Minnesota Ground Water Association
www.mgwa.org
Newsletter

March 2009
Volume 28, Number 1

Featured:

— *MGWA President Scott Alexander*

Inside:

President's Letter

By Scott Alexander, MGWA President

I would like to start out my presidency by thanking the preceding holders of this office for leaving a fully functioning organization with a well balanced budget. Stu Grubb can now relax into a well-earned advisory role as past president. Throughout the year Stu dealt with the issues that arose in a graceful, professional style that I hope to emulate.

One improvement to the Minnesota Ground Water Association that we hope to complete over the next year is a new, and much more user-friendly, website. We have contracted a professional website design service for this project. A second project that I would like to work on, being directly involved with hydrogeology education at the University of Minnesota, is to increase the involvement of students in the MGWA. Finally, I would like to continue the efforts of the MGWA as an information source and advisor to ground water issues in Minnesota.

In addition to the Clean Water, Land, and Legacy Amendment I expect the importance of ground water to continue to grow. The importance of ground water beyond just drinking water, irrigation and industrial uses needs to be clearly stated. Ground water is really at the heart of Minnesota in sustaining our lakes, rivers and bountiful natural resources. Ground water is also an essential "raw material" to industry and agriculture. While we see that Minnesota ground water forms the backbone that supports our

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Minnesotans Help Bring Clean Drinking Water to Tanzania

By Jim Stark, USGS

Providing drinking water in Africa is a complicated matter that has significant implications for the well-being of the people who live there. However, providing clean water is a lot more complicated in Africa than in the United States. A small village in Africa recently got a new well and safe drinking water with help from Lutheran churches in St Paul. This village, Na'ang'ange, is located in Tanzania.

Tanzania is in east-central Africa. It is among the poorest of African nations. Average family annual income is less than 300 American dollars. Typical life expectancy is less than 35 years. Many problems contribute to poor health for people of Tanzania and the lack of clean drinking water is one or those problems. Much of the population of Tanzania does not have access to clean water. The Evangelical Lutheran Church in America and the Evangelical Lutheran Church of Tanzania (ELCT) have established a partnership. Through this partnership, Lutheran churches in St. Paul formed a relationship with the Iringa Diocese of the ELCT. One of the activities of this relationship is to bring clean drinking water to Iringa by installing wells through a non-profit organization. This

— *continued on page 4*

Clean Water at the Pump

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Newsletter Deadlines

Issue	Due to Editor
June '09	5/08/09
September '09	8/07/09
December '09	11/06/09

MEMBER NEWS

New Officers Elected

Steve Robertson, Hydrologist with the Minnesota Department of Health has been elected President-Elect of MGWA for 2009. Steve is a long-term veteran of the MGWA Newsletter Team. **Craig Kurtz**, a Financial Risk Analyst for 3M Company, has been re-elected as Treasurer of MGWA for a two-year term. Craig's willingness to continue to serve allows the association to have continuity in financial mangement, a great benefit for a small non-profit. Congratulations to Steve and Craig!

Dr. Melinda Erickson Joins the USGS

Dr. Melinda Erickson has accepted a position at the United States Geological Survey (USGS) as Ground-Water Specialist. Melinda (Mindy) has a Bachelor's degree in Geological Engineering, a Master's degree in Civil Engineering, and a PhD in Water Resource Science, all from the University of Minnesota. She has worked for a local environmental consulting company, the Minnesota Department of Health, the Minnesota Department of Transportation and was most recently employed by the Minnesota Pollution Control Agency (MPCA). She also is an adjunct assistant professor at the University of Minnesota, Department of Bioproducts and Biosystems Engineering. She is also a member of the Water Resources Science program faculty. Mindy completed her Doctoral dissertation by assessing the geochemistry of arsenic in ground water in the upper Midwest. At the MPCA she was part of a team of scientists working to better understand the fate and transport of emerging contaminants (e.g., perfluorochemicals or PFCs) in the environment.

PROFESSIONAL NEWS

Minnesota Pollution Control Agency Veteran Named as Commissioner

Governor Pawlenty has appointed Paul Eger as commissioner of the Minnesota Pollution Control Agency (MPCA). Eger replaces Brad Moore, who left the MPCA last fall to take a job in the private sector. Eger has worked at MPCA since 2002 serving as a legislative liaison, where he represented the agency on legislative and statewide environmental policy matters. Paul then went on to serve as manager of the MPCA's Clean Water Legacy Act efforts and was assistant commissioner for water policy. Most recently, he managed the agency's internal operations as deputy commissioner. Eger is a graduate of St. Olaf College and has a master's degree in public administration from Hamline University.

Bay West Hires Brian Mattingly as Sr. Project Manager to Expand Federal HTRW/MMRP Group

Bay West, Inc., an environmental services company, has hired Brian Mattingly, CPG, as Senior Project Manager supporting the Federal HTRW/MMRP Services Group. Mattingly's responsibilities will include managing projects for Bay West's Army, Air Force, Navy, and USEPA customers.

Mattingly, a certified professional geologist, has 19 years of experience working in the Federal environmental cleanup industry for DoD, DoE, and USEPA customers. He has worked at sites around the country, and specifically under the Military Munitions Response Program (MMRP), a DoD program that in recent years has become an important initiative as the Army and Air Force tackle cleanup of the more hazardous munitions sites around the world.

Mattingly will be establishing a Bay West office near his home in Cincinnati, Ohio. He will actively participate in Bay West's current contracts, supporting the US Army Corps of Engineers, US Air Force (AFCEE), US Navy, and US EPA.

PROFESSIONAL NEWS

Two DNR Divisions to Join to Better Manage Water, Land

The Minnesota Department of Natural Resources (DNR) has announced that it will align the responsibilities of two existing divisions into a new division focused on watershed management.

"This new division will approach conservation work differently," said DNR Commissioner Mark Holsten. "Minnesotans value clean water and abundant habitat. We need to do all we can to manage our natural resources in the most comprehensive and efficient way."

Assistant Commissioner Larry Kramka will lead the effort to create the new division with staff from the existing divisions of Waters and Ecological Resources. Kramka will work closely with Division of Waters Director Kent Lokkesmoe and Division of Ecological Resources Director Steve Hirsch throughout the process. "We'll be doing much more than integrating two divisions," Kramka said. "We'll take a careful look at how we can further progress toward our conservation goals in the areas of clean water, productive lands and high-quality habitat."

Among those goals will be building the agency's working relationship with private landowners, communities, watershed organizations and others. The new division eventually will incorporate Division of Waters responsibilities, such as public waters protection, water supply management, and water levels measurement, with the Division of Ecological Resources functions of protecting and restoring ecosystems and providing support for land use decisions.

'Water' at the Science Museum of Minnesota until April 26th

'Water' will take you on a trip around the world to explore the ways that water—in its scarcity or abundance—has shaped different lands and cultures. Along the way, you'll be struck by the ways in which this most indispensable compound has inspired creativity, spirituality, and beauty throughout the world. Highlights of 'Water' include:

- A 68-inch globe called Science on a Sphere, which displays maps and satellite images of Earth via a state-of-the-art projection system so that it appears to be floating in the air. It provides an unforgettable look at just how much of our planet is made up of water.
- A walk-through water-carved slot canyon—a dramatic example of the ways in which running water physically sculpts our surroundings.
- Animals and plants, live and preserved, with adaptations that make them uniquely suited for their species' relationship with water. You'll see mudskippers, tetras, frogs and more.
- Interactive quizzes that will test your family's water know-how. Do you know how much water goes into making some of the items that you use or consume every day?
- Ancient artifacts and specimens—from a piece of 3.8 billion year-old Isua schist (metamorphic rock from Greenland) to a 5,000 year-old Sumerian water jug—present the story of water's origin on Earth and the ways that humans have handled it.
- A series of memorable sculptural elements—a fog wall and a lit pool at the exhibit's entrance to a display of plastic water bottles that provides a stunning demonstration of how much our dependence on bottled water is costing us.

The Water exhibition is designed to engage all learning styles. The "Teaching in the exhibition guide" divides the exhibition into areas; each supported by an overview, highlights to explore, and guiding questions. Ground water activities include: Getting Groundwater: Students turn a crank to pump water from a well to learn about water delivery from an aquifer, and Porous Rocks: Students drip water through four rocks of varying porosity to see how water finds its way underground. The "Teaching in the exhibition guide", is available at www.smm.org/static/water/water-educatorguide.pdf. The exhibition also includes an artesian aquifer sand model that was originally designed and developed by Peder Thompson as part of the SMM Groundwater exhibit in the Big Back Yard.

'Water' is organized by the Science Museum of Minnesota, St. Paul and the American Museum of Natural History, New York, in collaboration with Great Lakes Science Center, Cleveland; The Field Museum, Chicago; Instituto Sangari, São Paulo, Brazil; National Museum of Australia, Canberra; Royal Ontario Museum, Toronto, Canada; San Diego Natural History Museum; and Singapore Science Centre with PUB Singapore.

The exhibition runs from January 30 through April 26, 2009.

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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

Drinking Water in Tanzania, cont.

organization operates under the name "Bega Kwa Bega" which is Swahili for shoulder-to-shoulder. It employs Tanzanians and owns two portable drilling rigs that can be carried into remote areas and can drill in unconsolidated materials to depths of about 80 feet. It also owns a truck-mounted rig capable of drilling to greater depths and into rock.

Taking water samples

Here's one example of what the partnership has accomplished. Bega Kwa Bega worked with the village of Na'ang'ange, which is five miles beyond the end of any road shown on maps. It is about 50 miles from the city of Iringa, the nearest location with electricity or any kind of formal communication services. There is no power other than human power, and without power there is no refrigeration or lighting. The people in this village cook over wood fires outdoors and use oil lamps at night. Until recently, women from the village walked a considerable distance to fetch drinking water from what appeared to be a spring-fed pool. Cows grazed nearby and shared the water supply with about 1300 people. Motivated by this situation, Bega Kwa Bega resolved to drill a well for the village. The well was completed and a pump was installed. Last fall a group from St. Paul visited the village and brought back water samples for testing. Nitrate, arsenic and fluoride can present human-health problems in well water. Minnesota Valley Testing in Mankato graciously agreed to donate the testing of water for nutrients and metals. Although water samples could not be properly preserved for testing some constituents, such as bacteria, the water met drinking-water standards established for human consumption by the U. S. Environmental Protection Agency for chemical constituents that could be analyzed. The village now has a clean source of drinking water due to the efforts of people from opposite sides of the globe.

A basic premise of the Bega Kwa Bega partnership is that neither partner leads. Bega Kwa Bega has completed about 100 wells in Tanzania. Through efforts of those in the partnership, many people in Tanzania have a safer, more reliable supply of drinking water, and the project serves as a source of pride and a symbol of cooperation for everyone involved.

President's Letter, cont.

surface waters, the public and our elected representatives need to more aware of the relationship between ground water and surface waters. The MGWA, through the hard work of its members and our preceding elected boards, is in an excellent position to continue bringing ground water into public view.

Planning is underway for a spring meeting on the St. Paul Campus of the University of Minnesota. The meeting will be held on May 7th at the Continuing Education Center as is customary. The topic that is evolving is a continuation of the past several years of conferences. However, the program will focus more explicitly on the interconnectedness of water moving into and out of aquifers. While ground water represents more than 98% of the fresh, non-frozen water on planet Earth, the remaining very small percentage of fresh waters exerts a large influence on the quantity and quality of ground water. In Minnesota these other reservoirs of fresh waters, including our lakes, rivers and wetlands, often sustain ground water recharge while they themselves are often sustained by ground water. Perhaps a lake could be more simply defined as a portion of an aquifer that just happens to have a porosity (n) equal to 1.

Save the Date!

MGWA's Spring Conference

May 7, 2009

See page 12 for details

Joint Powers Water Board Brings Aquifer Storage Technology to Minnesota

By Stew Thornley, MDH

(reprinted from MDH's Waterline newsletter, Spring 2009)

More than 30 years ago, several communities 25 to 30 miles to the northwest of the Twin Cities, straddling the line between Hennepin and Wright Counties, began working together to provide drinking water to their residents. In 1977, they formed a utility, the Joint Powers Water Board (JPWB) of Albertville, Hanover, St. Michael, and Frankfort (the latter a township that has since been absorbed by St. Michael).

In 2000, the Joint Powers Water Board completed a water treatment plant with three horizontal pressure filters to remove iron and manganese. Within a few years two more filters were added to meet the demand caused by growth of the population. The expansion brought the plant to a capacity of 10 million gallons per day, but continued population growth caused the JPWB to look at the possibility of adding more wells.

Kelly Daleiden, the project manager for Veolia Water North American Central, which operates the plant on a contract basis for the JPWB, said that any new wells would have to be in the southern portion of the service area, in the vicinity of St. Michael and Hanover, and wouldn't be feasible for the existing plant, which is in Albertville. As a result, a new treatment plant would be needed, not just another expansion of the current plant.

Working first with Chris Catlin and then with Chris Larson at the engineering firm of Howard R. Green Company, the JPWB began exploring a different way to meet the growing demand. Instead of construction of another plant, JPWB opted for a technology that has been used in the eastern and southern United States since 1969.

Aquifer storage and recovery (ASR) involves injecting water into an aquifer during periods of surplus and/or low demand and then pumping it out when it is needed (see Figure 1). "The purpose of ASR is to allow you to shave the size of your water treatment plant in that you can treat closer to your average daily demand rather than building the treatment plant capacity to treat the maximum daily demand," said Larson. "You realize significant capital savings if your treatment plant is sized only to treat the average daily demand."

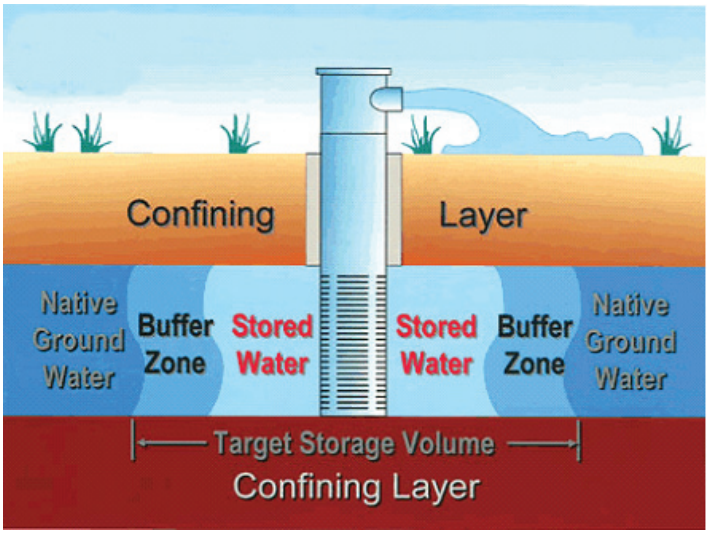

Figure 1. Schematic cross section showing ASR operations.

JPWB has been getting its water from seven wells that draw from either glacial drift or the Mt. Simon aquifer. In 2006, construction began in St. Michael on Well 9, which would serve as an ASR well, getting its water from the distribution system and injecting it into the aquifer. Completed in 2007, the well is 504 feet deep and is completed in the Mt. Simon Sandstone.

Larson pointed out that the well is a basic production well that has a stainless-steel injection tube, three inches in diameter, which extends through the static water table, allowing the utility to pump water into the aquifer. "It does not mix but rather displaces the water already there," he explained.

The water being injected into the aquifer will push out the water in such a manner that the water around Well 9 will be treated water taken directly from the distribution system. The Mount Simon is a confined aquifer, with the Eau Claire Formation serving as an upper confining unit and Proterozoic volcanic and sedimentary rocks as the lower confining unit. Because it is confined, the water displaces horizontally. In the aquifer are a mixing zone and a buffer zone, which allows the system to recover much of the treated water (Figure 1).

"The treated water being pumped back into the aquifer will displace the native water and push the water that contains iron and manganese back," said Larson. "They will be able to recover the water that is free of iron and manganese."

The well will recharge the aquifer in the winter and fall, when demand is low, and then recover it in the summer. Although the aquifer has been recharged with treated water, when it is recovered it may need some additional disinfection. Larson said sodium hypochlorite, along with fluoride, will be added as necessary before the water goes into the distribution system (Figure 2).

Figure 2. All the piping that is needed on the surface for ASR operations.

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Aquifer Storage and Recovery in Minnesota, cont.

Another advantage of using ASR is that it has reduced concerns about an abandoned landfill that has a groundwater contaminant plume migrating to the area of the new well field. Although the contaminants are in a different aquifer, the potential for contaminant migration exists if the aquifers are hydraulically connected. Since there is net-zero withdrawal from the Mt. Simon aquifer, potential migration of the landfill plume into the well field will be mitigated.

JPWB received a variance from the Minnesota Department of Health to use an injection well for a two-phase pilot study, using water from two existing wells. “We will pump a certain amount of water into the aquifer, and then we will recover somewhere around that volume of water,” said Larson. “Part of it is going to mix a bit. The question is what percentage of recovery can we get before something becomes objectionable.”

The first phase of the pilot study will be performed with 300,000 gallons of recharge and 150 percent recovery. The water will be tested as it is pumped out to determine the point at which the water quality changes from treated ASR water to native Well 9 water.

“There are a couple of things we can test to see that: iron and manganese concentrations, oxidation-reduction potential,” explained Larson. “The treated water we’re pumping into the aquifer is oxidized, has chlorine in it, and the iron and manganese has been removed. We pump 300,000 gallons and have to recover 450,000 gallons.”

The second phase of the pilot study will involve five million gallons of recharge with 150 percent recovery. When the ASR system is fully operational, Larson said they will be recharging the aquifer with 60 million gallons of water for later recovery.

Larson said the pilot studies should be complete by the summer of 2009. If all goes well, they will begin recharging for full-scale recovery later in the year. It will be the first application of Aquifer Storage and Recovery in Minnesota.

Perfluorochemicals in Minnesota's Ambient Environment

By Mindy Erickson, Minnesota Pollution Control Agency (now USGS Minnesota Water Science Center)

The Minnesota Pollution Control Agency recently published a report summarizing the results of its ambient perfluorochemical (PFC) investigations to date. The report, titled *PFCs in Minnesota's Ambient Environment: 2008 Progress Report*, is available for download from MPCA's PFC website, www.pca.state.mn.us/cleanup/pfc/index.html. The executive summary of the report, along with two maps of results, are provided here.

Perfluorochemicals (PFCs) are a group of fully-fluorinated carbon-based compounds that repel both oil and water and are very resistant to breakdown in the environment. These properties have led to their use in numerous industrial and consumer products. Specific PFCs of interest in Minnesota include PFOS (perfluorooctane sulfonate), PFOA (perfluorooctanoic acid) and PFBA (perfluorobutanoic acid).

Manufacture of PFCs in Minnesota began in the late 1950s by 3M Corporation at its Cottage Grove Facility. 3M ceased production of PFOS and PFOA in 2002 after several studies showed that PFCs were bioaccumulating in humans and wildlife worldwide. In 2004, PFCs were detected in drinking water supplies in several eastern Twin Cities suburbs; sources of the contamination were traced to legal disposal of 3M manufacturing wastes. The Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Health (MDH) have since identified contaminated wells and provided clean drinking water to affected consumers.

PFCs are released to the environment through manufacturing processes, industrial use, and the use of PFC-containing consumer products. PFCs, like PFOS and PFOA, are also formed from the breakdown of other fluorinated compounds, such as fluorotelomer alcohols produced by DuPont. In order to identify potential sources of PFCs to the environment it is critical to understand the fate and transport processes governing these compounds.

It is now known that PFCs are ubiquitous environmental contaminants. This is a concern because some PFCs (such as PFOS and PFOA) are persistent, bioaccumulative and toxic. The worldwide presence of PFCs in humans and animals provides strong evidence that exposure to this group of chemicals is through general environmental exposure and is not limited to known point sources or areas of contamination. Although all routes of exposure have yet to be clearly defined, exposure likely occurs through a variety of pathways including drinking water, food and food packaging, and use of consumer products containing PFCs.

In Minnesota, it has been apparent since 2006 that PFCs may be present at concentrations of potential concern in the ambient environment (i.e., away from 3M disposal sites). The MPCA negotiated a Consent Order with 3M in May 2007. The Consent

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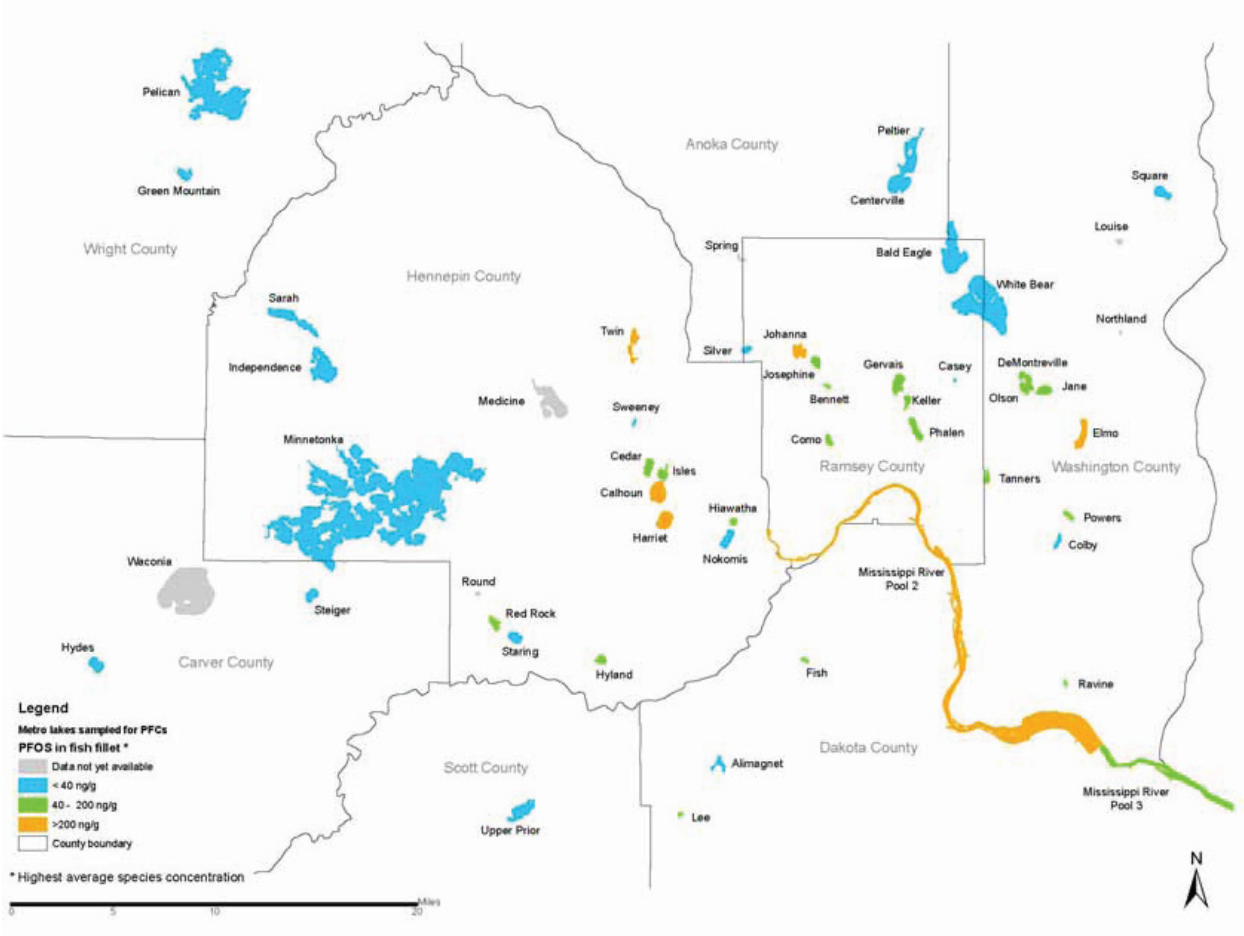


Figure 1 – Fish tissue sampling results for Twin Cities area lakes. Samples collected 2006-2008.

PFC's in Minnesota's Ambient Environment, cont.

Order provided funding for additional monitoring of PFCs around Minnesota and intense remediation efforts at the 3M manufacturing and waste disposal sites. Since then, the MPCA has made a number of important discoveries regarding PFCs in Minnesota's ambient environment.

Some of the results to date presented in the report include the following findings. Several lakes in the Twin Cities and portions of the Mississippi River have elevated concentrations of PFOS in fish tissue, which has resulted in fish consumption advisories (Figure 1). Sampling indicates that, although present, PFC concentrations in shallow ambient ground water are well below health advisory concentrations (Figure 2). Most sampled waste water treatment plant influent, effluent, and sludge has detectable concentrations of PFCs. PFCs were detected in permitted landfill leachate, landfill gas, and landfill gas condensate, as well as in ground water upgradient and downgradient of the facility. More detail and additional results are presented in the report, including several extensive data sets in the appendices.

The report coordinator was Summer Streets. Report authors were Mindy Erickson, Mark Ferrey, Paul Hoff, Laura Solem, and Summer Streets.

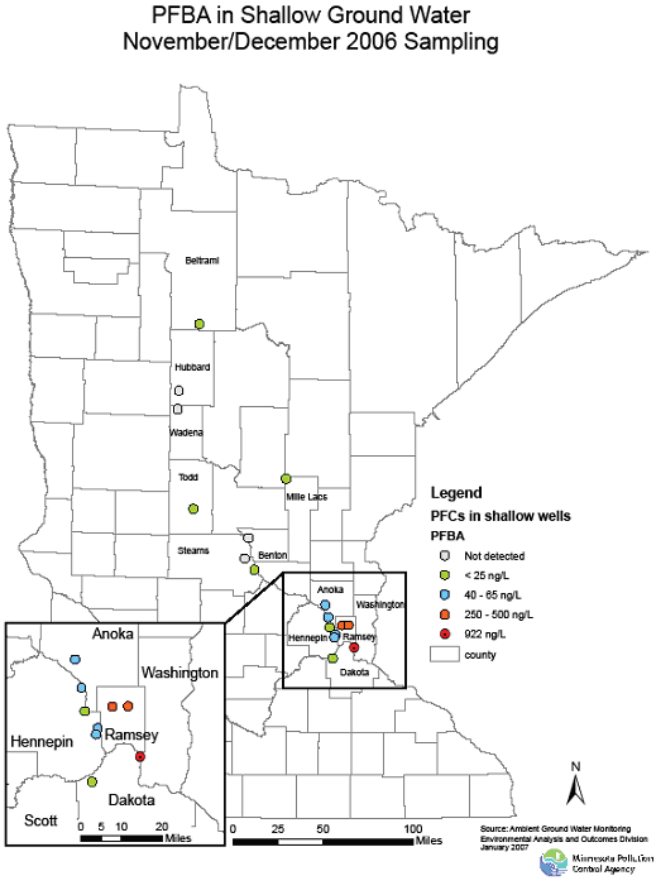


Figure 2 (to the right) – PFBA measured in shallow ground water.

Professors Discover Rare Fossils in Pierce County

By Kate Smith, University Communications, University of Wisconsin- River Falls

When University of Wisconsin-River Falls geology Professor Bill Cordua received a phone call from a local landowner about an unusual rock formation on his property, he could not have guessed their discussion would lead to the discovery of two rare Cretaceous-age fossils.

The fossils, which include two leaf impressions dating back to the Cretaceous period (from 65 million to 144 million years ago), were found on the property belonging to a geologist from the Minnesota Pollution Control Agency, Steve Thompson. Thompson, who lives southeast of River Falls, was excavating on his property when he noticed an unusual sandstone formation near the edge of the area where he was working. "I knew the strata of the area, and this was not in the normal sequence," Thompson said. Intrigued by his discovery, Thompson called the UWRF geology department and asked if anyone could come to his property and take a look at the formation.

Cordua received the call and recruited several of his colleagues to visit the site. Geology Professor Kerry Keen was one of the first to visit and view the area. Within minutes, he discovered an impression of a leaf in the unusual sandstone formation, as well as fragments of wood. Keen explained that the discovery is significant because it is extremely rare to find fossils from the Cretaceous period in western Wisconsin.

"Most of the rocks we find in western Wisconsin are from the Ordovician period, which ranges from 450 million years to 500 million years ago. Also, most fossils we find here are marine fossils; there is no other reference to plant fossils from that [Cretaceous] time period in western Wisconsin."

After making the discovery, Keen returned to the site with fellow geology Professor Mike Middleton and several others in the geology field. On that trip, the group found a second plant fossil in Thompson's sandstone formation. From there, the fossils were taken back to UWRF, where the professors began work on identifying them and promoting their discovery to the geological community. In order to promote the find, Keen, Middleton, Cordua, Thompson, UWRF geology Professor Bob Baker and UWRF junior geology major Amy Nachbor of Maple Grove, Minn., worked together to author a paper and create a poster on the fossils and presented them at the regional meeting of the Geological Society of America in last April.

The professors have also displayed the fossils themselves at other places, including Chalmer Davee Library during the UWRF Celebrating Research, Scholarship and Creative Achievement event. Keen hopes that in sharing the discovery it will bring awareness that there is a rich geological history in the River Falls area, and that there may be something unique in one's own backyard. "I would hope that someone could find an impression of dinosaur footprints or other plants," Keen said. "That's the fun thing of geology. You never know what discoveries are around the corner."

The fossil samples are housed in the UWRF paleontology collection and are available to view by appointment. Contact Middleton at 715-425-3139 or michael.d.middleton@uwrf.edu for more information.

Overview of the State of the World's Fresh and Marine Waters

A new edition of Vital Water Graphics presents an overview, through a set of graphics, maps and other illustrations, of the current state of the world's fresh, coastal and marine waters. It illustrates the causes and effects of trends that threaten our water resources, with examples of areas of major concern and future scenarios for the use and management of fresh, coastal and marine waters.

Vital Water Graphics, 2nd Edition (2008), is on the web at www.grida.no/publications/vg/water2/. An example of one of the many graphic illustrations is Figure 1, showing an estimate of global water stress.

This is a joint publication of the United Nations Environment Programme (UNEP) and its collaborating centre UNEP/GRID-Arendal in Norway. It is published as part of UNEP's global water policy and strategy.

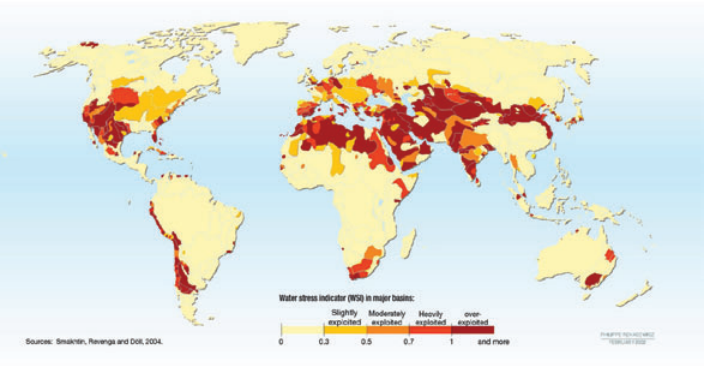


Figure 1. Global water stress.

Minnesota Pollution Control Agency Releases 2009 Environmental Information Report

The Minnesota Pollution Control Agency has released an update of its Environmental Information Report (EIR) which was originally published in 2003. The EIR is an assessment of a wide variety of environmental stresses facing Minnesota and their causes. The EIR is laid out in a series of matrices, organized by impacts, stressors and sources. Symbols (circles, squares and arrows) graphically portray information in an at-a-glance Consumers Reports type of format.

Of the stressors examined in the EIR, six were found to contribute most to negative impacts on Minnesota's environment:

- Fine particles in air
- Greenhouse gases
- Habitat modification and loss/hydrologic modification
- Invasive species
- Phosphorus
- Transported sediment

These stressors are rated as highly significant because they generally are widespread in the environment, affect large populations and have effects that are severe and only slowly reversible.

A two-page fact sheet which summarizes the EIR is available on the MPCA web site at: www.pca.state.mn.us/publications/p-gen1-01.pdf The fact sheet also contains a link to the full report.

Report on Industrial Solid Waste and Construction/Demolition Debris Disposal

The Minnesota Pollution Control Agency (MPCA) in January issued a 62-page report to the Legislature with recommendations concerning the regulation of Construction and Demolition and Industrial Landfills (CDIL). The MPCA appointed a CDIL work group represented by counties, state agencies, private landfill owners, waste haulers and environmental organizations to develop the report. Some of the issues that prompted the 2008 Legislature to pass a bill calling for a work group included:

- Old MPCA rules relating to industrial landfills, which the work group recommended be comprehensively updated;
- The MPCA's use of guidance documents as well as rules in CDIL permit reviews;
- A legacy of ground water contamination in Washington County in conjunction with a proposal from XCel Energy to develop a lined landfill in Washington County that would receive fly ash from coal combustion.

The 2008 Legislature imposed a moratorium on the siting of new landfills, pending the adoption of new rules about ground-water sensitivity and financial guarantees at landfills.

The full report may be accessed on the MPCA web site at: www.pca.state.mn.us/publications/lrw-sw-1sy09.pdf

The MPCA will now convene a stakeholder group to advise the MPCA on rulemaking to address the legislative directive on landfill siting and financial assurance to reduce risks to ground water. By January 15, 2010, the MPCA is to deliver a rule progress report to the legislature.

Ground Water Protection Council E-newsletter Rolls Out New Format

The Ground Water Protection Council (GWPC) has revamped its e-newsletter in a colorful new easy-to-use format. The February 2009 edition contains information and links on upcoming GWPC conferences; a summary of the 2000 Walkerton, Ontario well contamination incident in which seven died and thousands were sickened; the Obama administration's new EPA agenda, including a memo sent to all EPA staff; and a report on the Tennessee Valley Authority's coal sludge pond failure in Harriman, TN in December 2008 which resulted in loss of 1.1 billion gallons of waste contaminated with lead and arsenic. To request to be put on an e-mail list to receive the free newsletter, contact Sherri Henderson at the GWPC at shenderson@gwpc.org

Metro Area Master Water Supply Plan

By Chris Elvrum, Metropolitan Council

With three major rivers, hundreds of lakes and streams and several prolific aquifers, the Twin Cities is fortunate to have relatively abundant water supplies as compared to other parts of the country. The region's steady population growth, combined with localized water supply issues, however, may challenge some communities' ability to rely on traditional supply sources to meet future demand. The Twin Cities Metropolitan Area Master Water Supply Plan (Master Plan), currently in draft form and expected to be finalized in May 2009, provides a framework to ensure adequate supplies for future generations without unacceptable social, economic and environmental consequences.

For the development of the Master Plan, a water availability analysis was conducted that draws on regionally accepted natural resource data. The analyses performed included evaluation of projected water demands, mapping of surface water features that rely on groundwater, such as trout streams and calcareous fens, as well as the development of a regional groundwater model (Metro Model 2) to evaluate potential impacts of groundwater withdrawals based on projected demands and climate conditions. The model encompasses the entire Twin Cities metropolitan area and portions of adjacent counties and builds on the original metro model developed by the Minnesota Pollution Control Agency (MPCA) in the late 1990s. The model helps to answer questions, such as what drawdown will be and what is the potential for impact on surface waters, given projected water demands.

Based on the analysis, a community water supply profile was developed for each municipality in the metro area for the Master Plan. The profiles provide community-specific water demand and water supply source information. Each profile presents water supply sources available for use by each community as well as issues associated with using those sources. The plan also lays out options for addressing the issues such as conducting monitoring of groundwater levels and surface water features, developing resource protection thresholds and increasing conservation as well as using alternative sources such as other aquifers, surface water, or cooperating with neighboring communities. By identifying potential water supply issues and options to address those issues, water suppliers will know what is expected of them as part of water supply development. This will be valuable for both the communities and the Minnesota Department of Natural Resources (MDNR) when evaluating requests either for a new permit or for a permit modification involving increased pumping. This information will also be useful as the Metropolitan Council and local governments develop long-range plans for future growth.

Local governments, counties, state agencies, private consultants, non-profit organizations and others played an active role throughout the development of the Master Plan. The Metropolitan Area Water Supply Advisory Committee also provided guidance. Recognizing the importance these participants played in the development of the plan, the plan establishes a process for continuing the collaborative approach to water supply planning. As new information is available it will be incorporated in future analyses to improve the region's understanding of the availability of its water supplies.

A draft copy of the Metropolitan Area Master Water Supply Plan, as well as supporting documents and tools is available on the Metropolitan Council's website at www.metrocouncil.org/environment/WaterSupply/masterplandraft.htm. The Metropolitan Council anticipates having a completed version of the plan on its website in May 2009.

Environmental Quality Board Releases Water Availability Report

The Environmental Quality Board (EQB) recently released a report, "Managing for Water Sustainability: A Report of the EQB Water Availability Project", culminating nine months of work by an interagency team looking at water quantity issues as they relate to environmental review and high water-using industries. The report makes 14 recommendations related to:

- Achieving protective standards;
- Planning for water sustainability; and
- Defining water information needs

The report can be viewed on the EQB website, at www.eqb.state.mn.us/project.html?Id=19502

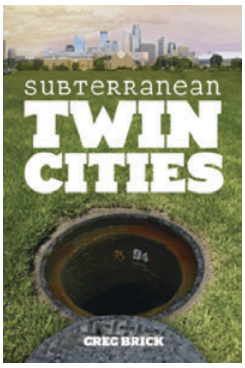
Plans are underway to move forward on project recommendations.

Airport Runway Deicers Impact on the Environment Greater Than Previously Thought

The USGS reported in a January 15, 2009 news release that the most widely used compound to remove ice from runways at many of the nation's airports may impact the environment more than previously realized. New reasearch shows that potassium acetate may be harmful to aquatic life. This is the first published study of potassium acetate in airport runoff. The report, Aquatic Toxicity of Airfield-Pavement Deicer Materials and Implications for Aiport Runoff, is available online through the USGS website www.usgs.gov.

Subterranean Twin Cities

By Greg Brick



For readers of my column, "Ground Water History," I'd like to introduce my second book, Subterranean Twin Cities, to be published by the University of Minnesota Press in April 2009. (My first book, Iowa Underground, was published by Trails Books in 2004). The new book is a retrospective of the two decades I spent exploring and researching the Twin Cities underground, with a mix of history and adventure. It is the first comprehensive treatment of the subject and should be of interest to anyone who deals with Twin Cities geology. Some of the themes have been dealt with in this newsletter, but to give you a better idea of its contents, successive chapters deal with: Carver's Cave, Fountain Cave, subterranean streams such as Trout Brook and Bassett Creek, brewery caves, the West Side caves, abandoned sand mines, the Minneapolis milling district, Chute's Cave, Nicollet Island caves, the Fort Road sewers (30 miles worth!), St. Paul's utility labyrinth, Schiek's Cave, and Channel Rock Caverns. The book is available at:
www.upress.umn.edu/Books/B/brick_subterranean.html

MGWA 2009 Spring Conference – Connecting with Ground Water

To be held on Thursday, May 7th at the Continuing Education Center at the University of Minnesota, starting at 8:00 am.

Ground water is really at the heart of Minnesota in sustaining our lakes, rivers and bountiful natural resources. Ground water is also an essential raw material to industry and agriculture. While we see the surface waters of Minnesota, it is the unseen ground waters that form the backbone that supports these surface waters. The public, our elected representatives, and ground water professionals need to more aware of the relationship between ground water and surface waters. The MGWA spring conference will focus on the interconnection of all the waters of Minnesota. This topic has evolved over the past several years of conferences by the MGWA. While previous conferences have dealt various components of ground water and surface water interaction it has not been the focus.

Ground water represents more than 98% of the fresh, non-frozen water on planet Earth. The remaining very small percentage of fresh waters exerts large influences on the quantity and quality of ground water. In Minnesota, these transient fluxes of fresh water, including our lakes, rivers and wetlands, sustain ground water recharge while they themselves are often sustained by ground water.

Hydrologists in many disciplines have staked their claims on various water resources by adding an adjective in front of water. We talk of surface water, ground water, rain water, storm water, lake water, river water, well water, drinking water, bath water, infiltrating water, and even bottled water. We can even create compound terms as in recharging ground water or discharging lake water. Is that ground water recharging a lake or lake water recharging ground water? It is important to recognize that all these forms depend on one essential component – WATER.

Speakers will include Jim Almendinger (Science Museum of Minnesota), Eric Mohring (Board of Water and Soil Resources), Deb Swackhamer and Faye Sleeper (Water Resources Center, U of M), Don Rosenberry (USGS) and Bruce Wilson (Bioproducts/ Biosystems Engineering,U of M) along with others.

Looking for a New Newsletter Editor

After over six years as your newsletter editor, it's time for me to step down and give someone else the chance to fill this position. Over the past six years, we have seen the publication move to an electronic format; a change in its look, including color; the 25th Anniversary edition; and the posting of all past issues on the MGWA web site. It has been a rewarding experience and I have enjoyed working on every issue.

I would like to thank the members of the newsletter team, Jan Falteisek, Tom Clark, Kurt Schroeder, Steve Robertson, and Eric Tollefsrud, for their involvement in the publication. It is the team concept that really makes the newsletter editor position an enjoyable one. The issue editor coordinates the selected articles and is rotated among the members of the newsletter team. The layout is handled by our publisher, the Watershed Research, Inc. with Jennie Leete and Sean Hunt providing a great service to our organization through their involvement with this publication. Jim Aiken, our advertising manager, does a great job of contacting companies to advertise in the newsletter.

With so many people involved in the publication, the newsletter editor is not a position that gets over-worked or burnt-out. It's an opportunity to work with people from different state agencies and private companies to make a difference in communicating to our members about important ground water issues. The newsletter editor chairs the monthly newsletter team meetings and attends the MGWA Board meetings as an appointed official. If you would be interested in this position, please contact one of the MGWA Board members or a member of the newsletter team.

— Norm Mofjeld, MGWA Newsletter Editor

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

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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: Friday, January 23, 2009
Location: DNR Offices, 500 Lafayette Road, St. Paul
From: Cathy Villas-Horns (Secretary)
Members Present: Gilbert Gabanski, Jeff Stoner, Chris Elvrum, David Liverseed, Stu Grubb and Cathy Villas-Horns. MGWA Management Present: Jennie Leete and Sean Hunt.
Minutes: The meeting minutes for the September 9, 2008 meeting were unanimously approved on October 15, 2008 and provided via e-mail to the MGWAF Board and the MGWA Newsletter staff.
Treasurer's Report: Foundation balance to date is $83,724.19. Total credits of $978.11 were added to the accounts. Interest in the amount of $332.94 was accrued since 12-4-08 and was swept into the endowment, which now totals $72,732.08. There were no debits for this period
Old Business: MGWA Board Meeting report – Jeff will remind Stu, the new MGWA Board liaison to the MGWA Foundation Board, to send out the minutes of the MGWA Board meeting on December 19, 2008. Jeff stated that the spring 2009 MGWA conference will focus on surface water and ground water interactions and will be held on May 7, 2009.
The MGWA Board approved the hiring of a web designer for the MGWA website. More information is provided under New Business below.
Membership renewals and donations from the fall conference are coming in fine.
We have not sent out reminders to colleges to apply for grants for field trips and other ground water related work. Should MGWAF members visit colleges? Should MGWAF pay travel expenses for some outstate students to attend MGWA conferences?
Also, the MGWA must submit the annual request to the MGWAF for student registration fees for the spring and fall conferences.
New Business: Grant requests – No requests were received during this quarter.
Scholarship Discussion – Jennie stated that the description of the scholarship process that was proposed for use by the MGWAF was included with the original application to the IRS. She will send out a copy of the scholarship process to MGWAF members.
More on MGWA website design – A designer has been selected and the contract is being firmed up. The new website will echo the look of the newsletter.
It is hoped that the next phase of website work will allow a more significant upgrade of the MGWA foundation web page, and MGWAF board members should think about what they want for the future. We decided that we would like to add photos of projects we have funded, including the Children's Water Festival, the Science Museum of Minnesota ground water exhibit and the aquifer test class. Chris will collect some photos and some text for the web designers. He will also ask Amanda to help out.
SMM ground water exhibit – Gil will be meeting with SMM staff. There is a sandbox model on river flow in the new Water exhibit. There is a transducer taking measurements in the well in the Big Backyard and the data should be downloaded from the Hermit. The pump is working fine. Would the DNR or the MCES like to use this well as an observation well for the Jordan Sandstone?
Acknowledgement: Applause and thanks to Jeff Stoner for serving as the MGWA board liaison to the MGWAF board for 2008.
Next Meeting: The next meeting will be March 11, 2009 at 11:30 AM at the Metro 94 building. Chris will make the arrangements. Future 2009 MGWAF board meetings are scheduled for June 9, September 15 and December 8.

Minnesota Ground Water Association Board Meeting Minutes

Meeting Date: **November 21, 2008**
Meeting Location: Fresh Grounds Coffee Shop, St. Paul, MN
Attendance: Stu Grubb, President; Jeff Stoner, Past President; Scott Alexander, President-Elect; Norm Mofjeld, Newsletter Editor; Sean Hunt and Jennie Leete, WRI.
Past Minutes: September and October Minutes approved.
Treasury: Savings and checking account balance: approximately $35,380.
Newsletter: Proposal to send out e-mail to members soliciting articles 1 month before article deadline. Midwest Geoscience calendar announcements discussed.
Web page: Continuing to use online resources to collect online orders for conferences and memberships. Conference web page with presentations is online in the 'Members Only' area. Sean met with Craig and Jennie to narrow down web redesign proposals to 3 candidates. Need to meet with each to narrow down more details and plan to have more suggestions for next Board meeting. The Board discussed keeping the design and maintenance effort targeted at less than $5,000, but not to exceed $10,000
WRI Mgmt: Bought the Professional Geologist mailing list to send out conference announcements. Worked on brochure and web site for the Fall conference. Collected registrations and put together attendee packets and receipts. Set out 2009 membership renewals for individuals and corporate members along with fundraising flyer for MGWAF. Next meeting dates set for April 16th and November 12th 2009 at the University of MN conference center.
Old Business Fall Conference: Most of the presenters were found from the open call for presentations. Discussion of student involvement – 6 signed up, but not all attended. Conference evaluation results passed out and discussed.
New Business 2009 Officers: The Board moved to try again electronic balloting options for MGWA elections despite the e-mail problems when using Ballot Bin last year. WRI will update research on this topic. Balloting to run in December.
Jerome Wagner Mr. Wagner, a member of the Capital Region Watershed District, expressed interest in learning more about ground water particularly as it relates to lake levels in Loeb Lake, St. Paul.
Next Meeting: December 19, 2008, 11:30 a.m., Fresh Grounds

The MGWA Board of Directors meets once a month.

All members are welcome to attend and observe

Meeting Date: **December 19, 2008**
Meeting Location: Fresh Grounds Coffee Shop, St. Paul, MN
Attendance: Stu Grubb, President; Scott Alexander, President Elect; Jeff Stoner, Past President; Craig Kurtz, Treasurer; Jon Pollock, Secretary; Norm Mofjeld, Newsletter Editor; Sean Hunt, WRI; Jennie Leete, WRI.
Past Minutes: November minutes approved as written.
Treasury: Profit and Loss and Balance Sheet handed out and reviewed. Net income in 2008 at $23,086.99 No action to be taken until 2009.
Newsletter: Changing from Ventura to InDesign software to put together newsletters. Ventura is no longer supported by the manufacturer. December newsletter should look the same as the previous newsletters and should be out in draft format next week.
MGWA received an offer from a company to put together the MGWA newsletter for no cost. The newsletter would look more like a magazine and would be paid for by advertisements relative to the organization. Newsletter team had discussed and was concerned with making edits, losing control over layout, number of advertisements, and longevity of company. Newsletter team would like to continue with WRI putting together the newsletter.
Webpage: MGWA officer ballots sent out. Update to Ground Water Information Guide. Craig, Jennie and Sean working on finding a company to work on the MGWA web re-design. Currently narrowed down to 2 out of 3 finalists.
Motion: To have the MGWA web-design workgroup choose between two design finalists as long as the final bid is less than $5,000.00. Motion approved.
WRI Mgmt: Report handed out. Using Survey Monkey for election, which is open until the end of the year. Also worked on other items for the Secretary, as well as items for the Treasurer, President, and Editor.
Old Business Officer election open until end of year. We receive more votes using Survey Monkey instead of using the mail.
New Business: Discussed the possibility of a ground water sustainability survey. Many questions were raised about the nature, purpose, and target of the survey. President will come back with sample questions.
Next Meeting: January 16, 2009, at 1130 at Fresh Grounds at 1362 West 7th Street, St. Paul, Minnesota.

— continued on page 16

Minnesota Ground Water Association Board Meeting Minutes, cont.

Members can access the current year's newsletters in the 'Members Only' area of the web page.

The username is mgwa and the password is emailed to members with each announcement of newsletter availability

Meeting Date:	**January 16, 2009**
Location:	Fresh Grounds Coffee Shop, 1362 West 7th Street, St. Paul, Minnesota
Attending:	Scott Alexander, President; Stu Grubb, Past President; Steve Roberson, President Elect; Craig Kurtz, Treasurer; Jon Pollock, Secretary; Norm Mofjeld, Newsletter Editor; Sean Hunt, WRI.
Past Minutes:	The December 19, 2008, minutes were approved as written.
Treasury:	Preliminary net income for 2008 is $18,345.00. Profit and Loss and Balance Sheet handed out and reviewed. $48,857.94 in checking and savings. $17,713.01 in dues so far this year.
Newsletter:	Past President circulated examples of newsletters from Matrix Group, Inc. Newsletter is currently including Table of Contents/Highlights with email announcement that newsletter is available online. Newsletter will be soliciting articles from members at the beginning of each quarter.
Web Page:	Web page group settled on Red Kite Creative in Fort Collins Colorado to redesign web page with the goals of evaluation of current content, consistency from page to page, more professional look, content management system (more web page format updating capabilities), and core interactive membership information (searching). Motion: MGWA Board of Directors to retain Red Kite Creative to work on new web design for a cost not to exceed $5,000.00. Motion approved.
WRI Report:	Report handed out. Membership renewal on track with previous years. Also worked on other items for the Secretary, as well as items for the Treasurer, President, and Editor.
Old Business	Past President looking into sample questions for ground water sustainability survey for members.
New Business	Election Results: President Elect is Steve Robertson and Treasurer is Craig Kurtz. Spring Conference: May 7, 2009. Timeline for putting together conference will be sent out by WRI. President looking at a conference to assess what other programs are doing that may be affecting ground water, such as infiltrating stormwater. MEP: Reviewed MEP's 2009 Legislative Agenda and Sign on Agreement. No action to be taken by MGWA.
Next Meeting:	February 13, 2009, at 1130 at Fresh Grounds at 1362 West 7th Street, St. Paul, Minnesota.

MGWA 2008 Year-End Financial Report

Treasurer's Report

- 2008 ended with a surplus of $18,342 on a total income of $73,120. This amount is approximately $15,000 more in net income compared to last year.
- Upon the Board's approval, approximately $8,000 net income from 2008 will be transferred to the MGWA Foundation in mid-2009.
- At the end of 2008, the Board decided to set aside $10,000 from the 2008 surplus for costs associated with redesign and development of the MGWA website.
- At the end of 2008, the MGWA had approximately $48,070 available for operations.
- If you have any questions, comments, or concerns regarding the MGWA finances.

If you have questions comments or concerns, please contact Craig Kurtz at (763)757-6876 or at craigkurtz@msn.com

Income Statement

January 1 - December 31, 2008
(all values rounded to nearest U.S. Dollar)

Income

Member, Student, and Corporate Dues	$17,670
Advertising	$5,488
Interest	$460
Conference and Program Fees	$48,790
Products	$712
Total Income	$73,120

Expenses

Administration	$13,138
Conference Expenses	$26,477
Membership Services	$14,341
Public Services	$754
Products	$68
Total Expenses	$54,778
Net Income	**$18,342**