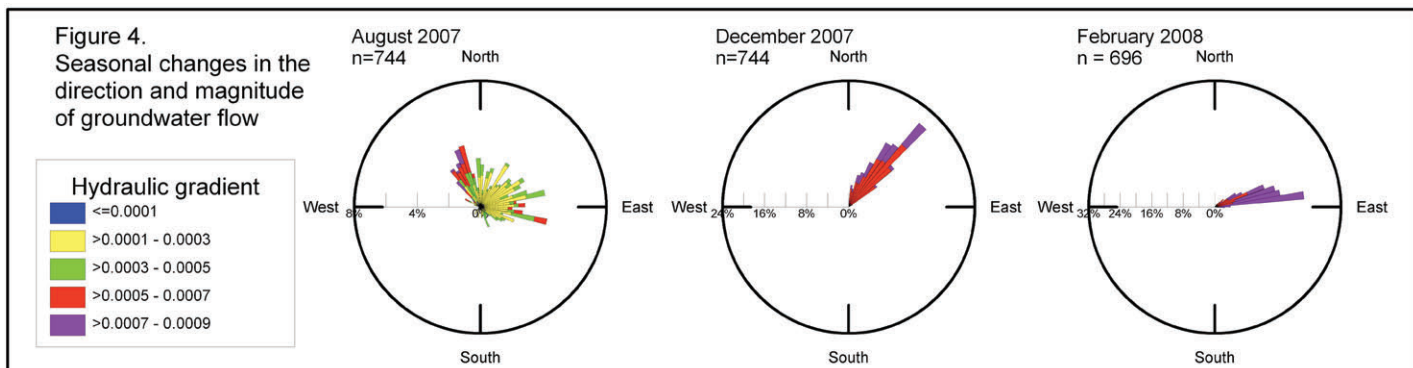
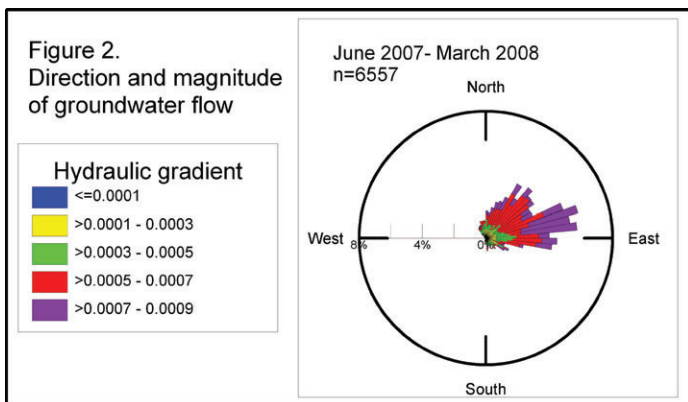
expected to move to the east or east-southeast based on regional information (Kanivetsky, 1989), although many high capacity pumping wells are present in the area.

The effect of high capacity wells on the flow regime is profound, causing temporal fluctuations in the direction and magnitude of groundwater flow that change hourly (Figure 3) and seasonally (Figure 4), depending on the vagaries of local pumping. Heavy seasonal pumping creates wide swings in the magnitude and direction of the gradient in summer months whereas lower demand in the winter leads to stable gradients (Figure 4). This data set illustrates the importance of long term, continuous measurements in understanding aquifer dynamics. Moreover, these hydraulic data, in conjunction with geologic complexities such as the secondary porosity conditions in the Prairie du Chien, highlight the difficulty of tracking contaminants in aquifer settings subject to high-capacity pumping.

References:

Kanivetsky, R., 1989, Quaternary Hydrogeology, in Geologic Atlas of Hennepin County, Minnesota, Balaban, N.H., (Ed.), County Atlas Series, C-4, Plate 5, Minnesota Geological Survey, St. Paul, Minn., scale 1:100,000 and 1:133,333.

Pinder, G.F., M. Celia, and W.G. Gray, 1981, Velocity calculation from randomly located hydraulic heads: Ground Water, v.19, n.3, p. 262-264.



Ground Water R.I.P., or Blame the Canadians

The groundwater grammar gods at the U. S. Geological Survey (USGS) have spoken and as of March 26, 2009, the USGS will be making a transition to the use of “groundwater” as one word. USGS Technical Memorandum 2009.03 issued by William M. Alley, Chief of the Office of Groundwater, states in part: “The term surface water has not seen the same language simplification that has occurred with the term ‘groundwater.’ ‘Surface water’ continues in the English language universally spelled as two words. Use of the two terms together spelled as ‘groundwater and surface water’ has become common usage.”

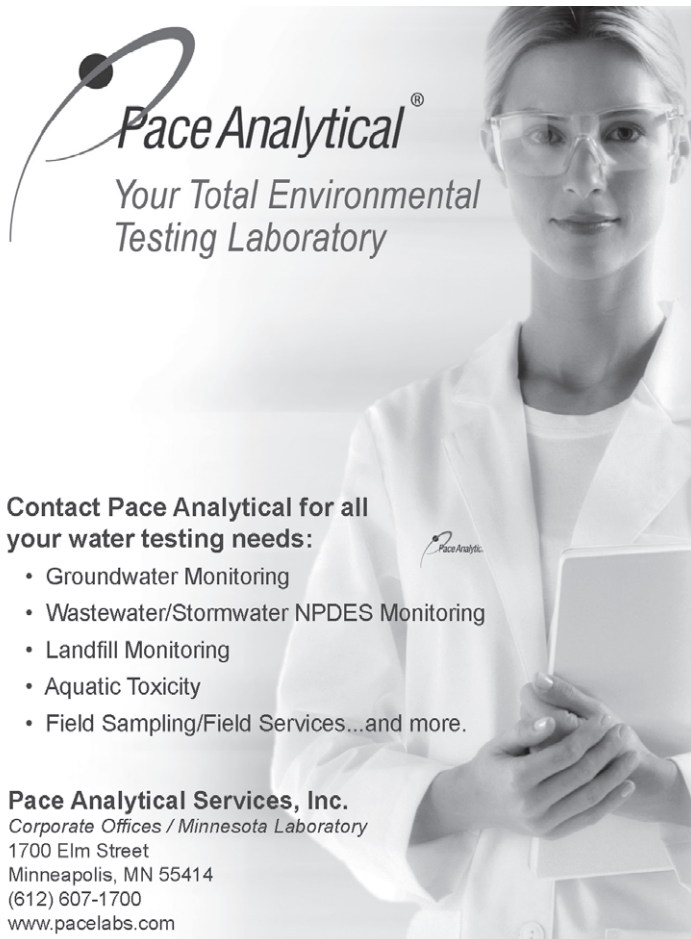
Over the past 30-plus years, the spelling of the very resource we are trying to protect has been hotly debated among hydrologists. In the slightly modified words of the pundit Mark Twain, “Whiskey is for drinkin’; groundwater (and how to spell it) is for fightin’ over.” At least one nationally recognized groundwater professional organization, the National Ground Water Association (originally the National Water Well Association) and their former executive director, Jay Lehr, campaigned for the two-word spelling beginning in the 1960’s.

The issue was discussed as early as 1974 in the Journal of Ground Water in an article bluntly titled, “Ground Water Is Two Words”. The article reprints four letters, starting with one from

Gerald Meyer, then USGS Ground Water Branch Chief, to Jay Lehr, placing the blame for the growing practice of the one-word usage to the listing of “groundwater” as the preferred spelling in Webster’s Third New International Dictionary. Next is a letter from Mr. Meyer to James E. Shea, Editor-in-Chief of G&C Merriam Company, publisher of the new dictionary. In his letter, Mr. Meyer lists many dictionaries, reference books, professional organizations and State and Federal agencies that prefer the two-word spelling. In addition, he noted, “Several countries favor the contracted form, usage stemming I believe from the German ‘Grundwasser.’ Recently a detectable increase in use of the term in its one-word form has arisen in the United States, traceable largely to the Third International Webster, and confusion is building. A parallel term, surface water, remains two words universally. Ground water and surface water are intimately related in nature and the terms appear together in writings on water. The predominant, general usage continues to be ground water.”

Next is a response from Mr. Shea to Mr. Meyer indicating that the term was entered in the Third International Webster as a single word based on the advice of Dr. Kirtley F. Mather, G&C Merriam’s outside consultant in Geology. Mr. Shea acknowledges that although the single-word spelling does occur

— continued on next page



Pace Analytical
Your Total Environmental Testing Laboratory

Contact Pace Analytical for all your water testing needs:

- Groundwater Monitoring
- Wastewater/Stormwater NPDES Monitoring
- Landfill Monitoring
- Aquatic Toxicity
- Field Sampling/Field Services...and more.

Pace Analytical Services, Inc.
Corporate Offices / Minnesota Laboratory
1700 Elm Street
Minneapolis, MN 55414
(612) 607-1700
www.pacelabs.com

THEIN WELL

Over 100 Years of Service



<ul style="list-style-type: none"> • Geo Probing • Soil Borings • Monitoring Well • Remediation Wells • Angle Drilling • Rock Coring 	<ul style="list-style-type: none"> • Well Televising • Gamma/E-logging • Test/Production Wells • Pump Sales/Service • Well Rehabilitation • Well Abandonment
--	--



**Certified Master
Groundwater Contractor**

1-800-450-8000

Blame Canada, cont.

in print, “it is outnumbered by the occurrence of the two-word phrase and should be entered in Webster’s Third International Dictionary as such.” Mr. Meyer acknowledges Mr. Shea’s response and states, “We were pleased to read that the two-word form should be entered in Webster’s Third New International Dictionary, and I conclude that you intend to change the entry in the next printing.”

There the debate stood until 1979 when R. Allan Freeze and John Cherry published their landmark textbook which educated a generation of new hydrogeologists. Being Canadians where the one-word spelling had always been favored, they titled the book “Groundwater”. Thus began a slow but steady movement to go to the one-word spelling worldwide. Alas, for the two-worders, it was a case of, “Colour my world grey.”

But the debate wasn’t over, not by a long shot. In the September-October 1986 edition of the Journal of Ground Water, A. Ivan Johnson, a Colorado consultant submitted an article to the Readers’ Forum titled “Ground Water Is Definitely Two Separate Words.” In it he provides a long list of dictionaries and other publications that use the two-word spelling. In the March-April 1987 edition, none other than R. Allan Freeze himself responded to the Readers’ Forum with “Groundwater Is Probably One Word (or Maybe Two), More or Less: An Allegory.” It includes a fanciful debate between the Oneworders and Two Worders, which ends up being adjudicated by The Grand Vizier, one Sir Jay of the Leer, who announced his decision in rhyme:

*One word or two words?
I’ve communed with my staff
We are all in agreement.
It shall be one-and-a-half!*

In January 1992, U. S. Water News published a guest editorial by Pat Larsen of the University of Nebraska Water Center, “Is It Groundwater or Ground Water?” Results of an informal survey of water research centers and academic institutions around the country showed a definite split in opinion, but with a preference for the one-word spelling, including this from Michael Price: “Early practice was to write the term as two words, but in Britain—and more recently in North America—there is an increasing tendency to write it as one word, to emphasize the fact that it is a technical term with a particular meaning.”

In 1995, when I was editor of this newsletter, I wrote this as part of an editorial note, “Ground Water or Groundwater?” in the December issue. “Since this is a debate that has raged for decades and will probably continue into the next century, I’ve chosen to take a ‘soft’ editorial approach to the issue and follow the author’s wishes. It makes the job of your volunteer editor and overworked publisher a little easier and hopefully keeps our authors happy, too.” The MGWA newsletter team still follows this policy, maintaining consistency of spelling within the same article.

Finally, a quick check of four professional state groundwater associations in the upper Midwest showed a split on the issue. Minnesota and Wisconsin use the two-word spelling, while the Iowa and Illinois associations prefer one word.

I’ll conclude this rambling with an excerpt from a clever piece by Peter L. Kellen of the Water Resources Program at Princeton
MGWA Newsletter June 2009

University, penned in March 1997 with apologies to William Shakespeare.

Scene: A dark graveyard with caskets leaching arsenic into the gyttia

Hamlet: (contemplating his latest Groundwater Digest). Alas, poor Yorameck, I knew him well, Puck. GROUND WATER or GROUNDWATER, that is the question. Whether ‘tis nobler in the hearts of men to suffer the slings and arrows of outrageous grammarians or to move forward to more pressing problems such as cleaning up this damnable witches brew my dowsers bring up from the gyttia and call “water.” It has such high nitrate levels it leaves a bitter taste in my mouth, almost as bitter as some of the commentary in this debate.

Puck: I am but a fool, Sir Prince. Maychance you can enlighten me on the import of this debate. To me, the difference between GROUND WATER and GROUNDWATER seems to be naught but the extra space between the letters. It seems to be truly much ado about nothing, a veritable tempest in a teapot.

Hamlet: In sooth, friend, I believe you’ve solved the enigma! They may call you fool, but there seems to be more here than meets the eye. It seems only logical that GROUND WATER, being pulled apart as if by suction or tension to create vadose spaces and unfilled pores must refer to water in the shallow unsaturated zone, whilst GROUNDWATER, being pushed together under greater than atmospheric pressure so that all pores are filled must refer to the saturated zone. Seems all should be able to agree on something this logical.

Puck: Seems clear to a fool like me, fair Prince, but why then all the bubble, bubble, toil and trouble?

Why all the bubble, bubble, toil and trouble, indeed? Methinks ‘tis time to stop, and so to bed, perchance to dream...

Submitted by Tom Clark, MGWA Newsletter Team



Complete Environmental Services Including:

- Groundwater and Surfacewater Sampling
- Sampling and Analysis of Natural Attenuation Parameters
- Landfill Gas Monitoring: EPA 25C and VOC’s
- Industrial Waste and Wastewater Compliance Monitoring
- Ambient Air and Meteorological Monitoring
- Source Testing
- Certified Full Service Laboratory

Interpoll Laboratories, Inc.
4500 Ball Road NE
Circle Pines, MN 55014-1819
Field@Interpoll-Labs.com

(763) 786-6020
FAX (763) 786-7854

Minnesota Response to the December 2008 Tennessee Dam Failure

As reported by the Associated Press, Minnesota Department of Natural Resources (DNR) engineers plan to inspect three dikes that hold large volumes of coal ash at Minnesota power plants. The dikes are at three large coal-fired power plants near Becker, Cohasset and Hoyt Lakes.

This inspection is in response to the disastrous failure in December 2008 of a dike at the Kingston Fossil Plant near Harriman, Tennessee. The failure sent an enormous volume of coal ash sludge into the Emory River, impacted a residential area and left traces of heavy metals such as lead and thallium in the water. An aerial survey showed the amount of the spill was 5.4 million cubic yards, or enough to flood more than 3,000 acres one foot deep. In addition to the concern over dam safety, the release brought renewed attention to the potential for surface water and groundwater impacts from such releases.

Unlike the Tennessee dam, which was built of dredged ash, the Minnesota dams are made of earth fill. Inspections are planned for this summer according to the DNR.

Minnesota Karst Preserve Yields Bones of Creatures Previously Unknown in Minnesota

The privately-owned Tyson Spring Cave in Fillmore County, part of the Minnesota Karst Preserve, has recently yielded bones of Pleistocene mammals previously unknown in Minnesota, including a possible stag-moose antler and part of a saber-tooth cat skull. Even as the Pleistocene ice on Minnesota's surface likely obliterated fossil remains there, the cave environment was ideal for preservation of the remains of these ice age mammals. You can read more about this fascinating story in the March-April 2009 issue of the Minnesota Department of Natural Resources Conservation Volunteer magazine, or go to their web site at: www.dnr.state.mn.us/volunteer/marapr09/index.html.

and click on Science Museum Underground: Visit the fossil vault.

Surface Water/Groundwater Interaction in the news

A March 24, 2009 news account by Minneapolis Star Tribune reporter Mary Jane Smetanka regarding Lower Penn Lake in Bloomington illustrates the importance of surface water/groundwater interaction, and of communicating its effects to the public. The Lower Penn gets most of its water from precipitation and storm water inflow from an area that includes Interstates 35W and 494. In the past, groundwater was pumped to the lake from a well in an effort to maintain lake levels and aerate the water. State law now limits use of groundwater wells to maintain lake levels. While a recent study on Lower Penn concluded that pumping from the 350-foot-deep well (now discontinued in accordance with state law) actually appears to cause the lake to lose water, local residents are reportedly unhappy that the lake seems shallower than it used to be and that the muddy shoreline is increasingly exposed. According to the press account, many people who live nearby want the 31-acre lake restored to the way it was in the 1970s, when it was dredged and stocked with fish, and groundwater was pumped into the lake.



LABORATORIES, Inc.

P.O. Box 249
NEW ULM, MN 56073-0249

Independent laboratory services, specializing in testing of groundwater, soil, hazardous wastes, sludges and drinking water.
On site sampling services available
Call: (800-782-3557)



SOIL ENGINEERING TESTING, INC.

A Comprehensive Soil Mechanics Testing Laboratory

**Bloomington, MN
(952) 884-6833**

www.soilengineeringtesting.com



Virginia • Duluth • Twin Cities

**Analytical Laboratory
Certified Low Level Mercury
Environmental Sampling
Sample Pickup
Water & Wastewater Services
Geoprobe Services**

**www.netechnical.com 1-800-569-4179
Twin Cities Lab and Service Center 763-497-9111**

McCain
and Associates, Inc. ☁

ENGINEERS & SCIENTISTS
Knowledge. Commitment. Service.

**Environmental Investigation
Groundwater Supply and Quality Improvement
Solid Waste Engineering
Construction Management
General Civil Engineering**

Contact Nick Bonow, 952-346-3859, nbonow@mccainassociates.com

PO Box 429, 5300 Hwy 12, Maple Plain, MN 55359
tel 952-346-3900 | fax 952-346-3901

REPORTS AND PUBLICATIONS

New USGS articles on Mercury Cycling in Stream Ecosystems

Three related U.S. Geological Survey articles on mercury transport, biogeochemical processes, and bioaccumulation in stream ecosystems have been published in the April 15, 2009 issue of Environmental Science & Technology (ES&T). Links to the articles and data from this study can be accessed electronically at water.usgs.gov/nawqa/mercury/pubs/.

The study examined eight streams in Oregon, Wisconsin, and Florida during 2002-2006. Streams were in both urbanized areas and in relatively undeveloped areas. The streams span a range of environmental settings and watershed characteristics that can affect biogeochemistry and bioaccumulation of mercury in streams, including precipitation, mercury deposition rates, degree of urbanization, and wetland abundance.

Although all eight streams receive mercury predominantly via atmospheric deposition, watershed characteristics primarily determine mercury transport and bioaccumulation in these streams. Key factors include (1) the abundance of wetlands, which influence how much of the atmospherically deposited mercury is converted to methylmercury (the most toxic, bioaccumulative form of mercury); and (2) runoff of dissolved organic carbon and suspended sediment, which controls how much mercury and methylmercury is delivered to the streams.

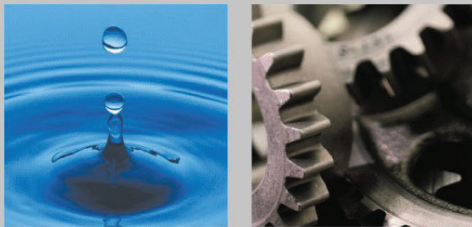
Findings show that the relative amount of methylmercury in streams is strongly correlated with streamflow, and is tied to production of methylmercury in the watersheds (particularly in wetland areas), which is subsequently transported in runoff to streams. An unexpected finding was that methylmercury production in channel sediments appears to be relatively unimportant for governing within-stream methylmercury levels.

For questions on individual papers, please contact the authors: Mark Brigham (mbrigham@usgs.gov, 763-783-3274), Mark Marvin-DiPasquale (mmarvin@usgs.gov, 650-329-4442), and Lia Chasar (lchasar@usgs.gov, 850-553-3649).

USGS Release: Quality of Water from Domestic Wells Across the United States, 1991-2004

This study from the National Water Quality Assessment (NAWQA) Program of the U. S. Geological Survey (USGS) assesses water quality conditions for about 2100 private domestic wells across the United States. As many as 219 properties and contaminants, including pH, major ions, nutrients, trace elements, radon, pesticides, and volatile organic compounds were measured. Fecal indicator bacteria and additional

— continued on next page



*Our goal is to develop
on-going relationships
with our clients
as we provide them
with innovative solutions
to their environmental issues.*



- Water Supply Services
- Wastewater Treatment
- Soil and Groundwater Remediation
- Well-head Protection
- Phase I & II Environmental Site Assessment Services
- Asbestos Assessment & Management
- Industrial Hygiene Services
- Underground Storage Tank Investigation & Remediation
- Environmental Compliance Assessments
- Indoor Air Quality Services

LIESCH ASSOCIATES, INC.

CONTACT: JIM DE LAMBERT - 800/338-7914
13400 15th Ave N, Minneapolis, MN 55441

USGS Reports on Domestic Well Water Quality, cont.

radionuclides were analyzed for a small number of wells. The large number of contaminants assessed and the broad geographic coverage of the study provides a foundation for an improved understanding of the quality of water from the major aquifers tapped by domestic supply wells in the United States.

The results of this study are described in two USGS publications, including an overview of the study findings (Circular 1332) and a detailed technical report on data sources, analyses, and results (Scientific Investigations Report 2008-5227). Both publications can be downloaded in PDF format from the NAWQA website: water.usgs.gov/nawqa/studies/domestic_wells/.

Also available in PDF format at the above address are two recent related articles in the Water Well Journal of the National Ground Water Association (NGWA) which briefly summarize USGS study findings and general information on domestic well siting, maintenance, and testing.

New Publication Regarding Carbon Sequestration

While the geology in Minnesota is not well-suited to carbon sequestration, research on the topic continues apace in other parts of the world. In a recent volume of the journal *Nature*, Stuart Gilfillan and colleagues reported on the mechanism of CO₂ fluid phase removal in natural gas fields as an analogue for assessing the geological storage of anthropogenic CO₂.

Gilfillan et al., 2009, Solubility trapping in formation water as dominant CO₂ sink in natural gas fields, *Nature*, vol. 458, April 2009, pp. 614-618.

May 2009 Newsletter on Assessment of Stormwater Best Management Practices

A multi-year project exploring how to assess stormwater best management practices (BMPs) is underway at the University of Minnesota. Funded through contract with the Minnesota Pollution Control Agency, the project is developing a protocol that will outline and explain proper methodology for the assessment of stormwater BMPs, such as rain gardens and infiltration practices, through monitoring and field testing.

The following wrc.umn.edu/outreach/stormwater/bmpassessment/index.html will take you to the project page and links to the May 2009, as well as earlier newsletters. The page also provides links to other documents and materials on stormwater.

DNR Waters 2008 Highlights

The Waters Division of the Minnesota Department of Natural Resources has compiled a factsheet of accomplishments for calendar year 2008. The "Highlights of 2008" provides an overview of activities supporting the division's mission of public waters protection, water supply management, and technical information. The factsheet is online and available at files.dnr.state.mn.us/publications/waters/waters_highlights_2008.pdf.

GEOPHYSICAL SERVICES

Environmental - Geotechnical - Engineering

952.556.1118 Tel
952.556.1119 Fax
info@3dgeophysics.com



There's no substitute for experience

- Ground-Water Exploration
- Wellhead/Source Water Protection
- Vulnerability Assessments
- Ground-Water Modeling
- Well Field Management
- Ground-Water/Surface-Water Assessments & Permitting
- Environmental Investigation
- Remediation Engineering
- Risk Assessments
- Environmental Risk Transfer
- Vapor Intrusion Evaluation



Leggette, Brashears & Graham, Inc.
Professional Ground-Water and Environmental Engineering Services
Established in 1944

8 Pine Tree Drive, Suite 250 | St. Paul, MN 55112
651.490.1405

Offices Nationwide | toll free: 877-959-7800 | www.lbgweb.com

Phone: (763) 427-6100
Fax: (763) 427-0533
Mobile: (763) 286-9355

rerenner@ehrenner.com
www.ehrenner.com
1-(800)-409-9355

ROGER E. RENNER
President

NGWA Certified Master Ground Water Contractor

E.H. Renner & Sons

INCORPORATED
WELL DRILLING FOR FIVE GENERATIONS
15688 Jarvis Street N.W. Elk River, MN 55330



**MGWA 2009 Spring Conference
– Connecting with Ground Water**

Little direct infiltration occurred in Minnesota on May 8, 2009, because skies were clear, temperatures were moderate, and no rain was reported (in the metro area anyway). On this glorious day approximately 190 MGWA members convened at the Continuing Education and Conference Center at the University of Minnesota to listen to a wide variety of speakers talk about the ways in which groundwater is linked to other earth systems.

MGWA president, **Scott Alexander**, convened the conference and introduced **Jim Almendinger**, with the Science Museum of Minnesota, who gave a brief overview of the many critical aspects of surface water and groundwater interactions. His talk provided an introduction to many of the concepts to be covered throughout the day.

Bruce Wilson, University of Minnesota, with his background as a surface water hydrologist, offered a slightly different perspective on the hydrologic cycle. He discussed the common approach of estimating recharge using surface water flows and implications of climate change on hydrologic processes. Bruce finished his talk with some examples from field study areas.

Don Rosenberry, U.S. Geological Survey, focused on the spatial and temporal variability of lake and groundwater interactions and discussed a number of examples from his broad experience studying lakes and groundwater systems. He particularly noted

recently published research addressing spatial and temporal variability, limitations of the scale at which measurements are made, and effects of climate change.

Ray Wuolo of Barr Engineering discussed the use of groundwater modeling approaches to bracket the likely effect of future municipal pumping on Valley Creek, a protected trout stream, in east central Washington County.

Ginny Yingling, Minnesota Department of Health (MDH), reviewed how she and other MDH staff have teased out likely connections between groundwater and surface water using perfluorochemicals (PFCs) to elucidate travel pathways. PFCs, while an unwelcome addition to the natural environment, do serve as excellent conservative tracers because of their physical properties (i.e., they resist degradation, do not tend to stick to the aquifer substrate, and are non-volatile).

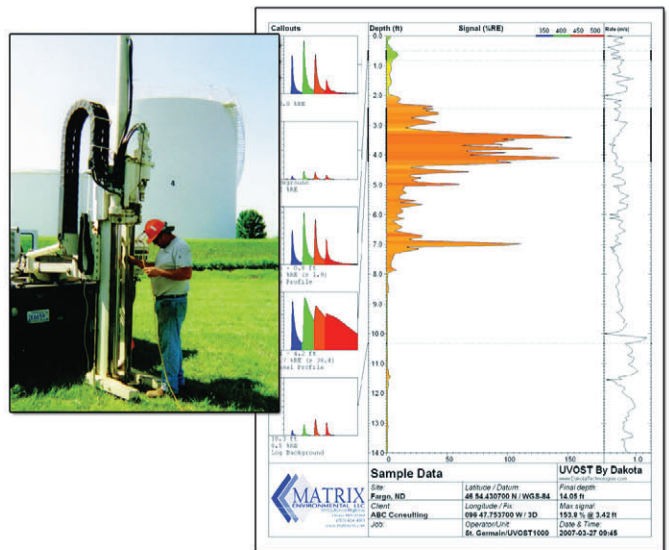
Deb Swackhamer, University of Minnesota, Water Resources Center, provided an overview of efforts underway to better understand the technical and management needs to assure the sustainability of Minnesota’s ground water resources. Deb noted especially the recent efforts to bring together representatives from state agencies, academia, and other organizations to identify the technical and data needs that will support groundwater sustainability.

— continued on next page



Environmental Field Services

- ◆ **Geoprobe®**
4x4 Trucks, All-Terrain Vehicles & Portable Units
- ◆ **Mobile Lab**
VOCs, Hydrocarbons, PCBs, PCP, PAHs & Metals
- ◆ **Direct Sensing**
UVOST - Laser Induced Fluorescence, Membrane Interface Probe (MIP), Electrical Conductivity Logging
- ◆ **Remediation**
Bioremediation, In-situ Chemical Oxidation, Stabilization



Our ultra-violet optical screening tool (UVOST) is specifically designed for delineating the NAPL found at Petroleum, Oil, Lubricant (POL) sites. UVOST can be deployed by all forms of direct push across a wide range of site conditions.

Matrix MN Office
8631 Jefferson Highway
Osseo, MN 55369
(763) 424-4803
Fax: (763) 424-9452

MATRIX ENVIRONMENTAL LLC
www.matrixenv.com
email: customerservice@matrixenv.com

OH Office
P.O. Box 364
Galena, OH 43021
(740) 965-8271
Fax: (740) 965-8037

MGWA Web Site has a New Look

Our upgraded web site's new design was created and implemented by MGWA's contractor Red Kite Creative, Sean Hunt, and Craig Kurtz.

We hope you enjoy it. www.mgwa.org.

New in the Members Area is an on-screen directory with quick links by last name of current members. Our directory is in the Members Only Area and requires a username/password. The current username and password is sent to members quarterly with the announcement that the newest newsletter is available.

Materials from the recent Spring Conference are also in the Members Area.

The MGWA Foundation has its own look and includes a section on past funded projects.

MGWA 2009 Spring Conference, cont.

Eric Mohring, Minnesota Board of Water and Soil Resources, gave an entertaining discussion on the general topic of water resources management in Minnesota. He talked about the governmental organization and relationships used by federal, state, and local entities to manage the many aspects of water resources. Ask anyone who was there how spaghetti fits into this discussion.

Carl Almer, EOR, Inc. and **Greg LeFevre**, University of Minnesota, reviewed the increasing use of infiltration for handling stormwater, the varying types, potential benefits, and potential impacts. Generally speaking, such practices are useful for meeting goals of resource managers focused on both groundwater and surface water, but exceptions exist depending on both land use and expected stormwater quality. Current practices may need to be improved to adequately protect groundwater.

Andrea Wedul of the University of Minnesota talked on the topic of water conservation. Her background as a landscape architect provided a unique perspective for groundwater professionals. She framed her discussion around what she called the four epochs in water management in the U.S.:

1) uncontrollable, 2) strictly controlled, 3) as a necessity, and 4) celebrated. Andrea provided examples to illustrate each era. The examples of water reuse and careful conservation that she provided at the end were especially interesting because the examples emphasized approaches that can be used in humid climates (e.g., Minnesota) where reuse has not traditionally been a priority.

To find out more about any of the presentations, check out the MGWA website (www.MGWA.org). MGWA members should be able to access copies of each speaker's presentation.

Visit the Ground Water Plaza at the Science Museum this Summer

The Ground Water Plaza in the Big Back Yard of the Science Museum of Minnesota (SMM) is now open! Even in the Land of 10,000 Lakes, most Minnesotans depend on ground water for their drinking water. Far more water exists underground than in Minnesota's lakes, rivers, and wetlands. Using pristine water from the Science Museum's 300-foot-deep artesian well, fill buckets of water and pour them over samples of bedrock and sediment beneath the Twin Cities that are important sources of ground water. Where does the water go? How can water move through seemingly solid rock? Find out for yourself!



Children enjoying the Ground Water Plaza in SMM's Big Back Yard

Omnibus Public Land Management Act of 2009

By Tim Thurnblad, Minnesota Pollution Control Agency

The landmark Omnibus Land bill was signed into law by President Obama on March 30. It addresses a wide variety of water resource issues. For those who work in the ground water field, it is particularly noteworthy that it contains several key provisions dealing with ground water monitoring and ground water protection. It also addresses water resources sustainability. In addition, the bill contains specific directives to consult with, coordinate with and cooperate with state water resource agencies on this work.

The Omnibus Public Land Management Act of 2009 is available in its entirety at the Government Printing Office' web site. At the link below, courtesy of the Ground Water Protection Council, you will find key ground-water related portions of the bill highlighted in blue.

www.gwpc.org/e-library/documents/general/HR146.doc

*Have an idea for an article?
Contact the editor at
editor@mgwa.org*

BRAUN INTERTEC

Steve Albrecht
952.995.2622
salbrecht@braunintertec.com
braunintertec.com



Analytical Laboratory Services:

- Ground Water Testing
- Waste Water Testing
- Soil Remediation
- Industrial Hygiene Monitoring
- Asbestos and Lead Paint Testing
- Hazardous Waste Testing

• Celebrating 50 years of Growth Through Service and Trust

UPCOMING EVENTS

Waterosity at Minnesota Landscape Arboretum

The summer exhibition this year at the Minnesota Landscape Arboretum in Chanhassen will be “Waterosity,” an exploration of the interdependence of people, plants and water through several interactive displays and exhibits, including a juried art exhibition. The event begins in June and continues through September. For more information, see <http://www.arboretum.umn.edu>.

54th Annual Midwest Ground Water Conference

The 54th Annual Midwest Ground Water Conference will be held October 12-15, 2009, in St. Louis, Missouri.

The pre-conference field trip to Onondaga Cave and Maramec Spring and dinner social on October 12 will make an informative, relaxed and enjoyable day. The conference has an excellent lineup of speakers thus far. They include Peter Cook, 2009 National Ground Water Association (NGWA) Darcy Lecturer; Richard Laton, 2009 NGWA McElhiney Lecturer; Cliff Treyens, NGWA Public Awareness Director; Frank Chapelle and Paul Bradley, U.S. Geological Survey and many other fine presenters. This is a conference you won't want to miss so make sure you reserve the dates on your calendar now! For information about the registration and conference highlight information for this year's Midwest Ground Water Conference see the web site www.dnr.mo.gov/env/wrc/midwest-gwconf2009.htm.

Assistance Needed for Environmental Learning Competition Featuring Groundwater Theme

The Board of Water and Soil Resources (BWSR) is seeking assistance from groundwater professionals to help prepare study materials and exams for the 2010 Envirothon. About 1,000 high school students statewide participate in this event, and they compete by studying aquatic ecology, forestry, soils and wildlife, and a “current events” topic, which changes each year. Protecting groundwater is the 2010 current events topic, so if you are interested in preparing study materials that would help high school students understand the science and public policy issues surrounding groundwater protection, please contact Jon Fure, BWSR Communications Director and State Envirothon Coordinator, at 651-296-0884. For more information about the State Envirothon, please go to www.bwsr.state.mn.us/outreach/envirothon/index.html.

2009 Nobel Conference at Gustavus Adolphus College: “Water...An Uncertain Resource”

This year's Nobel Conference at Gustavus Adolphus College in St. Peter, to be held October 6-7, is entitled “Water... An Uncertain Resource”. Among the featured speakers are Rajendra K. Pachauri, Chair of the Intergovernmental Panel on Climate Change (IPCC) and shared winner of the 2007 Nobel Peace Prize. His presentation will focus on how climate change may further stress water resources, especially exacerbating problems of clean water access and food security for the world's poor. Nancy N. Rabalais, Director of the Louisiana Universities Marine Consortium and one of the world's experts on documentation of hypoxic zones will focus on the health of estuaries and coastal waters as a critical ecological and food security issue and an indicator of unsustainable management of land and freshwater resources. David L. Sedlak, Professor in the department of Civil Engineering at the University of California at Berkeley, will speak on the connection between chemicals like hormones and pharmaceuticals in the waste stream and the quality of the aquatic environment. For a complete list of speakers and registration information, visit: gustavus.edu/events/nobelconference/2009/schedule.php.

Crow Wing County Geologic Atlas Workshop and Tour

The Crow Wing County Land Services Department is sponsoring a one-day workshop on Wednesday, July 22, 2009, to introduce the recently completed Crow Wing County Geologic Atlas.

Staff from the Minnesota Department of Natural Resources, Minnesota Geological Survey, and others will provide an introduction to the Atlas and training on its many uses. The workshop program is and registration information is described on the [workshop announcement](#). Copies of the Crow Wing County Geologic Atlas will be available at the workshop.

The day's program is designed to help familiarize both citizens and professionals with Crow Wing County's geology and its ground water resources. Problem-solving exercises will help attendees learn how the atlas information can be used to protect those resources now and into the future.

The registration deadline is July 13, 2009. For assistance with registration, contact Tracy Giza, Crow Wing County, at (218)824-1129. For other questions about the Crow Wing County Geologic Atlas, contact Jan Falteisek, jan.falteisek@dnr.state.mn.us, or (651)259-5665.

New MDH Fees Effective July 1

The 2009 legislature established two new permits fees for vertical heat exchanger (VHE) systems; eliminated the fee exemption for federal, state, or local government agencies; and established a temporary surcharge on all state licenses to fund development of statewide, electronic licensing. These changes will become effective on July 1, 2009, and are summarized below.

The permit fee schedule for vertical heat exchangers is as follows:

- ◆ \$215 for a VHE with less than 10 tons of heating/cooling capacity.
- ◆ \$425 for a VHE with 10 to 50 tons of heating/cooling capacity.
- ◆ \$650 for a VHE with greater than 50 tons of heating/cooling capacity.

The fee exemption for federal, state, or local government agencies (Minnesota Statutes, section 103I.112) was repealed. Government agencies must pay the same fees for licenses and registrations, notifications, permits, variances, and all other fees as private parties, with one exception — the monitoring well maintenance permit fee is \$50 annually for monitoring wells owned by a federal, state, or local agency.

A temporary 10 percent licensing surcharge will be applied to all

licenses issued by all executive branch state agencies, including the Minnesota Department of Health (MDH). For licenses issued by the MDH Well Management Section, the surcharge amounts to \$25 for the well contractor and \$7.50 for all other license types (or \$22.50 for three or more limited well/boring contractor licenses). This surcharge will be effect between July 1, 2009, and June 30, 2015. For most licensees, the surcharge will first appear in the 2010 license renewals.

Any fee payments received prior to July 1, 2009, will be accepted at the current rates. Insufficient fee payments for notifications, permits, variances, or licenses on or after July 1, 2009, will be returned to the contractor or individual making payment. Permits and variance requests will not be reviewed, and notifications and license applications will not be processed until the correct funds are submitted to MDH.

Well fees in jurisdictions of delegated well programs are established by the delegated program. Individuals should check with the delegated program for fee amounts and any other administrative requirements.

The MDH Well Management Section is currently revising notification, permit, variance, and license forms and will distribute these forms to contractors as they become available or when needed. If you have any questions, please contact the Well Management Section at 651/201-4600.

Opportunities

*We're proud to support MGWA and to have been named five times as a Best Place to Work.**

*Minneapolis/St. Paul Business Journal

BARR www.barr.com
800-632-BARR

in Difficult Times

Barr's wide client sector base and simple dedication to service have allowed us to thrive in tough times for over 40 years. If you are looking for a new opportunity and a fresh take on what consulting can be, please contact us or visit our website.

We work on some of the region's most challenging water supply, distribution, and treatment projects. Clients look to us for:

- Groundwater monitoring and modeling
- Distribution-system modeling
- Well siting, design, and construction
- Well-head protection plans

Minnesota • Michigan • Missouri • North Dakota

MGWA Foundation Board of Directors

President

Gil Gabanski

Hennepin County
(612)418-3246

ggabanski@hotmail.com

Secretary

Cathy Villas-Horns

Minnesota Department of
Agriculture

(651)297-5293

cathy.villas-horns@state.mn.us

Treasurer

David Liverseed

(651)366-3640

david.liverseed@dot.state.mn.us

MGWA Liaison

Stu Grubb

651-351-1614

grubbss@aol.com

Director

Chris Elvrum

Metropolitan Council

(651)602-1066

christopher.elvrum@metc.state.mn.us

metc.state.mn.us

Director

Amanda Strommer

Washington County

(651)430-6655

amanda.strommer@co.washington.mn.us

co.washington.mn.us

The MGWA Foundation is a 501(c)3 charitable organization. Donations to the Foundation are deductible on your state and federal income tax returns.

FOUNDATION MINUTES

Minnesota Ground Water Association Foundation Board Meeting Minutes

- Meeting Date:** Wednesday, March 11, 2009
- Location:** Metro 94 Building, 455 Etna Street, St. Paul
- From:** Cathy Villas-Horns (Secretary)
- Members Present:** Gilbert Gabanski, Chris Elvrum, David Liverseed (via phone), Amanda Strommer and Cathy Villas-Horns. MGWA Management Present: Jennie Leete and Sean Hunt
- Minutes:** The meeting minutes for the January 23, 2009 meeting were unanimously approved on March 3, 2009 and provided via e-mail to the MGWAF Board and the MGWA Newsletter staff.
- Treasurer's Report:** Foundation balance to date is \$84,618.05. Total credits of \$893.86 were added to the accounts. Interest in the amount of \$643.86 and donations in the amount of \$250 were accrued since 1-23-09 and were swept into the endowment, which now totals \$73,625.94. There were no debits for this period. The 48-month CD which matured in February was rolled over into the highest yielding Odyssey CD at 5.271%.
- New Business:** MGWA Board Meeting report – No liaison from the MGWA Board was present. The spring 2009 MGWA conference will be held on May 7, 2009. MGWA website design – Sean stated that the design of the MGWA website is being finalized in a blue theme, while the MGWAF website will be similar but with a green theme. Sean will forward the foundation page layout to the group. Chris will send in photographs. SMM ground water exhibit – Gil met with SMM staff, and will be meeting with them again. The water level data from the SMM well can be shared with the MN DNR. Gil will talk to a consultant and see if they will volunteer to download the data from the Hermit. Outreach Discussion of starting a speaker's bureau for MGWA, and possibly having a link on the MGWA website for this. Someone will need to facilitate the speaker's bureau.
- Old Business:** Grant requests – A grant request was received for \$1,000 from the University of Wisconsin-River Falls for a Regional Field Trip to the Southern Rockies and Colorado Plateau. Additional information was requested by Gil and was received concerning the amount of ground water education to be covered during the field trip. Chris moved that the grant be approved; Amanda seconded the motion. Motion passed. A grant request was received for \$1000 for student scholarships to the spring and fall MGWA conferences. Some discussion of requiring the students to pay \$10 or \$15 of the registration fee so that there would be fewer students not showing up even though they had registered for the conference. Chris moved that the MGWAF provide \$500 per conference for 2009 for ten (10) students provided that each student is required to pay \$10 towards the registration fee. Cathy seconded the motion. Motion passed. A grant request for the Metro Children's Water Festival was received on the old form. This request was tabled.

UW River Falls Field Trip Report

Thank you again for the Minnesota Ground Water Association Foundation grant to support our geology field trip to Colorado and Utah. Our trip took place from May 17-30, 2009. We had a fun and motivated group of 15 students and had many exciting water-related adventures along our trip...some of which were planned...and others...well...unexpected.

We experienced snow in the high altitude mountain passes (group picture in the snow at Vail Pass in Colorado), flooding conditions during our half-day whitewater rafting adventure, and travelled through a desert area that received half the average annual precipitation in two back-to-back storms.

The flash flooding and erosion was extremely intense (picture at right). It is difficult for our students to appreciate the power and importance water has, even in the desert. We think they have it figured out now!

In Arches and Canyonlands we discussed the formation of arches, which is largely dependent on joint formation, groundwater movement through the permeable sandstone, and weathering.

— continued on next page



UW-River Falls Field Trip, cont.

All in all it was a wonderful trip filled with a lot of learning and new experiences for our students. We thank you for your financial support for our trip and greatly appreciate your educational outreach efforts!

Sincerely, Dr. Mike Middleton, Dr. Holly Dolliver and Trip Participants

Editor's Note: The above is abridged from the complete field trip report, which can be found at www.mgwa.org on the Foundation's Past Projects Page.



From left to right: Dr. Holly Dolliver, Marcus Mussey, Tom Bednarowski, Dr. Mike Middleton, Tessa Chatara-Middleton, Stephanie Marchiafava, Ashley Murray, Courtney Schlosser, Amy Smits, Chelsea Payne, Heather Sumner, Abby Cole, Brad Patrick, Ryan Peterson, Greg Flaatten, Amy Nachbor, Ryan Anderson, and Randy Crandell.



AMEC Geomatrix

Groundwater professionals solving contaminant and water supply issues throughout the Upper Midwest since 1994.

- ▶ Hydrogeologic Characterization
- ▶ Groundwater Treatment and Remediation
- ▶ Aquifer Testing
- ▶ Groundwater/Surface Water Investigation
- ▶ Groundwater Modeling
- ▶ GIS/Database Management
- ▶ Water Budgets and Safe Yield Estimates
- ▶ Supply Well Design and Construction Oversight

Offices located throughout North America, for more information about our services please contact our local office:

Eric Tollefsrud, PG
AMEC Geomatrix, Inc.
14525 Highway 7, Suite 104
Minneapolis, MN 55345

Tel: 952-935-1010 Fax: 952-935-1254
E-mail: eric.tollefsrud@amec.com

www.amecgeomatrix.com

MGWA BOARD MINUTES

Minnesota Ground Water Association Board Meeting Minutes

The MGWA Board of Directors meets once a month.

All members are welcome to attend and observe

Meeting Date: February 13, 2009
Location: Fresh Grounds Coffee Shop, 1362 West 7th Street, St. Paul, Minnesota
Attending: Scott Alexander, President; Stu Grubb, Past President; Steve Robertson, President-Elect; Norm Mofjeld, Newsletter Editor
Past Minutes: January minutes approved as corrected.
Treasury: Preliminary net income of \$19,794 thus far in 2009, mostly from member dues. Checking/savings account balances total \$43,777.56.
Newsletter: Still searching for new Newsletter editor. Next issue editor is Eric Tollefsrud. He is assembling articles for March.
Web Page: Signed contract sent to Red Kite. Draft work products have been previewed by WRI. Expect preliminary site design in next month.
WRI Report: Reports handed out. Membership renewals are going well. WRI is handling miscellaneous filings.
MGWAF Report: Board met two weeks ago. Endowment continues to grow. When endowment hits 100k will establish formal scholarships. Water exhibit at the Science Museum open.
Old Business Past President handed out draft survey questions on sustainability.
New Business Spring Meeting May 7, 2009. President is assembling speakers and agenda. Topic is generally the interconnectedness of aquifers with other waters. WRI: motion to accept 2009 contract as amended passed unanimously.
Next Meeting: March 20, 2009, at 11:30 at Fresh Grounds at 1362 West 7th Street, St. Paul, Minnesota.

Meeting Date: March 20, 2009
Location: Fresh Grounds Coffee Shop, 1362 West 7th Street, St. Paul, Minnesota
Attending: Scott Alexander, President; Stu Grubb, Past President; Steve Robertson, President Elect; Craig Kurtz, Treasurer; Jon Pollock, Secretary; Sean Hunt, WRI; Jennie Leete, WRI.
Past Minutes: The February 13, 2009, minutes were approved as written.
Treasury: Income for 2008 is approx. \$73,120.00. 2008 expenses were approx. \$54,778.00. Net income was approx. \$18,342.00. Profit and loss statement for 2009 (January to mid March shows income in 2009 at \$20,978.07. Expenses of \$5,164.26 and a cash balance of approx \$40,619.00. Audit for 2008 to be completed by April 2009 meeting.
Newsletter: Current newsletter was distributed.
Web Page: Proposed web page passed out.
WRI Report: Report handed out. Membership renewal a little less than previous years (517 members as opposed to approx 600 after spring conference. Looking for someone to call entries in directory that have not renewed for 2009. MGWA lap top computer sent to Dell Computer for repair.
MGWAF Report: MGWA Foundation to provide conference fees for students, but requiring students to pay \$10.00 since they do not always show up.
Old Business Past President still looking into ground water sustainability survey for members. Spring Conference May 7, 2009. Copies of draft brochure handed out.
Next Meeting: April 24, 2009, at 1130 at Fresh Grounds at 1362 West 7th Street, St. Paul, Minnesota.

ECAD
Engineering

*Environmental Concepts
& Design, Inc.*

**Consultants for Landfills,
Groundwater & Environmental
Remediation.**

Professional Geologists &
Engineers

Toll-Free (800) 709-5263
ECADengineering.com