PRESENTATION SUMMARIES & SPEAKER BIOGRAPHIES

Minnesota Ground Water Association
Fall Conference 2021 – November 18, 2021

Online via Zoom

Rural and Sensitive: Groundwater across the "Driftless Area" of Southeastern Minnesota and Adjacent States

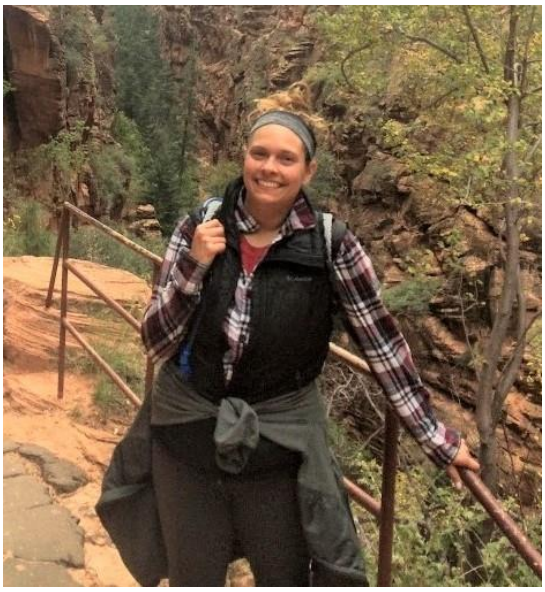
Jennifer McDonald
Minnesota Geological Survey
jmhorton@umn.edu

Quaternary Geology in Southeast Minnesota – The Not So Driftless Area

Presentation

- Setting the stage: previous work and historical context of "Driftless Area" terminology
- Recent MGS mapping of Dodge and Olmsted Counties
- Implications for land and water management
- Concluding remarks

Education
MS: (Geology) The University of Toledo, 2015
BA: (Geology and Environmental Studies) The College of Wooster, 2013



Julia Steenberg
Minnesota Geological Survey
jsteenb@umn.edu

Bedrock Geology and Groundwater Flow in Southeast Minnesota and Surrounding States

Presentation

- Geologic setting of SE MN and surrounding states
- Paleozoic stratigraphy
- Aquifer characteristics
- Karst features
- Hydrostratigraphic model

How Does Groundwater Move in Southeast Minnesota? Very Cool Videos for Outreach!

Presentation

- Educational videos showing how groundwater moves and contaminants are transported in southeastern Minnesota
- Videos were produced by the Minnesota Department of Agriculture in collaboration with multiple other agencies and organizations.

Education
M.S. (geosciences), Idaho State University, 2008
B.A. (geology), Gustavus Adolphus College, 2006

Experience
2008-present, Minnesota Geological Survey (geologist)

Kim Kaiser
Minnesota Department of Agriculture
kimberly.kaiser@state.mn.us

Nitrate Monitoring in Southeast MN: Private Wells and Drinking Water Supply Management Areas

Presentation

- Nitrate in private wells through Township Testing
- Nitrate in private wells through Southeast Volunteer Nitrate Monitoring Network
- Nitrate in Public Supply Wells and Drinking Water Management Areas
- MDA Policies and Rules in regard to nitrate in groundwater

Education

M.S. Environmental Policy and Law-University of Idaho, 2004
B.S. Environmental Geology- Hydrogeology Emphasis-University of Wisconsin: Eau-Claire, 1996.

Experience

2010-current. Hydrologist, Minnesota Department of Agriculture
2004-2010. Environmental Scientist, Idaho Department of Environmental Quality-INL Oversight Program
2003-2004. Hydrologist, Friends of the Teton River
2001-2003. Science fellowship, University of Idaho
2001-2002. Surface Water Hydrologist, Department of Environmental Quality-Idaho Falls
1998-2000. Science Instructor, Targhee Institute. Alta, Wyoming.

Heather Johnson
Minnesota Department of Agriculture
Heather.johnson@state.mn.us

A Chemical with Lasting Impact - Cyanazine in Groundwater in Southeastern Minnesota

Presentation

- Overview and history of cyanazine use
- Historical findings and recent results in 2019 and 2020
- Sampling strategy for 2021
- What can be done to mitigate and next steps

Education

M.S. (Water Resources Science), University of Minnesota – Twin Cities, 2006
B.A. (Environmental Studies), University of Minnesota – Duluth, 1998

Experience

2006-present, Minnesota Department of Agriculture, Hydrologist
2004-2006, North Central River Forecast Center, Hydrology Technician
2000-2004, Met Council, Environmental Scientist
1998-2000, RCRCA, Watershed Scientist

Maureen Muldoon
Wisconsin Geological & Natural History Survey
muldoon@wisc.edu

Hydrogeology and Well Construction in Southwestern Wisconsin: Why We May Have More Drinking Water Concerns than Southeastern Minnesota.

Presentation

- Geology of Southwestern WI
- Water-Quality Data from SWIGG study
- Geologic Controls on hydrogeology
- Well Construction Codes
- Summary/Take-away Points

Education

Ph.D. (Hydrogeology), University of Wisconsin-Madison, 1999
M.S. (Hydrogeology/Glacial Geology), University of Wisconsin-Madison, 1987
A.B. (Earth and Planetary Sciences), Washington Univ., St. Louis, 1983

Experience

June 2019 to Present, Wisconsin Geological & Natural History Survey (Hydrogeologist)
September 1998 to May 2019, Geology Professor, University of Wisconsin-Oshkosh
November 1987 to August 1998, Wisconsin Geological & Natural History Survey (Hydrogeologist)

Chris Jones
University of Iowa, IIHR-Hydroscience & Engineering
christopher-s-jones@uiowa.edu

Real-time Continuous Nitrate Monitoring of Driftless Area Surface and Groundwater

Presentation

- University of Iowa Water Quality Sensor Network
- Nitrate Dynamics in Karst Aquifers and Iowa Driftless Area Streams
- Driftless Area as a contributor to Iowa statewide N loading
- Concluding remarks

Education

Ph.D. (analytical chemistry), Montana State University, 1989
B.A. (chemistry/biology), Simpson College, 1983

Experience

2015-present, Research Engineer, IIHR, University of Iowa
2011-2015, Environmental Scientists, Iowa Soybean Association
2003-2011, Supervisor of Water Quality, Des Moines Water Works
1989-2003, private sector and consulting

Matthew Mitro
Wisconsin Department of Natural Resources, Office of Applied Science
matthew.mitro@wisconsin.gov

Groundwater and the Resistance and Resilience of Wisconsin Trout Streams to Climate Change

Abstract
Water temperature is a key factor in determining where coldwater fish species such as Brook Trout Salvelinus fontinalis and Brown Trout Salmo trutta live in streams. Our past experiences in losing and restoring coldwater stream habitat in the Driftless Area can help inform how to address potential losses attributable to climate change. In this presentation I will give a brief overview of the history of coldwater stream loss and recovery in the Driftless Area of Wisconsin; show how projected changes in climate may further change coldwater stream habitat in Wisconsin; and discuss how groundwater is the key to which regions have high resistance and resilience to climate effects.

Education
PhD (fish biology), Montana State University, 1999
MS (statistics), Montana State University, 1999
MS (fisheries biology), University of Vermont, 1995
BA (biology), Colgate University, 1992

Experience
2003-present, Wisconsin DNR (coldwater fisheries research scientist)
2000-2003, US EPA Atlantic Ecology Division (population ecologist)
1999-2000, Atlantic States Marine Fisheries Commission (stock assessment biologist)

John Barry
Minnesota Department of Natural Resources
john.barry@state.mn.us

Combining High Resolution Spring Monitoring, Dye Tracing, and Watershed Analysis to Provide a Better Understanding of Nitrate Transport and Aquifer Characteristics

Presentation

- Multiagency/multiyear monitoring of flow, level, temperature, and nitrate concentrations at springs emanating from different hydrostratigraphic units in southeastern Minnesota
- Combined with dye tracing to delineate springsheds and characterize aquifer recharge responses
- Ideal monitoring timing and frequency is unique to hydrostratigraphic units
- Data is being coupled with springshed land use to assist in BMP evaluations and model development

Education

B.S. (geology with emphasis in hydrogeology), University of Minnesota, 2004

Experience

2011-present, Minnesota Department of Natural Resources
2004-2011, EOR (Twin Cities environmental consulting and engineering firm)

John L. Nieber
University of Minnesota
nieber@umn.edu

When Will Improved Practices be Measurable in Our Aquifers? Introduction to the Nitrate Lag Time Project

Education

Syracuse University	Forest Engineering	B.S.	1972
Cornell University	Civil and Environmental Eng.	M.S.	1974
Cornell University	Agricultural Engineering	Ph.D.	1979

Experience

2015 – present, Professor, Bioproducts and Biosystems Engineering, and Co-DGS, WRS graduate program, Univ. of MN
2013 – 2015, Professor, Bioproducts and Biosystems Engineering, Univ. of MN
2012 – 2013, Professor and Interim Head, Bioproducts and Biosystems Engineering, Univ. of MN
1995-2012, Professor Bioproducts and Biosystems Engineering, Univ. of MN.
1985-1995, Assoc. Professor Agr. Eng. Dept., Univ. of MN.
1979-1985, Asst Professor, Agr. Eng. Dept., Texas A&M Univ.
1975-1979, Graduate Res. & Teaching Asst. Agr. Eng. Dept., Cornell University
1973-1975, Res. Techn. Agr. Eng. Dept., Cornell Univ.
1972-1973, Teaching Asst. Civil & Envir. Eng., Cornell Univ.

Tony Runkel
Minnesota Geological Survey, Lead Geologist
runke001@umn.edu

When Will Improved Practices be Measurable in Our Aquifers? The Nitrate Lag Time Project

Presentation

- Compilation of groundwater nitrate values across southeastern Minnesota

Education

B.A. University of Minnesota Twin Cities
M.S. University of Montana
PhD University of Texas Austin

Kerry Holmberg
University of Minnesota - Bioproducts and Biosystems Engineering
Holmberg @umn.edu

When Will Improved Practices be Measurable in Our Aquifers? The Nitrate Lag Time Project – Analysis of Groundwater Nitrates

Presentation

- Given a fixed number of samples, what minimum difference in nitrates is detectable
- How many samples are needed to detect a change in nitrate concentrations
- Are there any statistically significant nitrate and landuse trends in the groundwater data that have been collected

Education

M.S. (forest resources, water resources), University of Minnesota, 1994
B.A. (biology), Wheaton College, 1986

Experience

2014-Present, University of Minnesota Bioproducts and Biosystems Engineering (researcher)
2003-2013, Embro Corporation/Creative Waters Solutions St. Louis Park, MN (research scientist)
2000-2003, Dept. Forest Resources University of MN St. Paul, MN (research fellow)

Jared Trost
United States Geological Survey
jtrost@usgs.gov

The Nitrate Lag Time Project – Groundwater age in Southeastern Minnesota

Presentation

- Introduction to the concept of groundwater age
- Description of chemical and analytical methods
- Groundwater ages from samples collected in southeastern Minnesota
- Conclusions and implications

Education

M.S. (Water Resource Science), University of Minnesota, 2010
B.A. (biology and chemistry), Augsburg College, Minneapolis, 2000

Experience

2010-present, hydrologist, U.S. geological Survey
2007 – 2010, student trainee, U.S. geological Survey
2001 – 2007, research project manager, Cedar Creek Ecosystem Science Reserve, University of Minnesota

Philip Margarit
University of Minnesota, Twin Cities - Water Resources Science
Marga031@umn.edu

Setting realistic nitrate BMP goals in southeast Minnesota – The Nitrate Lag Time Project – Trout Brook MODFLOW Modeling

Presentation

- MODFLOW Modeling
- Modeling Background
- Data Sources
- Trout Brook Modeling
- Assumptions/Simplifications
- Calibration
- Data Limitations/Issues
- Next Steps

Education

Ph.D. (Water Resources Science), University of Minnesota, Twin Cities, In Progress
B.S. (Geology), University of Wisconsin-River Falls, 2020

Experience

2020-present, University of Minnesota, Twin Cities (graduate research assistant)
2020, Young Environmental Consulting Group (Lead Intern)
2019, University of Minnesota, Twin Cities (undergraduate research assistant)
2018-2020, University of Wisconsin, River Falls (undergraduate researcher)

Andy Holmberg
University of Minnesota
andy.p.holmberg@gmail.com

The Nitrate Lag Time Project – Estimating Travel Times Advective-Dispersive Convolution Model

Presentation

- Utilizes loading rate, recharge rate, and piezometric water levels to predict nitrate concentration in an unconfined system
- Overview and implementation of the model

Education

B.S. Applied Mathematics, Wheaton College
B.A. Economics, Wheaton College

Experience

2020 - present, University of Minnesota (Technician)

Donna Rasmussen
Fillmore Soil and Water Conservation District (SWCD) Administrator, retired
rdrasmussen@outlook.com

Groundwater in the Driftless: Lessons from the Past

Presentation

- Challenges in the early days of county water planning in southeast Minnesota's karst region and the steps taken using education and information, data collection and monitoring, incentives, and regulations to meet those challenges
- Challenges that remain and the lessons learned from the past to continue making progress in protecting groundwater in the Driftless

Education

B. A. (Biology), 1979, Luther College, Decorah, Iowa
A. A. 1977, Waldorf College, Forest City, Iowa

Experience

2008-2019 Fillmore SWCD Administrator, Preston, Minnesota
1991-2008 Fillmore County Water Plan Coordinator, Preston, Minnesota
1989-1990 Fillmore County Extension Recycling Education Intern, Preston, Minnesota
1988-1995 Substitute teacher
1979-1980, 1983-1984 Biological Technician, Upper Mississippi River National Wildlife and Fish Refuge, U. S. Fish and Wildlife Service, Lansing, Iowa

Terry Lee
Olmsted County, retired
zumbrowater1955@gmail.com

A Look Back on Local Groundwater Management in Olmsted County

Presentation

- Local impact of S.P. Kingston's 1943 paper on water and sewer management
- Olmsted's adoption of well and septic ordinances in the 1950s -- water quality & well logs
- Impact of the personal computer revolution on water testing, data management, and mapping
- Integration of data and other information into studies, reports, and ordinances
- Concluding remarks

Education

B.S. (biology), Winona State University, 1984

Experience

1984-1991, Olmsted County Public Health (regional water lab manager)
1991-2008, Olmsted County Administration (County environmental resources coordinator)
2008-2018, Olmsted County Environmental Resources (water resources manager)

Caitlin Brady
Olmsted Soil & Water Conservation District, Water Resources Coordinator
brady.caitlin@co.olmsted.mn.us

Local Efforts to Protect Drinking Water Quality and Encourage Nitrogen Reduction Practices

Abstract
Our groundwater in SE MN is a high-quality resource. How we have managed the land in sensitive areas has introduced contaminants, such as nitrate, into the groundwater system. Groundwater initiatives in Olmsted County are broad ranging, from increasing access to safe drinking water, to County level nitrate assessments that have led to identification of problem areas and have advised local decision makers to consider adoption of nutrient reduction initiatives. Regular monitoring of drinking water and understanding how the quality of water is changing allows for a proactive approach, identifying and preventing and/or addressing contamination before it reaches a level that can negatively impact health. In the past five years, Olmsted County has tested 35% of the total number of private wells for nitrate, of those, only 12% have tested for nitrate on the recommended frequency. To date, the opportunity for technical assistance for mitigation measures for private well owners concerned about drinking water quality has been limited. Additionally, lower-income residents are often disproportionately affected by groundwater contamination, as installation of treatment technologies to reduce nitrate levels can be difficult and will not always solve the problem.

This talk will highlight the complex issue of nitrate contamination in Olmsted County and the SE region. This talk will also cover regional efforts to expand access to testing programs, improve public knowledge and awareness related to water quality, development of meaningful and targeted programs to address contamination concerns, and evaluation to better understand effectiveness of nutrient reduction strategies.

Biography
Caitlin Brady is the Water Resources Coordinator for Olmsted Soil & Water Conservation District. She is responsible for administering the County's comprehensive watershed management plan which has transitioned to three watershed management plans for the Root, Greater Zumbro and Mississippi River Winona- La Crescent (WinLaC). Her work focuses on groundwater with various programs aimed at increasing access to monitoring, education, and outreach for private well owners. She oversees the administration of a 9-county regional grant for volunteer well monitoring that has been operational since 2006. More recently, she coordinated a regional group to develop a public outreach campaign and provide financial assistance to well owners with nitrate contamination using funding from the MN Department of Health. Caitlin holds a B.A in Biology from the College of Saint Benedict.

Todd Osweiler
Rochester Public Utilities (RPU)
tosweiler@rpu.org

Water Sustainability in Rochester

Presentation

- Overview of RPU's water system
- Anticipated growth in Rochester
- Evaluation of alternative water sources
- Groundwater modeling
- Plans for Well 16 and current status of the work
- Overall objective is to ensure Rochester will have a sustainable water supply into the future

Education

B.S. (conservation), UW River Falls University, 1997

Experience

1997-present, Rochester Public Utilities (Environmental & Regulatory Affairs Coordinator)

Jenny Seifert
University of Wisconsin-Madison Division of Extension and North Central Region Water Network, Watershed Outreach Specialist
jenny.seifert@wisc.edu

FEWscapes: Research and Engagement to Expand Horizons for Food, Energy, Water, and Ecosystem Security

Abstract
Scenarios, ecological and economic models, and cross-sector discussion are tools a team at the University of Wisconsin-Madison is using to help uncover new opportunities to achieve food, energy, water, and ecosystem security and resilience in the Upper Mississippi River Basin. Learn about this research and engagement project, called FEWscapes, and how it's trying to bridge research with decision-making and help managers prepare for changes that will impact the region's future.

Biography
Jenny's experience and expertise are in environmental communications and outreach. She has worked predominantly in the academic and nonprofit sectors for the past 15 years. She has a joint MS in science communication and environmental studies from the University of Wisconsin-Madison and a BA in German Language and Literature from the University of Virginia.

Jeffrey S. Broberg, LPG, MA
Minnesota Well Owners Organization, Director
brobergmnwoo@gmail.com

Well Owners Across Minnesota Like to Talk About Their Drinking Water at Nitrate Testing Clinics

Presentation

In 2018 Jeff joined forces with three southeast Minnesota water activists and formed the Minnesota Well Owners Organization (MNWOO). MNWOO's mission is to help private well owners assure safe drinking water at their kitchen sink. Jeff's interests range from trout fishing and the geology of the Driftless Area, clean renewable energy and natural resource protection, enhancement and restoration.

In cooperation with the MGWA Education Committee we have developed details about how to hold effective water quality clinics for private landowners. MNWOO/MGWA in cooperation with the U of MN Institute on the Environment and the Rural Sustainability Partnership have learned important lessons:

- It is necessary to assess the social factors that drive and motivate participation or that build barriers for well owners.
- By recruiting partners and volunteers, especially among retired water professionals the clinics can offer reliable and practical advice for well owners.
- When well owners do not feel threatened by regulations or perceived government intervention they open up and like to talk about their wells and their water.
- Depending on the hydrogeology a large percentage of wells, especially old, pre-Well Code wells are at risk of nitrate and pesticide contamination.
- It is necessary for water professional to help those who get bad water tests. Not everyone has the means to afford expensive treatment, bottled water or new wells.
- Our partner supported, volunteer driven clinics are growing and setting records for participation

Biography

Jeff Broberg had a 27- year career as an Environmental Consultant with McGhie & Betts Environmental Services of Rochester and served 10 years on the LCCMR before he retired and returned to college in 2017. Jeff worked for the next two years and received a degree in Philanthropy and Development from Saint Mary's University of Minnesota.

Kevin Kuehner
Minnesota Department of Agriculture, Hydrologist
kevin.kuehner@state.mn.us

Root River Field to Stream Partnership

Presentation

- Updates about a collaborative research and demonstration project to reduce sediment, nutrients and pesticides in small study watersheds
- Stream nitrate concentrations and trends
- What farmers are doing to reduce loss

Education

B.S.-Water Resources Management and Soil Science. University of Wisconsin-Stevens Point, 1998
Certified Crop Advisor, 2011

Jeffrey Vetsch
University of MN Southern, Research and Outreach Center
jvetsch@umn.edu

Strategies to Reduce Nitrogen Loss: Nitrogen Smart Techniques

Biography

Jeff Vetsch manages soil science research at the University of Minnesota, Southern Research and Outreach Center in Waseca. He conducts applied research in the areas of nutrient management, water quality and cropping systems, primarily in corn and soybean. His research emphasis is on nitrogen management in corn. Jeff earned his BS (1989) and MS (2005) degrees from the University of Minnesota and he is a Certified Professional Soil Scientist. He received the researcher of the year award from the Fluid Fertilizer Foundation in 2013. He has authored 21 refereed publications and eight extension publications. From 2010 through 2019, he gave 275 professional and extension presentations to more than 14,000 attendees.

Martin Larsen
Olmsted County SWCD, farmer
larsen.martin@co.olmsted.mn.us

Strategies to Reduce Nitrogen Loss: Expected Nitrate in Groundwater Beneath Row Crops. Reductions Using Cover and Alternative Crops

Presentation

- Background of expected nitrates in groundwater leaching from corn and soybeans
- Observed nitrate concentration reductions in groundwater from addition of cover crops to a row crop rotation
- Alternative crops such as small grains and the large gains in reductions

Biography

Martin Larsen is a fifth-generation farmer using no-till and cover cropping practices to grow conventional corn, soybeans, oats and rye near Byron, Minnesota. Martin also works for the Olmsted County Soil and Water Conservation District, where he has researched land use, cover crop use and alternative crops effects on groundwater quality. He also serves as president of the Minnesota Caving Club.

Lance Klessig
Soil Keepers / Heart & Soil Ridge
Lance.klessig@gmail.com

Strategies to Reduce Nitrogen Loss: Cover Crops, Soil Health, and Communicating with Farmers

Education
B.S. Resource Management Geography, Wisconsin, 2005

Experience
Winona County Soil & Water Conservation District (Resource Specialist), 2016-2021
USDA Natural Resources Conservation Service (Soil Conservation Technician), 2010-2016
Dunn County Land Conservation (Conservation Planner), 2008-2010
River Country Resource Conservation & Development Council, Grazing Lands Specialist, 2006-2008
Soil Keepers LLC (owner), 2019-2021
Heart & Soil Ridge (owner), 2020-2021

Biography
Lance Klessig is a regenerative agriculture advocate enthusiastically working alongside farmers to implement soil health practices on their farms across the Midwest. He owns Soil Keepers where he provides education outreach and professional technical services. He and his wife, Chrissy, and their 5 children direct market pastured pork, eggs along with broilers and additionally custom graze heifers and goats on their SE MN farm, Heart & Soil Ridge near Dakota, MN.