

Minnesota Ground Water Association

www.mgwa.org

Newsletter

March 2011
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MGWA President
Mindy Erickson

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President's Letter

By Mindy Erickson

In December, just before beginning my term as president of MGWA, I reflected back on how I ended up in the groundwater profession. First, I was shocked to realize that it's been almost 25 years! My introduction to groundwater was Professor Otto Strack's Groundwater Mechanics course at the University of Minnesota. Believe it or not, this was the course that changed the direction of my undergraduate coursework and ultimately my career path. Many professors, courses, and professional experiences contributed to me becoming and remaining a groundwater professional, yet Dr. Strack and his analytic elements hooked me into groundwater in the first place.

It seems like fate that I am serving my term as MGWA president this particular year, which will give me the privilege of presenting Dr. Strack with MGWA's Outstanding Service

Award this fall for his decades-long service to U of MN students, the groundwater community internationally, and the citizens of Minnesota. The award will be presented during an analytic element session at the Geological Society of America's annual conference being held in Minneapolis in October. MGWA is sponsoring the analytic element session, in addition to several other sessions, which are discussed in more detail in the MGWA News section of this newsletter.

We are fortunate to be working in our field at a time when we, as a society, are voluntarily investing resources toward water-related protection and improvements via taxes collected from the Clean Water, Land, and Legacy Amendment. Sustainability has been a buzzword for a while now.

In spite of the overuse and often misuse of the word, we in Minnesota are well-positioned to

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Subterranean Wonders of the Twin Cities

By Greg Brick

I have compiled a list of what I regard as the most important and unique subterranean features of the Minneapolis-St. Paul Metro area, whether they be natural, artificial, or "inadvertent" features. All of them still exist, though perhaps not as they were in their glory days. Grouped by threes for convenience, the following, describing three Minneapolis caves, is the first of four articles in this "miniseries."

Chute's Cave is located in the St. Peter Sandstone under Main Street SE, near the Pillsbury A Mill. It was created/discovered when a tailrace tunnel was dug there in 1866 by Dr. Sam Chute, agent of the St Anthony Falls Water Power Company. Abandoned by the proprietors, the cave and tunnel became the subject of a nationwide newspaper hoax in 1867. Dubbed the Nesmith hoax, the remains of a vanished civilization were supposedly found in the abandoned workings, along with "a serpent of uncreditable [sic] size" and an immense stalagmite called "the Tower of St. Anthony." After the Civil War, the cave and tunnel were rented by the Chalybeate Springs resort for torchlight boat tours, becoming Minneapolis' first and only commercial cave. Although the cave and tunnel



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MGWA Newsletter Team

Editor-in-Chief
Tedd Ronning
Xcel Energy
tedd.a.ronning@xcelenergy.com

Sherri Kroening
Minnesota PCA
sharon.kroening@state.mn.us

Joy Loughry
current issue editor
Minnesota DNR
joy.loughry@state.mn.us

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)705-6464
office@mgwa.org

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

Newsletter Deadlines

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ASSOCIATION NEWS

New Association Officers Elected

Kelton Barr was elected President-Elect of MGWA for 2011. Kelton is a Principal Hydrogeologist for the Braun Intertec Corporation.

Audrey Van Cleve is the newly-elected MGWA Treasurer. Audrey is a hydrologist in the MPCA's Petroleum Remediation Program. Congratulations to Kelton and Audrey!

GSA 2011 Update

In January, the Geological Society of America (GSA) accepted MGWA's application to become an associated society. GSA Associated Societies enjoy several benefits, including linking the MGWA's website to the GSA's. The most tangible benefit to most MGWA members, however, is that MGWA members will be able to register for GSA 2011 (<http://www.geosociety.org/meetings/2011/>) at GSA member rates. This benefit will result in a registration fee reduction of up to \$100 per MGWA member! MGWA is already actively involved in GSA 2011 as a sponsor for several field trips and technical sessions, including the following:

- ◆ Analytic modeling of groundwater flow: Advances and applications
- ◆ Dynamic gradients in karst aquifers
- ◆ Complexity in modeling: How much is too much?
- ◆ Advances in understanding at the groundwater-surface water interface and challenges for the future: A reflection on Tom Winter's legacy
- ◆ Naturally occurring trace-elements of concern in groundwater and aquatic systems
- ◆ Environmental problems in karst terranes/terrains and their solutions – in honor of James F. Quinlan, Ph.D.
- ◆ Innovative field investigations to assess natural attenuation and engineered remediation of subsurface contamination

Thank You, Craig Kurtz

The MGWA would like to thank Craig Kurtz for his service to the Association. Craig held the position of Treasurer since 2005 and he has been a member of MGWA since 1993. In appreciation of his service, Craig was recognized at the January MGWA Board meeting.



- ◆ Living in a political world – toward socially relevant geoscience
- ◆ Decision support for geosciences: The interface between public, policy, and science
- ◆ Groundwater-surface water interaction: Relating understanding across the water-rich Midwest to the scarcity of the Outback
- ◆ Springs and waterfalls of the Twin Cities field trip
- ◆ Subterranean Twin Cities field trip

MGWA will be hosting a spring conference in 2011 -- but no fall conference and no field trip -- to encourage as many MGWA members as possible to attend GSA 2011 technical sessions, short courses, and field trips.

We have a wide range of interesting and important groundwater projects happening in Minnesota, and GSA 2011 will be a chance to showcase our work and our active groundwater community. Please consider being actively involved in GSA 2011 as a presenter or attendee. Watch for registration information and invitations to submit abstracts for technical sessions later in the spring.

Mindy Erickson, MGWA President and GSA 2011 Local Committee Member and Short Course Co-chair



President's Letter, cont.

actually move toward sustainable water use. In fact, several important sustainability-related planning efforts were recently completed, including the Minnesota Water Sustainability Framework, the Plan to Develop a Groundwater Level Monitoring Network for the 11-County Metropolitan Area, the 2010 State Water Plan, and others.

More than ever before, we are achieving communication, coordination, and collaboration on water projects across agency boundaries, between levels and units of government, and with non-governmental entities. In addition, management of water use is moving away from the misconception of surface water and groundwater being separate, disconnected resources. Building and using monitoring and management tools to understand groundwater/surface water interactions is becoming a regular – instead of a rare – occurrence. Ground-

water is finally on the radar of a wide circle of decision-makers.

To bring into focus recent, current, and potential future water use sustainability plans and projects, the May 4 MGWA spring conference is titled 'Toward Sustainable Water Use in Minnesota: Where we are, Where we are going, and How we are going to get there.' Conference speakers will highlight some of the important sustainable water use planning efforts in Minnesota, showcase successful examples of sustainable water use planning and permitting in other states and regions of the country, summarize some current local sustainable water use implementation activities, and present new technologies that may be useful or instrumental to furthering our sustainable water use goals. Enjoy the spring – when it finally arrives – and we look forward to seeing you at the May conference!

MGWA Supports the National Ground Water Monitoring Network

Minnesota carried out one of five pilot studies as described in the article on page 5.

Minnesota Ground Water Association

December 31, 2010

The Honorable Betty McCollum
United States House of Representatives
1714 Longworth House Office Building
Washington, D.C. 20515-2304

Dear Representative McCollum:

I am writing to inform you of our support for the National Ground Water Monitoring Network and to seek your assistance in securing funding between \$10-50 Million for this program in FY 2012. The Minnesota Ground Water Association is an all-volunteer organization dedicated in part to promoting scientific and public policy issues associated with groundwater (www.mgwa.org).

By way of background, the National Ground Water Monitoring Network was authorized by the Secure Water Act (with final passage of Public Law 111-11) in 2009, and would create a comprehensive monitoring system through the United States Geological Survey to provide nationwide assessment of groundwater conditions, availability, and/or water-quality trends.

President Obama's FY 2011 budget included a few hundred thousand dollars to support a data portal and associated activities relative to developing a National Ground Water Monitoring Network. However, we would prefer that this program be funded between \$10-50 Million to provide the United States Geological Survey Ground Water Resources Program with enough support for the additional work necessary to manage the network and to provide national data access through an internet web portal. Part of these funds are also needed for grants to regional, state, and tribal governments to cover increased expenses associated with providing data to the network and to identify and fill data gaps.

As you are aware, Minnesota residents depend heavily on groundwater as a drinking water source, for industry, for agriculture, and as the main source of summer streamflow to our rivers. Minnesota was selected as one of the five states to participate in the National Groundwater Monitoring Network Pilot Project. Minnesota was selected because of the strength of its existing statewide monitoring network, the collaboration of multiple state agencies on the project, and the national significance of Minnesota's aquifers. We view continuation of this effort as critical for understanding the status of groundwater resources and water resources planning in Minnesota. A national network would provide a critical regional and national context to data networks being developed locally.

Increased demand for a shrinking groundwater source as well as impacts resulting from climate change make a national, regionally-based groundwater monitoring network especially important. The major aquifers of the upper Midwest overlap state boundaries. Comparable, reliable data will enable us to make fully informed and sound decisions as we face serious water management challenges in the coming years.

Development and funding of a long-term national groundwater monitoring network is in the vital interest of the people of Minnesota.

Thank you for your consideration and interest.
Sincerely,

Steve Robertson,
President - Minnesota Ground Water Association

Cc: Chris Reimer, Government Affairs Director, National Ground Water Association



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

President
Mindy Erickson
USGS
(763)783-3231
merickso@usgs.gov

President-Elect
Kelton Barr
Braun Intertec
(952)995-2486
kbarr@braunintertec.com

Secretary/Membership
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Dakota County
(952)891-7019
jill.trescott@co.dakota.mn.us

Treasurer
Audrey Van Cleve
Minnesota Pollution Control
Agency
(651)757-2792
audrey.van.cleve@state.mn.us

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.

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Abbreviations and Acronyms

- ◆ ASTM – American Society for Testing and Materials
- ◆ DNR – Minnesota Department of Natural Resources
- ◆ MDA – Minnesota Department of Agriculture
- ◆ MDH – Minnesota Department of Health
- ◆ MGS – Minnesota Geological Survey
- ◆ MPCA – Minnesota Pollution Control Agency
- ◆ USEPA or EPA – United States Environmental Protection Agency
- ◆ USGS – United States Geological Survey

AGENCY NEWS

New Commissioners Appointed for Minnesota State Agencies

MDA

Governor Mark Dayton appointed Dave Frederickson to serve as Minnesota Commissioner of Agriculture in January 2011. Frederickson farmed in Swift County for more than 20 years. He served in the Minnesota State Senate from 1987 to 1992, and he served as president of the Minnesota Farmers Union and later as president of the National Farmers Union. Most recently he was the agricultural outreach director for Senator Amy Klobuchar.



MPCA

Paul Aasen was appointed commissioner of the MPCA by Gov. Mark Dayton in January. Previously he was with the Minnesota Center for Environmental Advocacy, serving as advocacy director since 2007.



He has also held positions as Executive Vice President at Global Volunteers, Director of Government Relations and Policy for Jesse Ventura, Department of Public Safety Assistant Commissioner, Division of Emergency Management Director, and Minnesota Emergency Response Commission Executive Director. Earlier he was an environmental scientist with the Metropolitan Waste Control Commission. Paul has a master's degree in Environmental Health from the University of Minnesota School of Public Health.

MDH

The governor appointed Dr. Edward Ehlinger, MD, to serve as Minnesota Commissioner of Health in January. He has a Master of Science from the University of North Carolina. Prior to being appointed commissioner, Ehlinger served as director and chief health officer for Boynton Health Service at the

University of Minnesota from 1995 - 2011. He has also served as an adjunct professor at the University of MN School of Public Health. From 1980 to 1995, Ehlinger served as director of Personal Health Services for the Minneapolis Health Department.



DNR

Governor Dayton appointed Tom Landwehr as Commissioner of the Department of Natural Resources. He has an Master of Science degree in Wildlife Management from the University of Minnesota, and an MBA from the Carlson School of Management.



Prior to being appointed commissioner, Landwehr worked for the DNR for 17 years as a research biologist, Wildlife Manager, and as the Wetland Wildlife Program Leader. After leaving DNR in 1999 he was State Conservation Director for Ducks Unlimited in Minnesota and Iowa until 2003 and most recently has served as Assistant State Director for the Nature Conservancy in Minnesota, North Dakota and South Dakota. He also served as an instructor at the University of Minnesota's School of Natural Resources.

Metropolitan Council

Susan Haigh, CEO of Habitat for Humanity, is Governor Mark Dayton's choice to lead the Met Council. Susan will continue her duties at the non-profit as she fills her new role as Chair of the Metropolitan Council in partnership with local elected officials, community groups, and the business community.

Haigh's experience in public and community service includes ten years as a Ramsey County

— continued on next page

DNR and MPCA Participate in a Pilot Study for a Proposed National Groundwater Monitoring Network

By Sherri Kroening, MPCA

The nation's groundwater is under stress and requires increased interstate and national attention to assure sustainable use of this resource. Significant impacts have been documented to major and minor aquifers throughout the nation, including declining water levels and contamination from chemical use and waste disposal. Increased groundwater demand is expected in all sectors of the economy, including agriculture, drinking water, and energy production. As groundwater use increases, it is imperative to improve the overall management of the resource.

Sustainable groundwater management currently is constrained by the lack of a nationally integrated monitoring network focused on providing water level and water quality data for regionally and locally important aquifers. The need for a national groundwater monitoring network has been recognized by numerous water resources agencies. To address this need, a framework for a National Groundwater Monitoring Network (NGWMN) was developed by a subcommittee under the Federal Advisory Committee on Water Information. The framework document is available online at: acwi.gov/sogw.

The NGWMN is envisioned as a voluntary, integrated system of data collection, management, and reporting that provides the data needed to address present and future groundwater management questions. The NGWMN will be comprised of selected wells from existing state, federal, and tribal monitoring programs. The focus of the network will be on assessing baseline conditions and long-term trends in water levels and quality. As proposed, the NGWMN includes two monitoring subnetworks. One subnetwork will focus on the unstressed parts of principal aquifer systems, and the other will target areas of concern. The NGWMN also will include a web-based data portal, which will allow network stakeholders to retrieve data needed to address the nation's groundwater resources questions.

Five pilot projects were conducted in 2010 to test the concepts and approaches for the proposed NGWMN. The five pilot project study areas were in the states of Illinois-Indiana, Minnesota, Montana, New Jersey, and Texas. Information obtained from these projects will assist in developing an estimate of the number and types of resources needed for full-scale implementation of the NGWMN. The results from the pilot projects currently are being reviewed and will be presented in a summary report for ACWI. This report will include a review of the cost estimates and ease of implementation.

The DNR and MPCA worked jointly on the pilot project conducted in Minnesota. Below is the Executive Summary of the report that was submitted. The full report will be available soon, and a future edition of the MGWA Newsletter will contain a link to this report and the final report summarizing the results from all the pilot studies.

Executive Summary

The Minnesota Department of Natural Resources (DNR) and Minnesota Pollution Control Agency (MPCA) jointly participated in one of five pilot studies to test the concepts and approaches for a proposed National Groundwater Monitoring Network (NGWMN). The results from the pilot studies will be used to produce recommendations leading to full-scale implementation of this network. The NGWMN is envisioned as a voluntary,

integrated system of data collection, management, and reporting that provides the data needed to help address present and future ground-water management questions raised by Congress, federal, state and tribal agencies and the public. The NGWMN will be comprised of selected wells from existing State, Federal and tribal groundwater monitoring programs. The focus of the network will be on assessing the baseline conditions and long-term trends in water levels and water quality. As part of the pilot study, the DNR and MPCA evaluated monitoring points, field practices, data management practices, and identified a subset of points for potential inclusion in the NGWMN's Targeted and Unstressed Subnetworks. The DNR and MPCA also identified all costs of potential participation in the NGWMN, including operating and managing the wells selected for the proposed NGWMN and addressing the identified network gaps. These cost estimates will be used to develop a budget to potentially implement the NGWMN nationwide.

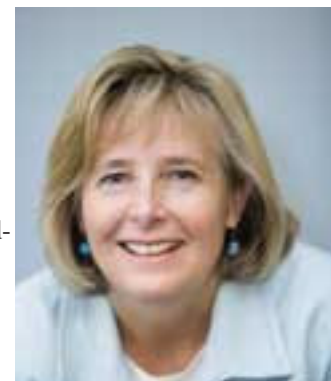
This pilot study focused on the Cambrian-Ordovician aquifer system within Southeastern Minnesota. This system consists of four aquifers and covers an area of approximately 15,000 square miles, including the seven-county Minneapolis-St. Paul metropolitan area (TCMA). The aquifers within the Cambrian-Ordovician system are an important water-supply source for this part of Minnesota, and most of the groundwater extracted within this part of the state is from the Cambrian-Ordovician system.

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Agency Appointments, cont.

Commissioner, twelve years as a chief deputy county attorney and has experience working as a staff attorney for the Met Council.

“Susan Haigh will be an outstanding Chair of the Metropolitan Council,” Dayton said. “She is a proven leader and consensus-builder. She will be closely involved with me in the selection of a Council, which will represent the diversity of our region and honor its tradition of enlightened non-partisan leadership.”



Patrick Born, chief financial officer for the city of Minneapolis, has been selected as the new Regional Administrator of the Metropolitan Council. Before assuming his current position with the city of Minneapolis, Born spent 19 years at Evensen Dodge Inc., a national financial advisory firm; a year as a senior consultant with Price Waterhouse & Co., a management consulting firm, and six years at the state of Minnesota including two years as director of financial management for the Minnesota Department of Finance (now called Minnesota Management and Budget). Born holds an undergraduate degree from Miami University of Ohio, and two master's degrees from the University of Minnesota.

Pilot Study, cont.

Water-Level and Water-Quality Trend Networks for the proposed NGWMN were developed based on the DNR and MPCA ambient groundwater monitoring networks, and each of these networks were further subdivided into Targeted and Unstressed Subnetworks. The Unstressed Water-Level and Water-Quality Subnetworks monitor parts of the aquifer system that are generally not affected by water-level declines or anthropogenic contamination, and the Targeted Water-Level and Water-Quality Subnetworks monitor areas affected by pumpage and/or anthropogenic contamination. Wells were placed in the Targeted Water-Level Subnetwork if the available data showed a long-term downward trend of water levels on the hydrograph or the well was in the vicinity of a known high volume pumping well. Wells were placed in the Targeted Water-Quality Subnetwork if the available baseline data indicated nitrate or chloride contamination.

Selected wells in the Cambrian-Ordovician system from the DNR's groundwater level monitoring network and all wells tapping the aquifer system from the MPCA's Ambient Groundwater Monitoring Network were included in the proposed NGWMN. Fifty-two of the 157 wells monitored in the Cambrian-Ordovician system from the State's groundwater level monitoring network were selected for potential inclusion in the NGWMN. All (37) of the wells in the Cambrian-Ordovician system from the MPCA's Ambient Groundwater Monitoring Network were selected for potential inclusion. All wells in the Water-Level Trend Network have a period of record of at least five years, and wells in the Water-Quality Network have a length of record ranging from one to 15 years.

Most of the wells selected for potential inclusion in the NGWMN were in the Targeted Subnetwork of the Water-Level or Water-Quality Trend Networks. Forty-three of the 52 wells in the Water-Level Network are in the Targeted Subnetwork, and 26 of the 38 wells in the Water-Quality Network are in the Targeted Subnetwork. The Water-Quality Targeted Subnetwork contains more wells compared to the Unstressed Subnetwork because the MPCA's Ambient Groundwater Monitoring Network concentrated on parts of the Cambrian-Ordovician system more susceptible to anthropogenic contamination.

Substantial spatial gaps in monitoring the Cambrian-Ordovician system were identified in the proposed Water-Level and Water-Quality Monitoring Networks. Both networks were disproportionately focused on the TCMA which accounts for approximately 20 percent of the study area. Most monitoring in the TCMA also was disproportionately focused on selected counties.

The installation of additional wells to the Water-Level and Water-Quality Trend Networks was proposed to address the identified spatial gaps in monitoring. Ninety-eight additional wells were proposed for the Water-Level Trend Network, and most of these wells would be installed in the Prairie du Chien-Jordan aquifer. A Surveillance Monitoring Network, focusing on the Prairie du Chien-Jordan aquifer, was recommended to enhance the Water-Quality Trend Network. The Surveillance Monitoring Network primarily would utilize existing wells, but would include installing approximately 20 additional wells in areas with no existing wells.

Few modifications are needed to the DNR's and MPCA's field practices to meet the requirements of the NGWMN. The agencies' current practices generally are similar to those described in the current guidance for the NGWMN.

The DNR and MPCA's data management systems would require modifications to meet the requirements for the NGWMN. Less than 25 percent of the proposed data elements for the NGWMN

currently are available in the DNR's data management system, and over 50 percent of the proposed data elements are available in data management systems maintained by the MPCA and Minnesota Department of Health. Some of the proposed minimum data elements are considered private information by the State of Minnesota, and the data management systems cannot be modified to include these data elements for the NGWMN.

As a result of this pilot study, several changes are recommended to the guidance developed for the NGWMN prior to final implementation. Additional guidance is needed to assist the states in determining the number of wells required for a national assessment of groundwater conditions. The states require finer-scale information to meet their needs compared to those of the NGWMN, and it is likely that not all of the state-level information is necessary to meet the goals of the NGWMN.

Because of the relative ease with which water levels can be obtained, it is suggested that the NGWMN increase the recommended frequency of water level measurements. The guidance also should be revised to lengthen the water quality sampling frequency in aquifers with longer residence times, such as many of those in the Cambrian-Ordovician aquifer system. Many wells in this system within Minnesota can be sampled at a longer frequency than those suggested in the guidance and still adequately characterize seasonal and temporal trends.

Additional guidance also is needed in defining the definition of 'unstressed' or 'targeted wells'. There is minimal guidance in the framework document detailing the definition of these categories. To insure consistency across the NGWMN, a better definition of Unstressed and Targeted is needed.



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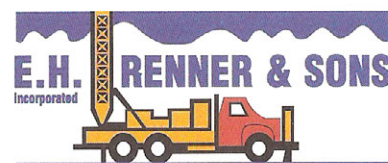
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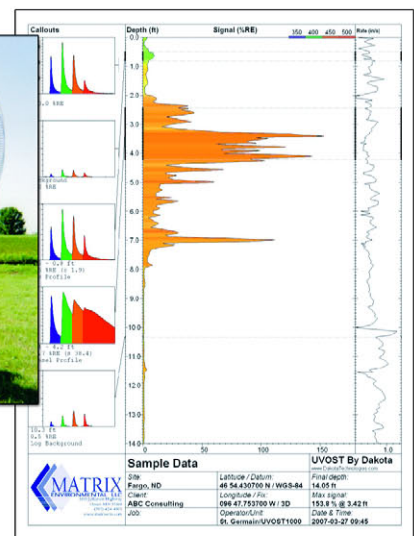
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Subterranean Wonders, continued from page 1.

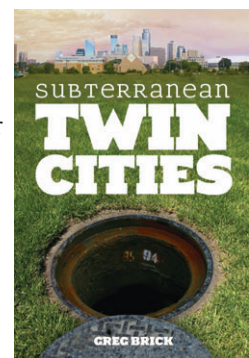
still exist, they were damaged by a roof collapse and sealed off when Pillsbury drove its own tailrace tunnels through the riverbanks in 1880. Since then, extensive deposits of colorful flowstone have accumulated in the passages.

Schieks Cave is located 75 feet below the streets of downtown Minneapolis, a sandstone maze cave underlying the former Farmers and Mechanics Bank, but now named after the nightclub that occupies the building. Discovered in 1904, the cave was likely the result of a washout adjacent to the Fourth Street tunnel. The cave was described as “shaped like an inverted bowl” and was profiled in a 1907 newspaper article, “In Caverns of Eternal Night.” The cave contains a ceiling spring that was dubbed “Little Minnehaha Falls” by sewer workers. A manganese deposit called the “Black Medusa” is found in another passage. The pyramid-style concrete piers installed to support the ceiling lend a vaguely Egyptian appearance to the place. In 1939, a newspaper reporter led a “camera safari” to this “lost world” beneath the streets. By the late twentieth century the cave was found flooded with raw sewage from leaking pipes, the largest pool known as the “Black Sea,” and swarming with cockroaches.



Channel Rock Cavern is the largest natural sandstone cave under Minneapolis as a whole, about 800 feet long and very roomy. Discovered at East 34th Street and West River Road in 1935 by sandhogs at work on the riverbank interceptor being constructed to prevent raw sewage from entering the Mississippi River, it was used by them as a place to dump sand, using a narrow gauge railway. The cave has some unique speleothems, such as calcite-lined drip pockets and mud stalactites, as well as a “sapphire pool.” Sewer workers constructed a faux “cemetery” inside the cave, complete with headstones. Although the cave was generated by groundwater piping related to the knickpoint retreat of St. Anthony Falls past this point, Calvin Alexander and Kelton Barr have recently proposed a hypogenic origin for some of its features.

If you'd like to read more, an extended account of these and other wonders is provided in Greg Brick's SUBTERRANEAN TWIN CITIES, published by the University of Minnesota Press in 2009.



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QUESTION OF THE QUARTER

Question of the Quarter

The Question of the Quarter is an occasional feature of your newsletter in which a question is posed and all members are invited to respond. Send your answer to: editor@mgwa.org

What familiar hydrogeologic term derives its origin from the activities of Carthusian monks and is named after a former province of France that became part of France as a princess's dowry?

INDUSTRY NEWS

Delta is now Antea Group

Incorporated in 1986 in Minnesota, Delta Consultants grew over the next 25 years to become a premier provider of environment, health and safety solutions both nationally and globally through focused innovation and expertise in compliance services, remediation technology and environmental liability transfer programs.

In 2008, Delta Consultants was acquired by the Dutch engineering and environmental consulting firm, Oranjewoud N.V. (NYSE Euronext ORANW). In 2011, Oranjewoud N.V. announced the integration of its international subsidiaries, including Delta Consultants, into a unified market presence operating under the brand name of Antea Group.

“The decision to transition company name aligns our group resources in Belgium, Colombia, France, Netherlands, and USA under one common brand in recognition of how we aspire to operate as one unified company,” states Bob Karls, former CEO of Delta Consultants and current International Director of Environment for Antea Group. “We view this transition as a positive step forward in our growth. Antea Group is an expression of our expanded capabilities and collective strength, both in the USA and globally. Our name is new, but our unwavering commitment to serving our clients, taking care of our employees, and managing a successful business are unchanged.” For more information visit: www.anteagroup.com.

Question
of the
Quarter!

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Existing Chemical Data as a Test for Recharge to the St. Peter Aquifer near the “Decorah Edge”

Jim Lundy, Minnesota Department of Health/Source Water Protection

The assessment of recharge to drinking water aquifers is essential for accurate assessment of water availability, sustainability, well-head protection, aquifer vulnerability, and contaminant transport (Scanlon and others, 2002; Delin and Falteisek, 2007; Lorenz and

Delin, 2007). Existing studies of recharge in southeastern Minnesota assessed the “Decorah Edge” effect near Rochester, where overlying low-permeability materials (Decorah Shale-Platteville Limestone-Glenwood Shale; “DPG”) curtail recharge to underlying bedrock (St. Peter-Prairie du Chien-Jordan aquifer system). Groundwater flow modeling (Lindgren, 2000) showed flow paths moving upgradient (compared to the regional groundwater flow direction) a short distance after moving beneath the DPG and into the St. Peter aquifer (Figure 1). This modeled zone of upgradient groundwater flow within the St. Peter was roughly one mile wide. The apparent upgradient flow of groundwater could be in response to mounding beneath areas of focused recharge because portions of the St. Peter aquifer near the Decorah Edge may be unsaturated (DNR, 1991; Carter, et al., 2010). Additionally, increased DPG vertical fracture density observed near bedrock valleys (personal communication, Bob Tipping, Minnesota Geological Survey) likely promotes recharge to the underlying St. Peter.

The DPG is generally expected to retard recharge to underlying aquifers within its footprint (DNR, 1991); however, the discussion above suggests this is not necessarily true everywhere, especially within a short distance of its downgradient edge. The MDH quantified whether groundwater is recently recharged in the vicinity of the DPG edge using available chemical datasets in a four-county area of southeastern Minnesota (Dodge, Olmsted, Mower, and Fillmore) where the “Decorah Edge” is prominent were collated, and a scheme was devised to determine likelihood of recent recharge based on the presence or concentration of selected analytes in the underlying St. Peter, Prairie du Chien and Jordan aquifer system (Table 1).

The resulting data set contained 1,100 wells where the neces-

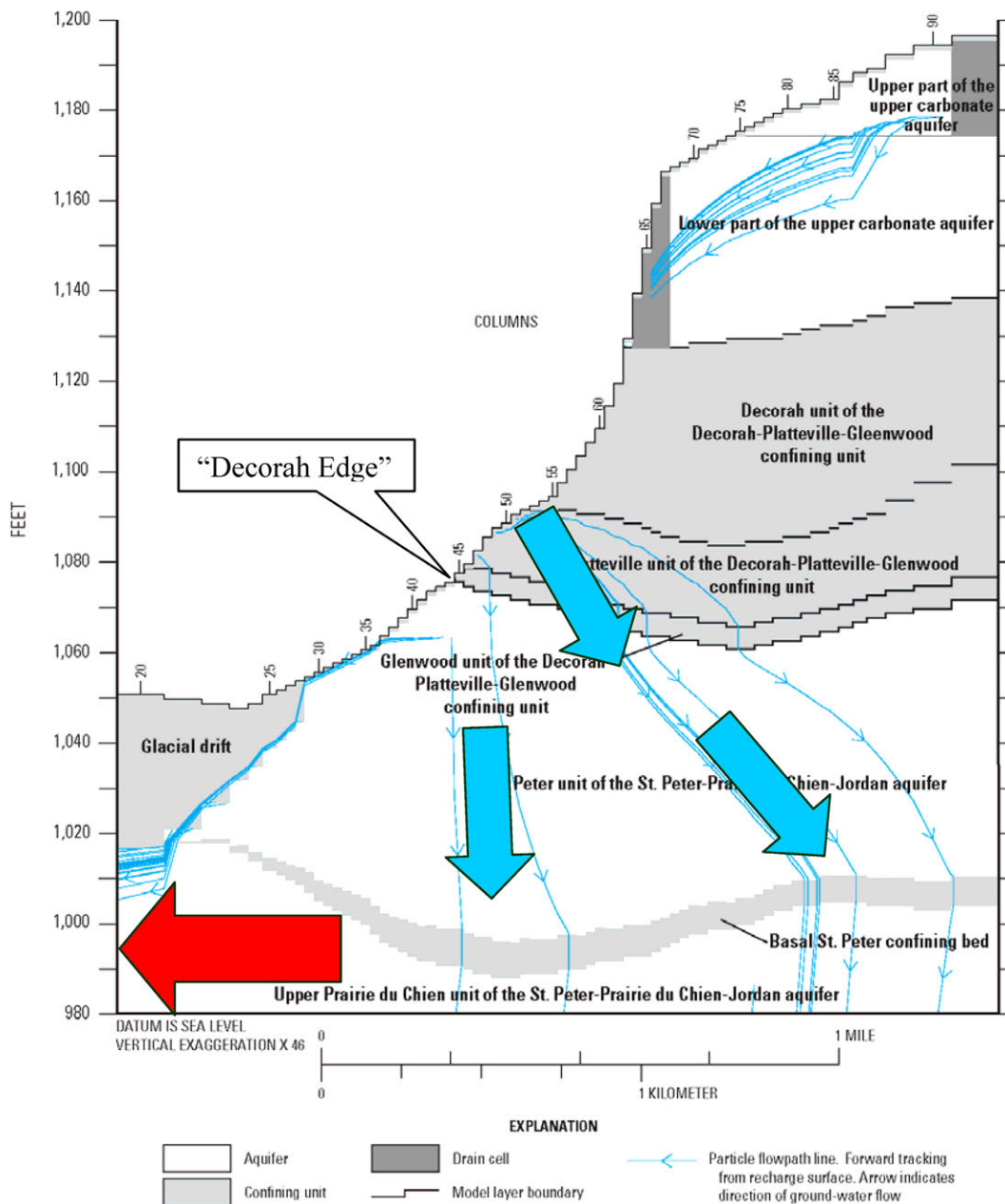


Figure 1. From Lindgren, 2000, figure 9b. Profile view of modeled flow paths reversing direction while recharging the St. Peter Aquifer (blue arrows). Red arrow indicates regional flow direction.

— continued on next page

Decorah Edge Recharge, cont.

Table 1: Scheme to Determine Chemical Recharge Evidence

Analyte	Recent recharge indicated if:
Nitrate	[NO ₃] > 3 mg/L
Tritium	[³ H] > 1 tritium unit (TU)
Dissolved oxygen	[DO] > 2 mg/L
Chloride	[Cl] > 10 mg/L
Atrazine	Detected
Benzene or TCE	Detected

sary water quality information was available. At most wells, only one or two of the listed analytes were reported. Recent recharge was indicated if: 1) any of the conditions in Table 1 were satisfied; or 2) there was more than one analyte but conflicting

outcomes. There still could be recent recharge even if a sample failed to satisfy all the conditions in Table 1. Therefore this data set confidently determined the likelihood of recent recharge but not the lack of it.

On the map in Figure 2, the color brown indicated the DPG footprint, in some places covered by glacial clay till (gray). Pink indicated sub-cropping St. Peter-Prairie du Chien-Jordan, where neither the DPG nor glacial clay till was present. Red points denoted where chemical evidence in the St. Peter, Prairie du Chien or Jordan indicates recharge occurred, and white points indicate where such evidence was absent. The distribution of points in Figure 2 was consistent with the results of the earlier flow modeling, with a general lack of recharge evidence beneath the DPG/till, and spatially abundant recharge evidence where the DPG/till

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Figure 2: Chemical Evidence For Recent Recharge St. Peter-Prairie du Chien-Jordan Aquifer System

Dodge, Olmsted, Mower and Fillmore Counties
Prepared by Minnesota Department of Health, December 2010

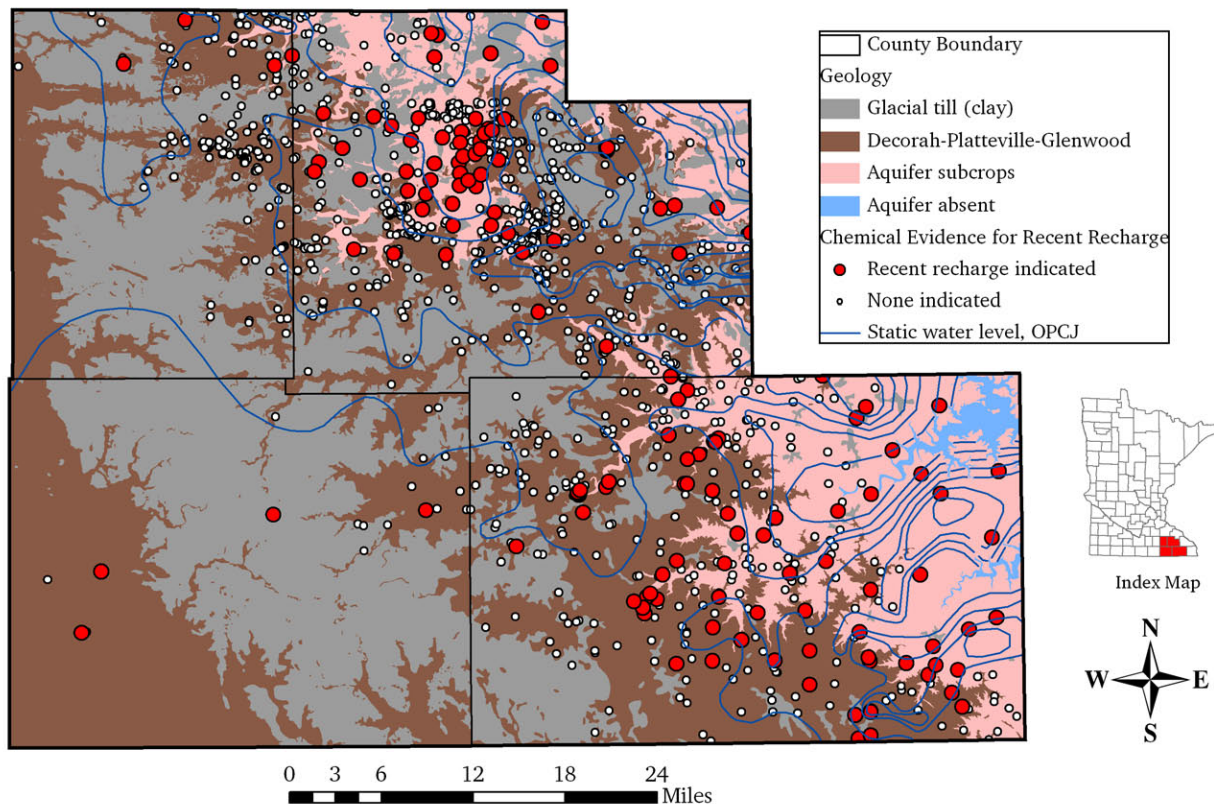


Figure 2. 1100 drinking water wells where water quality data suggest the presence of recent recharge. Data from: Minnesota Department of Health (Well Management, Source Water Protection, Community and Non-Community Drinking Water) and Minnesota Pollution Control Agency (Ground Water Monitoring and Assessment Program). Static water level contour lines drawn from data in County Well Index (CWI). Bedrock geology by Minnesota Geological Survey.

Decorah Edge Recharge, cont.

was absent.

Figure 2 also confirmed recharge to some areas that would otherwise be judged to be geologically protected (DNR, 1991). A potential cause of this unexpected chemical signature of recharge is an inadequate seal between the well casing and the formation. In such cases, the water quality is likely an artifact of well construction, not hydrogeologic factors.

The map in Figure 3 excludes wells where the presence of casing grout cannot be verified and for clarity also excluded wells with no chemical evidence of recharge. The green region on Figure 3 denoted an area within the mapped extent of the DPG/till but within one mile of its edge. This was the region where previous studies (Lindgren, 2000; Figure 1) suggested recharge occurs despite the presence of overlying DPG/till.

Ninety percent of properly constructed wells with chemical evidence of recent recharge were within the green buffer or the St. Peter-Prairie du Chien-Jordan sub-crop zone. Fourteen wells with chemical recharge evidence were beneath the DPG/till footprint

and more than one mile upgradient from its edge; these are the “outlying wells” denoted on Figure 3. The chemistry of these wells unexpectedly indicated recharge where the flow modeling and MDNR (1991) suggest there was none.

Possible reasons for recently-recharged water in the outlying wells include suspect measurements, source proximity (including poorly constructed nearby wells), source type, and geologic or hydrogeologic conditions. Source proximity and type were difficult to assess with the existing data. Geologic or hydrogeologic conditions remain the best explanations for these anomalous results. From the existing boreholes, there was very little information about lateral changes in features that seem insignificant but may control the flow of recharging water such as discontinuities in overlying clay, erosional dissection of subcropping DPG, or vertical fracture density under shallow conditions (Runkel, et al., 2003; Runkel, et al., 2006). Several outlying wells were located in areas with abundant karst features (sinkholes) in subcropping Galena Limestone, and it is unknown how such conditions might

Figure 3: One Mile Buffer and Outlying Points

Dodge, Olmsted, Mower and Fillmore Counties
Prepared by Minnesota Department of Health, December 2010

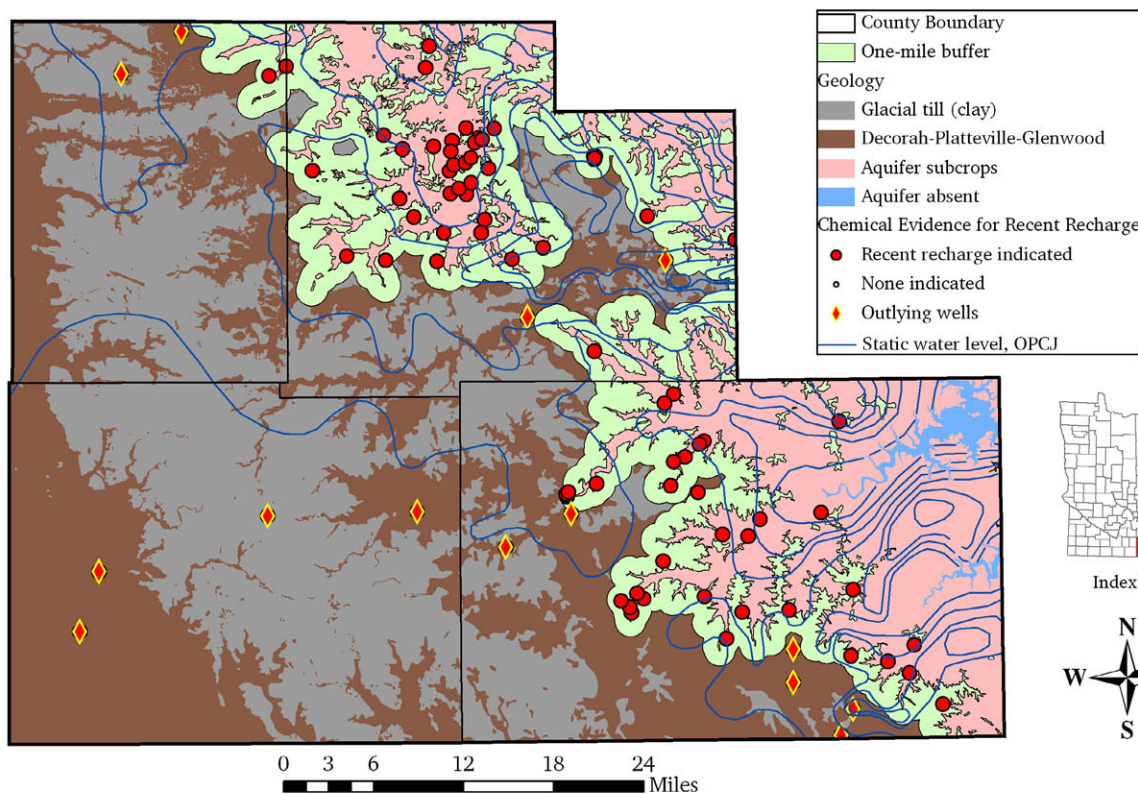


Figure 3. Same data as Figure 2, excluding points lacking chemical evidence for recharge and verified casing grout. Red diamonds with yellow outlines denote points where the DPG is expected to provide geologic protection to aquifers beneath, yet chemical evidence for recharge was measured.

Decorah Edge Recharge, cont.

affect the integrity of the underlying DPG confining layer.

In summary, groundwater flow modeling and geochemical data both show that recharge occurred over an area slightly smaller than the DPG footprint. The width of the green buffer zone in Figure 3, where the protective strength of the DPG is questionable, remains merely a reasonable estimate. The non-quantitative, empirical approach outlined here should be continued with more rigorous quantitative methods to determine a statistically significant distance to buffer. Other aquifers (for example the Tunnel City-Wonewoc beneath the St. Lawrence) should also be assessed. Results of these assessments would benefit efforts concerned with recharge, including vulnerability determinations in wellhead protection and nitrate probability ranking maps.

Some of this information was presented as a poster (Lundy and Blum, 2010) at the Minnesota Ground Water Association (MGWA) Fall 2010 conference. Thanks are due to the following colleagues for their help in preparing and reviewing this work: Justin Blum, Al Epp, Philippe Le Grand, and Bob Tipping.

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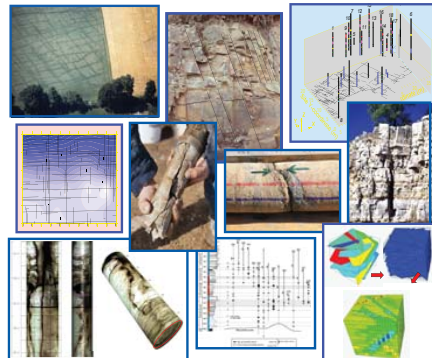
Instructors:

Maureen Muldoon, PhD, PG
University of Wisconsin, Oshkosh

Ken Bradbury, PhD, PG
Wisconsin Geological and
Natural History Survey

David Hart, PhD, PG
Wisconsin Geological and
Natural History Survey

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This course is one of the most useful courses that I have ever taken in my 19 year career. (It) presents both the challenges associated with characterization of complex bedrock hydrogeologic environments and the tools developed to address these complexities. The course is invaluable (because) it condenses the multitude of work that has been completed and is currently being done at numerous fractured bedrock sites into a single (short) course.

- Thomas M. Seckington, P.G.,
California Environmental Protection Agency
Department of Toxic Substances Control

Recent advances are rapidly improving our understanding of fractured bedrock systems. Fractured bedrock sites have been perceived as so inherently complex that unmanageable uncertainty remains even after an investigation is complete. This 3-day course is dedicated to unravelling those hydrogeologic complexities and the recent advances that are occurring from field investigations to comprehensive modeling techniques.

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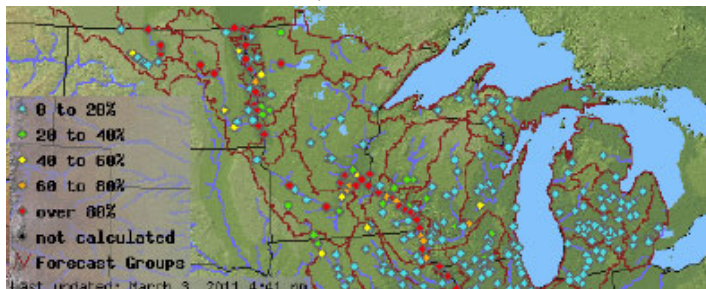
REPORTS & PUBLICATIONS

USGS Publication on Nutrient Conditions in Two Lakes on the Grand Portage Reservation in Northeastern Minnesota

A new publication was released on nutrient conditions on two lakes on the Grand Portage Reservation in northeastern Minnesota. The U.S. Geological Survey cooperated with the Science Museum of Minnesota and the Grand Portage Band of Chippewa Indians to study Swamp and Speckled Trout Lakes. Water samples and sediment cores were used to establish reference nutrient conditions. The full citation for the report is: Christensen, V.G., Jones, P.M., Edlund, M.B., and Ramstack, J.M., 2010, Water quality (2000–08) and historical phosphorus concentrations from paleolimnological studies of Swamp and Speckled Trout Lakes, Grand Portage Reservation, northeastern Minnesota: U.S. Geological Survey Scientific Investigations Report 2010–5192, 53 p. The report can be accessed on-line at: pubs.usgs.gov/sir/2010/5192/.

USGS Summary on the Spring Flood Outlook in Minnesota

The threat of widespread, major flooding in Minnesota and other areas of the Upper Midwest this spring is very great. A recent multi-agency meeting to discuss the threat indicated that major to peak-of-record flooding has about a 20% chance of occurrence in the Red, Mississippi (Upper and Lower in Minnesota), and Minnesota River Basins. Even the Mississippi River at St. Paul has about a 15% risk of exceeding the previous peak of record at 26.01 feet. The dots on the map below show the likelihood of major flooding in Minnesota and surrounding areas (courtesy of the National Weather Service).



Several factors contribute to the likelihood of major floods. Precipitation in late summer and early fall was much above average. This late-season precipitation saturates the soil and recharges aquifers so that stream flow remains larger than average during the fall and into the winter. Precipitation in the early winter was also much above average throughout all of Minnesota. Precipitation in the winter tends to remain on the soil as snow, which can be released quickly during thaw weather in the spring. Recent estimates indicate that much of Minnesota is covered by more than 4 inches of snow-water-equivalent, the equivalent of a 4-inch rainstorm.

New report released on water availability in the Great Lakes Basin

Though the Great Lakes are the largest freshwater system on Earth, the basin has the potential for local shortages, according to a new basin-wide water availability assessment by the USGS. Water availability in the Great Lakes Basin is a balance between storage of surface water and groundwater in the system, flows of water through the system, and existing, sometimes competing, human and ecological uses of water. Water use has a relatively

minor effect on regional water availability, because of the large volume of water in storage, large annual flows, and abundant, high quality groundwater. Development in the Great Lakes region also has had relatively little effect on basin-wide water availability, though surface-water diversions and pumping of groundwater have affected some flow patterns over large areas of the basin.

This study and related groundwater availability studies being conducted nationally by the USGS through the Groundwater Resources Program support the proposed Water Census for the United States. The Water Census is an initiative to provide citizens, communities, natural-resource managers, and policymakers with a clear knowledge of the status of their water resources, data on trends in water availability and use over recent decades, and an improved ability to forecast the availability of freshwater for future human, economic and environmental uses.

Reports from this project, as well as additional information on USGS water availability studies in the Great Lakes Basin, are available online at: water.usgs.gov/wateravailability/greatlakes/.

Fact Sheet and Video on USGS Sampling Protocols

A fact sheet is now available which summarizes water-quality sampling procedures used by staff of the USGS.

Water-Quality Sampling by the U.S. Geological Survey: Standard Protocols and Procedures,” Fact Sheet 2010-3121. The fact sheet can be accessed at: pubs.usgs.gov/fs/2010/3121/.

Stormwater Research at SAFL

The St. Anthony Falls Laboratory (SAFL) at the University of Minnesota publishes UPDATES, a monthly stormwater assessment and maintenance newsletter. The newsletter features articles on current stormwater research being conducted at SAFL. UPDATES also lists stormwater related events and workshops scheduled for the area. To get on the UPDATES electronic mailing list go to: <http://stormwater.safl.umn.edu/content/publications>.



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MGWA BOARD MINUTES

Minnesota Ground Water Association Board Meeting Minutes

Meeting Date:	December 3, 2010
Meeting Location:	Fresh Grounds Restaurant, St. Paul, MN
Attendance:	Steve Robertson, President; Mindy Erickson, President-Elect; Craig Kurtz, Treasurer; Sean Hunt, WRI; Tedd Ronning, Newsletter Editor
Past Minutes:	Nov. 5, 2010 meeting minutes approved with no corrections/edits/changes
Treasury:	Savings and checking account balance: \$53,106. Net income to date for 2010 is \$14,914. A more complete year-end report will be available at the January meeting
Newsletter:	Final draft of Dec Newsletter going to WRI next week (~Dec.9). Two Newsletter team members leaving and replacements are on board. Use of Google Docs appears to be working better.
Webpage:	Audio of the talks and pictures from the Fall Conference are now online. An email is going out to all members regarding the Newsletter. Another email will be going out regarding Stu Grubb.
WRI Mgmt:	A report was provided to the Board. A second membership renewal was sent to members (260 renewals so far). No comments have been received regarding the \$5 increase in membership dues. A lot of work performed on the Fall Conference.
MGWAF Report:	Next meeting scheduled for the week of Dec 10
Old Business	<u>Fall Conference:</u> Over 200 attendees. Generally positive feedback received (80 surveys). Ran out of padfolios for speakers. A couple speakers have asked that their presentations not be placed on the MGWA website. Mindy reviewing topics for future conferences.
New Business	<u>GSA 2011 Conference:</u> Letter has been sent. <u>Officer Elections:</u> Survey Monkey to be used again. Email will be going out this weekend. Voting closes December 31, 2010. <u>2012 Midwest Groundwater Conf:</u> MGWA may assist in 2012, but will not be assisting for the 2011 Conference. in the fall (October) <u>MEP:</u> Steve received a list of MEP General Priorities for the MGWA to endorse. Only two involved groundwater issues; read and reviewed by Board. Board approved Steve to submit MGWA response to MEP for the two groundwater relevant issues (M.Erickson moved; S.Alexander second) MEP requested an email list of MGWA members – Board will decline. An article will be included in the Dec Newsletter informing members of the option for individuals to join the MEP email alert and distribution list.
Meeting Date:	January 7, 2011
Location:	Fresh Grounds Restaurant, 1362 West 7th Street, St. Paul, MN
Attendance:	Mindy Erickson, President; Steve Robertson, Past President; Kelton Barr, President-Elect, Audrey Van Cleve, Treasurer; Jill Trescott, Secretary; Jeanette Leete, WRI; Sean Hunt, WRI; Tedd Ronning, Craig Kurtz, Gil Gabanski, Catherine von Euw
Past Minutes:	December minutes approved.
Treasury:	Craig submitted his final report as Treasurer. He expressed his appreciation to the Board for his time as Treasurer, and observed that the Association is in good financial shape. Cash on hand is approximately \$46,800.
Newsletter:	Tedd solicited ideas for the next newsletter.
Web Page:	The latest newsletter has been sent out and the members have been notified.
WRI Report:	Jeanette reported they have purchased a Sony Vaio and updated Quickbooks software. Second notices have been sent for membership renewals. They are preparing the financial records for audit.
Foundation:	Gil introduced Catherine von Euw as a new member of the Foundation board. The Foundation has a balance of \$107,000, with donations for the Pfannkuch fund of \$17,000. The Foundation has sufficient funds to begin awarding scholarships this year.
Old Business:	<u>Spring conference</u> Replacement supplies are needed. <u>GSA 2011:</u> MGWA has been approved as an affiliated society, so MGWA members will be able to register for the GSA Conference at the GSA rate. Five sessions have been proposed for MGWA sponsorship. Steve moved to sponsor the sessions; Kelton seconded. All in favor.
New Business:	<u>Audrey Van Cleve was authorized as a signer for the association's bank accounts.</u> Kelton Barr moved to: Direct the Bank to recognize the signature and/or written, telephone, electronic and oral instructions of any person who has been added as an authorized signer; Direct the Bank to discontinue acting on the instructions of any person who has been deleted as an authorized signer; Acknowledge that these modifications become effective only after this addendum has been received by the Bank and the Bank has had a reasonable opportunity to act on instructions it contains;

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MGWA Minutes, cont.

Certifies that the account owner has taken all action under its organizational documents, if any, including passage of resolutions by its board of directors, trustees, or other governing body, required to make these modifications and to authorize the undersigned to execute and deliver this addendum;
Direct the Bank that the additional authorized signers identified above shall have all of the authority granted to the persons identified as authorized signers on the Certificate of Authority.

Mindy Erickson seconded. All in favor.

Foundation Officer: Mindy moved to appoint Catherine von Euw to the Foundation Board. Audrey seconded. All in favor.

National Groundwater Monitoring Network: The Board approved sending a letter of support for the National Groundwater Monitoring Network over Steve Robertson's signature.

Bulgarian Groundwater Association Jim Aiken's response to the Bulgarian Groundwater Association was approved with one change.

Spring Conference The Spring Conference will be May 4.

WRI 2011 Contract The WRI contract was discussed. There are no substantive changes to the proposed terms. The Board wanted to know if it would be possible to enter into a multi-year agreement, so the topic was tabled until the next meeting.

Meeting Date: February 7, 2011

Location: Fresh Grounds Restaurant, 1362 West 7th Street, St. Paul, MN

Attendance: Mindy Erickson, President; Steve Robertson, Past President; Kelton Barr, President-Elect, Audrey Vann Cleve, Treasurer; Jill Trescott, Secretary; Jeanette Leete, WRI; Sean Hunt, WRI;

Past Minutes: January minutes approved as corrected.

Treasury: Jeanette submitted the Treasurer's report. Cash on hand is approximately \$51,200. The organization has sufficient cash to operate this year with only one paying conference. The organization shouldn't make a contribution to the Foundation this year until later in the year.

Newsletter: Next newsletter production is on schedule.

Web Page: Nothing new.

WRI Report: Jeanette reported that the WRI contract had been re-written as the Board requested. Software has been installed on the new computer and will be installed on the old computer for Audrey to use. The 2010 financial records have been updated.

Foundation: The Foundation will meet in March.

Old Business: GSA 2011: All of the sessions for which MGWA sponsorship was requested were accepted. The invitation to submit abstracts will be coming out soon. Information about conference sponsorship levels was distributed for discussion at a future meeting.

Spring Conference – May 4 – Theme will be Minnesota's Sustainable Water Use Planning & Implementation Efforts

WRI Contract: Kelton moved to execute the contract with WRI. Audrey seconded. All in favor. Rates will be \$45 per hour for accounting and \$30 per hour for other tasks.

New Business: Salary Survey Kelton proposed conducting an on-line salary survey for groundwater professionals, with the results to be published in the newsletter. The concept was approved and the questions to be asked were discussed.

MEP had requested support for their letter regarding environmental reviews in the state. Mindy had polled the Board by e-mail and a majority approved, so she had responded "yes" to MEP's request.

The MGWA Board of Directors meets once a month.

All members are welcome to attend and observe.



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Guidelines for Submission of Newsletter Articles

The newsletter team appreciates the efforts of article contributors, without whom our newsletter would not be possible. To make the process easier on the author, the newsletter team and production staff, we have established some guidelines we would like authors to follow. For a complete list of guidelines, please see the MGWA web site:

- ◆ Submittals should be complete and ready for publication.
- ◆ The text of the article should be submitted as a Microsoft Word document in an attachment to an e-mail or on disk.
- ◆ Tables, captions, figures and graphics should be submitted individually as separate high quality files.
- ◆ A version of the article with embedded tables, figures, and graphics may be submitted as an additional file to indicate the preferred layout of the tables, figures and graphics within the article.
- ◆ The contributor should include the contributor's name and affiliation following "By" below the title of the article.
- ◆ The contributor should secure permission to print or reprint if applicable and provide the required text to be included with the article.
- ◆ Materials should be submitted before the deadline.

If there is any question about the suitability of a proposed article's content for the MGWA newsletter, it is advisable for the contributor to call the editor before investing significant time in article preparation.

MGWA 2011 Membership Dues

Professional Rate:	\$35
Full-time Student Rate: Newsletter (printed and mailed)	\$15
Directory	\$20
	\$7

Membership dues rates were revised at the October 1, 2010 meeting of the MGWA Board. The Board intends to balance the membership services budget.

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FOUNDATION MINUTES

Meeting Date: Tuesday, December 14, 2010

- Location: Cafeteria, MN DOT, 395 John Ireland Boulevard, St. Paul
- Attending: Gilbert Gabanski, David Liverseed, Amanda Strommer, Scott Alexander, Cathy von Euw and Cathy Villas-Horns. MGWA Management present: Jennie Leete and Sean Hunt. Gil welcomed Cathy von Euw as new treasurer
- Review of Minutes The meeting minutes for the March 9, 2010 meeting were approved on May 10, 2010. The minutes were provided via e-mail to the MGWAF Board and the MGWA Newsletter staff.
- Treasurer's Report MGWA Foundation balance to date is \$106,977.61. Interest in the amount of \$1063.42 was accrued since 3-9-10 and was swept into the endowment. Total debits of \$14,275 were expended during this period including a \$1,500 grant to the Children's Water Festival. Total credits of \$23,292 from renewing memberships and donations to the MGWA Foundation were received during this period. The non-endowment MGWA Foundation account now has a balance of \$30,279.72. We discussed moving a portion of this money to the endowment account. Checking accounts currently provide 1% interest, while savings accounts provide 0.1% interest. Certificates of deposit (CDs) interest rates are just above 1%, while Step-Up CDs now pay 3.875% after four (4) years. Dave proposed and Amanda seconded that \$20,000 be transferred from the non-endowment account to the endowment Memberships Savings Account. Then, \$20,000 from the endowment Membership Savings Account will be transferred to Interest Reward Checking. Motion passed. The H.O. Pfannkuch Fund balance to date is \$12,680.84. Interest in the amount of \$5.84 was accrued since 6/23/10 and was swept into the fund. There were no debits during this period, and total credits of \$175 from donations were received during this period. The MGWA Foundation balance is now over \$100,000 and the MGWAF Board needs to decide if it wants to begin the scholarship project or if it wants to continue to accrue funds. Dave Liverseed is resigning as MGWAF treasurer, and new board member Cathy von Euw is the new candidate for treasurer. Dave will make the two transfers before he turns over the books to Cathy von Euw.
- Old Business MGWA Board Meeting report – Scott reported that both 2010 conferences were at full attendance, and therefore the MGWA Board is discussing the possible transfer of funds to the MGWA Foundation. In 2011 there will be a conference in the spring, but the Geological Society of America (GSA) conference to be held October 9-14, 2011 at the Minneapolis Convention Center will replace the fall MGWA conference. The MGWA will be a sponsoring group for the GSA, and MGWA members will be able to sign up at the GSA member rate. A family oriented bike field trip with associated guidebook may also be developed and would leave from the Convention Center. Pfannkuch Scholarship Fund – Discussion of how to manage \$12,680.84 in funds. Gil proposed and Amanda seconded that \$12,675.84 be transferred into an Interest Rewards Checking account and \$5 remain in the savings account, since checking is currently paying higher interest rates than savings. Motion passed.
- New Business New treasurer – Dave Liverseed is retiring as treasurer of MGWAF. Dave proposed and Gil seconded that Cathy von Euw serve as the new treasurer of MGWAF. Motion passed. Cathy V-H will print and sign a copy of the minutes of this meeting and will provide that to the MGWA Board, which will vote and make the final determination. Outreach – Amanda received the contact list of geosciences departments at regional universities and colleges from Dave. Scott has a more up to date list of contacts for geosciences departments and will provide Amanda with his updated contact list. In addition, Sean placed a 2009 contact list on the MGWA Google website. Amanda will also do a web search and will use the MGWAF e-mail address for the search. MGWAF Goals – Dave lead a general discussion of additional ways for the MGWAF board to raise money towards the MGWAF scholarship fund. Scott suggested that advertisements for donations to MGWAF be placed on informational plaques being placed at geocaching sites.
- Next Meeting The 2011 MGWAF meetings will be held in March and September. The next meeting will be Tuesday, March 8, 2011 at 11:30 AM at the Metro 94 building. Gil will ask Chris to make the arrangements.

ADDENDUM TO MINUTES: Cathy von Euw was approved as MGWAF Treasurer by the MGWA Board at their meeting on January 7, 2011.

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

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

Cathy von Euw

Stantec
(651)255-3963

Cathy.vonEuw@Stantec.com

MGWA Liaison

Scott Alexander

612-624-7822

alexa017@umn.edu

Director

Chris Elvrum

Metropolitan Council
(651)602-1066

[christopher.elvrum@](mailto:christopher.elvrum@metc.state.mn.us)

metc.state.mn.us

Director

Amanda Strommer

Washington County
(651)430-6655

[\[co.washington.mn.us\]\(mailto:co.washington.mn.us\)](mailto:amanda.strommer@</p></div><div data-bbox=)

FOUNDATION NEWS

Thank You David Liverseed

By Gil Gabanski

One of the many benefits from volunteering your time with an organization is the opportunity to meet and work with colleagues, and to simply get to know them. I will personally attest to this since I and the other Minnesota Ground Water Association Foundation (MGWAF) Board directors have had the pleasure of working with and getting to know David Liverseed, who last December stepped down as the treasurer of the MGWA Board. David served as Board treasurer for at least seven years, since perhaps late 2003 or early 2004. I have yet to find someone who can give me the exact time frame, and Dave seems to be fuzzy on his start date too. Since that time, Dave has been a steady hand at investing and monitoring the MGWAF Board finances and endowment. In particular and most importantly, I credit him with positioning our funds and successfully navigating through the last several years without a loss to our endowment and funds. Dave has been reliable, dependable, and always prepared to offer options when the Board needed to reinvest or move funds. He made his role and the task look easy, though I know it was more an effort than he let on. Dave also took on the task of setting up an outreach program to educators regarding the MGWAF Board's grant program. My task as Board president was easier with Dave. During these years, Dave became more a friend than a colleague, as I said, one of the benefits of working in an organization.

If you know Dave, or if you see him at one of conferences, please join me, take a moment, and thank him for his dedication, and for giving back to his profession. Dave, you truly have set the standard for excellence, your effort is much appreciated. Thank you.

Welcome Cathy von Euw - New MGWAF Board Treasurer

By Gil Gabanski

A relatively new MGWA member stepped up last November and volunteered to be considered to replace Dave Liverseed. On December 14, 2010, the MGWA Foundation Board accepted the resignation of David Liverseed as the MGWA Foundation Board treasurer and Cathy von Euw (pronounced "fun oy") was presented to the Foundation Board directors. Cathy was unanimously approved as the treasurer by the Foundation Board, pending final approval from the MGWA Board. On January 7, 2011, the MGWA Board approved the Foundation Board request.

Cathy is a Senior Geologist with Stantec and has worked around the country. Since returning to Minnesota in 2003, her work has been focused on projects outside of Minnesota, and she has felt somewhat disconnected from the local geology and hydrogeology community. She hopes to change that through her involvement with MGWA as she helps champion financial matters for the Foundation. Cathy earned a BS in Geology from the University of Minnesota-Duluth, an MS in Geology and an MS in Science Teaching from Syracuse University. She is a licensed Professional Geologist in California, Georgia, and Minnesota. Please welcome Cathy as our new treasurer.



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