

SPEAKER SUMMARIES/BIOGRAPHIES

**No Longer ‘Out of Sight, Out of Mind’ –
Making Groundwater Science Visible
to Citizens and Clients**



Minnesota Ground Water Association Fall Conference, 2019

Kelton Barr

Kelton Barr Consulting

Communicating to All Sides: The Quandary of the Groundwater Scientist

Biography

Kelton Barr is Principal of Kelton Barr Consulting, LLC. For more than 45 years he has been a consulting hydrogeologist for several local and national firms. During this time, he has been involved with the investigation and modeling of groundwater hydrology, karst flow systems, bioremediation, and geothermal systems, working on projects throughout the United States. Kelton has a B.A. in geology from Carleton College and a M.S. in hydrogeology from the University of Minnesota. He has conducted short courses on behalf of the University of Wisconsin, U.S. Environmental Protection Agency, U.S. Air Force, several oil companies, and more than 20 states' regulatory agencies.

Chris Niskanen

Communications Director, Minnesota Department of Natural Resources

Making the Invisible Visible: Telling Stories About Science

Abstract

Americans live in a society increasingly shaped by data, but the mixing of politics and science has the public confused and scientists worried. So how should state agencies, whose programs are driven by science, communicate about it? How do government agencies become trusted sources of information? What roles do traditional media and social media play in helping the public understand science? These are hard questions to solve, requiring strategic decisions, solid storytelling and engagement with the media and public.

Biography

Chris Niskanen has been the communications director at the Minnesota Department of Natural Resources since 2011, where he has worked on complex communications challenges ranging from avian influenza to wolf management. Prior to coming to the DNR, Niskanen was the outdoors editor for the St. Paul Pioneer Press for 17 years. He worked in the media for 23 years and has written two books. His current hobby is helping to excavate a 17th century Eskimo village in Alaska.

Jim Almendinger

Director, St. Croix Watershed Research Station, Science Museum of Minnesota

How to Tell Your Parents About Your Groundwater Problem

"We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology." Carl Sagan

Abstract

Wise decisions about how to manage our natural resources rely on communicating the complex functioning of interrelated ecosystems to non-expert policy makers and the public who supports them. Translation: if we want to save the earth, we need to explain how it works in the simplest possible terms to the folks in charge. And if you can't explain it, then you probably don't really understand it yourself (cf. Mortimer Adler). The famous physicist Richard Feynman had a 4-step method for understanding and teaching: (1) Identify the issue. (2) Explain how it works as though you were talking to a child, say, an eighth-grader. Or, explain it to your kindly parents, assuming they are non-experts. Aim for clarity and brevity. (3) Identify any stumbling blocks, and go back and repair these. (4) Finally, organize, simplify, and tell a story, with analogy and humor. This last step is difficult for scientists and engineers, who were implanted with a chip in grad school that tells them that all writing is formal, spare, full of jargon, and difficult to understand. Formal writing is fine for reports and journals, but presentations are for relating to people face-to-face, and people like stories.

Story, or narrative, follows a universal structure of rising action (and we did this, and then that...), a trial and climax (but wait...!), and falling action with resolution (therefore...) (cf. Randy Olson). Science can fit this structure nicely: (a) We studied this problem using these methods, and observed these results. (b) But, multiple hypotheses could explain the observations -- which one will win? The suspense is killing me! (c) We think hypothesis z is better than either x or y, but of course there remains some uncertainty (this leaves room for a sequel movie). Uncertainty is a critical aspect of all science, but difficult to communicate. How does one express uncertainty? I just don't know. (Wait, did I just do it?!)

Adler, Mortimer: "The person who says he knows what he thinks but cannot express it usually does not know what he thinks."

Olson, R., 2015. Houston, We Have a Narrative: Why Science Needs Story. University of Chicago Press.

Biography

Jim received a B.A. in botany from Ohio Wesleyan University and a Ph.D. in ecology from the University of Minnesota. After postdoctoral work in Alaska and Sweden, he spent five years as a hydrologist with the U.S. Geological Survey. In 1995 he joined the Science Museum of Minnesota's St. Croix Watershed Research Station, where he is a senior research scientist and, since 2017, the current Director. There he has spent over 20 years doing hydrological research to better understand human impacts on the environment at the watershed scale. Currently Jim is using watershed and lake models to better understand the impacts of land-use and climate change on our aquatic resources.

Emily Johnson

Outreach & Engagement Coordinator, Anoka Soil & Water Conservation District

“Our Groundwater Connection” – Using Animation to Make the Invisible, Visible

Abstract

Groundwater is one of our most valuable resources, yet it is largely invisible to the average citizen. Before one is willing to take personal action or change their behavior to benefit groundwater quality and quantity, they must first have an accurate mental model of groundwater and understand how this resource is used and impacted by our actions. Lack of groundwater literacy was a gap we endeavored to fill by creating an animated video. Through this medium, a significant amount of complex information can be portrayed in a relatively short time. Animation allows a variety of audiences including youth, the general public, and elected officials to visualize groundwater and their own connection to it. In addition, animation provides a vehicle for communicating the value of groundwater to a non-English speaking audience. In Anoka County where “Our Groundwater Connection” was produced, 94% of residents rely on groundwater for all of their water needs. When we turn on the tap, there is an expectation that clean water will flow indefinitely. Exposing the public to accurate groundwater science and the potential threats to groundwater health and supply is one way to change this false perception and create a groundwater savvy populace. The video welcomes all viewers into a world where they can be a positive agent of change to ensure safe and plentiful groundwater sources for future generations. This project was a collaborative effort of the Anoka County Water Resource Outreach Collaborative with funding provided by the partners.

Biography

Emily Johnson is the Outreach and Engagement Coordinator with the Anoka Soil and Water Conservation District and facilitates the Anoka County Water Resource Outreach Collaborative, a partnership of cities and watershed management organizations in Anoka County dedicated to working together for efficient and effective public education about surface and groundwater health. Emily holds a B.A. in Biology and Geology from Macalester College and a Certificate in Environmental Education from Hamline University.

Rich Soule

Minnesota Department of Health

Big Data and Uncertainty

Abstract

Scientists may not need Facebook, but we need our data. Hopefully, this presentation will provoke some thoughts about how you can extract information from data. As an example, we will walk through the steps necessary to calculate a groundwater elevation and its uncertainty from the County Well Index (CWI) and other available data bases. Along the way, we will see that often times a lot of bad data is better than just a little good data and how to identify those pesky outliers and biases. In the end, we'll consider our ethical responsibility as scientists to build useful, publicly available data bases. In truth, you really can't have enough data because you do not know what questions the future will bring.

Biography

Rich Soule is a groundwater provocateur at the Minnesota Department of Health.

Hans Neve & Michael Ginsbach

Minnesota Pollution Control Agency

MPCA Groundwater Contamination Mapping Project - “What’s Under my Neighborhood?”

Abstract

The Remediation Division of the Minnesota Pollution Control Agency is in the final months of a three-year project to produce a statewide map of groundwater contamination from the state’s active Superfund sites. The project will create an interactive, web-based map that will show areas of groundwater contamination, allow for data to be available in a self-service format, and tell the contamination story for areas of contamination. The project is one part of an ongoing larger effort to develop our data systems and make data more accessible. For the Superfund program the process involved finding and compiling data and then migrating that data from physical documents into a digital format. This data relating to sampling locations and analytical results was then standardized and loaded into an enterprise database system. The project established over 14,000 sampling locations and well over 20,000 analytical results in the database in a queryable, spatial format. This project is funded by the Environment and Natural Resource Trust Fund.

Biographies

Hans Neve is the program manager for the MPCA Closed Landfill Program and the Natural Resource Damage Program. He also leads data accessibility, GIS and program optimization efforts in the MPCA Remediation Division. He has been at MPCA for 22 years in several different roles including well driller, remediation project manager, emergency responder, hydrogeologist, superfund and brownfield program supervisor, public spokesperson, and program manager. He has a B.A. in geology from Gustavus Adolphus and a M.S in hydrogeology from Western Michigan University.

Michael Ginsbach is a hydrogeologist with the Minnesota Pollution Control Agency’s Remediation Division. He currently works in the Site Remediation and Redevelopment Section, providing technical review and guidance for RCRA Corrective Action and Superfund sites. In addition, he also works on data accessibility projects for the division and previously lead the data harvest portion of the statewide groundwater contamination mapping project. Michael has a B.S. in geology and a B.S. in earth science education from North Dakota State University and an M.S. in geology from Idaho State University.

Della Schall Young

Young Environmental Consulting Group, LLC

Navigating the Legislative-Citizen Commission on Minnesota Resources Grant Process

Abstract

In 1988, Minnesotans approved a constitutional amendment establishing and dedicating funds that originated from a combination of Minnesota State Lottery proceeds and investment income to the Environmental and Natural Resources Trust Fund (ENRTF). ENRTF provides funding for projects and research to protect, conserve, preserve, and enhance Minnesota's "air, water, land, fish, wildlife, and other natural resources" for current and future residents of Minnesota. This should be a windfall for professionals in the environmental and natural resource fields, right? Several of you have applied for a grant and have been either pleased or disenchanted by the process. Let us remove any uncertainty and ask ourselves, what works and what does not? What are the most common problems during the application process? We will explore these questions together, and explain the best practices of the grant application process.

Biography

Della Schall Young is the owner and principal hydrologist of Young Environmental Consulting Group, LLC., an environmental planning, permitting, and compliance consulting firm. She combines her passion for resource management and unwavering integrity to help clients execute projects in environmentally responsible ways. Della holds a Bachelor of Science degree in natural resources and environmental studies with an emphasis on water resources management and a Master of Science degree in water resources science from the University of Minnesota. She currently holds positions on the Legislative-Citizen Commission on Minnesota Resources, the Metropolitan Council Livable Communities Advisory Committee, and the Executive Board Iota Zeta Zeta Chapter of Zeta Phi Beta Sorority, Inc.

Mike Fienen

US Geological Survey, Midwest Water Science Center

Cracking the code of the groundwater modeling mystery

Abstract

Decision making for groundwater resources almost always relies on models. Why? It's "out of sight" in the sense that we can only "see" or measure groundwater at limited locations in an aquifer. To understand what is happening between our sparse measurements, or more importantly to forecast responses to changing conditions, we need a computer model. So, now we have two things that are "out of sight": groundwater and the inner workings of a mathematical model coded and run in a computer. This sets a high bar for us to be able to explain groundwater systems to citizens and cooperators.

In this presentation, I will first recount an effort to provide basic groundwater and modeling knowledge to an important audience – Judges and Justices that adjudicate water resources disputes in the west. Our efforts were presented in a "bench book" entitled Adjudicating Groundwater that was accompanied by a workshop.

In the remainder of the presentation I will recount some successes, failures, and redemptions from experiences discussing and explaining groundwater to stakeholders through the medium of groundwater modeling. In my work at the United States Geological Survey, I often work on projects with direct interaction with stakeholders ranging from state and county level resource managers, to water users including industrial users and farmers, and interested citizens.

Biography

Mike Fienen is a Research Hydrologist and the Acting Deputy Director of the Integrated Modeling and Prediction Division, Water Mission Area, USGS – at the USGS Midwest Water Science Center. Mike started his geologic career taking classes at Gustavus Adolphus College and earned a B.A. in Geology from Macalester College. After Macalester, he spent about 8 years in environmental consulting working on projects throughout the US and the Pacific before earning an M.S. and Ph.D. from Stanford University. A two-year postdoc at the USGS in Middleton, Wisconsin led to a long-term Research Hydrologist position and Mike remains based in Middleton. Mike's research focus is on groundwater modeling with emphases on forecast uncertainty quantification, machine learning, and decision support in the face of uncertainty. He is enthusiastic to work at the interface of science and society, often interacting with stakeholders and the general public.

Stu Grubb

Senior Hydrogeologist, EOR

Tell it to the Judge: Expert Witness Testimony and the White Bear Lake Case

Abstract

In White Bear Lake Restoration Association v. Minnesota Department of Natural Resources, business owners and homeowners claimed that the lack of management of water appropriation permits by MDNR led to record-low water levels in White Bear Lake. The low water levels greatly reduced the recreational opportunities around the lake and caused problems for local businesses. White Bear Lake is one of the most popular lakes in the Twin Cities, so the lawsuit attracted great interest from local residents and the media.

Previous studies by USGS and MDNR had established a connection between the surface water in White Bear Lake and the groundwater in the underlying Prairie du Chien aquifer. The question was whether groundwater pumping by municipal water suppliers and other large users had caused a significant lowering of the water in the lake, or whether the low water levels were simply due to a lack of precipitation.

The case was tried before Judge Judith Merrinan of the St. Paul District Court. The Ciresi Conlin law firm represented the plaintiffs and retained Emmons & Olivier Resources to provide analysis of the groundwater/surface water interactions and provide expert witness testimony during the trial. The challenge was to effectively communicate with the judge and explain the complex technical issues surrounding the case in a way that was complete, correct, credible, and not boring. We will discuss the hydrologic evidence that was presented and the methods used to argue the plaintiff's case. We will also discuss what arguments were most significant and will likely influence Minnesota water resource management in the future, regardless of the ultimate legal outcome of the lawsuit.

Biography

Stu Grubb, PG is a hydrogeologist with over 30 years of experience as a consultant. He has worked for several three-letter engineering consulting companies including HDR, NTS, and EOR. Mr. Grubb currently is a Senior Hydrogeologist with Emmons & Olivier Resources in Oakdale, Minnesota. He frequently works with law firms on lawsuits and mediation involving surface water and groundwater resources. He was the lead expert witness for the White Bear Lake case that is currently under review by the Minnesota Supreme Court. Mr. Grubb is a past president of the Minnesota Ground Water Association, and he serves on the Board of Directors of the MGWA Foundation.

Katie Crosby Lehmann

Managing Partner, Ciresi Conlin

Water Science and the Law

Abstract

The White Bear Lake case started in 2013 after the lake level hit the lowest water level ever and after the USGS published a detailed study on the connection between the groundwater and surface water at the Lake. After years of discovery, the case was tried to the bench (Judge Marrinan) for nearly one month. The Court issued a 140 page opinion, finding two causes of the Lake's decline, and only one of which can be controlled by humans. The Court found the DNR was directly and materially liable for causing the decline of the Lake by not considering the cumulative impact of all of the high capacity groundwater wells in the north and east metro and failing to act when it knew its actions were causing harm. After trial, the DNR appealed. The case was reversed on appeal on a purely legal issue concerning what statutory section applied. The Minnesota Supreme Court accepted review of the case. The White Bear Lake Restoration Association and Homeowner's Association have submitted their opening briefs. The DNR, City and Township's briefs are due shortly. The case will likely be argued to the Minnesota Supreme Court this winter.

Biography

Katie Crosby Lehmann is an attorney, practicing law since 1995. She graduated from the University of Notre Dame, with a degree in Economics and attended William Mitchell College of Law in St. Paul, MN. Before starting Ciresi Conlin with Mike Ciresi and Jan Conlin, Katie was a partner at Robins, Kaplan, Miller & Ciresi. She has been recognized as a Top Attorney and Super Lawyer in Minnesota, and awarded the Attorney of the Year recognition twice, including once for the White Bear Lake case. Overall, Katie practices at the intersection of science and the law. She dedicates herself to learning the science of each case. In the past, Katie has driven the science side of patent infringement or environmental cases for laser printers, railroads, stonewashed jeans, and groundwater. In addition to driving the science, Katie focuses on the best legal strategy for the client, whether it involves trial or not. When not working, Katie can be found at sporting events for her three teenage children or working at her northern Minnesota cabin.