

SPEAKER SUMMARIES/BIOGRAPHIES

Successes, Near-misses, and Failures –
Regional Groundwater Planning



Minnesota Ground Water Association
Fall Conference, 2018

Sharon Day

Indigenous People's Task Force

Morning Reflections: What Will You Do for the Water?

Biography

Sharon M. Day, Ojibwe is enrolled in the Bois Forte Band of Ojibwe. She is one of the founder's of the Indigenous Peoples Task Force, formerly known as the Minnesota American Indian AIDS Task Force. IPTF began as a volunteer organization (1987) with all of the work performed by the Board of Directors. In September of 1988, IPTF hired its' first staff. Ms. Day was hired as the Executive Director, May 1990 and has served in this capacity since then. IPTF has strived to ground its' services in the culture of American Indian people. Sharon M. Day is 2nd degree M'dewiwin and follows the spiritual path of the Anishinabe people. She is an artist, musician, and writer.

Ms. Day has received numerous awards, including the Resourceful Woman Award, the Gisela Knopka Award, BIHA's Women of Color Award, The National Native American AIDS Prevention Resource Center's Red Ribbon Award, and most recently, the Alston Bannerman Sabbatical Award. She as been named as one of the 100 best loved women by Yes! Magazine.

She is an editor of the anthology, Sing! Whisper! Shout! Pray! Feminist Visions for a Just World; Edgework Books, 2000.

She has led 5 Water Walks. The southern direction of the Mother Earth Water Walk which began at Gulf Port, Mississippi and ended in Ashland, Wisconsin, the Mississippi River Water Walk, the Seneca Lake Water Walk, the Ohio River Water Walk, and the Pokegama Water Walk. Each walk is ceremony to save the life giving force of water.

Lanya Ross

Metropolitan Council

Planning for Current and Future Generations: Water Supply in the Twin Cities Metropolitan Area

Summary

Over three million people, more than half of the state's population, live in 186 communities spread across the 3,000 square-mile Twin Cities metropolitan area. By 2040, the region is forecast to gain 900,000 more people and 500,000 jobs. Growth is expected to drive water use from approximately 350 to 450 million gallons/day.

The region has abundant sources of high quality water. In many respects, this area is among the most water-rich regions in the nation. However, a growing population, more business and industry and a changing environment make the long-range outlook for clean water a challenging one. Today, increased groundwater pumping to accommodate development is drawing down aquifers in some communities and affecting groundwater-connected lakes, streams, and wetlands in others. Water quality is changing. While some would agree that we are not in a crisis mode, these are signs we cannot ignore.

Metropolitan Council is the regional planning agency, policy-making body, and provider of essential services for the Twin Cities region. Minnesota statutes also direct the Council to develop a master water supply plan; provide technical information and guidance for local water suppliers; emphasize conservation, cooperation and sustainability; and address reliability, security, and cost-effectiveness.

Since 2005, the Council has been working with two advisory committees and hundreds of stakeholders to craft the right approach and scope of regional water supply planning. Through this process, partners have been wrestling with concerns about who has a voice at the table, how to spark and sustain meaningful discussions, and what is needed for technical analyses to be trust-worthy.

Biography

Lanya Ross is currently an environmental analyst with Metropolitan Council, the regional planning agency of the seven-county Twin Cities metropolitan area. Much of her work has focused on the development, update and implementation of the Twin Cities metropolitan area master water supply plan. Before joining the Council, Ms. Ross worked on projects such as water resource monitoring and source water protection planning for the Shakopee Mdewakanton Sioux (Dakota) Community and source water delineation for the Grand Canyon National Park public water supply. She is a professional geologist with a bachelor's degree in geology from Macalester College and a master's in geology from Northern Arizona University.

Kenny Blumenfeld

Minnesota DNR, Division of Ecological and Water Resources
State Climatology Office

Understanding Minnesota's Changing Climatology

Summary

Minnesota's climate already is changing rapidly and will continue to do so for the foreseeable future. Our most notable climate symptoms have been warming during winter and at night, increased precipitation, and heavier downpours. The decades ahead will bring even warmer winters and nights, and even larger rainfalls, along with the likelihood of increased summer heat and the potential for longer dry spells. This presentation will focus on the foundational data and science that helps us understand which changes are and are not currently affecting Minnesota, the changes expected moving forward, and gaps in our knowledge that preclude definitive statements.

Biography

Dr. Kenneth ("Kenny") Blumenfeld is Senior Climatologist with the DNR State Climatology Office, where he serves as the main climate change science contact for the state. In his work, he focuses on climate trends, extreme events, and developing climate monitoring networks. Kenny enjoys talking to Minnesotans about their weather, and frequently pursues what he calls "creative climate science" endeavors, including co-creating a documentary movie about winter in Minnesota during the harsh winter of 2013-14.

Carmelita Nelson

Minnesota Department of Natural Resources

Leo Steidel

Energy Platforms LLC

Results of the 1st Statewide Water Conservation Report

Summary

The Minnesota Department of Natural Resources has partnered with ESPWater to develop a cloud-based statewide water conservation reporting tool for utilities. Results from the first year of reporting are now available and are already being used by Groundwater Management Area planners and staff to prioritize actions. The report reviews how cities are doing with their water accounting, actions they are taking to directly conserve water, such as leak detection and repair, and indirect conservation actions, such as ordinances and educational efforts. The presentation will cover how effective MN municipalities have been in achieving water conservation goals, what conservation efforts result in significant water savings and offer the best return on investments. This data is available for review and research with 3rd party access. Data can be sorted by individual cities and used for regional groundwater planning

Biographies

Carmelita Nelson is the DNR water conservation coordinator with the Division of Ecological and Water Resources. Her work focuses on all aspects of developing the state water conservation program. Carmelita has been with the DNR for 30 years in a variety of positions in Wildlife, State Parks, and Information and Education. She has a Master's of Science degree from the University of Michigan.

Leo Steidel, founder and CEO of Energy Platforms LLC, is the software architect of ESP®, the energy efficiency reporting system. Energy Platforms is developing the MN Water Conservation Reporting System for Minnesota DNR.

Gil Zemansky

Jennifer L. Rose

Minnesota Department of Natural Resources

An American Perspective on Groundwater Management in New Zealand

Summary

Groundwater management in New Zealand has always been overshadowed by more visible surface water concerns. Initial freshwater management in New Zealand had the objectives of controlling erosion and preventing flood damage. Subsequent legislation recognized the importance of groundwater; however, surface waters continued to be the primary freshwater management focus.

New Zealand joined the growing worldwide awareness of the need to protect the environment in the 1970s. This led to wholesale review of New Zealand environmental laws, culminating with passage of the Resource Management Act in 1991 (an attempt to comprehensively address the use of land, air, and water in one statute). The central principle of the RMA is "sustainable development." This was to be accomplished primarily by two layers of local governments: (1) Regional Councils; and (2) territorial authorities. Central government's role was primarily to provide guidance and review.

Two circumstances after the RMA was adopted ultimately resulted in calls for reform to make it more effective: (1) dairy intensification, causing both allocation and water quality concerns; and (2) the failure of central government to provide national guidance. Climate change projections also indicate available water may decline in key parts of the country. Efforts to reform the RMA became visible by 2008; however, the shape of such reform is heavily dependent on politics and remains under development today. In October 2018, the new Labour government proposed to investigate major reforms of the RMA.

This paper discusses a number of differences between New Zealand and the US that impact groundwater management.

Biographies

Gil Zemansky, Ph.D., PG, PHGW, CGWP

Gil has a BS from the U.S. Naval Academy, MS degrees from the University of Colorado and University of Kansas, and a Ph.D. from the University of Washington (his undergraduate academic education specialized in naval science while his graduate academic education specialized in hydrology). He is registered as a groundwater hydrologist by the American Institute of Hydrology and certified as a Ground Water Professional by the National Ground Water Association. He is a registered geologist and/or hydrogeologist in two states. After 10 years of naval service, he has had more than 45 years of professional education and experience,

primarily as a hydrogeologist. He currently works as a research analyst for Shook, Hardy & Bacon LLC in Kansas City, MO teaching lawyers hydrogeology using Superfund sites as examples. Gil worked as a technical supervisor in a Crown Research Institute and as an independent consultant for nine years in New Zealand and holds dual US and New Zealand citizenship.

Jennifer L. Rose, Hydrogeologist, Minnesota DNR

Jennifer holds a Master and Bachelor of Science in Geology from Oklahoma State University and North Dakota State University, respectively. Jennifer began her career as hydrogeologist in New Zealand. She worked at a multi-disciplinary consulting firm and at GNS Science, one of New Zealand's Crown Research Institutes for six years. Jennifer joined the Minnesota Department of Natural Resources (DNR) five years ago. Her role at DNR is to provide expert technical analysis on the nature, availability, and use of groundwater in northwestern Minnesota.

BJ Bonin

Minnesota Department of Natural Resources

Drilling deeper through a vertical feature won't work

Summary

Locating an appropriate site for a public water supply is one of the most important functions of regional planning. Not every site is suitable for a well, and sometimes solutions to known water supply problems are overlooked due to communication failures exacerbated by low-bid contracting. This case study uses a thorough but disregarded well siting study to show how better planning and communication could have resulted in a well that produced potable water for a state park expansion. Actions at Split Rock State Park's Campground (MN) along the north shore of Lake Superior resulted in flowing brine and a very low capacity potable water supply. Ambitious project managers dismissed the advice of the staff engineers and geologist, directing the construction of several wells into the into the large diabase and anorthosite dike that dominates the local landscape. The wells drilled produced limited volumes of potable water, turning to brine as the wells were drilled deeper into this vertical geological feature to increase yield. The campground expansion is currently on hold.

Biography

BJ Bonin is currently a Support Hydrologist with Minnesota DNR. BJ has 25 years of experience in geology, wells, and municipal engineering projects. His expertise lies in well construction, wellfield development, geological mapping, and mineralogy. BJ also has experience in surveying, utility design and construction, geological investigations for mining, and aquifer testing. BJ has a BS in Geology from Bemidji State University, studied geochemistry at the University of Tennessee, has a MS in Infrastructure Systems Engineering from the University of Minnesota, and is a licensed Geologist in several states.

Blythe Reiha

The Regional Municipality of York

Beyond the Model: Communicating Results to the Decision Maker

Summary

- Scientific connection between anthropogenic usage and environmental impacts (aquifer depletion, water quality impacts, etc.), require decision makers to consider all facets of the water balance system.
- Many present-day challenges go beyond qualified rationalization and reasoning, and are best addressed in conjunction with a numerical hydrogeologic modeling approach.
- As the modeling processes increase in complexity it is imperative to ensure that model results are translated into understandable and applicable “messages” for the decision maker.
- This presentation highlights modeling project challenges experienced by municipal water supply decision makers. Effective communicative approaches are emphasized, in addition to lessons learned.
- End goal is to evolve the numerical hydrogeologist’s role as ‘modeler’ to ‘big-picture communicator’.

Education

M.A.Sc. (Civil & Environmental Engineering), University of Waterloo, 2007

B.A.Sc. (Environmental Engineering), University of Waterloo, 2004

Experience

2016 - Present, The Regional Municipality of York, Program Coordinator – Water Resource Monitoring

2006 - 2016, Golder Associates Ltd., Environmental Engineer

Affiliations

Professional Engineers Ontario

Biography

Ms. Blythe Reiha holds Civil & Environmental Engineering degrees from the University of Waterloo. She has close to 10 years of experience working in the consulting industry, with specific expertise in hydrogeologic data analyses and management, 2D/3D visualization, and numerical flow modelling.

In 2016, Blythe joined the Regional Municipality of York, shifting her role from “Consultant” to “Client”. In this new role, she applies her expertise for supporting internal hydrogeologic programs, as well as new and existing numerical modeling projects.

Michael Ahern

Ever-Green Energy

Aquifer Thermal Energy Storage at the Ford Site in St Paul

Summary

The redevelopment of the Ford Site in St. Paul has provided a unique opportunity to leverage local resources and innovative technologies to achieve the City of St. Paul's sustainability goals. Ever-Green Energy has been working with the City and the site developer to integrate Aquifer Thermal Energy Storage as the primary heating and cooling solution to serve this 5 million square foot development. Applying this proven technology at the Ford Site, along with on-site solar PV, will establish the foundation for achieving a net-zero carbon community. Michael Ahern will review the development and status of this energy program.

Biography

Michael Ahern has over 25 years of experience in development, construction, operation, and management of industrial and energy systems, managing the development, construction and start-up of over one billion dollars of new systems. Since joining the Ever-Green team he has led the development of energy systems throughout the U.S. and Canada. Michael holds a BS in Business Finance from the University of Notre Dame (International Business Minor).

Jeremy Greenhouse

The Environmental Law Group, Ltd

Applying Past Lessons Learned to Future Groundwater Problems

Summary

This presentation will discuss a line of federal case law on an issue that seems destined for the United States Supreme Court: Do the NPDES permitting, technology-based effluent limitations (TBELs) and other Clean Water Act (CWA) requirements apply to discharges of pollutants to groundwater that is hydrologically connected to jurisdictional surface waters?

When Congress passed the modern CWA in the early 1970s, lawmakers were clear that the Act applied only to discharges to surface waters; groundwater discharges were more appropriately regulated by the states under state law. This divide has persisted since that time. However, with increasing frequency, proponents of the so-called “Conduit Theory” have argued that if pollutants discharged to groundwater subsequently migrate through the groundwater and emerge in a surface water, this constitutes a de facto discharge to the surface water that should be subject to the CWA. In effect, the groundwater simply acts as a “conduit,” much like a pipe or ditch, delivering the pollutants to the surface water.

The issue has significant potential real-world ramifications. For example, if the Conduit Theory becomes settled law, settling ponds, that seep to groundwater—where the groundwater may have a direct hydrological connection to surface waters—could find themselves newly subject to federal CWA requirements.

There is considerable disagreement among courts in various jurisdictions across the country regarding whether and how the Conduit Theory applies. Several federal circuit courts of appeal have weighed in on the issue over the last year and reached divergent conclusions, and a petition to review the issue is pending before the U.S. Supreme Court. This presentation will explain this legal issue, outline the key case law developments, and highlight the role that technical determinations have played in the courts’ decisions.

Biography

Jeremy Greenhouse is a partner with The Environmental Law Group, Ltd in Minneapolis. He advises clients on a broad range of environmental laws, with a focus on surface water and groundwater regulation and permitting. Jeremy regularly speaks and writes on environmental issues.

Steve Robertson

Minnesota Department of Health, Source Water Protection Unit

The Minnesota Department of Health Wellhead Protection Program

Summary

Protection of drinking water sources always ranks high as a priority for the public. Groundwater is a common source of drinking water for Minnesotans, and management of this resource for drinking water purposes has been a primary aim of the source water protection program at MDH since its inception. This presentation will trace the arc of that experience, highlighting some of the difficulties, problems, and lessons learned along the journey. Despite these challenges, adherence to fundamental principles that have helped the program stay on course – focus on public health, reliance on a science-based, objective planning and management process, and a commitment to local priorities. Still, results have been uneven, and this presentation will discuss the program’s plans to improve outcomes in the current water resource management environment in Minnesota.

Biography

Steve Robertson is the supervisor of the Source Water Protection Unit at the Minnesota Department of Health, where he has worked for 20 years in various roles. Prior to that, he worked for 13 years in the environmental consulting arena. Steve has a Master’s degree in Geological Sciences from the University of Texas at Austin and a B.A. in Geology from Carleton College.

Mónica Ximena Guzmán Rojo

Catholic University of Bolivia "San Pablo", Santa Cruz, Bolivia / Free University of Brussels, Belgium

Hydrogeological evidence and its implications for sustainable water management in Santa Cruz, Bolivia

Summary

Lessons learned from two case studies:

- Strategies for the protection of recharge areas of the alluvial aquifer that supplies the metropolitan area of Santa Cruz.
- Construction of a GIS-based hydrogeological database focused on groundwater modeling in the municipality of San José de Chiquitos.

Education

Ph.D. student (numerical groundwater modeling), Free University of Brussels, Belgium.

M.A. (hydrogeology and water resources), University of San Francisco Xavier de Chuquisaca, Bolivia, and University of Calgary, Canada., 2013

B.A. (civil engineer), University of San Francisco Xavier de Chuquisaca, Bolivia, 2010

Experience

2017-present, Catholic University of Bolivia "San Pablo" (teacher responsible for the research area in water resources)

2013-2016, Autonomous departmental government of Santa Cruz (hydrogeological manager of the groundwater monitoring network)

Affiliations

Latin American Association of Underground Hydrology (ALHSUD)

International Association of Hydrogeologists (IAH)

Ali M Elhassan

Metropolitan Council

Regional Groundwater Management: Different Drivers Different Solutions

Summary

Different economic, regulatory, and political drivers suggest different management institutions and policies for managing groundwater at a regional level. Hydrologic simulation models are tools to understand the physical behavior of an aquifer system in response to the economic and social decisions. This presentation discusses three case studies where different groundwater models were developed and used to understand impacts of different drivers on regional aquifers.

First case: This study was completed in Nasunogahara Basin, Japan to evaluate the effect of changing rice crop irrigation practices and land use on availability of water from the shallow aquifer of the area. Politics were a key driver for this project, because in the early 1990's this area was one of three candidates for a new capital for Japan.

Second case: This study entails development and use of a groundwater model, the Roswell Artesian Basin Groundwater Model, as a regulatory tool for evaluating the impacts associated with proposed changes in pumping patterns within the Roswell Underground Water Basin (RUWB), New Mexico. The Office of the State Engineer adopted the model for water rights administration in the RUWB in December 2004.

Third case: The SacIGSM Model was used to simulate a 'No Action' condition and three alternative groundwater management strategies on water availability and suitability to support economic development in South Sacramento County, California. These management strategies include conjunctive use, direct Groundwater Recharge, and combination of both.

In all cases, groundwater models were developed and used to guide successful implementation of regional management strategies.

Biography

Dr. Ali Elhassan is the manager of water supply planning for the Metropolitan Council. He oversees assessment of the region's water supplies and the development of plans in collaboration with partners to ensure that supplies can meet projected demands. Prior to joining the Council, Ali worked as a senior water resource engineer in both New Mexico and California. Dr. Elhassan has a Master of environmental engineering and a PhD in agricultural engineering from Japan with a major in hydrology and water resources engineering. Ali has more than 20 years of experience in hydrology, water supply and use, water resources planning and management in both private and public sectors.

Tim Gieseke

Minnesota Department of Natural Resources

Shared Aquifers and CAMP Collaborations

Summary

CAMP, the Community-based Aquifer Management Partnership is an effort by DNR Region 4 to connect stakeholders of a shared aquifer with each other and the collective data they need to manage it.

A CAMP begins with the DNR collaborating with a community to “write their groundwater story”. The story starts with the size and location of their aquifer, the water use trends, and observation well data. This enables the community to “ask the next good question” relative their needs and future plans.

Pilot CAMPs in 2017 revealed the community’s interest may include their entire water cycle. While the “water molecule” begins as groundwater, it soon becomes supply water, then waste water, then discharge water and perhaps recharge water. With this expanded view, a broader collaboration of state water agencies is needed.

In fall 2018, 17 communities expressed interest to hear their CAMP story. Issues related to how local land use decisions = water use decisions, and how aquifers act as “joint groundwater checking accounts” are also discussed. DNR’s new online Water Conservation Reporting System may act as the aquifer checking account ledger.

This MGWA presentation will describe the approach and process to initiate a CAMP. It will review the progress made with the 17 CAMP communities. And it will discuss the success of the overall CAMP goal of assisting communities to reduce use, risks, and costs associated with their whole groundwater cycle.

Biography

Tim is the Groundwater Planner for DNR’s Division of Ecological and Water Resources, Region 4 in New Ulm since 2016. He leads the delivery of Community-based Aquifer Management Partnerships (CAMP) where he is responsible for increasing awareness and engaging communities to actively manage aquifers. In addition to this role, he has experience as a SWCD director, a farm policy analyst, ag producer and owner of an ag-environmental consulting business. He holds a MS in environmental sciences and has written two books on socio-economics of landscape sustainability; EcoCommerce 101 (2011) and Shared Governance for Sustainable Working Landscapes (2016).

POSTERS

Greg Brick, Ph.D.

Minnesota Department of Natural Resources

GLACIAL BEACH SPRINGS OF MINNESOTA'S NORTH SHORE

Abstract

The springs of the North Shore of Lake Superior are difficult to map owing to the rugged landscape. This daunting task was first attempted by aquatic biologist Thaddeus Surber, who drafted a giant map on durable linen, 5 feet by 2 feet, depicting the North Shore springs in 1922. But only a few of Surber's 53 springs could be verified by the Minnesota Spring Inventory (MSI) even after his map had been georeferenced.

Surber's strategy of following trout streams was reprised in a high-tech way by Ostazeski and Schreiner (2004). Visual, thermal infrared, and hyperspectral imagery was flown along several North Shore rivers. Only one spring was detected and even that one was not obvious on a subsequent flight. They concluded that groundwater resources are scarce along the North Shore.

When MSI began mapping springs around Grand Marais in 2015, however, a different pattern emerged. High-discharge springs flowing from spring boxes had supplied the town of Grand Marais with water until after World War 2 (Thiel, 1947). These springs were not found along trout streams, but along abandoned sand & gravel glacial beaches above the present elevation of Lake Superior. In other words, the spring-lines ran with, rather than against, the grain of the landscape. Sharp (1953) published a classic study of the glacial shorelines of Cook County and this was correlated with the ridges seen on LIDAR coverage to find more springs. The mapping has only just begun, however, and would take years to complete.

THE CRENOREGIONS CONCEPT IN MINNESOTA

Abstract

Crenoregions (crenos=spring) are regions that have similar sets of springs. This may include factors such as spring classification, spring density index, aquifer, geology, landscape setting, geochemistry, and so forth. Each crenoregion usually embraces multiple spring-lines and they tend to track geomorphic landscape units. They differ from groundwater provinces in that the latter are based on water wells, whereas springs are natural discharge points.

The Minnesota Spring Inventory (MSI) has been mapping springs since 2014 with funding by the LCCMR but there was no expectation that the entire state would be uniformly mapped in a fine-grained way during the duration of the grant. The prioritization of public lands in the mapping program creates gaps that preclude the development of robust statistics of spring density, as

has been used elsewhere to help characterize crenoregions (e.g., Chelmicki et al, 2011; Junghans et al, 2016).

Nonetheless, an attempt is made here to roughly sketch Minnesota's crenoregions based on the preliminary data gained during the MSI spring-hunting campaigns. Minnesota was divided into the following 7 crenoregions: Southeastern Karst, Minnesota River valley, Glacial Lake Agassiz beach-lines, St. Croix River valley, North Shore, Southwestern Coteau, and morainal.