

# Minnesota Ground Water Association

www.mgwa.org

## Newsletter

December 2018  
Volume 37, Number 4

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- ◆ MGS Borehole Geophysical Database, page 9
- ◆ Annular Space Test at McCarthy Beach State Park, page 10



MGWA President  
Ellen Considine

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### President's Letter

Ellen J. Considine, P.G., DNR

All of a sudden it is November, and my year as president has flown by. I am indebted to the rest of the MGWA board and our dedicated management team (Jennie Leete and Sean Hunt) for helping me navigate this role.

During 2018 MGWA maintained its finances as in previous years. The conferences were able to net enough income that we will once again contribute to the MGWA Foundation account. The Foundation uses the interest revenue from that account to award academic scholarships and field camp scholarships every year, as well as making awards for groundwater education such as children's water festivals.

If you would like to contribute to the Foundation, you can make a cash donation at <https://givemn.org/project/MGWAF>.

You can also contribute by shopping at Amazon Smile <https://smile.amazon.com/ch/91-2033113> and selecting the MGWA Foundation as the recipient charity. Amazon will then contribute

0.5 percent of most purchases to the MGWA Foundation. Finally, you can contribute your time; the Foundation is volunteer-run. Nominations for the Foundation Board are accepted every fall and are reviewed by the MGWA Board every winter.

Looking ahead, watch for a change in the MGWA newsletter format during late 2019 and early 2020. The newsletter will migrate from the four-issue per year, PDF-format to which you are accustomed, toward periodic email updates archived in the style of a blog. The newsletter team is excited to roll out this change, which will make newsletter content more easily available to everyone and should streamline preparation of the newsletter.

In 2019 I very much look forward to Kate Pound taking the role of president. Kate's enthusiasm and devotion to the organization, coupled with her championing of students, has brought new vibrancy to the MGWA board meetings, and I am confident her passion will translate into great conference experiences for all of us!

### Students Learn Skills in the Field

by Sophia Vaughan, MPCA

The MPCA's Ambient Groundwater Monitoring Program monitors a network of wells across the state to determine the condition of the state's groundwater quality. As of 2018, the Ambient Groundwater Monitoring Network is comprised of approximately 270 sites that represent a mix of deep domestic wells and shallow monitoring wells in non-agricultural regions across the state, predominantly located in sand and gravel and Prairie du Chien-Jordan aquifers. These wells are sampled on an annual basis for a comprehensive suite of over 100 chemicals that include nutrients, metals, anions and cations, and volatile organic compounds (VOCs).

In addition to this suite of chemicals, 40 wells are sampled each year for contaminants of emerging concern (CECs) and 20 wells for pesticides (in collaboration with the MDA). Other sampling, not necessarily on an annual basis, has been done for per- and polyfluoro-alkyl

substances (PFAS) and age dating groundwater recharge. Many of the network's sites are located in three different urban settings and act as an early warning network because they are in aquifers that are vulnerable to pollution. The assessed land use settings include:

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Figure 1. Remediation student workers participating in groundwater sampling. From left to right: Lauren Strug, Michele Pannier, Matthias Wolf, and James Butler.

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Visit [www.mgwa.org](http://www.mgwa.org) for MGWA information between newsletters and to conduct membership and conference transactions.

## Newsletter Deadlines

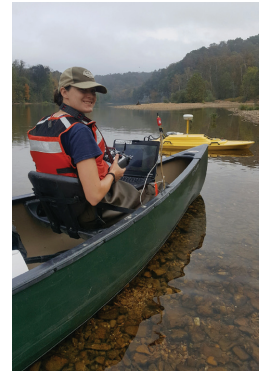
Issue	Due to Editor
March '19	02/02/2019
June '19	05/03/2019
September '19	08/02/2019
New Format in December 2019, Ongoing Call for Submissions.	

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## MGWA MEMBER NEWS

### Hannah Wilson - MDH

Hannah Wilson recently started a position as a hydrologist in the Source Water Protection unit of the MDH. She is currently working on data management and mapping related to wellhead protection plans. Hannah previously worked as a hydrologic technician at the USGS Columbia Environmental Research Center in Columbia, Missouri, as part of a team that conducted research projects in surface-water hydrology and sediment transport to support river habitat remediation efforts. She grew up in Durham, North Carolina, but moved to Minnesota to attend Macalester College, where she completed her BA (geology) in 2016. Hannah is happy to be back in the Twin Cities and enjoys baking, exploring Minneapolis by bike, and winning last place at trivia.



### Jim Lundy is Retiring

After more than 30 years of state government service, I will retire from the MDH on January 8, 2019. Thanks to all my colleagues! It's been a gratifying career of improving Minnesota's health and environment by using our knowledge of how the earth works.



In Precambrian time I earned a master's degree in structural geology from the University of Minnesota, then pivoted to the MPCA (Site Assessment, Tanks and Spills, Superfund, Policy and Planning, and Feedlots). To test which side of the septic tank grows greener grass, I transferred to MDH in 2004 to construct nitrate predictive maps, map the statewide distribution of radium and other trace metals, and assist a regional ambient groundwater quality study in southeastern Minnesota. Along the way I worked briefly in environmental consulting (Superfund) and gold exploration in northern Minnesota.

Each working day since 1986, I've been amazed to work in a field so close to my interests and geological training, and with such interesting and talented people. But my wife Sherryl, who retired from MPCA last year, and I have many adventures planned, beginning with New Zealand next spring. We'll also visit our grown kids Sean (Washington DC) and Rose (Washington State), and make frequent junkets to the north woods. I'll do plenty of writing and volunteering. I'm sure to continue my MGWA membership, and perhaps even attend conferences—at retiree registration rates.

### Sandeep Burman Moves to MDH

Sandeep Burman has accepted the Drinking Water Protection Manager position at MDH. His last day at MPCA was on November 13th. Sandeep has over 20 years experience at the MPCA in roles of increasing responsibility and leadership and has been a strong leader of the Site Remediation and Redevelopment Section for the past five years. Through his leadership, he has established strong, positive work teams that are able to deal with emerging issues and multiple priorities.



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## Students in the Field, cont.

1) sewer residential, 2) residential areas that use subsurface sewage treatment systems (SSTS) for wastewater disposal, and 3) commercial or industrial, and 4) undeveloped. Data collected from the wells in the undeveloped areas provide a baseline to assess the extent of any pollution from all other land use settings.

My introduction to this program occurred in a nondescript office at the MPCA, interviewing for the position of student worker in the Ambient Groundwater Monitoring Program. I was read a quick summary of the program, which went in one ear and out the next, overwhelming me with information despite all efforts to focus. I was nervous, trying hard to get my foot in the door at a state agency, an opportunity that would finally put something other than service industry jobs in the “Work Experience” portion of my resume and give me a fighting chance in a field with few job openings and fierce competition.

Despite my nervousness, I was able to land that student worker position and soon became enamored with field work and representing the Agency. It was incredibly fulfilling to feel part of an organization devoted “to protect and improve the environment and human health”, and to contribute to that mission. And I even got a badge with my picture and name on it! I may spend a surprising amount of time warding off swarms of mosquitoes, wood ticks, and fire ants while dodging groves of poison ivy, but I am doing my part to provide samples that increase our knowledge of the condition of groundwater quality. I am able to learn about groundwater, travel all over the state, and I love every minute of it.

Thankfully I was fortunate enough to be able to continue to do this work as a student worker with the MPCA for a few years and eventually was hired as a groundwater hydrologist. Over the years I have been privileged to be part of the field work, data analysis and report writing, as well as aid in the hiring and training of other student workers in our program. It has been very satisfying to meet and work with these eager students and then release them into the wild world of job searching, many of whom are now working full time in state government positions, including the MDH, DNR, Minnesota Department of Transportation, and of course the MPCA.

This summer I was honored when approached by MPCA GIS specialist Anne Morris requesting that I take her four student workers on a field work trip, so that they could experience groundwater sampling procedures. These four student workers: Lauren Strug, James Butler, Matthias Wolf, and Michele Pannier, had been working tirelessly to load thousands of well locations and analytical data into our Environ-

mental Quality Information System database. Their positions were part of a very large three-year LCCMR Groundwater Contamination project in the Remediation Division at the MPCA (<https://www.pca.state.mn.us/groundwater-contamination-mapping-project>).

*Our sampling and data analysis efforts help inform other state agencies, local government units and the general public of trends found in groundwater quality. To mention a few: the CEC sampling informed MDH on which chemicals should be evaluated as part of their CEC program. Any detections that we identify promulgates human health guidance as health risk limits rather than remain as health based values. The chloride monitoring has informed and helped drive the efforts to reduce road salt usage, especially in the Twin Cities Metro Area. Information collected on sulfate concentrations in groundwater throughout the state has been used to evaluate the current standards that are in place for wild rice protection. The basic major ion water chemistry that we have measured is currently being used in a revision of the state's old irrigation water standards, and this groundwater quality information is summarized by watershed for reports such as the Watershed Monitoring and Assessment Reports and the Groundwater Restoration and Protection Strategies (GRAPS) Reports.*

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Figure 2. Matthias Wolf fills a 1 liter amber glass bottle from a monitoring well using a submersible pump for the pesticide sampling done in collaboration with MDA.

## 2018 MGWA Board

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## MGWA Primary Objectives

- ◆ 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.
- ◆ Disseminate groundwater information.

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## MGWA NEWS

### Education Committee

by Cathy Undem

After an absence of many years, the Education Committee is back and working hard on groundwater issues. The committee will provide regular updates on their activities in future newsletters. In the meantime, if the mission of this group appeals to you, contact one of the following members: Cathy Undem, Jeff Stoner, Bruce Olsen, Kate Pound, Bryce Hoppie, Jared Trost, Erin Borgschatz, and Rachel Biese. Monthly meetings are scheduled for the

2nd Thursday of the month at 5:15 PM.

The Education Committee is currently working on an action plan for education initiatives for 2019 and beyond. Information will be posted on the MGWA Education website as it is available. All MGWA members are welcome and encouraged to submit ideas, comments and recommendations for education opportunities and initiatives to any member of the education committee. All MGWA members are invited to attend a monthly meeting if they are interested or have an idea to present.

### Another Successful MGWA Conference

By Sherri Kroening and Andrew Streitz,  
MGWA Newsletter Team

In what is becoming a wonderful routine, the MGWA Fall conference was again very well attended and provided many stimulating presentations! This year, the conference was held on Thursday, November 15, 2018, at the usual venue at the University of Minnesota's Continuing Education and Conference Center in St. Paul, Minnesota. The conference's theme was, "Successes, Near-misses, and Failures—Regional Groundwater Planning".

The opening presentation was an interesting talk from MGWA member Lanya Ross on the Metropolitan Council's water-supply planning efforts. She started by suggesting that some of the Council's best data doesn't appear to have much to do with water at first look, but can be of surprising use. For instance, the projected changes to demographics in the Twin Cities includes shifts in ethnicity, age, and population, and all will affect how the Metro uses water. One of the more interesting displays was of the growing ratio of summer to non-summer use. As cities in the area have grown and developed, the old ratio of 1:1 has shifted to 3:1 or greater, putting new pressures on water supply systems. She then described local concerns by city engineers about the scenarios used in the groundwater flow models the Council uses for their water supply plans. This ultimately resulted in a successful collaboration with them and a better-supported regional water-supply plan.

Sharon Day, an Ojibwe speaker from the Indigenous Peoples Task Force, reminded us that not everyone views water with a scientist's lens. Sharon currently serves on the state's Clean Water Council and has led nineteen Water Walks throughout the country. She encouraged the membership not to view water as a commodity but as the force that gives us life. The Water Walks that she leads help recreate our relationship with water. For each walk,

water is gathered from the river's headwaters, and then carried down the length of the river, with stops to greet friends and meet with groups who care for the river. She told of the reluctance of tribes living along the river from Missouri to Louisiana to share a drink of the waters of the river, until they were told the water came from the headwaters. It is a way to share the potential of a rejuvenated river. The walkers concluded by pouring the remaining water from the headwaters into the river itself, to remind the river of what it can become again. Sharon ended her presentation with a beautiful song.

Kenny Blumenfeld, a senior climatologist at the DNR, reminded us that our changing climate will affect the state's groundwater planning. The state is becoming warmer and wetter with the minimum daily temperatures increasing the fastest. In addition, the state's extreme rain and snowfall events are becoming ever more extreme. He acknowledged that climate forecasts have predicted two scenarios that don't appear to have yet happened, increased heat waves and droughts, but suggested that both could begin to appear later in the century as the warming of the system becomes more established.

Carmelita Nelson from the DNR described the agency's first water conservation report. This is a new effort that is similar to the water use reporting associated with the agency's water appropriation permits but focuses instead on water savings. The draft report indicates that many of the water conservation targets were met and identified that cities can save a substantial amount of water by repairing leaking hydrants.

Jennifer Rose, from the DNR, and independent consultant Gil Zemansky gave us a different perspective on groundwater planning by describing how this is done halfway across the world in beautiful New Zealand. In this country, water allocations are governed by

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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



### Ann Pierce New Deputy Director - DNR Ecological and Water Resources

Ann Pierce was appointed deputy director of the DNR's Division of Ecological and Water Resources. Ann began her career in 1995 as bluffland coordinator and became the regional plant ecologist in the southeast in 1999. She held positions as the terrestrial invasive plant species ecologist, Conservation Management and Rare Resources Unit supervisor and Invasive Species Unit supervisor. Ann has been the Ecosystem Management and Protection Section manager since 2014. Ann holds a master's degree in natural resources and a Ph.D. in conservation biology from the University of Minnesota.

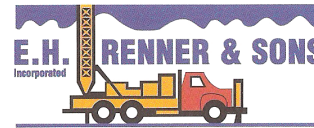


### Students in the Field, cont.

Anne and I took the students to two sites in Cottage Grove, where we collected samples for our ambient suite of chemicals, as well as pesticide sampling for MDA. It was August, and the temperature was in the low 80s, but the humidity was 93 percent, giving us all a greater appreciation for student workers and their endless efforts, air conditioning and desk jobs. But what made this field trip especially worth it was being able to reach out to students that I may have never met and be able to demonstrate a new perspective of the work they were doing, as well as learn about their work. Often times we are caught in our same routine, stuck in our own projects, and we need to remember that time in our early careers when we wanted to learn and soak up everything. With that in mind, my advice to new and even older professionals is to never stop learning and networking!

ROGER E. RENNER  
President

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### Call for White Paper Topics

**MGWA members, we are looking to you** for a new topic for a white paper. The creation of white papers on relevant issues truly begins with you. If you have an idea for a white paper, just go to the White Paper website ([mgwa.org/white-papers/](http://mgwa.org/white-papers/)), fill out the nomination form, and send it to [office@mgwa.org](mailto:office@mgwa.org).

All previously submitted topics will also be actively considered (good ideas never die—they just wait their turn).

We look forward to your ideas!

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## MGWA Fall Conference, cont.

law that is similar to the US western water law. The country also adopted a Resource Management Act in 1991 that requires a resource consent to appropriate water or discharge contaminants to it. However, the lack of trained groundwater flow modelers and data have hampered groundwater planning efforts in this country. They currently need to import staff from other countries to do this work. Gil described the fast build-up in dairy herds that has occurred in the last thirty years, becoming both a major source of income for the country, as well as threatening groundwater and surface water quality.

BJ Bonin, from the DNR, described to the membership a common concern: finding potable water for a new development. The surprising piece was that the development was a new campground next to one of the biggest supplies of freshwater in the world. Though the lake lies literally a stone's-throw away from the campground, the Department wanted to develop a groundwater source in a crystalline bedrock environment. This is a common story along the North Shore in northeastern Minnesota where groundwater supplies are scarce and some aquifers yield saline-rich water that may date back millions of years. He described the search for water and gave advice that few have heard uttered before, "don't drill down through a dike looking for groundwater."

Blythe Reiha, from the Regional Municipality of York in Canada, gave an engaging presentation on the challenges associated with communicating the results from numerical modeling of groundwater flow to the decision makers. She used her experience moving from the producer of models to a client hiring modelers to make a pitch to groundwater professionals to learn to communicate complex information in simpler terms.

Michael Ahern, from Ever-Green Energy, described how Aquifer Thermal Energy Storage or ATEs may be used to achieve a net-zero carbon community at the Ford Site Redevelopment in St. Paul. This technology is well-established in the Netherlands. Other technology proposed to achieve the net-carbon goals at this site include electric vehicles, battery storage, zero-energy homes, and district energy. Michael's talk was a welcome response to the earlier presentation on Minnesota's changing climate, that there are steps we can make (and are now making) that can "decarbonize" our energy production systems, and perhaps hold off the worst predictions of climate change.

Jeremy Greenhouse, an environmental attorney whose father was a geophysics professor at the University of Waterloo, spoke on how contaminant discharges into groundwater are governed by the Clean Water Act (CWA). He first pointed out to the membership that the CWA is very narrow. It only applies to point source pollution that is discharged into the navigable "Waters of the United States", and Minnesota has much stronger state laws. Cases in several district courts have considered the groundwater's role in transporting pollutants to surface waters. Some courts have ruled that these discharges require NPDES permits while others have not. These cases likely may reach the Supreme Court.

Steve Robertson from the MDH described the agency's Source Water Protection Program, which has been in place for 25 years. This program aims to protect the public from contaminated drinking water by using a locally-driven, science-based planning process. Currently, wellhead protection plans cover 90 percent of the state's population and the water-supply systems currently are implementing these plans. Steve detailed two case studies in the

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## MGWA Fall Conference, cont.

cities of Worthington and Bovey. Several lessons were learned from these two studies. For these efforts to be successful, it is crucial to have a locally-led team; identify multiple benefits associated with protecting an aquifer, like using the land set aside for pheasant hunting; and provide financial assistance.

Monica Ximena Guzman Rojo, from Vrije University in Belgium, shared with the membership how groundwater planning is conducted in the county of Bolivia in South America. This country currently does not have any laws that govern water use. Groundwater is the main source of water supply in the country because the rivers have contamination issues. She described two study cases, one in the city of Santa Cruz and the other near the town of San Jose, which highlighted the need to obtain and share groundwater information. Currently, many different entities collect groundwater information, but this is not readily available to all interested parties.

Ali Elhassan from the Metropolitan Council described numerical groundwater modeling was used in three different studies. The first case study was from Japan where a model was used to investigate the water availability in candidate sites for a proposed new Japanese capital. The second case study used a model to change pumping patterns in the Pecos River Basin to bring the State of New Mexico in compliance with an agreement with the State of Texas. The third case study used modeling to determine the water availability in South Sacramento County in California to support economic development.

Tim Gieseke from the DNR ended the conference by providing an update on the agency's Community-Based Aquifer Management Partnership or CAMP program. This program seeks to connect the users of an aquifer together so they can collectively manage the resource. The DNR currently has 12 CAMPs in place. Some of the key lessons learned to date are: 1) the groundwater "checking account" concept strongly resonated with the stakeholders, 2) water conservation can be an issue if it causes another party to lose income (especially when one party receives income from selling water), and 3) state agencies at times inadvertently give conflicting advice which is confusing to local units of government and other stakeholders.

Throughout the meeting, there were several announcements and updates by the MGWA.

Ellen took the stage again to open a larger discussion of MGWA's white paper (WP) program. Ellen described the appearance of organization members in front of the State Legislature's Legislative Water Commission to give a presentation of WP #3, dealing with drain tiles and groundwater recharge. This was an exciting opportunity for the organization to help inform state decision makers, and to realize one of the original goals for the WP program. She was followed by Carrie Jennings and David Crisman, two members of the WP Committee, who gave an update on how the other reports have been used in the state. Carrie described how the organization's first report changed our understanding on manganese. It is more than just a nuisance pollutant that stains our clothing, sinks, and tubs. Now, it is known that this metal also causes human health problems. The second report on groundwater education gaps has been used by the University of Minnesota's Earth Science Advisory Board to ensure its graduates have the skills necessary in today's workforce.

David Crisman then stepped up to encourage the membership to send in ideas for new WP topics and participate on any of the workgroups. Any candidate topics can be discussed with the steering committee which currently consists of David Crisman, Mindy Erickson, Carrie Jennings, and Andrew Streitz.

Cathy Udem reminded the membership that the organization's education committee is newly revitalized. She also encouraged the membership to become involved in its activities.

Finally, several awards were presented to MGWA members during the conference. Evan Christensen and Anneka Munsell were recognized for their service to the Board as the outgoing President and Treasurer. Dale Setterholm from the MGS received MGWA's Outstanding Service Award for his tireless work at the state legislature to accelerate the effort to produce the state's County Geologic Atlases. For Dale, this award was very meaningful, and he attributed his success to selling a product that he firmly believes in and the MGS staff for completing all of the work he promised to the state's lawmakers.

For those who missed the conference talks or want to view/listen to them again, links to the presentations will be provided on the organization website.



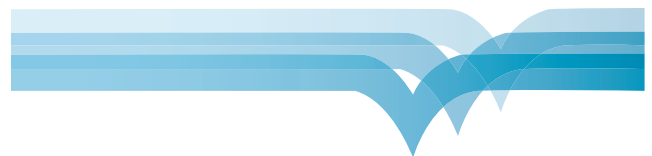
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## MGWA Outstanding Service Award: Dale Setterholm, Minnesota Geological Survey

Over the course of his career, Dale Setterholm has been one of Minnesota's most effective promoters of groundwater science. As Associate Director of the Minnesota Geological Survey, his most impressive accomplishment was his lead role in accelerating the production of County Geologic Atlases across the state. The County Geological Atlases, produced by the MGS and Department of Natural Resources, provide foundational data that support management of drinking water, domestic and industrial supply, irrigation, and aquatic habitat. Dale's outreach led to the Atlases being identified as essential data in the Statewide Conservation Plan, and in the efforts of the Environmental Quality Board, and the Water Resources Center at the University of Minnesota to design a sustainable water management process. Dale authored the widely-used Geologic Atlas User's Guide.

Dale's water-related service activities also include:

- ◆ Citizens Advisory Board, White Bear Lake (early 1990s)
- ◆ MPCA Storm Water Steering Committee (2004)
- ◆ President of the Minnesota Ground Water Association (2006)
- ◆ Advisory committee, Washington County Groundwater Plan (2013)
- ◆ Washington County Advisory Board (Groundwater Advisory, 2017)

Dale's willingness and ability to effectively engage in public and political debate as a scientist-citizen is summarized in a 2006 MGWA newsletter where he wrote:

*"Sustainable groundwater will require a new level of awareness in the general public, and a change in our collective behavior. The task of instigating those changes falls largely to those who set public policy and write our laws. They rely*

*on scientists to explain the workings of the natural world. They must also gain an understanding of the businesses and lifestyles that affect groundwater, and the markets and legal framework that drive those activities."* [MGWA newsletter, 2006]

Dale's career is characterized by the connections he has made between science and public policy. For these reasons, and many more, Dale Setterholm's role in promoting and advancing groundwater science in Minnesota is why he is deserving of the MGWA Outstanding Service Award.



## MGWA Officer Candidates for 2019

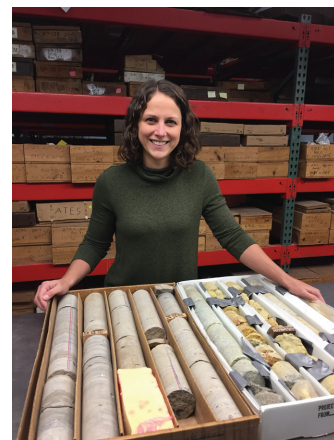
### Julia Steenberg, Candidate for President-Elect

Julia Steenberg is a geologist and project manager at the Minnesota Geological Survey. Her job is a combination of geologic mapping, applied research and outreach. Since starting at the survey in 2008, she has been heavily involved in the County Geologic Atlas Program and authored many bedrock geologic maps across the state. Julia's research interests include sedimentology and stratigraphy of the Paleozoic and Mesozoic bedrock in Minnesota and characterizing the hydrogeologic attributes of these strata. Recent research projects have included studying the geologic controls on nitrate transport in the Paleozoic bedrock of southeastern Minnesota, defining hydraulic properties of the St. Lawrence Formation aquitard and characterizing the hydraulic conductivity and hydrostratigraphy of the Platteville Formation. Julia has a B.A. degree in Geology from Gustavus Adolphus College and a M.S. degree in Geosciences from Idaho State University.

*"MGWA you are an incredible organization focused around one essential resource. I have benefited from the exchange of groundwater information at conferences, in the newsletters and from working together with many of you. You've given my work as a geologist meaning and I would be excited and honored to serve you. I am committed to furthering the science of groundwater hydrology in our state, serving the needs of our groundwater professionals and educating the general public on groundwater related issues so that informed decisions can be made".*

### Vanessa Baratta, Candidate for Treasurer

Vanessa Baratta is a mapping hydrologist at the Minnesota Department of Natural Resources (DNR). She joined the DNR in 2013 as a field technician monitoring surface water in southwestern Minnesota and has worked for the County Geologic Atlas (CGA) Unit since May 2014. She co-authored the Part B County Geologic atlases for Nicollet and Sibley counties and is currently working on atlases for Morrison, Redwood, and Wadena counties. She also leads and supports the development of the procedure documents, plans and conducts fieldwork, trains new team members, and manages data. Vanessa has a Bachelor of Arts in Geology and Statistics (2011) from the University of Minnesota Morris and a Master of Science in Geosciences (2013) from the University of Iowa.





## MGS Borehole Geophysical Database

Andrew Retzler

The MGS investigates the geology of Minnesota and provides basic public information on the geology of the state. The MGS works with state, county, and regional offices to set up geologic databases and provide technical guidance for water resource planning, land management and mineral exploration policy, energy system development, and other planning and resource management activities. As part of this mission, the MGS collects, archives, and provides access to collections of geologic materials from Minnesota. The MGS Borehole Geophysical Database is one such example.

In 2015 and 2017, the MGS began work on inventorying, archiving, and creating/updating the digital infrastructure of our Borehole Geophysical Database using funds awarded through the USGS's National Geological and Geophysical Data Preservation Program (NGDPP) (Award Nos. G15AP00105 and G17P00089) and cost-shared with matching funds from the MGS. A key culmination of this work was the creation of the [Borehole Geophysical Database](https://mngs-umn.opendata.arcgis.com/) web portal that went live in October 2018 (Fig. 1).

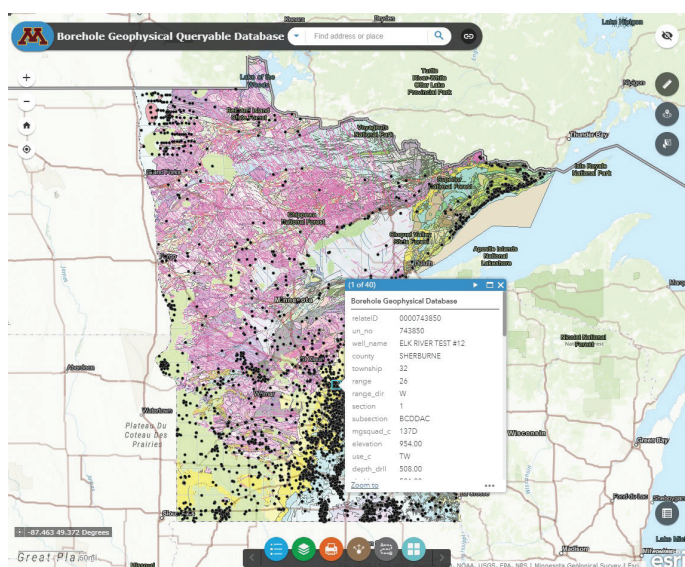


Figure 1. Screen capture of the Borehole Geophysical Database web portal hosted through the MGS Open Data Portal (<https://mngs-umn.opendata.arcgis.com/>).

This web portal serves to make the database collections publicly accessible, providing users with direct access to digital PDF and LAS (Log ASCII Standard) copies of any borehole geophysical log (if available). LAS files are a standard file-format developed by the Canadian Well Log Society and common in the industry for borehole logs. Most borehole logging software can import and display LAS files.

The Borehole Geophysical Database (as of August 2018) contains data from nearly 10,486 logs in 7,280 separate boreholes drilled throughout the state. This is equal to over 2.4 million feet of sediment and rock. The majority of geophysical logs are from water wells or boreholes drilled for scientific purposes and they measure a variety of properties of the rock and sediment exposed in the borehole wall and the groundwater within those materials. Records include both logs generated by the MGS and those

generated by outside parties and donated to MGS collections. Database collections reside at the MGS and are continually maintained and expanded upon by staff as part of ongoing mapping efforts.

The Borehole Geophysical Database contains the following types of logs:

- ◆ Gamma logs (natural gamma radiation and typically collected concurrently with single point resistance and spontaneous potential)
- ◆ Electrical logs (single point resistance and/or spontaneous potential)
- ◆ Caliper logs (borehole diameter)
- ◆ Multi-parameter logs (natural gamma radiation, fluid resistivity, spontaneous potential, temperature, normal resistivity, single point resistance, and specific conductivity)
- ◆ Electromagnetic (EM-) flowmeter logs (flowmeter, fluid resistivity, and temperature)
- ◆ Video logs (borehole video recordings)

Our current suite of geophysical tools at the MGS enables us to collect gamma, caliper, multi-parameter, EM-flowmeter, and video logs (Fig. 2).



Figure 2. Bruce Bloomgren (MGS gamma logger extraordinaire!) posing in front of the MGS geophysical logging van while collecting data at a borehole.

The majority of logs in our database capture geophysical information of the Quaternary unconsolidated glacial sediment and Paleozoic bedrock of Minnesota. In the Paleozoic strata of the upper Midwest, fine-grained siliciclastic rocks with low intergranular permeability contain potassium in sufficient abundance to emit relatively high levels of gamma rays, and therefore cause strong positive deflections on gamma logs. Coarse-grained siliciclastic rocks with higher permeability have low potassium content and therefore correspond to low readings on the gamma logs. Carbonate strata most commonly have readings between those of fine and coarse siliciclastic rocks. This allows us to acquire very reliable interpretations of the subsurface geology at a very low cost (Fig. 3).

— continued on page 10



*Figure 3. An example natural gamma radiation log and how it correlates to the various strata exposed along an outcrop of the Ordovician-aged St. Peter Sandstone, Glenwood Shale, and Platteville Formation in the Twin Cities metropolitan area.*

The caliper tool measures borehole diameter as it is slowly raised in a borehole to document the size, shape, and position of fractures and dissolution features in the open borehole interval. The multi-parameter tool measures natural gamma, fluid resistivity, spontaneous potential, and temperature. The EM-flowmeter logs are collected in several ways: under ambient or stressed conditions, and while trolling or stationary. Ambient trolling logs are collected as the tool is slowly raised in the borehole and is a measure of any flow up or down a borehole as well as fluid resistivity and temperature. The same parameters are recorded in ambient station measurements when the EM-flowmeter tool is held in place at a particular depth. The ambient troll and station logs are used to recognize the hydraulically dominant intervals of matrix or fracture flow in an individual borehole and the aquitards that separate them. Flow logging in stressed conditions provides the same measures of fluid properties, but with borehole flow altered by pumping or injection of water. The hydraulic properties of discrete intervals can be quantified when compared to ambient EM-flowmeter measurements. Borehole video logs are used to document the size, shape, and stratigraphic position of fractures and dissolution features. In holes with ambient flow, movement of sediment held in suspension also allows documentation of flow entering, exiting or moving vertically in a borehole.

Geophysical logs are imperative for mapping the subsurface geology in lieu of drill cuttings and core and provide useful information for hydrostratigraphic research. A well-defined hydrogeologic system increases the accuracy and usefulness of groundwater protection plans and improves our ability to predict aquifer productivity, aquitard integrity and contaminant transport. This allows mineral and water resource managers, environmental scientists, academics, other state agencies, public health professionals, and the general public, to make better decisions on how to use, manage, and protect Minnesota's resources.

## Annular Space Test at McCarthy Beach State Park

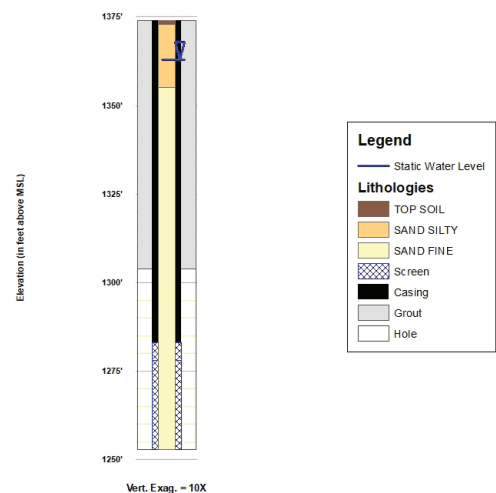
By Jim Walsh, MDH

The campground well at McCarthy Beach State Park has experienced water quality problems over the past several years. A giardia outbreak that occurred in 2010 put this well on the radar at MDH, although the well itself could not be definitively established as the cause of the problem. Subsequently, this well was included in the Clean Water Fund Viral Occurrence Study and found to contain low levels of genetic material from human enteric virus, as well as relatively high levels of artificial sweeteners. Although the standard indicators of sanitary quality, total coliform and E. coli bacteria, have not been detected, it was clear this well was impacted by one or more sources of human and perhaps animal waste.

These concerns led MDH to engage the karst tracer team at the DNR to conduct a tracer study of possible wastewater sources that might be impacting the campground well. This test was initiated in late May of 2018 and involved dye application at three possible wastewater sources (two drainfields and the buried plumbing running from a nearby sanitation building). This study is ongoing, and may be the subject of a future newsletter article. In this article, we feature a component of this tracer study that was added by MDH to test whether downward flow of surface waters along the well annulus might be a relevant pathway for microbiological or chemical contaminants.

The campground well was constructed in 1992 using rotary methods, with a borehole diameter of 12-inches to 121 feet, a casing diameter of 6-inches to 91-feet, and unspecified grout material (presumably bentonite) from 0-70 feet (**Figure 1**). The static water level is approximately 11 feet below the land surface, and the pumping level is approximately 17 feet below grade at a pumping rate of 40 gallons per minute (gpm), which was the pump capacity.

McCarthy Beach State Park #2 Campground Well/Unique Well #482936



*Figure 1. Construction and stratigraphic profile for McCarthy Beach Well #2.*

### Objective:

The objective of this test was to evaluate the time needed for a chloride tracer introduced at the land surface to be detected within the well water. Short times of travel (hours to days) may

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## Annular Space Test, cont.

reflect fast-flow pathways through the grout seal caused by fractures or voids and may represent pathways for microbial or other contaminants to enter the well during recharge or runoff events. Knowledge of this potential pathway can help inform the park's decision to keep this well for water supply purposes or replace it.

### Study Design:

The goal of the study was to introduce enough salt-laden water at the surface to register a short-term spike in specific conductance and thereby determine the travel time from the land surface to the well intake through the grout seal. This was accomplished by filling two tree-watering bags strapped to the well casing with NaCl-spiked water from nearby Side Lake. The bags have a combined capacity of 45-gallons and the NaCl came from a 50-pound bag of commercially-available salt. Each bag filling introduced a 1-weight percent NaCl solution, with an approximate specific conductance value of 16,000  $\mu\text{moh/cm}$ . Background specific conductance values for the well water historically ranged from approximately 400  $\mu\text{moh/cm}$  to 750  $\mu\text{moh/cm}$ , with lower values observed in the spring.

It was estimated that approximately 22 gallons of the salt solution would need to mix with the volume of water stored in the well (approximately 162 gallons) to raise the specific conductance above 800  $\mu\text{moh/cm}$ , thereby exceeding previously recorded maximum values. It was also expected that the grouted annular space would contain a volume of water within pores or fractures that would need to be displaced or mixed with as the salt-water traveled to the well intake. A possible water volume of approximately 77 gallons was estimated for the grouted annular space, assuming a maximum porosity of 25 percent. Given these dilution values and goals for raising the specific conductance significantly above background, it was thought that up to 300-500 gallons of salt-laden water might need to be introduced, assuming possible losses of 80-90 percent to the surrounding aquifer. Bags were filled as needed by park staff, with a total of 225 gallons of saltwater having been released by the bags by June 7 when the test ended.

Specific conductance and water temperature was measured in the Well 2 discharge stream via a Solinst Levellogger Edge data logger set to gather data on 2-minute intervals during the duration of the test. Manual readings were also taken from an Orion specific conductance meter as a backup. The manual readings were taken relatively infrequently (no more than twice daily).

### Study Results:

The test was initiated on May 25, 2018 at 08:30, and the first spike in specific conductance was observed approximately 60-hours later (**Figure 2**). Subsequent spikes were observed related to later bag-fillings at durations ranging from 14–69 hours, with the largest spike occurring 24 hours after additional holes were poked in the bottom of the tree bags on June 5 in response to slow drainage issues noted over the previous few days. The very high temperature values associated with this spike are presumed due to the several days of solar heating that accompanied this period of slow or no drainage.

### Conclusions:

The annular space test confirmed that water and contaminants can travel quickly from the land surface around the well to the well intake in very short time periods, in some cases less than one day. This suggests that the grout seal may be ineffective, as the standard permeability values specified for bentonite grout should require time scales on the order of years for this sort of vertical travel distance. However, the exact pathways taken by the tracer cannot be known, and it is entirely possible that some or much of the transport occurred via the sandy aquifer material, bypassing the grout seal around the casing. The sharp nature of some of the conductance and temperature spikes may be more reflective of secondary permeability pathways rather than standard piston flow through sand, and so short-circuiting of the grout seal cannot be ruled out. Regardless, this test demonstrated the susceptibility of this well to contamination from land surface activities in its immediate vicinity. The results can be used to make decisions about replacing the well, or in the event it is retained, restricting access and land uses in the immediate area around the wellhead.

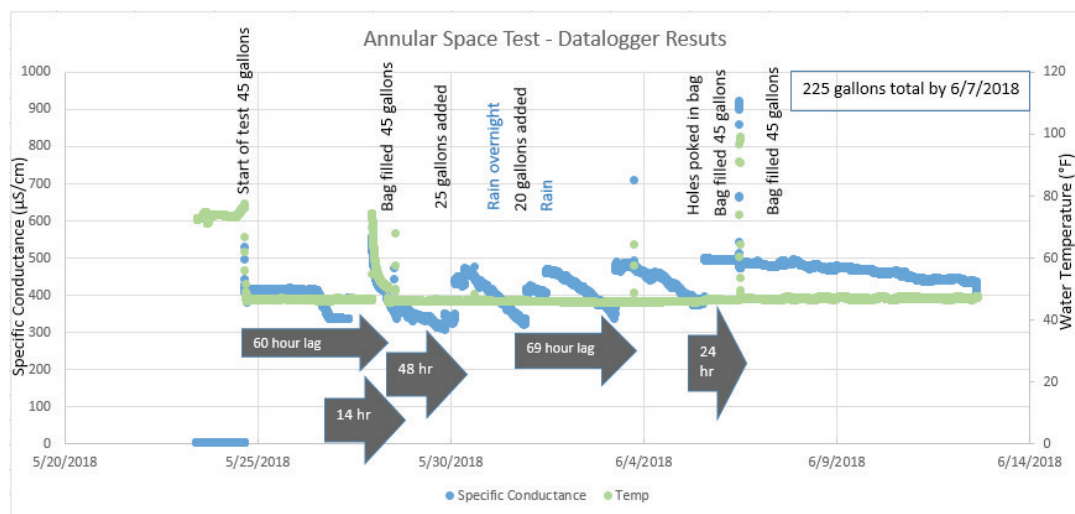


Figure 2. Specific conductance and water temperature data logger results for annular space test at McCarthy Beach Well #2. Lag times between bag fillings and conductance and/or temperature spikes are shown in grey arrows.

## PUBLICATIONS AND LINKS

### DNR Completes Sustainability Assessment for White Bear Lake

By Jason Moeckel

On October 17 the DNR published a three-page article describing the results of the analysis of groundwater use and White Bear Lake water levels.

The DNR conducted this specific analysis in response to an August 2017 Ramsey County District Court ruling, which directed the DNR to determine whether existing water appropriation permits within five miles of White Bear Lake meet the state's sustainability standard, both individually and cumulatively.

The transient groundwater flow model used to conduct this analysis gives DNR an important new tool in managing groundwater in the north and east metro. DNR will continue to work with the communities and businesses to ensure that water supply remains sustainable and sufficient to meet needs, while also protecting the recreational values of White Bear Lake.

A full copy of the technical report and the model documentation are available on the DNR website:

[White Bear Lake, DNR Sustainability Analysis.](#)



### 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 guidelines we would like authors to follow. For 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 email.
- ◆ 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 on a byline 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 FOUNDATION

### MGWA Foundation Announces 2019 Gil Gabanski Student Scholarship

Undergraduate and graduate students are encouraged to apply for the MGWA Foundation Gil Gabanski Student Scholarship. There is one \$1,500 scholarship for undergraduate students and one \$1,500 scholarship for graduate students. Applicants must be enrolled as an undergraduate or graduate student in good academic standing in hydrogeology, groundwater hydrology or similar program at an accredited college or university in Minnesota or an adjoining state or province including North Dakota, South Dakota, Iowa, Wisconsin, Michigan, Ontario, or Manitoba. The application deadline is January 29, 2019.

The scholarship recipients will be announced by the end of March, 2019. The recipients will also be announced at the next MGWA conference in April and in the MGWA newsletter. The recipients will be awarded a one year student membership in the Minnesota Ground Water Association (MGWA). The recipients will write an article describing their research or their interest in hydrogeology for publication in the newsletter of the MGWA, or present either a poster or a presentation at an upcoming MGWA conference.

### News from Freshwater

— By Steve Woods

I'm writing to let you know that I will be stepping back from my leadership role as Executive Director at Freshwater in 2019. I am at a point in my life where changing priorities have been persistently whispering to me that it is time to get out there and enjoy the water and lands my career has focused on.

This was not an easy decision, because honestly it is a blast to come to work here at Freshwater each day. I literally bounce out of bed most mornings eager to get to the office. Not only do I get to work with a dedicated team of employees and board members who "give a rip", but Freshwater does transformative work that really matters.

For now, stepping back means continuing to work part-time. I benefitted from the overlap with my predecessors, Gene Merriam and Joan Nephew, five years ago and we want to provide my successor with that luxury as well. I do not intend to retire so much as reduce my hours.

This decision took some time to make. My family and the Board have been super helpful in reaching the decision. Freshwater's strong fiscal position, stellar reputation, and interesting workload means my successor will have a wise board and solid organization with which to make a difference.

It has been an absolute joy and privilege to bookend my career through a Freshwater lens. The Board has started a search process and is accepting resumes for my successor through the end of December.





## MGWA FOUNDATION

### MGWA Foundation Directors Sought for 2019

The MGWA Foundation board needs to fill director positions. The Directors oversee MGWA Foundation fundraising, participate on scholarship committees, and assist with financial management of the endowment. Here's a chance for you or someone you nominate to advance groundwater education in Minnesota. Nominations will be accepted until 12/31/2018.

E-mail nominations to the MGWA at [office@mgwa.org](mailto:office@mgwa.org).

### Feedback from Sponsored Events



November 6, 2018

Minnesota Ground Water Association  
4779 126th St. N.  
White Bear Lake, MN 55110-5910

Dear MGWA Foundation,

Thank you for your generous donation of \$2,000.00 for the Children's Water Festival! Because of your donation, and others like yours, 700 - 1,000 4th grade students from Brown, Nicollet and Cottonwood Counties will be able to attend the Festival that's taking place March 6th at SCC in North Mankato. This is a unique opportunity for kids from rural and city backgrounds to see and discuss water quality issues in an informative and entertaining environment.

Thanks again for helping to provide this unique learning experience.

Warm regards,

*Judy Beetch*

Judy Beetch

Administrative Assistant  
Nicollet Soil & Water Conservation District  
907-232-2550  
501 7th Street  
PO Box 457  
Nicollet, MN 56063  
[judy.beetch@nicolletswcd.org](mailto:judy.beetch@nicolletswcd.org)

"Water Connects Everyone  
and Everything on Earth!"



November 2018

To the members of the MN Groundwater Association,

On behalf of the Metropolitan Conservation Districts and the Children's Water Festival Planning Committee, I would like to thank you for your generous contribution to the 2018 Children's Water Festival. The festival would not have been possible without your support.

The festival was a huge success. The 1700 students had a great experience outdoors interacting with water resource specialists and learning much about how Water Connects Everyone and Everything on Earth! We were very lucky to have squeaked in an outdoor festival between storms during this rainy fall.

This year was our 21st festival and we continued to improve upon the many changes we made last year. We increased the number of students attending by 300 again and added 10 new presenters.

Enclosed is the 2018 Children's Water Festival booklet, listing sponsors, participating schools and presenters. Sponsors are recognized on the website, booklets, and signs throughout the festival. Also included are the 2018 Program Summary, the Composting Summary, and a Sponsor Certificate.

Plans for the 2019 Children's Water Festival have begun. The date is currently set for September 25th, 2019 at the State Fair Grounds.

Thank you for your commitment to educating Minnesota's students in the metro area, and your commitment to protecting water as one of Minnesota's most valuable resources.

Makeline Seveland  
Festival Coordinator  
Carver County Water Management Organization  
600 East 4th St. Chaska, MN 55318  
952-361-1026 [mseveland@co.carver.mn.us](mailto:mseveland@co.carver.mn.us)

[www.metrocwf.org](http://www.metrocwf.org)

#### 2018 METRO CHILDREN'S WATER FESTIVAL

September 26th, 2018  
Minnesota State Fair Grounds

### MGWA Foundation Board of Directors

**President**  
**Scott Alexander**  
University of Minnesota  
(612)626-4164  
[alexa017@umn.edu](mailto:alexa017@umn.edu)

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Northeast Technical Services  
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**Director**  
**Eric Mohring**  
retired (BWSR)  
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[eric.mohring@gmail.com](mailto:eric.mohring@gmail.com)

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

### PROUD SPONSOR OF THE 2018 METRO AREA CHILDREN'S WATER FESTIVAL

AWARDED TO

Minnesota Groundwater Association



# MGWA BOARD MINUTES

## MGWA Board of Directors Regular Meetings

### Meeting Date: Tuesday, August 28, 2018

Attendance: Ellen Considine, President; Kate Pound, President-Elect; Evan Christianson, Past-President; Annika Munsell, Treasurer; Andrew Retzler, Secretary; Sean Hunt, WRI; Jeanette Leete, WRI; Andrew Streitz, MGWA Newsletter.

Agenda: Approved.

Past Minutes: Approved with revisions.

#### Treasury Report:

- ◆ Munsell updated the Board on the Treasury Report. The numbers as reported include a total income for the period of January 1, 2018 to August 26, 2018 of \$57,271.62; net income for this period of \$21,586.38; total assets for this period of \$104,130.99.

#### Newsletter Report:

- ◆ Streitz reported that the September Newsletter is almost ready for the publisher, with plans to have it sent over around Labor Day.
- ◆ Considine will send Streitz a write-up describing the upcoming Fall Conference and the White Paper meeting with State legislators.
- ◆ Leete commented that the Sept. 30 abstract deadline is too late to put together a brochure. Considine said she has five keynote speakers and abstracts already lined up that can be featured on the brochure. Munsell also commented that the later abstract deadline would be beneficial for student presenters. The Board agrees to keep the Sept. 30 abstract deadline.
- ◆ Pound commented that the MGWA Education Committee thinks it would be more beneficial to provide open access of the Newsletters to everyone. The Board discussed this and ideas about integrating articles from the Newsletter with the web page. The Board will table this discussion until Streitz talks to the Newsletter Team about possibilities.
- ◆ Streitz asked Retzler to set his Google Drive upload settings to automatically convert Word document minutes to Google Doc format. Streitz also commented that the minutes template will not consider 3rd level bullet points.

#### WRI Report:

- ◆ Leete has brought the accounting books up-to-date and needs to finish preparing the required IRS filings for MGWA by November.
- ◆ Hunt shared with the Board an old email he found describing mentorship that might be useful to consider with future conferences.

#### Web Page:

- ◆ Hunt set up the Fall Conference and an exhibitors page. He also made an Outstanding Service Award page that lists all previous recipients.

#### MGWAF Report:

- ◆ MGWAF meets next week.
- ◆ Christianson said there have been several fund requests that will be considered at the meeting. He also hopes to discuss the MGWAF Bylaws.

#### Social Coordinator:

- ◆ No updates.

#### White Paper Committee:

- ◆ Streitz reported that the current White Paper is moving along smoothly.
- ◆ Considine shared with the Board her recap of a meeting with several State legislators to discuss MGWA's latest Drain Tile White Paper. Overall, the meeting went well and the main point the legislators made is that we need more data. Munsell recommended we give Jim Stark a heads up about other upcoming White Papers to hold the interest of the State legislators.

#### Education Committee:

- ◆ Pound reported that the Education Committee is meeting regularly and there has been lots of discussion. The main topics being:

Putting a scoping document together for their committee.

Having all White Papers include a section exploring any possible educational

opportunities.

Having the education-related portions of the web page updated.

Restarting the MGWA shop and/or having MGWA-related gift items as an

incentive for volunteering and mentoring.

### Other Business:

#### MGWA Outstanding Service Award:

- ◆ Hunt will share the Outstanding Service Award web page materials he put together with Streitz for the Newsletter.
- ◆ Retzler shared with the Board an Outstanding Service Award nomination for Dale Setterholm submitted by Bob Tipping and Tony Runkel. Munsell motioned to approve the nomination and award Dale Setterholm the Outstanding Service Award. Christianson seconded. Motion passed. Retzler will send Streitz an electronic copy of the nomination and share it on Google Drive.

#### Fall Conference:

- ◆ The Board discussed and finalized the Fall Conference title as "Successes, Near Misses, and Failure: Regional Groundwater Planning".
- ◆ Considine reviewed the speaker lineup she has thus far. Considine will share this with Hunt and Leete by the end of the week for the web page and brochure materials.
- ◆ Hunt will put together another call for abstracts and a general conference notice email to membership. Hunt will wait to send out an email notice to membership regarding posters and

The MGWA Board meets once a month, currently over lunch, at 11:30 on the third Tuesday in the meeting room at Fresh Grounds on W 7th Street in St. Paul (entrance in back of the building).

Members are welcome to attend and observe



## MGWA BOARD MINUTES

### MGWA Minutes, cont.

lightning talks.

- ◆ Munsell shared with the Board a posters submission form she compiled, along with several style suggestions. Munsell will wait to send Hunt the final copy until the Board reviews it further in the coming week. Hunt recommended adding a statement about being present by your poster during the conference break times.
- ◆ Christianson will mention having MGWAF solicit exhibitors in the future at the upcoming MGWAF meeting.

#### Action Items:

- ◆ Considine will send Streitz a write-up describing the upcoming Fall Conference and the White Paper meeting with State legislators.
- ◆ Streitz will discuss with the Newsletter Team the idea about making the Newsletter open-access and/or integrating articles with the MGWA web page.
- ◆ Retzler will change his Google Drive settings to have the minutes documents automatically converted to Google format.
- ◆ Leete will continue work on preparing the required IRS filings.
- ◆ Christianson will discuss MGWAF Bylaws and having MGWAF solicit exhibitors for future conferences at the upcoming MGWAF meeting.
- ◆ Hunt will share the Outstanding Service Award web page materials with Streitz for use in the Newsletter.
- ◆ Retzler will send Streitz an electronic copy of Dale Setterholm's Outstanding Service Award nomination and share it on Google Drive.
- ◆ Considine will provide Hunt and Leete with a list of the Fall Conference keynote speakers and their talk titles and abstracts.
- ◆ Hunt will put together a call for abstracts and general conference notice email to membership. At a later date, he will also send out an email soliciting posters and lightning talks.
- ◆ Munsell will send Hunt a finalized copy of the poster submission form and style suggestions.

Next Meeting: Tuesday, September 18, 2018, 11:30am – 1:00pm at Fresh Grounds Café, 1362 West 7th Street, St. Paul, MN

### Meeting Date: Tuesday, September 18, 2018

Attendance: Ellen Considine, President; Kate Pound, President-Elect; Evan Christianson, Past-President; Anneka Munsell, Treasurer; Andrew Retzler, Secretary; Sean Hunt, WRI; Jeanette Leete, WRI; Sharon Kroening, MGWA Newsletter.

Agenda: Approved with revisions.

Past Minutes: Approved.

#### Treasury Report:

- ◆ Munsell updated the Board on the Treasury Report. The numbers as reported include a total income for the period of January 1, 2018 to September 18, 2018 of \$57,422.59; net income for this period of \$20,729.42; total assets for this period of \$103,344.03. Munsell gave a short description of the meaning behind some of the numbers often reported in the Treasury Report.

#### Newsletter Report:

- ◆ Kroening stated that the Newsletter Team is finalizing the September issue. Afterwards, they will begin gathering articles for the December issue.
- ◆ The Newsletter Team has not met since the August MGWA Board meeting and hasn't yet discussed the idea of open-access Newsletters and their integration with the MGWA website. The Newsletter Team is scheduled to meet this Thursday, September 20.

#### WRI Report:

- ◆ Leete has been working to finalize the September Newsletter.
- ◆ Hunt completed his action items from the August Board meeting.
- ◆ Considine asked who typically awards the MGWA Outstanding Service Award. Hunt confirmed it's the MGWA President.
- ◆ Leete and Hunt are preparing the Fall Conference brochure and other materials to mail out to membership. Hunt asked about the conference mentorship checkbox on the brochure that was suggested at a past meeting and whether or not to include it. The Board discussed this option and ideas about conference mentorship for the future. The Board agreed to not include the checkbox this time until they get a better handle on how they want to organize the conference mentorship program in the future. Hunt will need a write-up describing the mentor program for an email announcement.

#### Web Page:

- ◆ Hunt noticed some oddities with the web page and has to check whether or not a recent Wordpress update may be the culprit.
- ◆ Hunt was asked about MGWA web page statistics by Mindy Erikson. Google Analytics was used as an additional stats tracker on the old web page, but this was never integrated into the new site. Hunt sent an email to Ole Olmanson asking whether or not Google Analytics can be set up on the new site.

#### MGWAF Report:

- ◆ Christianson, Leete, and Hunt attended the recent MGWAF Board meeting and updated the Board on the proceedings.
- ◆ Several spending measures were discussed and approved at the meeting, including a water festival funding request and retroactive field camp scholarships. Only two field

### MGWA 2019 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.

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## MGWA BOARD MINUTES

### MGWA Minutes, cont.

#### Save These Dates

#### MGWA Conferences

04/25/2019

11/12/2019

camp scholarship applications were received this year and they were not formally reviewed by the entire Foundation Board, as in previous years. The MGWA Board discussed ways in which to streamline the scholarship application and review process. Considine will email Scot Alexander about this and include the Board's recommendation that scholarship announcements be made earlier in the preceding year, such as in the September Newsletter.

- ◆ Christianson stated that there was some discussion about the undergraduate and graduate student scholarships and that they have maintained a more organized schedule.
- ◆ The Foundation Board discussed the new Minutes template and had no issue with it.
- ◆ Christianson stated that he discussed the Bylaws and term limits of the current Directors with the Foundation Board. The MGWA Board discussed this further and concluded that the formal process of term renewals for existing Foundation Directors has not been followed in the recent past. Considine will email the Foundation Board about this. The MGWA Board also agreed to put a notice in the September Newsletter regarding Foundation Board nominations. An email announcement and an announcement at the Fall Conference will also be made. The MGWA Board plans to review any nominations in January and hold a joint MGWA-MGWAF Board meeting in the early spring.
- ◆ Hunt and Christianson discussed the Fall Conference exhibitor process with the Foundation Board. Kara Dennis agreed to manage the exhibitors for this conference.

#### Social Coordinator:

- ◆ No updates.

#### White Paper Committee:

- ◆ No updates.

#### Education Committee:

- ◆ Pound reported that the Education Committee continues to meet and has finalized a mission write-up. The Committee is also working on finalizing their Charter.
- ◆ The Committee plans to focus their attention on overhauling the education-related pages on the MGWA web page once finalizing their Charter.

#### Other Business:

##### Job Announcements:

- ◆ Considine asked about the current process of posting and announcing groundwater-related jobs through MGWA. Hunt stated that these are posted to the web page and that in the past an email announcement was also sent out. Considine asked whether an email announcement for job postings should be reintroduced. The Board discussed this idea. Munsell suggested interested members might be able to use RSS feeds to stay current on any new job announcements posted on our web page, eliminating the need for an email announcement each time. Hunt will look into this possibility. Pound will talk to Emily Berquist about also making Facebook posts regarding job announcements.

##### Fall Conference:

- ◆ Considine updated the Board on the current speaker lineup—six confirmed speakers. There still have not been many abstracts submitted following the email announcement to membership and Considine might have to start looking elsewhere for further speakers. Kroening asked Considine about what specific speaker topics she is need of at this time. The Board discussed these needs and made speaker suggestions for Considine to pursue. Kroening stated that the next email announcement asking for submitted abstracts should detail these specific needs in topics.
- ◆ Pound asked about the possibility of a panel discussion at the conference. The Board agreed this could be pursued if more time gaps are needed filled.
- ◆ Hunt will send out another call for abstracts to membership this week and a conference registration notice sometime next week. An email regarding lightning talks, posters, and exhibitors will follow shortly after.

##### Action Items:

- ◆ Hunt will send out the following email announcements: another call for speaker abstracts, a conference registration notice (possibly with some short description of the mentor program), one for lightning talks, posters, and exhibitors, and one regarding Foundation Board nominations being sought.
- ◆ Hunt will follow-up on the possible web page issue and whether or not Google Analytics can be integrated into the new site.
- ◆ Considine will email Scott Alexander the Board's recommendations for improving the field camp scholarship application and review process.
- ◆ Considine will email the Foundation Board regarding term renewals for their current Directors.
- ◆ Leete will add a notice in the September Newsletter regarding Foundation Board nominations.
- ◆ Hunt will look into the possibility of using RSS feeds to stay current on any new job announcements posted to the web page.
- ◆ Pound will talk to Emily Berquist about making Facebook posts regarding job announcements.

Next Meeting: Tuesday, October 23, 2018, 11:30am – 1:00pm at Fresh Grounds Café, 1362 West 7th Street, St. Paul, MN