



Minnesota **Water** Resources
CONFERENCE

October 17–18, 2017

Saint Paul RiverCentre

cce.umn.edu/water

Minnesota Water Resources Conference

October 17–18, 2017

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Welcome from the Co-chairs

We are excited to invite you to the 2017 Minnesota Water Resources Conference. Recent events across the nation and around the world highlight the need for scientific information and productive dialogue to shape informed decisions about water resource management.

We thank all those who submitted abstracts and the Water Resources Planning committee for their work in developing a timely and engaging program for this year's conference. The lineup of breakout sessions and posters will provide the latest knowledge on a rich array of water resource topics important to Minnesota and beyond. As always, these sessions will be complemented by a lineup of sought-after plenary speakers in the morning and luncheon sessions.

We also thank the attendees from previous years for feedback on the conference experience. The committee considered these comments carefully and has responded by keeping the features that work well and modifying those that can be improved. Features that have been added or improved in recent years:

- A separate exhibition space featuring exhibitor booths and posters throughout the conference, where you will find refreshments served during breaks.
- The Water Bar makes a return to serve a selection of local tap waters in the exhibitor hall.
- A breakout schedule with four presentations per session, allowing for a program with a large and diverse set of presented topics.
- A downloadable mobile app with the fully searchable conference program, speaker biographies, maps, exhibitor information, and social media capabilities.
- Special session on a timely topic: "A Market Approach to Continuous Living Cropping Systems: The Sweet Spot for Water, Wildlife, and Climate" (see box on page 2).
- Professional development and mentoring opportunities for student attendees.
- Live background music at the Tuesday afternoon poster session and reception, featuring a local student artist.

Finally, we would like to thank our exhibitors for both their financial support and the energy they bring to the networking breaks and Tuesday afternoon reception.

Please join us along with over 700 other policy makers, academics, local implementers, and water resources advocates on October 17 and 18 at the Saint Paul RiverCentre for this annual event.

Jeffrey Peterson, Water Resources Center, University of Minnesota, and
Greg Wilson, Barr Engineering, Conference Co-Chairs



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Water Resources Center

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University of Minnesota

Natural Resources Research Institute,
University of Minnesota

Minnesota Water Resources Conference

October 17–18, 2017

The **Minnesota Water Resources Conference** presents **innovative, practical, and applied water resource engineering solutions, management techniques, and current research about Minnesota's water resources.** The conference provides an opportunity to address: 1) lessons learned from the implementation of engineering projects, 2) best practices discovered in the design and application of water resource management techniques, 3) implications of water policy decisions, and 4) research into current and emerging issues. The conference facilitates interaction among engineers, water resources managers, researchers, and local, state, and federal agency staff.



Registration and Fees

Early registration

(before September 22)

Two-day: \$245

One-day: \$170

Student: \$65

Late registration

(starting September 22)

Two-day: \$295

One-day: \$220

Student: \$85

The registration fee for the Minnesota Water Resources Conference includes access into all plenary, luncheon, and concurrent sessions, special sessions, poster sessions, conference materials, lunch and refreshment breaks each day, and the Tuesday evening reception. Participants may register online, by fax or mail, for both days or one day only.

Cancellations

Refunds, minus a \$30 fee, will be issued to participants who provide a written cancellation notice by October 3. If you cancel after this date, you will not be eligible for a refund. The University reserves the right to cancel the conference, if necessary, in which case a full refund would be made.

Continuing Education Units (CEUs), Professional Development Hours (PDHs)

Conference attendees will receive .675 CEUs/ 6.75 PDHs for each day of the Minnesota Water Resources Conference. Participants who wish to receive full credit must attend all scheduled hours of the event.

Guidebook Mobile App



We encourage you to download the mobile app to enhance your experience at the conference. We will send instructions to registered participants before the conference. Attendees will be able to plan their days with a personalized schedule and browse concurrent session and poster abstracts, presenter biographies, exhibitors, and maps, and participate in the conference backchannel by posting on social media (Twitter and Facebook) before and during the conference.

The app is compatible with iOS and Android devices. Windows, iPhone 7, and Blackberry users can access the same information via the mobile site.

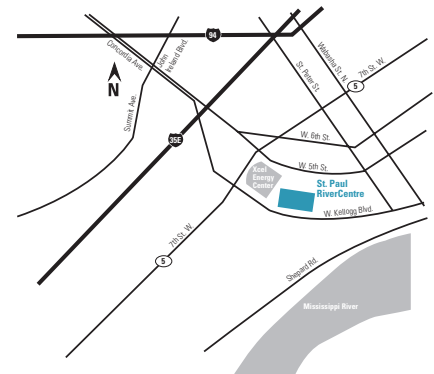
Social Media: Join the Conversation #mnwrc17



We invite you to join the conversation about the Minnesota Water Resources Conference by posting updates on Twitter and Facebook. The course hashtag is **#mnwrc17**: type this hashtag in your tweets/posts to continue the course backchannel, or you may also search Twitter for this hashtag to view the tweets online and keep up with sessions you missed. These social media efforts will help participants network and meet new colleagues prior to and during the course.

Location and Parking

The Minnesota Water Resources Conference will be held at the Saint Paul RiverCentre, 175 Kellogg Boulevard, Saint Paul. Parking is available in the RiverCentre parking ramp, located on Kellogg Boulevard across the street from the RiverCentre. Please see the map for the location of the RiverCentre. Convenient bus service to the RiverCentre is available. Call Metropolitan Transit, 612-373-3333, for specific route information.



Accommodations

Hotel rooms are available at the Holiday Inn RiverCentre, 175 West 7th Street, Saint Paul. Call the hotel directly at 651-225-1515 or toll free at 888-465-4329 and ask for the University of Minnesota rate. Make your reservation early in order to ensure a room at the hotel.

For Registration Questions

612-625-2900

ccereg@umn.edu

For Program Questions

Katherine Hagberg

University of Minnesota

612-624-4230

cceconf3@umn.edu

RETURNING FEATURES THIS YEAR

Special Session

A Market Approach to Continuous Living Cropping Systems: The Sweet Spot for Water, Wildlife, and Climate

This special session will explore the need for perennial cropping systems and their potential to improve our natural resources. Specific markets examples will be used to illustrate the benefits to water and wildlife, and also policies, technologies, and financial incentives necessary to make these markets profitable.

Presenters will include:

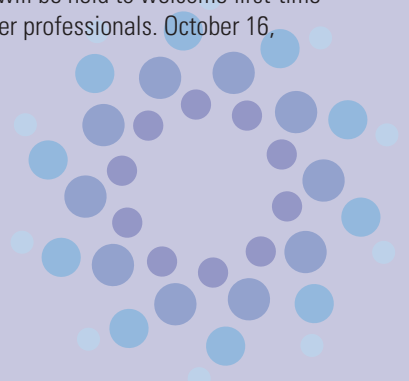
Rich Biske, The Nature Conservancy; *Joe Duggan*, Pheasants Forever; *Brendan Jordan*, Great Plains Institute; *Steve Morse*, Minnesota Environmental Partnership; *Jeff Peterson*, University of Minnesota; *Shawn Schottler*, Science Museum of Minnesota; *Don Wyse*, University of Minnesota–Forever Green Initiative

Exhibitor and Poster Area

The exhibitor and poster area will be set up in a large ballroom again this year, to facilitate networking and discussion with exhibitors and poster authors. Refreshments will be served in this area, along with the Tuesday evening reception.

Networking Event

A preconference networking event will be held to welcome first-time attendees, students, and early career professionals. October 16, 7–8:30 p.m.



2017 Water Resources Planning Committee

John Baker, US Department of Agriculture, and Department of Soil, Water, and Climate, University of Minnesota

Ann Banitt, US Army Corps of Engineers

Jeff Berg, Minnesota Department of Agriculture

John Bilotta, MN Sea Grant, University of Minnesota Extension

Mark Brigham, US Geological Survey

Tina Carstens, Ramsey-Washington Metro Watershed District

Heather Dorr, College of Continuing Education, University of Minnesota

Bill Douglass, Bolton & Menk, Inc.

Lorin K. Hatch, WSB & Associates

Andrea Hendrickson, Minnesota Department of Transportation

Kimberly Hill, St. Anthony Falls Laboratory, University of Minnesota

Karen Jensen, Metropolitan Council

Lucinda Johnson, Natural Resources Research Institute, University of Minnesota

Stephanie Johnson, Mississippi Watershed Management Organization

Cheryl Konate, Water Resources Center, University of Minnesota

Ron Leaf, Short Elliott Hendrickson, Inc.

Zack McGough, College of Continuing Education, University of Minnesota

Salam Murtada, Department of Natural Resources, Division of Waters

Randy Neprash, Minnesota Cities Stormwater Coalition & Stantec

* *Jeffrey Peterson*, Water Resources Center, University of Minnesota

Amit Pradhananga, Department of Forest Resources, University of Minnesota

Shawn Schottler, St. Croix Watershed Research Station

Wayne Sicora, Natural Resource Group

Gene Soderbeck, Minnesota Pollution Control Agency

James Stark, US Geological Survey

Katy Thompson, ASCE Representative and WSB & Associates, Inc.

Stew Thornley, Minnesota Department of Health

Rick Voigt, Voigt Consultants, LLC

Marcey Westrick, Board of Water and Soil Resources

* *Greg Wilson*, Barr Engineering Company

* Committee Co-Chairs

Program Schedule – Tuesday, October 17, 2017

8:00–8:10 a.m. **Welcome**
Jeff Peterson, Water Resources Center, University of Minnesota

8:10–8:20 a.m. **Dave Ford Water Resources Award**

8:20–9:30 a.m. **Plenary Session**
Communicating Science for Action
Amy Skoczlas Cole, American Public Media

9:30–10:00 a.m. **Break**

10:00–11:30 a.m. Concurrent Sessions I

Track A	Track B	Track C	Track D
<p>Wetlands—Benefits to All Moderator: <i>Katy Thompson, WSB & Associates</i> Co-Moderator: <i>Rick Voigt, Voigt Consultants, LLC</i></p>	<p>Stormwater: Iron Enhanced Practices Moderator: <i>John Bilotta, University of Minnesota</i> Co-Moderator: <i>John Gulliver, University of Minnesota</i></p>	<p>Adapting to Climate Change Moderator: <i>Tina Carstens, Ramsey-Washington Metro Watershed District</i> Co-Moderator: <i>Ann Banitt, United States Army Corps of Engineers</i></p>	<p>Sediment & Phosphorus Moderator: <i>Gene Soderbeck, Minnesota Pollution Control Agency</i> Co-Moderator: <i>Mark Brigham, United States Geological Survey</i></p>
<p>Monitoring Changes in Minnesota Wetland Area from 2006 to 2014 <i>Steve Kloiber and Doug Norris, Minnesota Department of Natural Resources</i></p>	<p>Iron Filings Application to Reduce Internal Phosphorus Loading in Lakes <i>Poornima Natarajan, Saint Anthony Falls Laboratory, University of Minnesota; John Gulliver and William Arnold, University of Minnesota</i></p>	<p>3D Modeling and Prediction of Coolwater Fish Habitat Under Changing Climate <i>Shahram Missaghi, St. Anthony Falls Laboratory, University of Minnesota and University of Minnesota Extension; Miki Hondzo and William Herb, Saint Anthony Falls, University of Minnesota</i></p>	<p>Tackling Soluble Phosphorus in Agricultural Watersheds <i>Rebecca Carlson, Wenck Associates, Inc.; Cole Loewen, Clearwater River Watershed District</i></p>
<p>Potholes in the Prairie: Defining Wetland Complex Hydrology <i>Jennifer Gruetzman, United States Fish and Wildlife Service</i></p>	<p>Iron-Enhanced Sand Filter Performance for Reducing Phosphorus from a Regional Stormwater Pond: Roseville, MN <i>Maddie Vargo, Bob Fossum, and Britta Suppes, Capitol Region Watershed District</i></p>	<p>Climate and Land Use Changes Impact on Nitrogen Concentrations and Nitrogen Loads in the Minnesota River <i>Nathaniel Baeumler and Satish Gupta, University of Minnesota</i></p>	<p>Sediment-Phosphorus Interactions and Their Implications for Watershed Management in Agricultural Landscapes <i>Anna Baker, Jacques Finlay, Diana Karwan, Tessa Belo, and Water Atkins, University of Minnesota; Karen Gran, University of Minnesota Duluth; Daniel Engstrom, St. Croix Watershed Research Station</i></p>
<p>Modeling Hydrology of Headwater Boreal Watersheds <i>Jonathan Hess, Scott County Soil and Water Conservation District; John Nieber, University of Minnesota; Stephen Sebestyen, United States Forest Service</i></p>	<p>Performance of Iron-Enhanced Sand Filters: Results from Laboratory, Urban, and Agricultural Studies <i>Andy Erickson and John Gulliver, St. Anthony Falls Laboratory, University of Minnesota; Pete Weiss, Valparaiso University</i></p>	<p>Protecting Two-Story Lakes: A Battle Against Phosphorus and Climate Change <i>Hans Holmberg, Dendy Lofton, and Ben Cray, LimnoTech; Gary Pulford, Courte Oreilles Lake Association; Dan Tyrolt, Lac Courte Oreilles Conservation District</i></p>	<p>Suspended-Sediment Concentrations, Bed Load, Particle Sizes, Surrogate Measurements, and Annual Sediment Loads for Selected Sites in the Lower Minnesota River Basin, Water Years 2011 Through 2016 <i>Joel Groten, United States Geological Survey Minnesota Water Science Center; Christopher Ellison, United States Geological Survey; Jon Hendrickson, United States Army Corps of Engineers</i></p>
<p>Six Mile Marsh: Total Phosphorus Sink or Soluble Phosphorus Source? <i>Brian Beck, Wenck Associates, Inc.; Kelly Dooley, Minnehaha Creek Watershed District; Sarah Nalven and Joe Bischoff, Wenck Associates; Anna Brown, Minnehaha Creek Watershed District</i></p>	<p>Using Innovative Iron-Enhanced BMPs to Maximize Phosphorus Removal <i>Tim Olson and Bill Douglass, Bolton & Menk, Inc.</i></p>	<p>Engagement Strategies to Plan for Climate Resilience at the Community and Watershed Scale <i>Leslie Yetka, Freshwater Society; Claire Bleser, Riley Purgatory Bluff Creek Watershed District; Erica Sniogowski, Nine Mile Creek Watershed District; Fred Rozumalski, Barr Engineering Company</i></p>	<p>Wind Erosion: Does it Matter for Water Quality? <i>Kris Guentzel, Drew Kessler, and Mark Deutschman, Houston Engineering, Inc.</i></p>

Program Schedule – Tuesday, October 17, 2017 (continued)

11:30 a.m.–12:15 p.m. **Lunch**

12:15–1:00 p.m. **Luncheon Presentation**

Water Quality and Agriculture

Greg Page, Retired Chairman and CEO, Cargill, Incorporated

1:15–2:45 p.m. **Concurrent Sessions II**

Track A	Track B	Track C	Track D
<p>Lakes—Phosphorus Loading</p> <p>Moderator: <i>Gene Soderbeck</i>, Minnesota Pollution Control Agency</p> <p>Co-Moderator: <i>Bill Douglass</i>, Bolton & Menk, Inc.</p>	<p>Water Reuse and Conservation</p> <p>Moderator: <i>Stew Thornley</i>, Minnesota Department of Health</p> <p>Co-Moderator: <i>Ron Leaf</i>, Kimley-Horn & Associates</p>	<p>Wastewater Treatment</p> <p>Moderator: <i>John Baker</i>, United States Department of Agriculture</p> <p>Co-Moderator: <i>Karen Jensen</i>, Metropolitan Council</p>	<p>Special Session</p> <p>Moderator: <i>Shawn Schottler</i>, St. Croix Watershed Research Station</p> <p>Co-Moderator: <i>Jeffrey Peterson</i>, University of Minnesota</p>
<p>Predicting Responses of Lakes to Phosphorus Loading by Characterizing Efficiency of P Recycling in Sediments</p> <p><i>Sergei Katsev</i>, Large Lakes Observatory, University of Minnesota Duluth</p>	<p>Advancing Safe and Sustainable Water Reuse in Minnesota</p> <p><i>Anita Anderson</i>, Minnesota Department of Health</p>	<p>A History of “Conventional” Wastewater Treatment” in Response to New Water Quality Standards in Minnesota</p> <p><i>Kyser Scott</i>, Minnesota Pollution Control Agency</p>	<p>A Market Approach to Continuous Living Cropping Systems: The Sweet Spot for Water, Wildlife, and Climate</p> <p>This special session will explore the need for perennial cropping systems and their potential to improve our natural resources. Specific markets examples will be used to illustrate the benefits to water and wildlife, and also policies, technologies, and financial incentives necessary to make these markets profitable.</p> <p>Presenters will include:</p>
<p>Why Zebra Mussels Are Crashing in Lake Minnetonka and What It Means for Other Lakes</p> <p><i>Steve McComas</i>, Blue Water Science; <i>Eric Fieldseth</i>, Minnehaha Creek Watershed District</p>	<p>Stormwater Reuse in Carver County: An Innovative Approach to Reducing Pollutant Loads to Water Resources</p> <p><i>Tim Sundby</i>, Carver County Water Management Organization</p>	<p>Clean Water Funding and the Cost of Wastewater Treatment in Minnesota</p> <p><i>Baishali Bakshi and Joel Peck</i>, Minnesota Pollution Control Agency</p>	<p><i>Rich Biske</i>, The Nature Conservancy; <i>Joe Duggan</i>, Pheasants Forever; <i>Brendan Jordan</i>, Great Plains Institute; <i>Steve Morse</i>, Minnesota Environmental Partnership; <i>Jeff Peterson</i>, University of Minnesota; <i>Shawn Schottler</i>, Science Museum of Minnesota; <i>Don Wyse</i>, Forever Green</p>
<p>Assessment of Lake of the Woods’ Internal Phosphorus Loading</p> <p><i>Geoff Kramer and Bruce Wilson</i>, RESPEC Consulting and Services; <i>Jesse Anderson and Cary Hernandez</i>, Minnesota Pollution Control Agency</p>	<p>Northwood Lake Stormwater Improvements</p> <p><i>Tyler Johnson and Chris Long</i>, Stantec Consulting Services; <i>Bernie Weber and Megan Albert</i>, City of New Hope</p>	<p>Nanoselenium Sponge Technology for Mercury Removal from Water</p> <p><i>John Brockgreitens, Snober Ahmed, and Abdennour Abbas</i>, University of Minnesota</p>	<p>Agenda</p>
<p>“Not Enough Evidence of a Trend”: Distinguishing Between Stable and Variable Water Quality</p> <p><i>Marta Shore, James Jahnz, Lee Ganske, Shannon Martin, and Laurie Sovell</i>, Minnesota Pollution Control Agency</p>	<p>New Water Conservation Reporting System</p> <p><i>Carmelita Nelson</i>, Minnesota Department of Natural Resources; <i>Leo Steidel</i>, Energy Savings Platform</p>	<p>Rapid Removal of Phosphate from Water Using a Nanoiron Sponge</p> <p><i>Fatemeh Heidari, John Brockgreitens, and Abdennour Abbas</i>, University of Minnesota</p>	<p>A. 1:15–1:30</p> <p>Introduction: Perennial Crops as a Water, Wildlife, and Climate Remedy</p>
			<p>B. 1:30–2:15</p> <p>The Need for and Potential of Perennial Cropping Systems—Three Perspectives: Water Quality, Wildlife Habitat, Carbon Storage</p>
			<p>C. 2:15–2:45</p> <p>Example Market Scenarios</p>

Program Schedule – Tuesday, October 17, 2017 (continued)

2:45–3:15 p.m. Break

3:15–4:45 p.m. Concurrent Sessions III

Track A	Track B	Track C	Track D
<p>Lakes—Miscellaneous Moderator: <i>Lorin Hatch</i>, WSB & Associates Co-Moderator: <i>Gene Soderbeck</i>, Minnesota Pollution Control Agency</p>	<p>Water Management from the Metro's Perspective Moderator: <i>Stephanie Johnson</i>, Mississippi Watershed Management Organization Co-Moderator: <i>Andrea Hendrickson</i>, Minnesota Department of Transportation</p>	<p>Using Bioreactors for Water Quality Enhancement Moderator: <i>Lucinda Johnson</i>, Natural Resources Research Institute, University of Minnesota Co-Moderator: <i>Jeff Berg</i>, Minnesota Department of Agriculture</p>	<p>Special Session (continued)</p>
<p>Canvasback Ducks, Wild Celery, and Nutrient Regulation in Large Shallow Water Lakes <i>Stephen Thomforde</i>, Dakota County Technical College</p>	<p>35 Years of Failures and Success: Impact of the Metropolitan Surface Water Management Act <i>Steve Woods</i>, Freshwater Society</p>	<p>Bioreactors and Saturated Buffer—Making an Impact on Drainage and Water Quality <i>Chuck Brandel</i>, ISG, Inc.</p>	<p>D. 3:15–4:00 Example Market Scenarios continued</p>
<p>New Evidence of Algal Toxins in Lake Kabetogama, Voyageurs National Park, Northern Minnesota <i>Victoria Christensen and Erin Stelzer</i>, United States Geological Survey Minnesota Water Science Center; <i>Ryan Maki</i>, National Park Service</p>	<p>Revitalizing Stormwater: Incorporating Ultra-Urban BMPs in the Jackson Street Reconstruction <i>Patrick Sejkora and Chad Setterholm</i>, Short Elliott Hendrickson, Inc.; <i>Cindy Zenger</i>, Toole Design Group</p>	<p>Novel Design and Field Performance of Phosphorus-Sorbing and Denitrifying Bioreactors <i>Andry Ranaivoson, Jeffrey Strock, Marta Roser, and David Mulla</i>, University of Minnesota; <i>Gary Feyereisen and Kurt Spokas</i>, United States Department of Agriculture, Agricultural Research Service</p>	<p>E. 4:00–4:10 Synthesis</p>
<p>Lake Color Across Seasons, Years and Decades: Cross-Scale Temporal Variability in Minnesota Lake Chromophoric Dissolved Organic Matter from Field and Remote Sensing Data <i>Claire Griffin, Patrick Brezonik, Jacques Finlay, Leif Olmanson, Benjamin Allen, and Raymond Hozalski</i>, University of Minnesota</p>	<p>Adaptive Project Execution Under Challenging Seasonal Climatic Conditions <i>Kyle Axtell</i>, Rice Creek Watershed District; <i>Dennis McAlpine</i>, Houston Engineering, Inc.</p>	<p>Nitrate Removal from Agricultural Runoff in Denitrifying Bioreactors <i>Nadine Hacksaw, Michael Brown, Lori Krider, Bruce Wilson, and Sebastian Behrens</i>, University of Minnesota</p>	<p>F. 4:10–4:45 Panel Discussion</p>
<p>Moving Toward Near Real-Time Water Quality Measurements in Minnesota Using New Landsat and Sentinel Satellite Data <i>Claire Griffin, Patrick Brezonik, Marvin Bauer, Jacques Finlay, Leif Olmanson, Benjamin Allen, and Raymond Hozalski</i>, University of Minnesota</p>	<p>Solving a TMDL Problem: Keller Lake WQ Improvements <i>Jacob Newhall</i>, WSB and Associates; <i>Daryl Jacobson</i>, City of Burnsville</p>	<p>Enhanced Microbial Sulfate Removal Through a Novel Electrode-Integrated Bioreactor <i>Daniel Takaki, Tobin Deen, and Chan Lan Chun</i>, Natural Resources Research Institute, University of Minnesota Duluth; <i>Daniel S. Jones</i>, University of Minnesota</p>	

4:45 – 5:45 Reception and Poster Session

Program Schedule – Wednesday, October 18, 2017

8:00–8:10 a.m. Welcome
Greg Wilson, Barr Engineering Company

8:10–9:30 a.m. Plenary Session
Water Quality and Microorganisms: Protecting Recreation and Public Health
Mike Sadowsky, University of Minnesota

9:30–10:00 a.m. Break

10:00–11:30 a.m. Concurrent Sessions IV

Track A	Track B	Track C	Track D
<p>Alteration and Conservation</p> <p>Moderator: <i>Ann Banitt</i>, United States Army Corps of Engineers</p> <p>Co-Moderator: <i>Salam Murtada</i>, Minnesota Department of Natural Resources</p>	<p>Equity, Value, and Capacity—Building for Water Resources</p> <p>Moderator: <i>Karen Jensen</i>, Metropolitan Council</p> <p>Co-Moderator: <i>Tina Carstens</i>, Ramsey-Washington Metro Watershed District</p>	<p>Groundwater/Surface Water</p> <p>Moderator: <i>Gene Soderbeck</i>, Minnesota Pollution Control Agency</p> <p>Co-Moderator: <i>Jim Stark</i>, United States Geological Survey</p>	<p>Chemicals of Concern</p> <p>Moderator: <i>Kimberly Hill</i>, St. Anthony Falls Laboratory, University of Minnesota</p> <p>Co-Moderator: <i>Randy Neprash</i>, Stantec Consulting Services, Inc.</p>
<p>A Framework for Addressing Altered Hydrology</p> <p><i>Timothy Erickson, Mark Deutschman, and Drew Kessler</i>, Houston Engineering, Inc.</p>	<p>Equity and Justice in Organizations Responsible for the Stewardship of Water Resources</p> <p><i>Marie Donahue and Vanessa Voller</i>, University of Minnesota; <i>Lark Weller</i>, National Park Service Mississippi National River and Recreation Area</p>	<p>Who Uses the Municipal Groundwater Supply in the North and East Groundwater Management Area?</p> <p><i>Mick Jost</i>, Minnesota Technical Assistance Program, University of Minnesota; <i>Miriam Yee</i>, (formerly) Minnesota Technical Assistance Program, University of Minnesota</p>	<p>Estrone and Temperature Interactions: Effects on the Predator-Prey Relationship in Freshwater Fish</p> <p><i>Victoria Korn, Heiko Schoenfuss, and Jessica Ward</i>, St. Cloud State University</p>
<p>The Minnesota Public Drainage Manual—A Guide to Administering Minnesota Statutes, Chapter 103E Publically Administered Privately Owned Drainage Systems</p> <p><i>Tim Gillette</i>, Minnesota Board of Water and Soil Resources</p>	<p>What Is Clean Water Worth? Accounting for the True Value of Water in Minnesota</p> <p><i>Bonnie Keller</i>, University of Minnesota</p>	<p>Groundwater-Surface Water Exchange Dynamics Following a Channel Reconfiguration Project: Stewart River, MN</p> <p><i>Larissa Scott and Karen Gran</i>, University of Minnesota Duluth; <i>Lucinda Johnson</i>, National Resources Research Institute, University of Minnesota</p>	<p>Micropollutants in Groundwater and Soil at Wastewater Land Application Sites</p> <p><i>Aleisha Krall and Sarah Elliott</i>, United States Geological Survey Minnesota Water Science Center; <i>Melinda Erickson</i>, United States Geological Survey; <i>Byron Adams</i>, Minnesota Pollution Control Agency</p>
<p>Evolution of the Agricultural BMP Handbook for Minnesota</p> <p><i>Christian Lenhart and Brad Gordon</i>, University of Minnesota; <i>Heidi Peterson</i>, Minnesota Department of Agriculture; <i>Walter Esenaur</i>, SRF Consulting Group, Inc.</p>	<p>Building Capacity and Competence: It's Not All About Money</p> <p><i>Paul Nelson</i>, Scott County; <i>Mae Davenport</i>, University of Minnesota; <i>Troy Kuphal</i>, Scott Soil and Water Conservation District</p>	<p>Streambank Stabilization Project: Landowner Perspectives</p> <p><i>Barbara Liukkonen</i>, Retired, University of Minnesota</p>	<p>PFAS Trends in Environmental Media and Facility Management Considerations to Limit Future Liabilities</p> <p><i>Shalene Thomas</i>, Amec Foster Wheeler</p>
<p>Improving the Effectiveness of Conservation in the Le Sueur River Basin</p> <p><i>Amy Hansen</i>, St. Anthony Falls Laboratory, University of Minnesota; <i>Christine Dolph, Jacques Finlay, and Brent Dalzell</i>, University of Minnesota; <i>Efi Foufoula-Georgiou</i>, University of California-Irvine; <i>Patrick Belmont and Peter Wilcock</i>, Utah State University; <i>Cathy Kling</i>, Iowa State University; <i>Sergey Rabotyagov</i>, University of Washington; <i>Karen Gran</i>, University of Minnesota Duluth</p>	<p>Blooming Alleys for Clean Water: Addressing Impaired Waters through Citizen Engagement</p> <p><i>Laura Scholl and Rich Harrison</i>, Metro Blooms</p>	<p>Simulation and Assessment of Groundwater Flow and Surface-Water Exchanges in Lakes of the Northeast Twin Cities Metropolitan Area, Minnesota, 2003–2013</p> <p><i>Perry Jones</i>, United States Geological Survey Minnesota Water Science Center; <i>Jared Trost, Catherine Christenson, and Aliasha L. Diekoff</i>, United States Geological Survey; <i>Jason Roth</i>, United States Department of Agriculture, Natural Resources Conservation Service</p>	<p>Pollutant Stress in the Maumee River: Impacted Physiology and Reproduction in Fathead Minnows (<i>Pimephales promelas</i>) and Sunfish (<i>Lepomis spp.</i>)</p> <p><i>Nicholas Cipoletti and Heiko Schoenfuss</i>, St. Cloud State University</p>

Program Schedule – Wednesday, October 18, 2017 (continued)

11:30 a.m.–12:15 p.m. **Lunch**

12:15–1:00 p.m. **Luncheon Presentation**

Tribal Water Resources Issues

Nancy Schuldt, Fond du Lac Environmental Program

1:15–2:45 p.m. **Concurrent Sessions V**

Track A	Track B	Track C	Track D
<p>Modeling in Agricultural Watersheds</p> <p>Moderator: <i>Jeff Berg</i>, Minnesota Department of Agriculture</p> <p>Co-Moderator: <i>Marcey Westrick</i>, Board of Water and Soil Resources</p>	<p>Contaminated Runoff and Mitigation Strategies</p> <p>Moderator: <i>Bill Douglass</i>, Bolton & Menk, Inc.</p> <p>Co-Moderator: <i>Tina Carstens</i>, Ramsey-Washington Metro Watershed District</p>	<p>Nitrate and Arsenic in Groundwater</p> <p>Moderator: <i>Stew Thornley</i>, Minnesota Department of Health</p> <p>Co-Moderator: <i>Amit Pradhananga</i>, University of Minnesota</p>	<p>Flow, Floodplains, and Fish</p> <p>Moderator: <i>Katy Thompson</i>, WSB & Associates</p> <p>Co-Moderator: <i>Andrea Hendrickson</i>, Minnesota Department of Transportation</p>
<p>Resilience Under Accelerated Change (REACH): Modeling Tradeoffs in Water Quality, Ecosystem Services, and Conservation in the Minnesota River Basin</p> <p><i>Christy Dolph</i>, <i>Jacques Finlay</i>, <i>Brent Dalzell</i>, and <i>Amy Hansen</i>, University of Minnesota; <i>Efi Foufoula-Georgiou</i>, University of California–Irvine; <i>Patrick Belmont</i> and <i>Peter Wilcock</i>, Utah State University; <i>Cathy Kling</i>, Iowa State University; <i>Sergey Rabotyagov</i>, University of Washington; <i>Karen Gran</i>, University of Minnesota Duluth; <i>Se Jong Cha</i>, Johns Hopkins University</p>	<p>Assessing BMP Removal of Contaminants of Emerging Concern in Urban Stormwater</p> <p><i>Richard Kiesling</i>, United States Geological Survey; <i>David Fairbairn</i>, Minnesota Pollution Control Agency; <i>Sarah Elliott</i>, United States Geological Survey Minnesota Water Science Center; <i>Mark Ferrey</i>, Minnesota Pollution Control Agency; <i>Benjamin Westerhoff</i>, Saint Cloud State University</p>	<p>Arsenic Concentration Variability in Newly Constructed Drinking Water Wells in Minnesota, USA</p> <p><i>Melinda Erickson</i>, United States Geological Survey Minnesota Water Science Center; <i>Emily Berquist</i>, Minnesota Department of Health; <i>Helen Malenda</i>, Colorado School of Mines</p>	<p>Using the M.O.V.E. Equations and Balances Hydrograph Analysis to Better Define Graphical Flow-Frequency Analysis</p> <p><i>Chanel Mueller</i>, United States Army Corps of Engineers</p>
<p>Evaluating the Benefits of Cover Crop Applications on Surface Runoff, Erosion, and Water Quality Using the Gridded Surface Subsurface Hydrological Analysis (GSSHA) Model</p> <p><i>Salam Murtada</i>, Minnesota Department of Natural Resources, Ecological and Water Resources</p>	<p>MPCA Stormwater Research: Understanding Contaminant Loads and Chemical-Hydrological Performance of Urban Stormwater BMPs</p> <p><i>David Fairbairn</i>, Minnesota Pollution Control Agency</p>	<p>Predicting Arsenic in Drinking Water Wells in Glacial Aquifer in Western and Central Minnesota, USA</p> <p><i>Melinda Erickson</i> and <i>Sarah Elliott</i>, United States Geological Survey Minnesota Water Science Center; <i>Catherine Christenson</i>, United States Geological Survey</p>	<p>Managing Channel Incision Through Legacy Sediments in Driftless Area Streams</p> <p><i>Jeffrey Lee</i>, <i>Ron Koth</i>, and <i>Jeff Weiss</i>, Barr Engineering Company</p>
<p>Modeling Effects of Nitrogen BMPs on Nitrate Efflux from Small Agricultural Watersheds in the South Branch of the Root River Watershed</p> <p><i>Mark Greve</i>, <i>John Nieber</i>, and <i>David Mulla</i>, University of Minnesota; <i>Heidi Peterson</i>, and <i>Kevin Kuehner</i>, Minnesota Department of Agriculture</p>	<p>Properties of Alternative Treatment Media for Stormwater Biofiltration Systems</p> <p><i>David Saftner</i> and <i>Josh Swanson</i>, University of Minnesota Duluth; <i>Meijun Cai</i>, <i>Kurt Johnson</i>, and <i>Marsha Patelke</i>, Natural Resources Institute, University of Minnesota Duluth</p>	<p>Time Lapse Movies of Nitrate Concentrations in Dakota County Aquifers</p> <p><i>William Olsen</i>, Dakota County Environmental Resources Department</p>	<p>Ecological Flow Analyses for Minnesota Streams</p> <p><i>Jeff Ziegeweid</i>, United States Geological Survey Minnesota Water Science Center; <i>Greg Johnson</i>, Minnesota Pollution Control Agency</p>
<p>Watershed Model Calibration with HSPEXP+1.31: A Case Study for the Snake River Watershed</p> <p><i>Anurag Mishra</i>, <i>Brian Bicknell</i>, <i>Paul Duda</i>, and <i>Tony Donigan</i>, RESPEC Consulting and Services</p>	<p>Accumulation and Transport of Road Salt in a Twin Cities Metro Lakeshed</p> <p><i>Ben Janke</i>, <i>William Herb</i>, and <i>Heinz Stefan</i>, Saint Anthony Falls Laboratory, University of Minnesota</p>	<p>The Status and Future of Nitrate in Drinking Water Aquifers</p> <p><i>Richard Soule</i>, Minnesota Department of Health</p>	<p>Box Culvert Design to Maintain Stream Connectivity at Road-Stream Crossings</p> <p><i>Jessica Kozarek</i>, St. Anthony Falls Laboratory, University of Minnesota; <i>Jay Hatch</i>, <i>Britney Mosey</i>, and <i>Matt Herrick</i>, University of Minnesota</p>

Program Schedule – Wednesday, October 18, 2017 (continued)

2:45–3:00 p.m. Break

3:00–4:30 p.m. Concurrent Sessions VI

Track A	Track B	Track C	Track D
<p>Keeping Stormwater on the Land</p> <p>Moderator: <i>Jim Stark</i>, United States Geological Survey</p> <p>Co-Moderator: <i>Stephanie Johnson</i>, Mississippi Watershed Management Organization</p>	<p>Adaptive Management</p> <p>Moderator: <i>Marcey Westrick</i>, Board of Water and Soil Resources</p> <p>Co-Moderator: <i>Gene Soderbeck</i>, Minnesota Pollution Control Agency</p>	<p>Measuring and Managing Altered Hydrology</p> <p>Moderator: <i>Shawn Schattler</i>, St. Croix Watershed Research Station</p> <p>Co-Moderator: <i>John Baker</i>, United States Department of Agriculture</p>	<p>Go with the Flow</p> <p>Moderator: <i>Rick Voigt</i>, Voigt Consultants, LLC</p> <p>Co-Moderator: <i>Ron Leaf</i>, Kimley-Horn & Associates</p>
<p>Water Storage that Maximizes Land Use and Production</p> <p><i>Chuck Brandel</i>, International Systems Group, Inc.</p>	<p>The Importance of TMDL Adaptive Management: Lessons from Shingle Creek</p> <p><i>Diane Spector and Jeff Strom</i>, Wenck Associates, Inc.</p>	<p>Stimulating Watershed-Scale Hydrologic Response to Farm-level Changes in Water Management</p> <p><i>Brent Dalzell, Jeffrey Strock, Joseph Magner, and Lu Zhang</i>, University of Minnesota</p>	<p>Increasing Resiliency for Flood-Prone Roadways at Henderson, Minnesota</p> <p><i>Nicole Bartelt</i>, Minnesota Department of Transportation; <i>Rachel Pichelmann</i>, Short Elliott Hendrickson, Inc.</p>
<p>Water Quality Benefits of a Floodwater Storage Impoundment</p> <p><i>Mariya Guzner and Joseph Magner</i>, University of Minnesota; <i>Aaron Ostlund</i>, Red River Basin Commission</p>	<p>Minnehaha Creek Bacterial Source Identification Study—Sources of E. Coli in an Urban Environment</p> <p><i>Michael Sadowsky and Chris Staley</i>, University of Minnesota; <i>Steve Gruber</i>, Burns & McDonnell Engineering; <i>Nico Cantarero</i>, City of Minneapolis</p>	<p>Impacts of Subsurface Drainage Strategies on the Fate of Water in the Upper Midwest</p> <p><i>Jeffrey Strock, Brent Dalzell, Axel Garcia y Garcia, Joseph Magner, Gary Sands, and Lu Zhang</i>, University of Minnesota; <i>Laurent Ahiablame and Todd Trooien</i>, South Dakota State University</p>	<p>Monitoring Urban Flooding—the Details that Matter: Lessons from Projects</p> <p><i>Dan Cazanacli</i>, Short Elliott Hendrickson, Inc.</p>
<p>Water Retention for Water Quality Benefits: Targeting Practices that Improve Environmental Flows</p> <p><i>Jun Yang, Drew Kessler, Mark Deutschman, and Tim Erickson</i>, Houston Engineering, Inc.</p>	<p>Why Is Watershed Phosphorus Loading so Stubbornly Persistent?</p> <p><i>Kelly Dooly and Yvette Christianson</i>, Minnehaha Creek Watershed District; <i>Brian Beck and Joe Bischoff</i>, Wenck Associates, Inc.; <i>Eric Macbeth</i>, City of Eagan; <i>Bill James</i>, University of Wisconsin Stout</p>	<p>Isotope Uses in a Drained Agricultural Landscape Water Budget</p> <p><i>Lu Zhang, Brent Dalzell, Joseph Magner, and Jeffrey Strock</i>, University of Minnesota</p>	<p>Underwater Visualization Using 3D Sonar Equipment</p> <p><i>Petra DeWall</i>, Minnesota Department of Transportation Bridge Office</p>
<p>Increased Precipitation as the Main Driver of Increased Streamflow in Tile Drain Watershed of the Upper Midwestern United States</p> <p><i>Satish Gupta, Melinda Brown, Nathaniel Baessler, and Kari A. Wolf</i>, University of Minnesota; <i>William Schuh</i>, North Dakota State Water Commission; <i>Andrew Kessler</i>, Houston Engineering, Inc.</p>	<p>A Web-Based Decision Support Tool for Watershed Planning</p> <p><i>Todd Redder, Derek Schlea, Anthony Aufdenkampe, and Hans Holmberg</i>, LimnoTech</p>	<p>Restoring Stream Flow and Reducing Groundwater Use Through Conservation Irrigation</p> <p><i>Julie Blackburn and Paul Senne</i>, RESPEC Consulting and Services; <i>Gerry Maciej</i>, Benton County Soil and Water Conservation District</p>	<p>Innovative Technologies to Meet Changing Client Expectations in River Modeling, Bridge Monitoring, and 3D Presentation of Results</p> <p><i>John Wirries and Kevin Pederson</i>, KLJ Engineering</p>

4:30 Adjourn

Poster Display



The following posters will be displayed during the breaks each day.

The poster session with poster presenters will be held on Tuesday evening, during the reception.

A New Face for the Minnesota Water Research Digital Library

Stephan Roos, Minnesota Department of Agriculture

Antibiotic Resistant *Escherichia coli* (E. coli) in Minneopa Creek

Melissa Jones, Caitlin Flynn, and Beth Proctor, Minnesota State University Mankato

Assessing GIS-Based Tools to Target Buffer Placement for Maximum Nutrient and Sediment Removal in Southern Minnesota Watersheds

Hilary Pierce and Joe Magner, University of Minnesota

Contaminants of Emerging Concern Alter Fathead Minnow Gene Expression and Predator Escape Performance

Utku Hasbay, St. Cloud State University

Cyanobacterial Harmful Algal Blooms and US Geological Survey Science Capabilities

Jennifer Graham, Neil Dubrovsky, and Sandra Eberts, United States Geological Survey

Detecting Sulfamethoxazole and Carbamazepine in Groundwater: Is ELISA a Reliable Screening Tool?

Aliasha Krall, Sarah Elliott, and Melinda Erickson, United States Geological Survey; *Byron Adams*, Minnesota Pollution Control Agency

Developing a Water Quality Risk Model for Sedimentation Due to Forest Harvesting in Minnesota

Zachary McEachran, University of Minnesota; *Robert Slesak*, Minnesota Forest Resources Council; *Diana Karwan*, University of Minnesota

Effects of Wetland Disturbance on Anuran Biodiversity near Leech Lake Band of Ojibwe Reservation

Alana Gross and Melinda Neville, Leech Lake Tribal College

Electromagnetic Enhancement of Microbial Processes to Reduce Nutrient Contaminants

Thomas Vennemann, Natural Resources Research Institute, University of Minnesota Duluth; *Eric Singaas*, NRRI; *Chan Lan Chun*, NRRI/University of Minnesota Duluth Civil Engineering

***Escherichia coli* (E. coli) Impairment in Minneopa Creek**

Caitlin Flynn, Melissa Johnson, and Beth Proctor, Minnesota State University Mankato

Evaluation of Bed Load Formulas for the Minnesota River

Gustavo Merten, University of Minnesota Duluth; *Elisa Armijos*, University of Minnesota Duluth and Amazon University; *Luke Ulstad-Lisie*, University of Minnesota Duluth

Improving Nitrogen and Irrigation Management for Potato Production in Central Minnesota

Brian Bohman, Carl Rosen, and David Mulla, University of Minnesota

Is Molasses an Effective Carbon Source for Denitrification?

Elisabeth King, Lori Krider, and Joe Magner, University of Minnesota

Microbial Sulfate Removal in Electrode-Integrated Bioreactor: Modeling and Experimental Validation

Tobin Deen, Dan Takaki, and Chan Lan Chun, University of Minnesota Duluth

Models and Experiments of Internal Erosion

Qingfeng Feng, Tsinghua University; *Teng Man and Kimberly Hill*, University of Minnesota; *Xudong Fu*, Tsinghua University

Omakakii Biodiversity on the Leech Lake Reservation

Anta Cloud and Melinda Neville, Leech Lake Tribal College

Phosphorus Release from Urban Stormwater Retention Pond Sediments

Vinicius Taguchi, Tyler Olsen, Poomima Natarajan, and John Gulliver, St. Anthony Falls Laboratory

Quantifying Total Water Storage in the Minnesota River Basin

Francisco Lahoud and John Nieber, University of Minnesota

Restoring Connectivity and Ecology to Grey Cloud Channel

Greg Bowles, Houston Engineering, Inc.; *John Loomis*, South Washington Watershed District

Sediment Oxygen Demand: A Review of Current Literature and Implications for Interpretation of Water-Quality Conditions

Erin Coenen, University of Minnesota, US Geological Survey, Minnesota Water Science Center; *Victoria Christensen*, US Geological Survey, Minnesota Water Science Center; *Lynn Bartsch, Rebecca Kreiling, and William Richardson*, US Geological Survey, Upper Midwest Environmental Science Center

The Minnesota Groundwater Dye Trace Database

J. Wes Rutelonis, Minnesota Department of Natural Resources; *Betty Wheeler*, University of Minnesota; *John Barry and Jeffrey Green*, Minnesota Department of Natural Resources; *E. Calvin Alexander, Jr.*, University of Minnesota

Time-Series Data Management and Application in Watershed Projects

Lee Ganske, Brittany Story, and Eileen Campbell, Minnesota Pollution Control Agency

Understanding the Frequency, Distribution, and Regulating Mechanisms of Harmful and Nuisance Algae Blooms in Minnesota Lakes

Matthew Bambach, Andrew Bramburger, and Euan Reavie, Natural Resources Research Institute, University of Minnesota Duluth

Water Tracing and Structural Control Analyses to Decipher Karst Groundwater Flow around Fountain, Minnesota

Betty Wheeler, Scott C. Alexander, and Kelsi R. Ustipak, University of Minnesota; *Jeffrey A. Green and J. Wes Rutelonis*, Minnesota Department of Natural Resources; *Julia R. Steenberg, Anthony C. Runkel, and Robert G. Tipping*, Minnesota Geological Survey; *E. Calvin Alexander, Jr.*, University of Minnesota

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October 17–18, 2017

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