

Minnesota Ground Water Association

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Newsletter

June 2016
Volume 35, Number 2

Featured:

- Lewis & Clark Regional Water System, page 1
- Contaminated Groundwater Concerns Mount in Minnesota, page 9
- MGWA Foundation Scholarship Winners, page 10



MGWA President
Ole Olmanson

Inside:

President's Letter	1
Member News	2
MGWA News	3
Abbreviations and Acronyms	4
Agency News	8
Minnesota Well Index	8
Groundwater in the News	9
Photo Tips	11
MGWA/MGWAF Minutes	12

President's Letter

What an exciting time to be in the water business in Minnesota! At the MGWA Spring Conference, all in attendance got a firsthand account of some of the ways that MN organizations are giving water a second thought and a second use. I hope everyone there walked away with a handful of ideas that they can apply to their next water project.

I'd like to take a minute to extend my thanks to all the speakers, staff, and volunteers that came together to make this spring's conference a great learning opportunity for everybody. I'd also like to thank our members who came out to listen and participate in the lively discussions during the breaks. It was great to see so many students there as well, with many bringing posters to share their work with the rest of us. I even heard that one group of students started their day at 4:00a.m. in order to make it on time. What dedication!

I thought the California perspective from Dr. Richard Laton was especially important for us to hear when many of us are still on the fence about the current treatment technologies and practices. It was also great to hear the Mankato story and learn how a potentially large groundwater withdrawal was turned into a wastewater reuse opportunity.

It was a surprise to me to see so many willing MGWA members who sat with the students and offered their mentoring talents during the conference lunch. By the time I got in there, it looked like everyone was paired up and enjoying some good student-to-professional conversation. Thanks to all who participated.

For those who were unable to attend, I highly encourage you to review the conference slides and recordings that will be posted on the MGWA website soon. While you're at it, go

— continued on page 4

The Lewis & Clark Regional Water System – A Vision for the Future

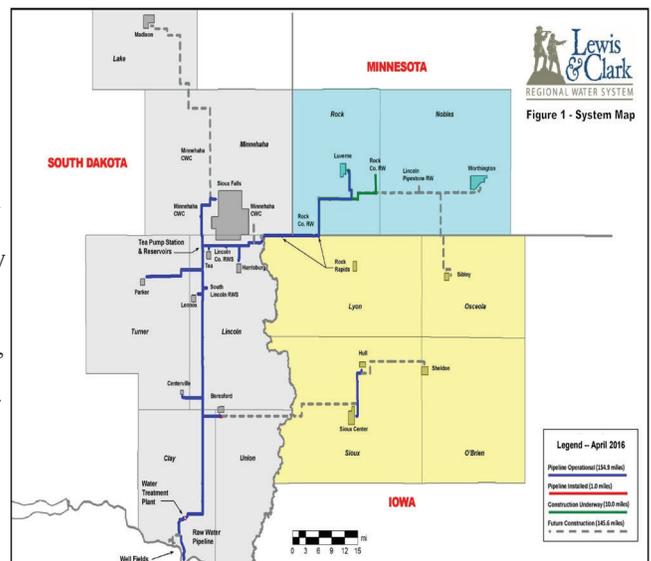
By Jim Auen, Operations Manager Lewis and Clark Regional Water System

After years of planning and dedication, the Lewis and Clark Rural Water System Act was signed into law (Public Law 106-246) by President Clinton on July 13, 2000. The Act authorized \$213,887,700 (in 1993 dol-

— continued on page 4

Background and History of the Project

Twenty-six years ago, the Lewis & Clark Regional Water System (Lewis & Clark) was just a dream. Lewis & Clark was formed in 1990 as a unique approach to address common problems with water resources in a more effective and cost-efficient way than each member could do alone. Regional water problems include shallow wells susceptible to drought, aquifers prone to contamination, compliance with new drinking water standards, economic growth stifled due to inadequate water supplies and insufficient resources to replace aging facilities. Lewis & Clark will provide a desperately needed source of quality, reliable drinking water to over 300,000 people in Minnesota, South Dakota and Iowa.



— Figure 1: System Map

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Newsletter Deadlines

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June '17	05/05/2017

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Paul Putzier Promoted to Supervisor at the DNR

Paul Putzier has accepted the Hydrogeologist Supervisor position in the DNR's County Geologic Atlas Program. Prior to this, Paul was a Lead Hydrogeologist in the Hydrogeology & Groundwater Unit, supporting the department's Clean Water Legacy - Drinking Water Protection work. Paul's primary responsibility was developing the agency's Groundwater Management Area program, and he was the Project Manager for the North & East Metro Groundwater Management Area.

Before joining DNR, Paul held positions as Operations Manager, Project Manager and Senior Hydrogeologist over the last 25 years for several national consulting firms, leading investigation and remediation of State and Federal Superfund, Brownfield and other sites. Paul held the offices of Secretary-Treasurer for MGWA, as well as President, Vice President, and Secretary Treasurer for the American Institute of Professional Geologists (AIPG) Minnesota Section. He currently holds a Director's position on the Board of the Minnesota Section of AIPG. He earned a Bachelor of Science in

Geology from University of Wisconsin, Madison and a Master of Science in Geology from the University of South Florida, Tampa.

Paul's hobbies have included hockey, night-games in the 'hood like "Ghosts in the Graveyard" and "Capture the Flag", hiking and skiing. Unfortunately the age of reason has caught up with him, and he is looking for new 'age appropriate' hobbies (sadly, no more hockey) and welcomes your suggestions.



Steve Thompson Retires

Steve Thompson retired after 25 years of service with the State of Minnesota. Most recently, Steve had been the supervisor of the Hydrogeology and Groundwater Division at the DNR. Prior to that, Steve worked at the MPCA in various programs including Petroleum Remediation, Superfund, Watershed Pollutant Load Monitoring, and Ambient Groundwater Monitoring.

Steve's post-retirement life will include making hay, building a barn, making maple syrup, and finishing reconstruction of an immigrant log home.

Jan Falteisek Receives MGWA Outstanding Service Award

Jan Falteisek was honored at the MGWA Spring Conference with the MGWA Outstanding Service Award in recognition of her distinguished service to the citizens of Minnesota



and the science of ground water. She provided leadership to the State's County Geologic Atlas Program, building it into a resource for Minnesota that is the envy of other states.

Jan also served the Association for decades as newsletter editor and team member and a member of the MGWA Board of Directors.

Jeff Green Featured in Minnesota Conservation Volunteer Article

DNR Hydrologist and MGWA member Jeff Green is featured in an article in the March/April Minnesota Conservation Volunteer magazine. The feature is called "Mapping Subterranean Waters". <http://www.dnr.state.mn.us/mcvmagazine/issues/2016/mar-apr/springshed-mapping.html>.

MGWA Newsletter June 2016

MEMBER/MGWA NEWS

Laura Scheid to Lead Minneapolis Environment Office at WSP | Parsons Brinckerhoff

Laura Scheid will manage the Minneapolis environment office of WSP | Parsons Brinckerhoff, a global engineering and professional services firm, as general manager.

Ms. Scheid will direct the Minneapolis environment team, which provides services in such areas as environmental investigation, remediation, compliance and due-diligence.

Ms. Scheid has nearly 19 years of experience in geology, hydrogeology, environmental geology and geophysics. At WSP | Parsons Brinckerhoff, she had served as a senior technical manager on petroleum and chlorinated solvent investigations, developing cost effective, environmentally sound and risk-based remedial strategies, achieving regulatory closure and reducing client's environmental liabilities.

A certified professional geologist in Minnesota, Indiana, Kansas, Wisconsin and Wyoming, Ms. Scheid received an MS degree in geology from Wright State University and a BS in geology from the State University of New York College at Fredonia. She is a member of Minnesota Groundwater Association and the American Institute of Professional Geologists, serving on the Executive Committee for the local Minneapolis chapter.



Another Successful MGWA Spring Conference

By Sharon Kroening, MGWA Newsletter Team

Once again, the MGWA hosted an extremely successful spring conference! This year, the conference was held on April 20th, 2016, at the usual venue at the University of Minnesota's Continuing Education and Conference Center in St. Paul, Minnesota. The conference's theme of groundwater recharge and reuse attracted more than 300 participants, including over 40 students from St. Cloud State and Iowa State Universities.

Anita Anderson from MDH opened the conference with a very interesting talk on the rules and standards governing water reuse in Minnesota. Rules and codes can potentially be a very dull subject to begin a conference, but Ms. Anderson's command and presentation of the subject matter kept all of the participants extremely engaged! Next, Brian Davis from the Metropolitan Council and Wes Saunders-Pierce from the City of St. Paul described how rainwater is harvested from the new CHS Field in St. Paul and reused for turf irrigation and toilet flushing. The CHS Field is the home for the St. Paul Saints minor league baseball team. The conference participants were then treated to an entertaining presentation by Peter Cartwright, the National Ground Water Association's 2016 McEllhiney Lecturer. Mr. Cartwright holds a chemical engineering degree from the University of Minnesota and spoke about some of the advanced treatment processes for removing contaminants from

water, including microfiltration, ultrafiltration, nanofiltration, and reverse osmosis.

Many case studies on water reuse projects in Minnesota and other parts of the Nation were given during the afternoon sessions. Dr. W. Richard Laton, a hydrogeology professor from California State University-Fullerton, gave an animated talk on how Orange County, California, uses the infiltration of highly treated wastewater to stave off saltwater intrusion and provide drinking water to over two million people, while working with the constraints imposed by very costly real estate in a crowded urban environment. Dr. Laton also has ties to Minnesota, having received his Bachelor of Science degree from St. Cloud State University. Next, Mary Fralish, the Director of Public Utilities for the City of Mankato, described several water reuse projects that were undertaken in this city. She was followed by Christopher Larson, a project manager with SEH, who explained how aquifer storage and recovery, known by the acronym ASR, is being used to provide potable water to the communities of Albertville, Hanover, and St. Michael. Deborah Manning, an engineer with the Metropolitan Council, ended the conference by explaining how the agency is planning to reuse wastewater from several of its sites.

For those who missed the conference talks or want to view them again, links to the presentations are available at: www.mgwa.org/meetings/2016_spring/spring2016.php

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The primary objectives of the MGWA are:

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

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Lewis & Clark Water Supply, cont.

lars, subject to cost indexing) in the form of a Federal grant for planning and construction of the project. The states and local project sponsors provide the remaining funds necessary to complete construction of the project.

Lewis & Clark's Member Systems

Lewis and Clark's member systems include 15 municipalities and 5 rural water systems. Lewis & Clark's members include Sioux Falls, with over 170,000 people and rural communities of less than 1,000 people. The five rural water system members serve whole towns, industries and individual farms. Lewis & Clark's member systems will use this new source of water to replace or supplement existing sources of supply.

System Facilities Overview

The Lewis & Clark project uses a series of wells to tap into an aquifer adjacent to the Missouri River near Vermillion, South Dakota. Raw water is pumped through a Raw Water Pipeline to Lewis & Clark's Water Treatment Plant. Treated water is pumped from the plant into the treated water pipeline system which will eventually include 311.5 miles of pipeline ranging in size from 6" to 54" diameter to its members in a roughly 5,000 square mile area, which is equivalent to the size of Connecticut. The System also includes a series of pump stations and reservoirs. The capacity of the completed system will be approximately 45 million gallons per day (MGD). The system is

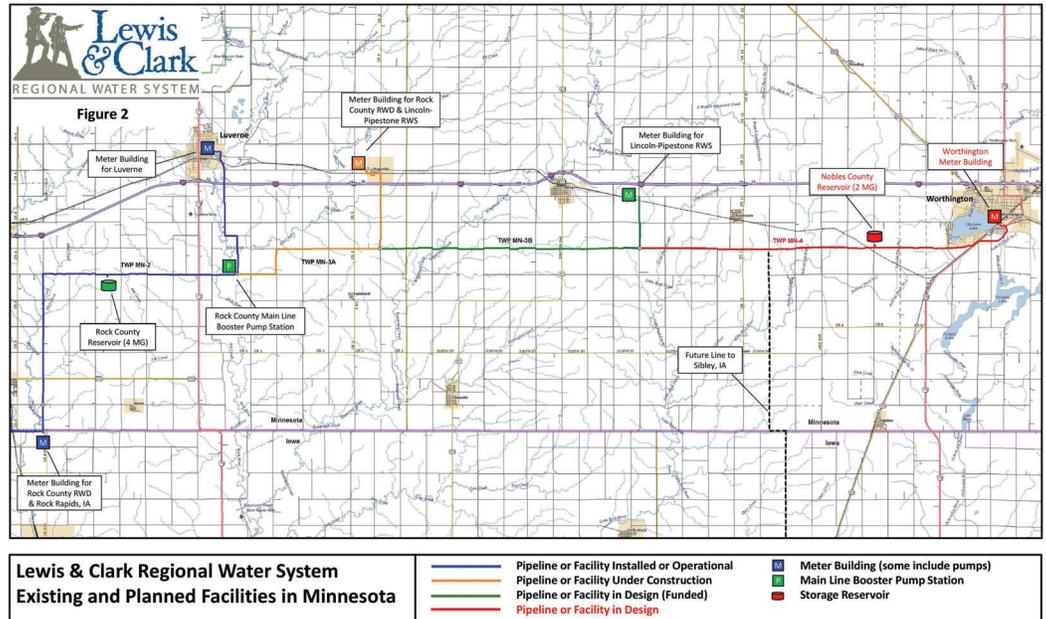
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Lewis & Clark's Member Systems			
South Dakota		Iowa	Minnesota
<i>Beresford</i>	<i>Sioux Falls</i>	Hull	<i>Luverne</i>
<i>Centerville</i>	<i>Tea</i>	Sheldon	Worthington
<i>Harrisburg</i>	<i>Lincoln County RWS</i>	Sibley	<i>Rock County RWD</i>
<i>Lennox</i>	<i>South Lincoln RWS</i>	Sioux Center	Lincoln – Pipestone RWS
Madison	<i>Minnehaha Comm. Water Corp.</i>	<i>Rock Rapids</i>	
<i>Parker</i>			

The systems shown above in italics are currently receiving water from Lewis & Clark.

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



President's Letter, cont.

ahead and mark your calendars for our Fall Conference which will be held on November 16 this year. I hope to see you there.

Another event to consider attending is any one of our MGWA sponsored social hours. We've been doing them for a little over a year now, and each one has generated nice attendance

and positive responses. They are designed to be a very informal meeting for an hour or two where groundwater professionals and students can have a bite to eat and chat about the industry and network. Look for an announcement for one this summer and think about meeting us after work.

I hope you all have a good summer.

Lewis & Clark Water Supply, cont.

designed to accommodate future expansions to develop up to 60 MGD. Figure 1 shows the approximate location of the well field, water treatment facilities and the routing of the pipelines.

Construction is on-going for the Lewis & Clark system. To date, 39 construction contracts have been awarded with a total value of \$322.9 million dollars. As of this writing, the following work has been completed or is underway:

- The well field currently includes 11 angle and vertical wells that tap into an aquifer adjacent to the Missouri River near the South Dakota/Nebraska state line. The bank of the Missouri River adjacent to the well field is highly erodible. A bank stabilization project utilized a unique and environmentally friendly “vegetated stone toe revetment.” This technique has never been used on a major river, like the Missouri. The steep river bank was sloped, rip rap was placed and covered with soil and planted with vegetation. The well field, with additional wells, should have a capacity of approximately 45 MGD with the highest yielding well out of production.



— Drilling one of the four 18” diameter angle wells next to the Missouri River near the South Dakota/Nebraska state line.

- A Raw Water Pipeline takes water from the well field through approximately 8 miles of various size pipes (mainly 54” diameter) to the Water Treatment Plant. As new wells are added, additional piping will be required to expand the Raw Water Pipeline network.



— Main 54” diameter trunk line construction (August 2008).

- A new Water Treatment Plant was constructed north of Vermillion. The plant was constructed under two contracts: 1) high service pump station, 3 million gallon clearwell, electrical service building and generators; and 2) the main treatment plant contract. The plant is a conventional treatment process (lime softening) with filtration. Additional construction and equipment will need to be added to increase plant capacity to 45 MGD. The plant was completed in July 2012 and began producing and delivering water to several member systems. Lewis & Clark produced and delivered 4.9 billion gallons of water for an average of 13.4 MGD in 2015. Usage during July of 2015 was 569 million gallons with an average of 18.35 MGD and a peak day of 21 MGD.
- To date, Lewis & Clark has constructed (or has under contract) a Treated Water Pipeline system consisting of approximately 165.9 miles of pipe ranging from 6” to 54” diameter. The transmission pipeline system also includes: 1) three water storage reservoirs in the Sioux Falls area that have a combined capacity of 18 million gallons; 2) the Tea Pump Station that boosts pressure along the main transmission lines going north and east of Sioux Falls; and 3) twenty-one service connections (some are under construction) to meter water into the member systems.

Lewis & Clark in Minnesota

Treated water is pumped from the water treatment plant into the main 54” diameter, 49.2 mile trunk line that delivers water into two 7.5 million gallon reservoirs located west of Tea, SD. A booster pump station is located at the Tea Reservoir site. The Tea Pump Station delivers water into two 36” diameter pipelines – one 36” pipeline is routed to the north to deliver water to the west side of Sioux Falls and other member systems. The other 36” pipeline extends eastward to deliver water to the south side of Sioux Falls and other member systems and into the 85th Street Tower. The 85th Street Tower is a 3 million gallon elevated water tower. Water flows through the 85th Street Tower to the pipeline that extends eastward into Iowa and Minnesota.

The pipeline extending east of the Tea Pump Station has been constructed through several construction contracts starting in 2007. The pipeline from the Tea Pump Station to the point where it enters Minnesota consists of 28.7 miles of pipe ranging in size from 24” to 36”. Construction in Minnesota started in 2014 with



— Tea Reservoirs (7.5 million gallons, each) and the Tea Pump Station (August 2012).

Lewis & Clark Water Supply, cont.



— Workers installing 24" diameter steel pipe in Minnesota on the Treated Water Pipeline Segment MN-2 project south of Luverne, MN (August 2015).



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Treated Water Pipeline Segment MN-2 (TWP MN-2) which was completed and placed into service in March 2016. The TWP MN-2 project included 12.7 miles of 24" steel pipe and 5.6 miles of 14" PVC pipe for the Luverne Service Line. See Figure 2.

Recently, L&C awarded TWP MN-3A and the Magnolia Service Line pipeline projects to Carstensen Contracting, Inc. of Pipestone. Carstensen was also the contractor for TWP MN-2. The length of the main TWP MN-3A pipeline is 6.4 miles of 24" diameter steel pipe. The Magnolia Service Line is 3.6 miles of 16" PVC pipe. Construction of TWP MN-3A recently started and is expected to be complete in the fall of 2016.

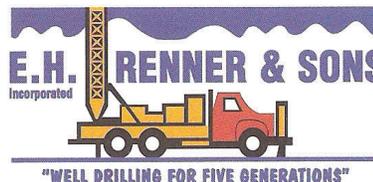
Lewis & Clark is also constructing two new meter buildings – one for Luverne and another meter building at Magnolia to serve both Rock County RWD and Lincoln-Pipestone RWS. The Luverne meter building was completed in January 2016 and is now in service. The Magnolia meter building will be completed in August 2016. The construction contractor for these buildings is R.L. Carr, Co. of Marshall, MN.

Lewis & Clark is poised to bid four other construction projects in 2016 and two others in 2017, depending on availability of funding:

- **TWP MN-3B.**
This pipeline segment is nearly through the agency review, easement acquisition and permitting processes. This project includes 10.1 miles of 24" pipe and 2 miles of 12" pipe. Completion is planned for November 2017.
- **Rock County Pump Station and Meter Buildings.**
This project will include construction of a main line booster pump station located south of Luverne and a meter building for Lincoln-Pipestone RWS east of Adrian.
- **Rock County Reservoir.**
This project includes a 4 million gallon ground storage reservoir located west of Luverne.

— continued on page 7

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Lewis & Clark Water Supply, cont.

- TWP MN-4.

This pipeline segment is in the easement acquisition and permitting processes. This project includes approximately 14.8 miles of pipe ranging in size from 16” to 24” diameter. Funding for this project is pending.

Lewis & Clark would still be a dream if it weren't for dedicated advocates and visionaries. Lewis & Clark has had strong support from leaders in all three states. The rapid construction progress Lewis & Clark and its members are enjoying in Minnesota is no exception. These efforts were spearheaded by Lewis & Clark's President, Red Arndt from Luverne and Director Scott Hain from Worthington. They have been helped tremendously by the leadership of Governor Mark Dayton, Senator Bill Weber and Representatives Joe Schomacker and Rod Hamilton. The State of Minnesota has provided “federal funding advances” of \$22 million in 2014 and \$19 million in 2015. Lewis & Clark officials are grateful for the past funding advances and optimistic that the final piece of the funding puzzle will fall into place during the 2016 legislative session.

Closing

The Lewis & Clark project is a model for future regional systems with regard to cooperation, funding and resource sharing. Lewis & Clark will increase both the quantity and quality of water for its member systems. Lewis & Clark creates several positive economic impacts and jobs, including those associated with construction and related indirect contributions to the regional economy and tax revenue for the state and municipalities. Other

economic benefits include expansion of existing industries and new development of new opportunities. Lewis & Clark's members can avoid or delay future upgrades or new construction in their water systems.

The Lewis & Clark Regional Water System truly is “A Vision for the Future.”



—Construction worker “holiday” testing the protective outer coating of a 54” diameter steel pipe (August 2006).

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Introducing the Minnesota Well Index

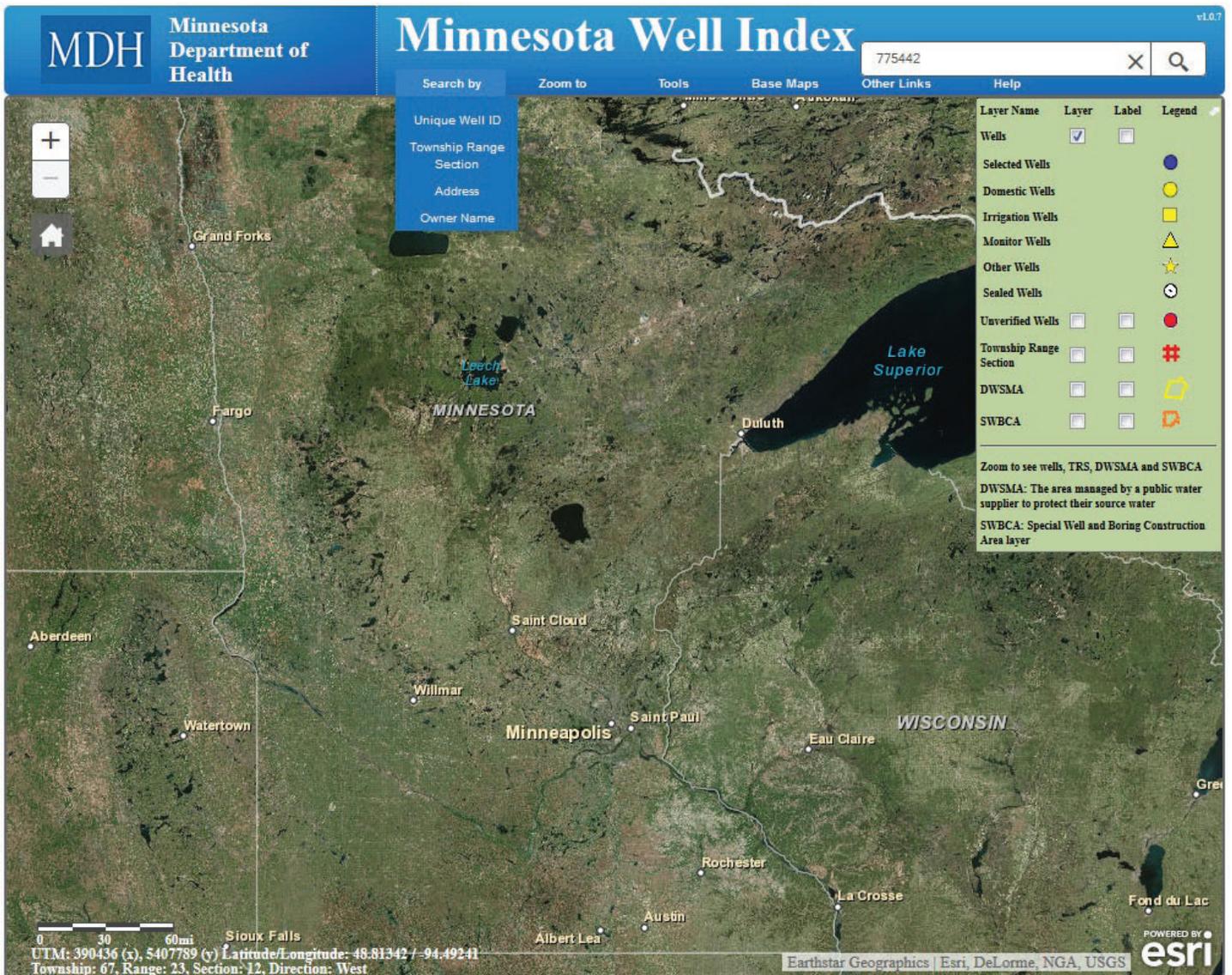
Reprinted with permission from the Minnesota Well Management News

The Minnesota Well Index (MWI) was launched by the Minnesota Department of Health (MDH) on November 4, 2015. It is a new and improved computer application that can be used to find well, geological, and hydrologic information within Minnesota. Users can obtain scanned copies of original well records; geologic stratigraphy; water sample results; and pump test data when available. MWI replaces the County Well Index (CWI) Online application, which has been an important resource to contractors, consultants, engineers, planners, real estate agents, the public, and others. MWI has updated and improved search features for finding well information. You can select a well on the map to get well information, or you can search for well records by address; township, range, and section; Minnesota Unique Well Number; or owner name. MWI has zoom and pan features on the map so that you can zoom in and out to any property in Minnesota!

Not all MWI information has been verified. Well owner name and address can change over time, and sometimes wells are modified or reconstructed and changes may not be reported and get updated in MWI. Some information may be incomplete or incorrect. When searching for well information, users are reminded to search by multiple identifiers. If you cannot find a well record searching the well owner's name, try searching by unique well number; address; or by township, range, and section numbers.

If you have any questions or comments about MWI, or need help searching for well information, please contact the Well Management Section at 651-201-4600 or health.minnesotawellindex@state.mn.us.

The image below is a screenshot of the new Minnesota Well Index (MWI) computer application, launched on November 4, 2015.



Contaminated groundwater concerns mount in Minnesota

By Risikat Adesaogun, MPCA, 651-757-2056

Groundwater contamination is a growing concern that should be on everyone's radar, according to scientists at the Minnesota Pollution Control Agency (MPCA). Three out of 4 Minnesotans get their drinking water from groundwater sources. However, unlike our lakes, rivers, and streams, groundwater is largely out of sight.

Up to 60% of groundwater monitoring wells sampled in central Minnesota are contaminated with nitrate well beyond the safe drinking water standard. Many small cities are spending millions to replace contaminated supplies. The Groundwater Protection Recommendations report calls for action. Nitrate enters groundwater from sources like animal manure and agricultural fertilizers. Some of the affected cities include Becker, Clear Lake, Cold Spring, Hastings, Goodhue, Adrian and Park Rapids. City officials in those areas have explored treatment options including distributing bottled water to residents, drilling new wells, and building new reverse-osmosis water treatment plants. Drinking water contaminated with nitrate can lead to illnesses such as Blue Baby Syndrome, a fatal blood disorder in infants.

The Groundwater Protection Recommendations report highlights the current state of Minnesota's groundwater and provides recommendations for ways to reduce and prevent groundwater contamination. Minnesota lawmakers requested the report during the 2013 legislative session.

"This report underscores the urgent need to ensure that all Minnesotans have clean water," said Governor Mark Dayton. "I look forward to discussing this report, and our state's serious water quality challenges at the Governor's Water Summit this weekend."

Some Minnesota cities have already experienced the cost burden of treating contaminated groundwater. A 2014 [Drinking Water report](#) from the Minnesota Department of Health (MDH) put cost estimates for treating contaminated drinking water in Minnesota in the billions of dollars. The estimated cost for cleaning up contaminated water in Hastings was a staggering 9 million dollars; estimated costs for Park Rapids were upwards of 11 million dollars.

"Groundwater is one of our most precious resources. This report is another warning indicator about our water quality challenges," said MPCA Commissioner John Linc Stine. "We know that prevention is key. It costs between 10 to 30 times more to fix contaminated groundwater than to prevent contamination in the first place."

Many harmful groundwater contaminants are caused by human activity. Those contaminants come from sources like urban runoff, road de-icing salt, antibiotics, pharmaceuticals, viruses, and agricultural practices.

One contaminant, chloride, enters Minnesota's groundwater from salt use during winter. While chloride is not believed to be very toxic to humans, high concentrations give drinking water a taste many people dislike. Additionally, contaminated groundwater can make its way to lakes and streams, harming fish and other aquatic life. Scientists recommend reducing the amount of road salt used during the winter months. Many local governments have already decreased their use of road salt, but more work needs to be done to reduce use on roads, parking lots, and sidewalks.

MGWA Newsletter June 2016

The report also includes information about naturally-occurring contaminants like arsenic, manganese and radium. Long term exposure to these can contribute to illnesses such as bladder, liver, and prostate cancer. Infants are also at risk; for example, infants relying on powdered formula mixed with drinking water containing high concentrations of manganese are at risk of developing neurological problems.

The MPCA partnered with other state agencies with groundwater responsibilities to provide 30 recommendations that will aid in protecting Minnesota's groundwater. One recommendation includes continuing to fund programs that support clean and safe groundwater, like MPCA's [Superfund Program](#). Another recommendation in the report calls for more research to better understand the impacts of contaminants on human health, especially for newer contaminants of concern like pharmaceuticals and antibiotics.

The Governor's Water Summit in St. Paul on Saturday, February 27th focused public attention on the serious challenges facing Minnesota's water supplies, including groundwater. The Groundwater Protection Recommendations report is available on MPCA's [Legislative Reports](#) webpage.

New Publications from the USGS Minnesota Water Science Center

The USGS Minnesota Water Science Center is pleased to announce three new publications. You may access these publications at the links provided below or by contacting the authors directly.

1. A new publication helps researchers better understand the flow of water and nutrients between two of the large, connected water bodies on the Minnesota-Canadian border. The publication by the U.S. Geological Survey and the National Park Service describes Kabetogama and Namakan Lakes in Voyageurs National Park.

Kabetogama Lake historically has had high nutrient concentrations, recurring algal blooms, and elevated levels of a known toxin, Microcystin, which can be harmful to humans, pets, and wildlife. Namakan Lake, however, is relatively pristine. The hydrology of the area is complex. Sometimes water flows from Kabetogama to Namakan Lake, while at other times flow is reversed. Therefore, this study used a modern acoustic Doppler velocity meter to account for wind, waves, and changing flow direction in combination with water analysis to determine flow direction and nutrient transport. Results indicate that Kabetogama Lake water flowed into Namakan Lake up to 70% of the time, which may have a negative effect on the more pristine lake. This study is considered essential to understanding changes in water flow, water quality, and ecological consequences of water-level management and the dams that regulate these waters.

Full citation: Christensen, Victoria G., Wakeman, E.S., and Maki, R.P., 2016, Discharge and Nutrient Transport between Lakes in a Hydrologically Complex Area of Voyageurs National Park, Minnesota, 2010-2012, *Journal of the American Water Resources Association (JAWRA)* 1-14.

<http://dx.doi.org/10.1111/1752-1688.12412>

Contact: Victoria Christensen, vglenn@usgs.gov

2. A new journal article on water chemistry from two groundwater plumes in north central Minnesota, with residual crude oil

— continued on page 10

Groundwater in the News

Des Moines Water Works Lawsuit

A link to the MPR story on the Des Moines Water Works suing rural Iowa drainage districts over farm runoff is available at: <http://www.mprnews.org/story/2016/05/18/water-iowa-farmers-city-pay-to-clean-des-moines-waterworks>

New Metro Water Supply Technical Advisory Committee

By Lanya Ross, Metropolitan Council

A new water supply technical advisory committee has been convened in the Twin Cities metropolitan area, and the Minnesota Ground Water Association is well represented.

The committee was established by Minnesota Statutes, Section 473.1565, Subdivision 2a. This new committee will provide scientific and engineering information to an existing policy committee, the Metropolitan Area Water Supply Advisory Committee (MAWSAC). MAWSAC, in turn, guides the Metropolitan Council's water supply planning efforts.

The technical advisory committee consists of 15 members appointed by MAWSAC. The majority of members represent single-city and multicity public water supply systems in the metropolitan area and include experts in water resources analysis and modeling; hydrology; and the engineering, planning, design, and construction of water systems or water systems finance.

Applications were solicited in January and February 2016, and 29 people applied. The following criteria were used to evaluate applications:

- ◆ Areas of expertise required by statute
- ◆ Diversity in backgrounds, experience
- ◆ Geographic distribution

The following people were appointed by MAWSAC on March 23, 2016 (MGWA members are highlighted in blue):

- ◆ Kristin Asher, City of Richfield
- ◆ Robert Cockriel, City of Bloomington
- ◆ John Dustman, Summit Envirosolutions
- ◆ Klayton Eckles, City of Woodbury
- ◆ **Dale Folen, City of Minneapolis, MGWA member**
- ◆ Jennifer Levitt, City of Cottage Grove
- ◆ Mark Maloney, City of Shoreview
- ◆ G. H. Crystal Ng, University of Minnesota
- ◆ Chris Petree, City of Lakeville
- ◆ Lih-in Rezanja, Minnesota Department of Health
- ◆ Lon Schemel, City of Shakopee
- ◆ **James Stark, U.S. Geological Survey, MGWA member**
- ◆ **Jamie Wallerstedt, Minnesota Pollution Control Agency, MGWA member**
- ◆ Bruce Westby, City of Ramsey
- ◆ **Ray Wuolo, Barr Engineering Company, MGWA Past President**

The committee will have its first meeting in July. For more information, contact Dave Brown, Metropolitan Council.

USGS Publications, cont.

sources, show that groundwater concentrations of residual crude oil metabolites exceed concentrations of diesel range organics, yet are largely unmonitored. The research was conducted at the National Crude Oil Spill Fate and Natural Attenuation Site near Bemidji, Minnesota. The USGS has been researching the movement and natural degradation processes associated with crude-oil spills at the Bemidji site since 1983.

More information on this paper and the Bemidji research site is available at: <https://www.usgs.gov/news/crude-oil-byproducts-groundwater-plumes>

Full citation: Bekins, B.A., Cozzarelli, I.M., Erickson, M.L., Steenson, R.A., and Thorn, K.A., 2016, Crude oil metabolites in groundwater at two spill sites: Groundwater, published online 24 March 2016: <http://dx.doi.org/10.1111/gwat.12419>

Contact: Mindy Erickson, merickso@usgs.gov

MGWA Foundation Scholarship Winners

Amanda Strommer - MDH

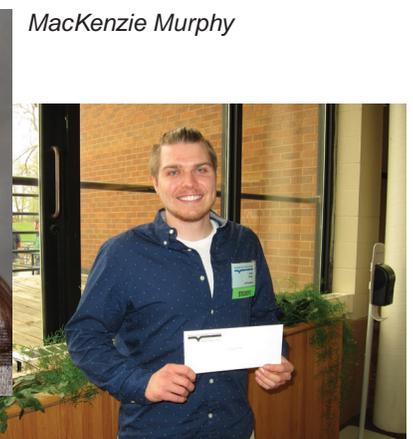
The fourth annual MGWAF scholarships were presented at the 2016 MGWA Conference. One \$1,000 graduate scholarship and one \$1,000 undergraduate scholarship were awarded. There were five candidates for the graduate scholarship and eight candidates for the undergraduate scholarship this year. Candidates were excellent and it was a difficult decision for the committee of Cathy Villas-Horns, Jim Lundy, Joy Loughry, Stephanie Souter, and Amanda Strommer.

On behalf of the MGWA Foundation, Amanda Strommer presented the graduate student scholarship to Josh Olson at the conference. Josh is pursuing a double Master of Science degree in Hydrogeology and Water Resources Management at the University of Wisconsin Madison. He will graduate in Spring 2017. His Bachelor of Science degree is from University of Wisconsin Eau Claire in Geology, Hydrogeology, and Water Chemistry. Josh was a geohydrology research assistant with the Kansas Geological Survey and as an assessment and remediation intern at Barr Engineering. His fieldwork took him across much of Minnesota and Wisconsin. His master's thesis is examining the long-term alterations on groundwater flow in Dane County, Wisconsin caused by municipal pumping. His work focuses on modeling the interaction between the shallow and deep groundwater sources. He is also involved with a kettle pond management project. Josh thanked the membership for the scholarship and spoke to his interests in groundwater.

— continued on page 11



Josh Olson



MacKenzie Murphy

Field Photo Tip

By Ruth MacDonald

Field season is upon us and we need to take photos. Do you have photos where items in the background seem to disappear? Or where the foreground seems exaggeratedly large?

Try stepping back and zooming in.

- ◆ The zoom compresses the space, things become more similar in size, and items appear closer together. The farther you back up and zoom, the more pronounced the effect.
- ◆ Sometimes this introduces camera shake (blur) because of



Figure 1A. Wide angle.



Figure 1B. The zoom brings up the car to the pump.



Figure 2A. Wide angle minimizes the center pivot irrigation system in the distance.



Figure 2B. The zoom brings the center pivot system more clearly into the picture, without degrading the view of the drain tile pumpout in the foreground.

MGWAF Scholarships, cont.

MacKenzie Murphy was chosen for the undergraduate scholarship. She is currently a student at Minnesota State University – Mankato pursuing a Bachelor of Science degree in Earth Science, with a Geology emphasis, and expects to complete her degree in December 2016. She is working on a Geographic

MGWA Newsletter June 2016

- ◆ the longer lens. Try a faster shutter speed or “sport” setting.
- ◆ If you don’t have a zoom on your camera, you can back up with your normal setting and crop it later. Just ensure you have enough resolution for this.

See Figure 1A-2B. Take note of the items in the background and differences in size.

“A” was taken on the normal setting (usually wide angle).

“B” was taken by backing away and zooming in (telephoto).

One more thing. Ever wonder why hand-held selfies aren’t flattering? Same as above: a wide angle lens, up close to your nose. Big nose, little ears. If you want something flattering, get a stick.

Information Science Certificate to compliment her degree. MacKenzie is an intern at Cedar Corporation where she collects water and soil samples from installing monitoring wells and monitoring pollution from abandoned gas stations. She is interested in studying the movement and location of aquifers. In her current hydrogeology class, her professor states that others in the class seek her counsel. As he puts it she is “our Oracle of K”.

MGWAF BOARD MINUTES

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deductible on your state
and federal income tax
returns.**

MGWA Foundation Minutes

March 18, 2016

Members Present: Scott Alexander, Cathy von Euw, Eric Mohring, Stu Grubb, Lanya Ross, Stephanie Souter, and Amanda Strommer (via conference call)
MGWA Management Present: Sean Hunt and Jennie Leete

Current Business: December 18, 2015 Meeting Minutes.

Eric made a motion to approve and Cathy seconded. All in favor; motion carries. Minutes sent to newsletter.

Welcome new board members: Lanya Ross, MGWA Board Liaison! Eric officially approved by MGWA board in January to be director on foundation board!

Review current years finances: Total for the MGWAF fund is \$147,142.96 as of 3/15/16. Total for the HOP fund is \$29,712.47. Credits since last meeting included the donations from Give to the Max, other donations, Amazon smile, and \$15,000 donation to the endowment from the MGWA. No debits this quarter. HOP also continues to receive credits from donations.

Discuss investment possibilities: Subcommittee meeting was held in January about account finances. Step up CD will expire in August. After meeting with two representatives the subcommittee had a recommendation for using the Wells Fargo representative as MGWAF financial advisor. Eric made a motion that the board select Wells Fargo as financial advisor to MGWAF, seconded by Lanya; all in favor; motion carries. Meetings will be set up with advisor. Special thanks goes to Stu for coordinating and setting everything up! Special thanks to the MGWA board for the \$15,000 donation to the foundation!

Scholarship committee: Amanda gave update from scholarship committee. The 2016 MGWA scholarship consists of one \$1,000 graduate scholarship and one \$1,000 undergraduate scholarship. There were five candidates for the graduate scholarship and eight candidates for the undergraduate scholarship. There were a number of very excellent candidates and just like every year it was a difficult decision. The scholarship committee consists of Cathy Villas-Horns, Jim Lundy, Joy Loughry, Stephanie Souter, and Amanda Strommer. This is the fourth year that the scholarships have been awarded and this year's recommended recipients are Josh Olson and MacKenzie Murphy. Approval was done via email and winners have been contacted. Scholarship checks will be given at the April 20th conference.

No new grant applications.

Discussion of board positions - potential new candidates: Amanda will be phasing off the board by the end of the year. Stephanie Souter has interest in joining the MGWAF board and could replace Amanda.

Eric made a motion to request that MGWA board appoint Stephanie Souter to MGWAF board, Amanda seconded; all in favor; motion carries. Amanda will continue on as secretary to year end and then the board can establish that replacement.

Vendors committee to promote vendors at conferences. Spring conference is April 20th. Cathy will start sending out emails to vendors for the conference. She will have assistance from Eric, Lanya, and a co-worker at Stantec.

Discussion: How do we grow the Pfannkuch fund and set up scholarships.

Offering a field camp scholarship.

Scott met once with committee. Students are starting to sign up for the camp.

Next Meeting The next meeting will be Thursday, June 16, 2016 at 11:30 AM.

MGWA BOARD MINUTES

Minnesota Ground Water Association Board Meeting Minutes

Meeting Date: Tuesday, March 1, 2016

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

Attendance: Ole Olmanson, President; Evan Christianson, President-Elect; Emily Berquist, Treasurer; Andrew Retzler, Secretary; Sean Hunt, WRI; Jeanette Leete, WRI

Past Minutes: Approved with changes.

Newsletter: Ronning released the March issue. Hunt reported that a mock-up draft for review and finalization should take about two weeks. Hunt will consider sending out a note to current and former advertisers regarding any changes they may request to advertising space in the newsletter.

Treasury: Berquist discussed the Treasury report with the Board. Total of January 1, 2016 – February 29, 2016 is \$16,060.47; total assets as of February 29, 2016 are \$116,340.95. Net income for the period of January 1, 2016 – February 29, 2016 is \$-3,886.06. The Board needs to verify that the transfer of the 2014 savings carryover of \$15,000 to MGWAF endowment has been completed, and that it is currently reflected in the treasury report.

Web Page: Hunt will advertise the upcoming 79th Annual MN Academy of Science State Science & Engineering Fair in April, and send notices out to membership about the opportunity to participate as a judge. Membership rates were updated.

WRI Report: Hunt discussed the current membership report with the Board. Requests for membership renewal dues were sent out to membership last week. The Board discussed the current state of the membership database and the process by which member information is updated. Hunt attributed this year's low membership renewal numbers to a slower start in notifying membership, and possibly due to an increase in membership dues. Hunt anticipates an increase in membership around the formal announcement of the Spring Conference and registration.

MGWAF: The scholarship deadline has passed. Hunt reported that twelve applications were received and are currently being reviewed. Scholarship awardees are expected to be chosen within March, and formally recognized at the upcoming Spring Conference.

Old Business: Spring Conference. Olmanson presented a draft conference schedule. One more speaker is needed. The Board discussed options for filling this slot and the order in which talks are arranged on the draft schedule. Olmanson plans to have a finalized conference title and short summary prepared shortly for use in an MGWA brochure and for the website. Christianson suggested highlighting the MGWA 2016 McEllhiney Lecturer Peter Cartwright on the Spring Conference advertisements. The Board discussed exhibitors for the upcoming conference. Leete informed the Board that Waste Management will be an exhibitor again. Hunt suggested contacting past conference exhibitors to garner interest. The Board discussed soliciting corporations whose work aligns with the conference topic of wastewater re-use as possible exhibitors. Retzler proposed asking conference speakers for exhibitor suggestions. Olmanson will consider asking the Shakopee Mdewakanton Sioux Community to be a corporate sponsor. The Board discussed corporate sponsorship logistics and examples of corporate sponsorship for past conferences. Leete suggested the Shakopee Mdewakanton Sioux Community have an outreach/educational-focused booth, and to consider having two exhibitor levels, commercial and outreach/educational, at future conferences. The Board will revisit further details about conference sponsorships, exhibitors, and booths in the summer to begin preparations for future conferences. Hunt requested bios and presentation abstracts for the list of upcoming speakers for use on the website and brochures. Hunt plans to send more details out to membership about student poster presentations. Berquist notified the Board that several students have already shown interest in presenting at the conference, but are unsure how to register and submit poster abstracts. Hunt and Olmanson will work on finalizing Spring Conference details and advertisements as soon as possible to allow students to start submitting poster abstracts and to get their topics approved.

Social Hour. The Social Hour is Wednesday, March 2 at Groveland Tap. Retzler advertised the event to students at the University of Minnesota, St. Thomas, and Macalester. Hunt will send out a final reminder of the event to membership.

Website. Olmanson created a nearly complete mock-up of the current MGWA website using WordPress, and has updated the logo to include an origination date. Hunt proposed following through with WordPress as the official content management system for the updated website. Hunt suggested delaying the website transfer and update until after the Spring Conference. Olmanson asked about current hosting and domain costs, which Hunt reported as ~\$100-120 for hosting and ~\$14 for domain registration. Olmanson recommends completing as much of the WordPress website offline before bringing the site fully online.

New Business: Governor's Summit. Olmanson discussed the Governor's Water Summit that he attended on Saturday, February 27 to the Board. Several different topics and subtopics related to both surface water and ground water were discussed. Olmanson said that the meeting was well-attended, and that comments and discussion from the meeting will be compiled in a report for the governor.

MGWA 2016 Membership Dues

Sustaining Member	\$65
Professional Member:	\$45
Retired Member	\$25
Full-time Student Member	\$20
Newsletter (printed and mailed)	\$20

Membership dues rates were revised at the July 1, 2015 meeting of the MGWA Board.

MGWA BOARD MINUTES

MGWA Board Meeting Minutes, cont.

Meeting Date: Tuesday, April 5, 2016

Location:	Fresh Grounds Café, 1362 West 7th Street, St. Paul, MN
Attendance:	Ole Olmanson, President; Evan Christianson, President-Elect; Lanya Ross, Past-President; Emily Berquist, Treasurer; Andrew Retzler, Secretary; Sean Hunt, WRI; Jeanette Leete, WRI; Kelton Barr, MGWA White Paper; Andrew Streitz (conference call), MGWA White Paper
Past Minutes:	Approved.
Newsletter:	March newsletter released. No further updates to report.
Treasury:	Berquist discussed the treasury report with the Board. The total income from the period of January 1, 2016 – April 3, 2016 is \$37309.80; total assets from January 1, 2016 – April 3, 2016 are \$129,029.51. Net income from January 1, 2016 – April 3, 2016 is \$316.19. Berquist reports there are more expenses due to the upcoming Spring Conference.
Web Page:	Hunt sent notification out to membership regarding the UMN Seminar Series. Conference details have been added to the web page. Newsletter files have been updated, and the password change for access was sent out. Hunt reports a steady increase in member registration.
WRI Report:	Leete reports 133 registrants for the conference. Hunt updated the Board on current membership totals. Current student/retired members for 2016 – 40; professional members – 354; sustaining members – 28. No corporate membership requests yet.
MGWAF:	Ross updated the Board on her first meeting with the MGWAF. Ross motions for the approval to appoint Stephanie Souter to the MGWAF Board as a fill-in for Amanda Strommer, with some overlap – motion carries. Ross says two scholarships were approved. Olmanson says the scholarship awardees will be recognized at the conference. Ross reports that the Field Scholarship awardee search is ongoing. Hunt discussed the details of the Field Scholarship with the Board. The Board discussed trying to push the Field Scholarship award for next year. The next MGWAF meeting is in June. Hunt reports three exhibitors currently signed up for the conference.
Old Business:	<u>Social Hour</u> . Board discussed last Social Hour and feedback. Berquist and Retzler will try and have another Social Hour planned in May within a week to be announced at the conference. Tentatively scheduled for the first week in May. <u>White Paper</u> . Barr thanked the Board for approving White Paper topic. Details of the topic were discussed, focusing on the careful steps needed to maintain an impartial viewpoint towards a possibly contentious subject matter. Barr says the White Paper Group is preparing a scoping document that will help guide them, and Streitz assures the Board that strong guidelines will be followed. The White Paper Group plans on identifying both sides of the contentious topic, and address these in a responsible manner. Barr reports a short presentation on the topic and a call for volunteers will be made at the conference. The deadline for volunteers and draft of scoping document is tentatively set at the end of May. Christianson asks that the White Paper Group make clear their terminology and definitions in the final paper to avoid confusion. Barr updated the Board on the current White Paper topic, gaps in groundwater education in Minnesota. The group has been split into 3 focus areas: K-12, post-secondary, and statewide focus. Each focus area has met separately for discussion, and each will be writing reports. Barr reports that Jeff Stoner expects to have a draft done by August, with the goal of presenting the finalized report at the Fall Conference. Hunt says Jeff Stoner is planning more surveys targeted toward employers for the paper. Ross mentioned she shared previous survey data to the Surface and Groundwater Hydrology class at Macalester College with good results. Barr reports there will be a White Paper committee meeting with Star Tribune reporter Tom Meersman in attendance to get his opinion on the impact of previous White Papers. <u>Spring Conference</u> . Barr mentions the White Paper presentation will be both current and future topics. Olmanson has Pall of the bios and abstracts prepared for the speakers. Hunt reports pre-registration discount deadline is coming up, and that 492 conference brochures were mailed out. Hunt will send out reminder to membership. Hunt will begin compiling all of the necessary documents for the conference (speaker bios and abstracts, agenda, poster abstracts, registration invoice, feedback forms, etc.). The Board plans to coordinate with the facility and catered food options once the final numbers are in. Three exhibitors currently plan to attend, with others showing interest. Olmanson says several St. Cloud students plan to attend and present posters. The Board discussed the student fund policy and logistics in preparation for the conference. Christianson volunteers to help facilitate poster presenters. Olmanson presented an updated conference agenda, and discussed gift ideas and awards planned to be given. The Board discussed logistics for the student-mentor lunch at the conference. The Board agrees to send out notification for student-mentor volunteers. Ross recommends notifying speakers about post-conference dinner ahead of time to avoid confusion.
New Business	<u>Conference Document Assembly</u> . Will be the night before the conference.

The MGWA Board meets once a month, currently over lunch, on the first Wednesday at Fresh Grounds on 7th in St. Paul.

Members are welcome to attend and observe

Save These Dates

2016 and 2017 MGWA Conferences

11/16/2016

4/26/2017

11/15/2017

MGWA BOARD MINUTES

MGWA Board Meeting Minutes, cont.

Meeting Date: Tuesday, May 3, 2016

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

Attendance: Ole Olmanson, President; Evan Christianson, President-Elect; Lanya Ross, Past-President; Emily Berquist, Treasurer; Andrew Retzler, Secretary; Sean Hunt, WRI; Tedd Ronning, Newsletter Editor; Mark Collins, MGWA White Paper

Past Minutes: Approved with changes.

Treasury: Berquist discussed the treasury report with the Board. The income for the period of January 1, 2016 - May 3, 2016 is \$62,786.97; assets are \$153, 283.59. Net profit from the same period is \$14,461.87. The net income spike is due to the Spring Conference. Hunt noted that current policy is to donate profits from the previous year to MGWAF after a profitable Spring Conference.

Newsletter: Deadline for newsletter submittal this Friday. No further updates to report.

Web Page: Hunt is working on the content page for the 2016 Spring Conference (i.e., speaker bios, abstracts, presentation slides, exhibitor details, etc.). Olmanson is re-creating the MGWA web page on a WordPress content management system (CMS), because current CMS will be phased out. Olmanson start transferring content from the old system to the new, by identifying pages with static content that can be easily moved. Olmanson recommends that all MGWA Presidents obtain consent from conference speakers to publish their presentation content online.

WRI Report: Hunt reported that membership numbers increased due to Spring Conference. Membership is low compared to last year. Hunt reminded the Board that some memberships are tied to corporate memberships yet to be finalized. Hunt reports that there were a total of eight exhibitors at the Spring Conference. Leete is managing an accounting dilemma involving separating Beck Scholarship expenses from MGWA 2015 Fall Conference/14th Sinkhole Conference expenses. NCKRI wants Scholarship expenses to be covered by the conference. That causes a small reduction in profit to MGWA. Hunt asked the Board for recommendations on how to proceed. The Board agreed that Leete should provide those managing the scholarship a more detailed accounting report to address the issue.

**MGWAF Report
Old Business:** MGWAF scholarships were distributed to awardees at the Spring Conference. Spring Conference. The Board reviewed and discussed survey results from attendees at the Spring Conference. Some conference speakers have yet to submit reimbursement requests. Olmanson will follow-up. Hunt informed the Board that a final bill from the venue is expected. The Board discussed the idea of sharing a list of conference attendees with the exhibitors. Hunt reports that he is compiling the post-conference web page, and will also include student posters/abstracts. White Paper. Collins and the Board reviewed and discussed the scoping document for the upcoming White Paper topic on drain tiling and its' role in the surface water and groundwater system. The Board raised concerns about the section describing costs and benefits of tiling, and reiterated that the White Paper Group needs to remain impartial on the subject. The Board suggested minor revisions to the wording of the scoping document to focus on the facts while avoiding taking a position. Ross suggested distributing a survey on the subject matter to ensure all perspectives are taken into account that may not be represented in the White Paper Workgroup. Collins stated that the call for workgroup volunteers will start by the end of May, selection of volunteers will be made by June, and that the workgroup will begin by July. Christianson suggested identifying MGWA members with experience in the agricultural industry and inviting them to join the workgroup. Collins and the White Paper Committee will send a revised version of the scoping document out to the Board in the following week to review and approve. The Board discussed the state of the current White Paper topic on groundwater education in Minnesota. Hunt reported that Jeff Stoner's latest survey on the topic was sent out to membership, and that Bruce Olsen is planning a survey to determine the skillsets groundwater professionals desire when hiring. The Board will mail out certificates of appreciation to those who participated in the Manganese White Paper and who were not present at the conference.

New Business: Board Meeting Time. This month's Board meeting unintentionally conflicted with the regular AIPG meeting. The Board will tentatively meet the second Tuesday of every month, with our next meeting on Tuesday, June 14, 11:30am-1:00pm at Fresh Grounds Café. Meeting times will be discussed further at the next meeting.

Social Hour. The Board discussed plans for the next Social Hour, with the idea of it taking place in June or July. A finalized location and time TBD.

MGWA Sponsored Speaker Series. Olmanson's idea about having a sponsored speaker series in which designated speakers representing the MGWA make circuits around nearby colleges and universities to present research and promote the organization--possibly stressing White Paper topics. Christianson making certain the talks are open to the public, as well. Ross recommended having the Water Bar & Public Studio in Minneapolis be a venue for presentations to the public. The Board noted that any White Paper volunteers designated as public representatives should be made aware that this may involve presentations as part of this speaker series.

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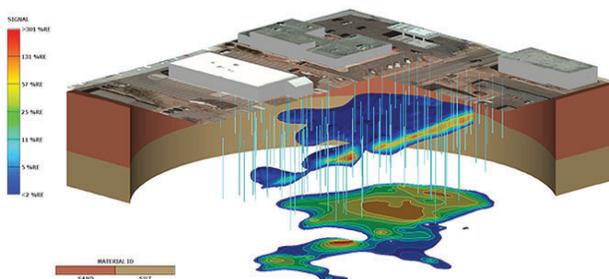
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