

# PROTECTING MINNESOTA'S GROUNDWATER

BUILDING KNOWLEDGE AND CAPACITY FOR GROUNDWATER PROTECTION  
IN LOCAL WATER RESOURCE PRACTITIONERS

Prepared by

FRESHWATER

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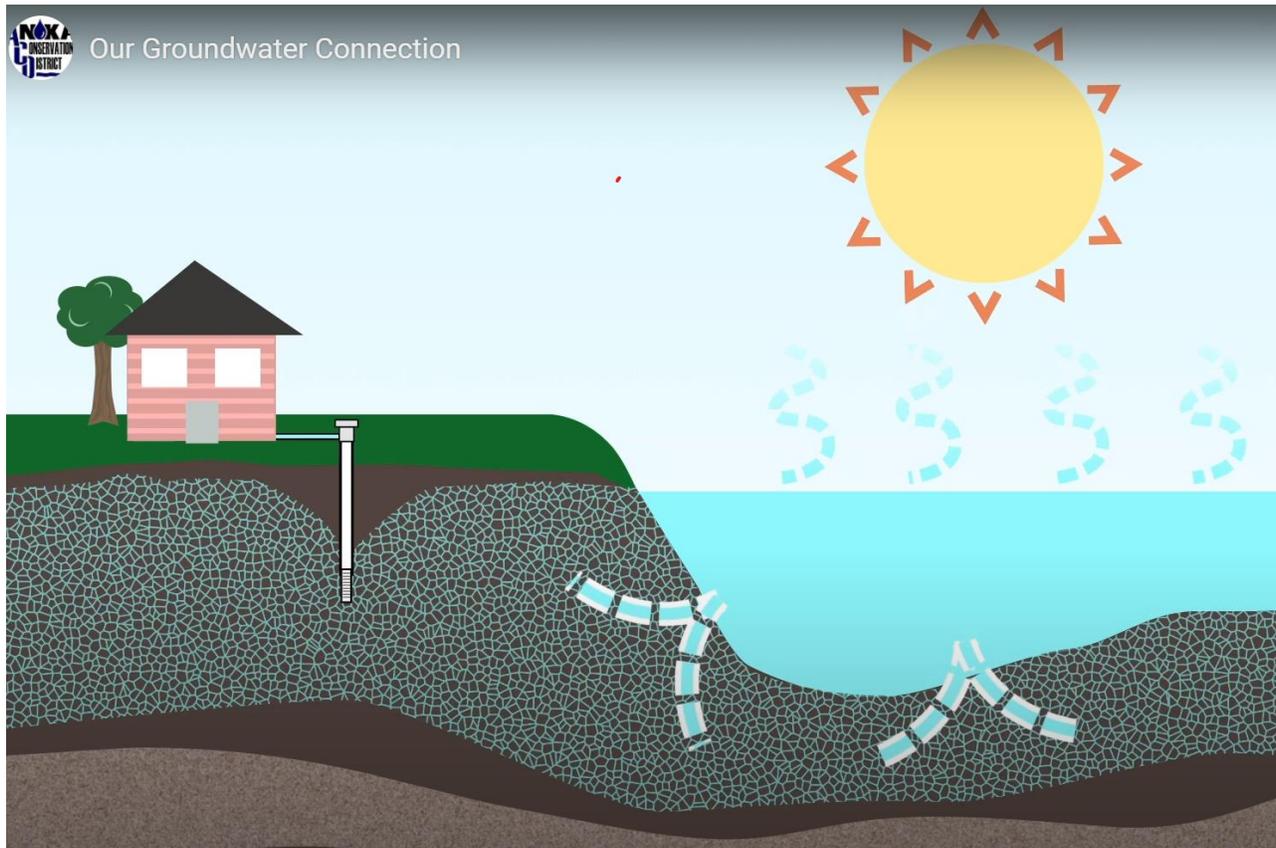
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## EXECUTIVE SUMMARY

Minnesota’s focus on developing comprehensive watershed management plans through the One Watershed, One Plan (1W1P) program requires that local units of government (LGUs), such as soil and water conservation districts (SWCDs) include groundwater protection in local water planning. However, technical field staff and local elected officials need more tools to help them learn about local groundwater, solve local groundwater challenges, and communicate and work effectively with landowners.

This project designed and developed a basic groundwater science and communication course to serve as a building block for future work in this area. The online course is now available at no cost for conservation professionals and decision-makers across Minnesota. Future modules may be developed to address specific local needs. In addition, this basic course could be used in conjunction with face-to-face learning options to build relationships between individuals working together on local groundwater issues, as well as supporting community groundwater goals.



Anoka County [“Our Groundwater Connection”](#)

## NEED

Minnesota's focus on developing comprehensive watershed management plans through the One Watershed, One Plan (1W1P) program requires that LGUs, such as SWCDs, include groundwater protection in local water planning. However, as the studies reviewed below reveal, technical field staff (and to a lesser extent local elected officials) need more tools to help them learn about local groundwater, solve local groundwater challenges, and communicate and work effectively with landowners to protect the natural resource that supplies 75 percent of Minnesota's drinking water and 90 percent of agricultural irrigation.

## BACKGROUND

In 2014, the Minnesota Association of Soil and Water Conservation Districts (MASWCD) adopted a groundwater policy based on resolutions approved by SWCDs, to better equip their efforts to address emerging groundwater issues. MASWCD members requested that state agencies develop policies that engage them as stakeholders, since groundwater is a local issue, and provide them with the science-based education and technical assistance needed to engage in this critical work.

To support LGU engagement, three capacity studies were conducted:

[DNR Groundwater Management: Capacity Assessment at the Local Level – A Survey of Minnesota Soil and Water Conservation Districts, 2015](#). This study surveyed all SWCDs in the state and revealed the need for:

1. Information on local groundwater quality and quantity trends
2. Funding for groundwater BMP implementation
3. Information on studies of land use impacts on groundwater
4. Better understanding of groundwater basics and surface-groundwater connections

[MDH Protecting groundwater-sourced drinking water: An assessment of the needs and barriers faced by local water management professionals, 2016](#). This study again surveyed SWCDs, as well as watershed districts and county government staff charged with land use controls. The conclusions were very similar, identifying the need for:

1. Education for multiple audiences including SWCD staff, landowners, local elected officials, and crop consultants
2. Increased staff capacity of SWCDs through creation of shared, regional positions
3. Better tools, data, and monitoring to improve understanding of local groundwater concerns and support programs that promote and implement alternative land uses and practices
4. Critical funding to accelerate protection efforts
5. Regulation/mandates necessary to accelerate groundwater protection work
6. Collaboration/leadership shared by local staff and state agencies, to work together on common goals and approaches to protecting water resources

[DNR Groundwater Management: Capacity Assessment at the Local Level – A Survey of Minnesota Local Government Units, 2018](#). The study surveyed city and county LGUs to assess their capacity to engage in groundwater protection. The survey expressed the following needs:

1. A simple web-based map showing groundwater use in their region
2. Information on local groundwater quality and quantity trends
3. Grant opportunities to fund groundwater activities in local plans
4. Assistance in identifying/prioritizing local threats to groundwater quality/quantity

Evaluating the needs in all three surveys, the commonalities among them are clear. All respondents felt a sense of responsibility to protect groundwater and expressed the need for access to groundwater quality and quantity information to prioritize and target their work. In addition, they believed adequate funding to implement groundwater BMPs and activities identified in local plans was critical.

Both surveys targeting SWCDs emphasized the need to reach multiple audiences, through education, technical assistance, and training to better understand impacts to groundwater resources.

## PURPOSE

The purpose of this project is to build capacity to protect groundwater sources of drinking water by providing SWCD technical field staff (and to a lesser degree, local elected officials) a set of organized activities to help them view local groundwater and surface water resources as part of a greater, interrelated system; better understand local vulnerabilities; and address real, local groundwater challenges.

These online groundwater education modules are part of a larger vision to build capacity for groundwater and drinking water protection at the local level, which is being championed by the Interagency Groundwater Drinking Water Team. This team is part of Minnesota's Executive Branch collaboration focused on water resource protection and restoration, largely made possible through the Clean Water Fund. In the team's work plan, the first priority area is to integrate drinking water protection for both public water systems and private wells into comprehensive watershed management plans. Foundational to this priority is building capacity for groundwater and drinking water protection at the local level.

*Groundwater Restoration and Protection Strategies* (GRAPS) reports and increased access to groundwater data and information are essential to developing local watershed plans. However, local partners report that they lack a basic understanding of groundwater science needed to understand, interpret, and apply these reports in the planning process. The online groundwater modules are the first step in making this knowledge available in an accessible format throughout the state. The team's intention is for these modules to be supplemented by learning opportunities through existing organizations and events, and new workshops prepared for watersheds entering into the planning process.

### Phase 1: Planning

**Timeline: December 2018- May 2019**

#### Core Planning Team

Tannie Eshenaur, Planning Director, Drinking Water Protection, Minnesota Department of Health  
Annie Felix-Gerth, Water Programs Coordinator, Board of Water and Soil Resources  
Ann Lewandowski, Senior Research and Extension Coordinator, Water Resources Center, University of Minnesota  
Kris Meyer, Project Coordinator, Freshwater  
Anne Nelson, Extension Educator, Water Resources Center, University of Minnesota  
Carrie Raber, Principle Planner, Drinking Water Protection, Minnesota Department of Health

#### Contributing members of original concept team

LeAnn Buck, Executive Director at Minnesota Association of Soil & Water Conservation Districts  
Tannie Eshenaur, Planning Director, Drinking Water Protection, Minnesota Department of Health  
Peggy Knapp, Ph. D., consultant and former Program Director, Freshwater  
Sharon Pfeifer, Ph. D., retired Community Assistance and Natural Resource Manager, Minnesota Department of Natural Resources  
Leslie Yetka, former Program Director, Freshwater

**Core Planning Team convened** (December 20, 2018). In a conversation facilitated by Freshwater, the group agreed on the need, purpose, principles, audience, and scope of the project. To aid in developing the program design, the group also compiled a series of questions intended for a focus group of probable program participants. Although the project continued to develop and was modified, this summary represents an important step in building consensus around key knowledge needs and principles to guide the work. (Appendix A: GW Education Planning Summary)

**Subject matter expert interviews** (March 19-28, 2019). In collaboration with the Core Planning Team, Consultant Peggy Knapp composed a master list of potential subject matter experts. She then interviewed a group of nine key subject matter experts from state agencies, the University of Minnesota, counties, and nonprofits for feedback on the scope, design and accessibility of materials for the course. (Appendix B: Subject Matter Experts Interview Narrative)

**Participant interviews** (March 13-28, 2019). LeAnn Buck, Executive Director at MASWCD, provided Freshwater with a list of potential course participants. Considering the time and resources required of SWCD staff to convene from throughout the state as a single focus group, Freshwater staff decided instead to conduct standardized, individual phone interviews. Kristen Meyer, Project Coordinator and Peggy Knapp, Freshwater Consultant conducted seven interviews with LGU staff representing a variety of areas throughout the state. All interviews were recorded, with the permission of the interviewee, and notes were taken by computer. Notes were entered into a spreadsheet, coded, and sorted by theme. (Appendix C: Local Government Units Interview Narrative)

The responses from interviews with representative staff members and district managers at LGUs around the state, and with subject matter experts (SMEs) who work with groundwater, corroborated the need for, and value in, a perennially available, on-demand online course that explores basic concepts about groundwater. They also indicated interest in a resource hub that efficiently directs conservation staff and others to groundwater

resources, data, and expertise. However, respondents - both from LGUs and SMEs - also expressed a clear preference for a face-to-face option for learning. In some cases, that preference was based on a dislike of online learning. In other cases, and more significantly, respondents expressed a need for conversations with hydrogeologists and peers that provide an opportunity to directly address current challenges in their service areas. Respondents felt an online format would be too general, and would not help them address the immediate challenges they face in their work.

Based on these interviews, Freshwater presented the Core Planning Team with several alternative approaches to the content and mode of delivering groundwater education. After considering alternatives and the available resources, the decision was made to focus this project on designing a basic groundwater science and communication course to serve as the building block for future work in this area. The concerns noted above will be addressed in future efforts as outlined in the Future Efforts section of this report.

### **Technical Design Team**

Since this course will be housed at the University of Minnesota Water Resources Center (WRC), Freshwater contracted with instructional designer/programmer Krista Johansen Dederich of Stellar Interactions, LLC to design and build the groundwater course in Canvas, the educational platform used by the University of Minnesota. Kris Meyer, Freshwater and Anne Nelson, UMN Extension worked as the technical sub-group of the Core Planning Team and, together with Krista Deiderich, Stellar Interactions, comprised the project technical team.

## **Phase 2: Development**

**Timeline: June 2019 - January 2020**

### **Scope and Sequence**

The scope of learning for course content relevant to the target audience and the sequence of instruction and delivery of the course, based on work accomplished in the Phase 1, was initially developed by Freshwater Consultant Peggy Knapp. This was later revised by Freshwater Project Manager Kris Meyer, in collaboration with content specialists.

### **Content**

Content for the two groundwater science modules was grounded in Phase 1 planning conversations and developed by Eric Mohring, retired BWSR hydrogeologist and consultant to Freshwater and Dr. Carrie Jennings, Freshwater Research and Policy Director. Both scientists have extensive experience in SWCD staff training.

Content for the groundwater communications module was developed by Kristen Meyer, Freshwater Project Coordinator, based on guidance principles established in collaboration with the Core Planning Team. (Appendix D: Five Communications Principles to Guide Groundwater Conversations)

### **Expert Review**

A team of six practitioners from the Department of Agriculture, the Department of Health, the Department of Natural Resources, a Soil and Water Conservation District, and the Minnesota Rural Water Association, along with the Core Planning Team vetted the course material prior to the online build-out.

### **Module and Course Evaluation Planning**

Evaluation team:

Anne Nelson, UMN Extension

Kris Meyer, Freshwater

Krista Johansen Dederich, Stellar Interactions, LLC

Anne Nelson and Kris Meyer met with Regina McGoff, Business Development Coordinator, UMN Extension Center for Agriculture, Food, and Natural Resources, for expert guidance on evaluation tools and questions. Krista Johansen Dederich provided guidance on platform-related evaluation.

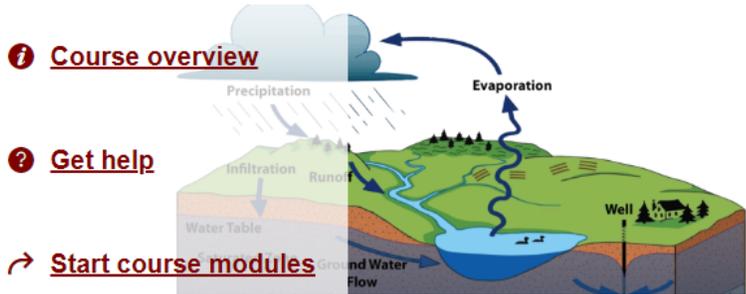
### Canvas design and construction

The technical team met regularly throughout the design and construction phase of the project.

The course that emerged consists of nine modules that provide information and exercises related to groundwater science including aquifers, defining groundwater areas, human impact, and contamination and depletion. There are also six communications modules including guidance into understanding your audience, building relationships, choosing your words with care, and creating a communications plan. A set of groundwater activities is available at the end of the course. See the landing page of the course here.

# UNIVERSITY OF MINNESOTA EXTENSION

## Groundwater Basics for Resource Managers



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- 
- ✓ [Welcome to the course](#)
  - ✓ [Groundwater basics 1: Basic science of g...](#)
  - ✓ [Groundwater basics 2: Aquifers](#)
  - ✓ [Groundwater basics 3: How we define g...](#)
  - ✓ [Groundwater basics 4: Human impact o...](#)
  - ✓ [Groundwater basics 5: Groundwater co...](#)
  - ✓ [Groundwater basics 6: Groundwater co...](#)
  - ✓ [Groundwater basics 7: Groundwater de...](#)
  - ✓ [Groundwater basics 8: Mapping ground...](#)
  - ✓ [Groundwater basics 9: Resources](#)
  - ✓ [Communications: Introduction](#)
  - ✓ [Communications 1: Understand your au...](#)
  - ✓ [Communications 2: Build relationships](#)
  - ✓ [Communications 3: Building relationshi...](#)
  - ✓ [Communications 4: Choose your words...](#)
  - ✓ [Communications 5: Create a communica...](#)
  - ✓ [Communications 6: Resources](#)
  - ✓ [Groundwater activity](#)
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### Phase 3: Pilot Testing, Evaluation, and Revision

Timeline: December 2019 - June 2020

#### Pilot

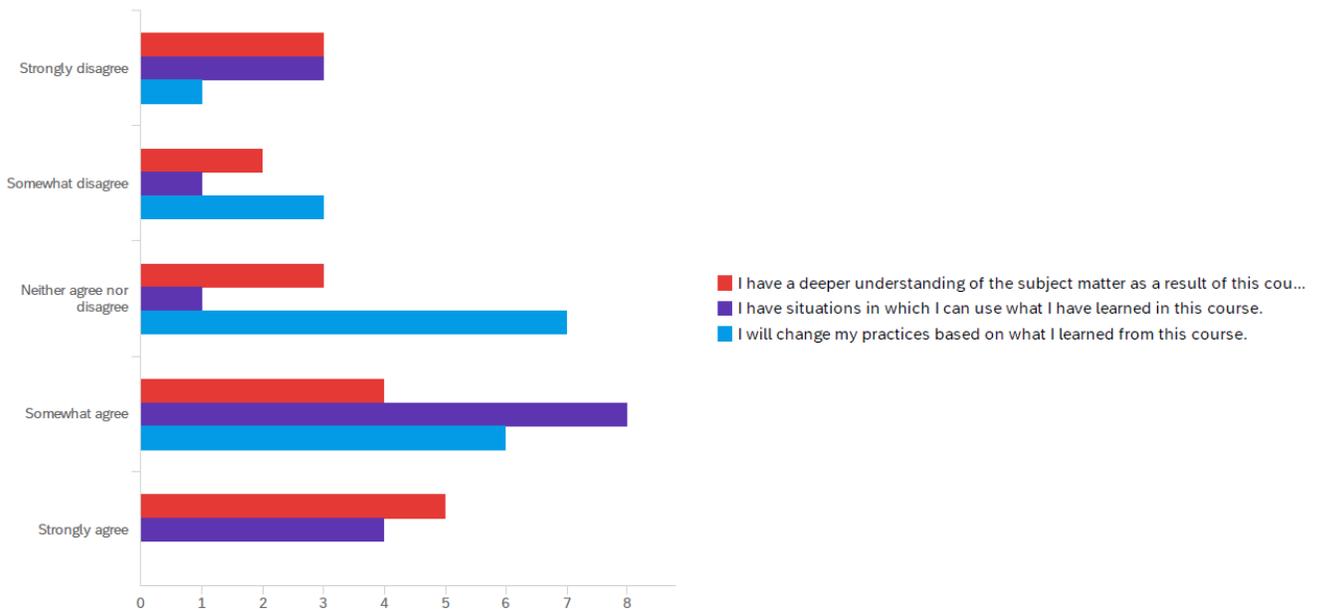
Recruitment for the pilot phase of the course occurred in December and January. There were 25 interested participants - a mix of Soil Water Conservation District Board members, administrators, supervisors, and technicians - representing a diversity of knowledge levels as well as regions of the state. After invitations to the course were sent out, 21 participants signed into the course. The pilot course ran February 3 through March 8, 2020.

#### Evaluation

A survey through the platform Qualtrics was used to evaluate the course. Thirty-two questions were asked ranging from knowledge gained to course satisfaction. Many questions were multiple choice with an option to follow up with written comments after the question. Seventeen of the 21 participants worked through the entire course, and 18 completed the final survey.

Some of the important findings are discussed below:

1. 52% of participants either agreed or strongly agreed that they had a deeper understanding of the subject matter as a result of the course. Although this may seem low, it should be noted that some of the participants are experienced hydrologists and already have the education this training provides. The purpose of the pilot was to ensure we were on the right track with material for a basic course, which the evaluation responses support.



2. When asked “As a result of this program, how much has your knowledge and understanding increased about the following?” 88% of participants indicated that their *Confidence in communicating about groundwater* improved from moderate to a great deal. This indicates that the communications modules, although not all were directly related to groundwater, were helpful in improving participants’ confidence in communicating with an untrained audience. This was an important goal of the course.

#	Field	A great deal	A lot	A moderate amount	A little	None at all	Total
1	The different types of aquifers in my area.	11.11% 2	11.11% 2	22.22% 4	44.44% 8	11.11% 2	18
2	How water flows through the landscape.	0.00% 0	27.78% 5	22.22% 4	38.89% 7	11.11% 2	18
3	Groundwater use and issues in Minnesota	16.67% 3	11.11% 2	27.78% 5	38.89% 7	5.56% 1	18
4	Groundwater conditions in your county or region	11.11% 2	11.11% 2	22.22% 4	38.89% 7	16.67% 3	18
5	Confidence in communicating about groundwater	11.11% 2	22.22% 4	50.00% 9	11.11% 2	5.56% 1	18

Showing rows 1 - 5 of 5

- Participants indicated they would have liked more interaction with the instructor but not with other students. This suggests the possibility of integrating quizzes or discussion forums, a place where the instructor can provide feedback but while also leaving this course as self-paced.
- The average time it took to complete the course was approximately four hours, ranging from two to twenty-five hours.
- Many participants would like access to the course indefinitely as a resource.
- Four of the main issues of future interest cited were rural vs. urban issues, new contaminants, the quantity of groundwater, and climate effects.

### Revision

The most needed course improvement cited by participants had to do with the more detailed graphics and images. Some photos were too large to view properly in Canvas. Participants asked for a link to a larger photo with a zoom function. Other photos and images were copies rather than originals, and therefore pixelated. In response, our revision process focused on these graphics and images. Our Canvas developer located and replaced 20 images, and in some cases, highlighted parts of images that were hard to read. She also included links to each image so they can be accessed and viewed in full detail at the source of the image.

## COURSE DELIVERY AND MAINTENANCE

The course will be hosted by the University of Minnesota Water Resources Center (WRC) and housed on the University of Minnesota's Canvas website. WRC and University of Minnesota Extension staff will host, deliver, and maintain the course at a basic level with no need for external financial support. However, additional funding from participant fees, grants, or external contracts would be needed for a higher level of instructor involvement in course delivery or for significant course updates.

## FUTURE EFFORTS

The participant interview responses supported online modules, but preferred in-person training and regionally-specific information. Future efforts can support all of these needs, as described below.

### Additional Curriculum Development

The expansion of online groundwater modules would address the need to increase knowledge at the individual level, specifically modules focused on drinking water protection for both private wells and public water systems. Future modules could focus on groundwater quantity and how it relates to groundwater connected features (plants, animals that depend on sustained groundwater levels) or modules on regulated contaminants (point sources such as closed landfills, or tanks).

For those interested in face-to-face learning, there are several options:

- UMN Extension can provide customized training and outreach for watershed-based partnerships, building upon the online content (contracted service)
- BWSR's Regional Technical Training Teams could develop in-person trainings at multiple scales
- BWSR Academy offers training on an annual basis.
- State agency technical staff could provide training at a specified scale.

The larger vision of the Interagency Groundwater Drinking Water Team is to build capacity beyond the individual, to address relational, organizational and program capacities. These future efforts will work to build relationships between individuals around groundwater, as well as supporting community groundwater goals.

### Authors

Tannie Eshenaur, Planning Director, Drinking Water Protection, Minnesota Department of Health

Annie Felix-Gerth, Water Programs Coordinator, Board of Water and Soil Resources

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### **What is the need we sense in our community?**

Minnesota's focus on One Watershed, One Plan (1W1P) requires technical field staff to include groundwater protection in local water planning. Studies conducted by DNR and MDH have exposed technical field staff's lack of knowledge of local groundwater quality and quantity, and how to protect groundwater sources of drinking water. Technical field staff (and to a lesser extent local elected officials) need more tools to help them learn about local groundwater, solve local groundwater challenges, and communicate and work effectively with landowners to protect the natural resource that provides so much of Minnesota's drinking water.

### **What is the purpose of this project?**

The purpose of this project is to provide technical field staff (and to a lesser degree, local elected officials) with a set of organized activities that build capacity to protect groundwater sources of drinking water. Increased individual, relational, and organizational capacity will help technical field staff view local water resources as part of a greater, interrelated system, better understand local vulnerabilities, and address real, local groundwater challenges.

### **What principles will guide our work?**

- We will hold the needs our technical audience as the target of our work, respecting their experience and prior knowledge
- We will keep participants' needs at the center of course activities, including the time required of participants to complete the course
- Our focus will be local- local groundwater conditions, local challenges, local resources, local conversations, local planning, local implementation
- We will use existing resources whenever possible
- We will integrate a programmatic approach into the course, taking advantage of programs familiar to participants, including Farm Bill, BMPs, 1W1P, GRAPs and other existing programs
- We will use existing technical infrastructure to deliver the course, rather than creating something new
- We recognize that groundwater protection spans multiple agencies, and will use a collaborative approach to creating this course
- The course will facilitate networking and local conversations
- If there is a disagreement in our process, we will return to our principles and goals to decide next steps

### **What questions should we ask participants in a focus group?**

- What do you most need to know about groundwater in order to do your job effectively?
- Describe a difficult conversation you have had with someone locally concerning groundwater.
- What experiences or features would make you want to take a course in groundwater? What would you want to DO in a course on groundwater?
- What would you want to be able to do after completing a course on groundwater?
- What barriers would keep you from taking a course on groundwater?
  - Time required
  - Cost

- Access to internet or technology
- What would address those barriers and make it more likely for you to take this course?
  - Incentives (Credit, scholarships or other financial supports)
- What experiences have you had in the past with online courses? What did you like or not like?
  - Synchronous or asynchronous
  - Time spent online v. time spent on activities
- How might a course like this help you in your job?

### **What should be included in the three proposed modules?**

#### 1. Groundwater Basics

- What is hydrogeology?
  - What is an aquifer?
  - Groundwater quantity basics (generalized overview)
  - Groundwater quality basics (generalized overview)
- What is under the ground in YOUR area?
  - What resources do you have to find out?
  - What data are available?
  - What does the data mean for you in your job?
  - How do you use those data?
- In what ways do surface waters in your area connect to groundwater?
  - Sensitivities
  - Vulnerabilities
  - Travel time
  - Local wells, well depths
- What features, conditions and land uses pose a threat to groundwater in your area?

#### 2. Groundwater protections

- What does it mean to protect groundwater and groundwater sources of drinking water?
  - Drinkwater basics (DWSMAs)
  - Technologically and economically feasible treatment – private wells (MN Well Owners Organization) vs. municipal treatment systems
  - Examples for each groundwater protection BMP
    - Land cover
    - Green infrastructure
    - Withdrawals
- How might you protect groundwater in YOUR area?
  - How to protect groundwater quality
    - What local conditions and vulnerabilities exist and how do you find out?
    - BMPs appropriate for local conditions
    - Contaminants of emerging concern
  - How to protect groundwater quantity
    - Technical innovations
    - Programmatic supports (irrigation, etc.)
- What do you do when there is little or no data?

- Local knowledge
- Local monitoring
- Other indicators

### 3. Communication and outreach- A guided practice

- Understand local values and beliefs
  - Start where people are, and work with what works
  - Local policy and its impact on practices
- Use plain language to translate and communicate technical science
- Move from a transactional approach to transformation of systems
  - Thinking systemically
    - Markets, bankers, Certified Crop Consultants and Advisors, Buyers, food supply chain
  - Prioritizing BMPs
- Increase levels of local capacity
  - Individual
  - Relational- how do you build stronger relationships locally?
  - Organizational- how do you connect groundwater concerns to your organization's priorities and practices?

Consulting for Freshwater, Peggy Knapp interviewed five subject matter experts. The focus of the interviews was to gain insight into what they think LGU conservation staff should know about groundwater, how a course should be structured, and how to communicate with landowners and others involved in groundwater. Interviews lasted between 30- 45 minutes. Responses were recorded through note-taking on computer. Notes were entered into a spreadsheet, coded, and sorted.

### THEMES

#### **Groundwater Basics, Protecting the Resource**

Interviewees, generally, listed topics that should be covered in a course, rather than concepts. During the construction of the course, these topics will need to be converted into concept statements. Learning objectives will need to be crafted to suggest how the concepts will be assessed.

Topics that should be included are:

- Aquifers
  - Water table
  - Buried
- Aquitards
- Pore space
- Flow direction
  - How flow direction affects where water comes from and where it goes
  - How flow affects how surface water and groundwater are connected
- Recharge
- Cones of depression
  - How cones overlap and why that is important
  - Pumps in wells pull pollution toward them
- Age of water
  - Groundwater predates humans
  - Groundwater pollution is caused by humans
  - Groundwater can contain naturally occurring contaminants
    - How do you treat naturally occurring contaminants?
- Surficial geology
- County Hydrogeologic Atlas and how to use it
  - Everything you do on the land ends up in the water. The only variable is time
  - Everything we know about groundwater is an interpretation of data that comes from wells
- Sensitivity and protection
  - How are surface water and groundwater connected?
  - County Hydrogeologic Atlas Part B
- Connectivity
  - How connectivity is used in models
- Time of travel
- Protection practices
  - Quantifying the impact of protection practices

## **Communication**

Communicating the complex science of groundwater in simple language to landowners and other involved in groundwater is an ongoing challenge for SWCD conservation staff. Topics to be covered in an online groundwater course might include:

- Building relationships as a first step
  - Listening reflectively
  - Listening for facts, values and emotions
- The science of persuasion
  - Thinking like a salesperson
  - Understanding the values and interests of others
- Framing issues
- Using plain language
  - Working with different languages, ethnicities, worldviews
  - Working with differing priorities
- Crafting an invitation
- The value of water
- Having conversations that matter

## **Barriers**

During the interviews, interviewees brought up a number of barriers that provide further insight into how to get more effective groundwater protection.

People in general don't understand groundwater sheds, recharge zones, how far pollution can spread through a groundwater system, how much land you need to protect in a DWSMA, and how local land use affects groundwater. There is a lack of data, and where there are data, how do you use it? Is it useful to anyone?

The lack of data compounds the challenge of talking with landowners. Do conservation staff have confidence in the data, and can they defend the integrity of those data to landowners, especially when protection practices might have a negative effect on a farmer's bottom line? Some counties have no Atlas, no Hydrologic Assessment, have incomplete soil maps, and lack LIDAR data. What will conservation staff do when there is no data?

Much of the work in groundwater protection involves agricultural lands. Farmers are driven by data, but the data is incomplete. If you don't have adequate data, however that is defined, you need to have reliable models. But, models are not entirely trusted. Models are still too theoretical, and can be "manipulated by government." There are many models to use, but how do you know which is appropriate for the situation, how do you use each model, and what are they telling you?

Funding groundwater projects continues to be a barrier. SWCDs work at a county scale, not a watershed scale and certainly not a groundwater shed scale. A county trying to fund a groundwater protection project might find the recharge zone is in another jurisdiction. Finding the appropriate scale to work on groundwater is challenging for employees of a county-based organization.

As noted in the interviews with LGUs, counties might include groundwater as a priority in their planning, but it often slips lower compared to surface water. How do conservation staff proceed with groundwater protection

when local elected officials place a lower priority on groundwater than they do on surface water? How should staff navigate the difference?

Small SWCDs have low staffing levels, and are chronically short of time. How do staff work with landowners when the focus of site visits is on habitat, nutrients, sediment basins, or grassed waterways? They may acknowledge the need for more training, and even want more training, but may simply not have time to devote to an issue that is so easy to ignore.

## APPENDIX C: LOCAL GOVERNMENT UNITS INTERVIEW NARRATIVE

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Freshwater staff and contractor – Kris Meyer and Peggy Knapp – met to determine a standardized protocol for interviewing staff at LGUs. Staff members interviewed were recommended by LeAnn Buck, MASWCD.

Meyer and Knapp conducted one interview together, to practice the standard protocol. Meyer conducted three interviews, as did Knapp, for a total of seven interviews with LGUs. All interviews with LGU staff were recorded, with the permission of the interviewee, and notes were taken by computer. Notes were entered into a spreadsheet, coded, and sorted by theme.

### THEMES

#### **The Science**

There is a general, clearly acknowledged lack of knowledge about groundwater, both in the professional community charged with protecting it, and among landowners and other members of the public. Groundwater was described as “the great unknown.” At SWCDs, there is a lack of understanding about how surface water and groundwater are connected, and how they interact. There is a great deal of very specific, technical jargon associated with groundwater. SWCD staff either don’t fully understand the science, or they struggle to explain the science in lay terms to landowners, or both. There are few tools to support the whole concept of groundwater protection, or to quantify the impact of groundwater protection practices. “What is the science that went into identifying the drinking water protection areas and well- head protection? The conversations are very different depending on whether I’m talking to a city council member vs. a landowner.”

There is also an overall lack of data that SWCD conservation staff can use to determine how best to protect groundwater resources, and to back up their advice and suggestions as they work with landowners. “We have a whole lot of wells and septics next to high quality lakes. We don’t have enough info on the interaction between these.” Well indexes are incomplete, and many wells have not been tested. “Went through county data. It requires immense individual effort to get to wells, well testing. Wells haven’t been tracked.”

Even when there is data on local groundwater, SWCD staff are unclear on what to do with the data; how to act on it. “We worked with MDH on a clinic- tested for arsenic, bacteria, and nitrates. Now have data – we know the percentage of pollutants. But now what is the next step? What do they DO with data?” Another respondent said, “I understand the information, but what are they doing with it? How can we use this info? We want to know what those measurements mean and how they can benefit people.” There is a critical step missing between understanding the science, having the data, and how to take action. And what do they do when there is no data?

There are also persistent misconceptions about groundwater that will need to be addressed. One respondent said, “Talking to landowners, they assume all groundwater is safe and clean because it has percolated. Don’t understand how water percolates into groundwater and how that can affect quality.”

#### **Barriers**

Interviewees were asked to describe the barriers they would face in taking an online groundwater course. Limited time for professional development, limited number of staff, and limited funds were cited numerous times as very real barriers.

Scale was also a barrier- groundwater doesn't follow the political boundaries of a county. Focusing on DWSMAs is too small a scale for the work SWCDs do. They are being pushed to work at a watershed scale. A groundwater course would need to address the issue of scale in both what is taught, and the practices the course would recommend to protect groundwater. "GW gets frustrating because GW doesn't fall into small areas. MDA nutrient mgmt. strategies send funding and programming to towns that don't meet N standards. We have only so many resources to do staff training. There are conflicting priorities. Sometimes you just have to move on. There are diminishing rewards on staff training."

Cost will be a barrier for many SWCDs. A groundwater course would compete for attention with other certifications that SWCD staff MUST have. Groundwater often slips to a lower priority, funding is more difficult to get, and it is just plain harder to manage.

Lack of technology, and older, slower technology, will be a barrier for some smaller, outstate SWCDs.

Communicating the science of groundwater to landowners is a challenge for many. There are competing worldviews and perspectives around groundwater as a resource. Conversations about groundwater, drinking water, contaminants and who is to "blame" can get contentious. Staff at SWCDs feel ill-equipped to manage those conversations.

### **Framework and Features**

Respondents were asked their preferred delivery framework for a groundwater course. The clear preference was for an asynchronous, self-paced course that they could take on their own schedule, as their time allowed. The course needs to directly relate and address the work SWCD staff do with groundwater. It would have to tie into high priority protection issues identified in a water plan or 1W1P. One respondent expressed the expectation, "When I'm done with it can I write a more insightful grant or put a better project on the ground?"

However, a number of respondents expressed a preference for a face-to-face option. They don't like online learning, or they don't retain information as well as in a face-to-face course. Online courses generally take more time. While respondents acknowledge the need for more knowledge of groundwater and how to protect it, there was an overall coolness about the idea of an online groundwater course. A respondent explained, "It's a challenge to get people excited about it. Groundwater is generally thought of as drinking water. SWCDs are slightly removed from groundwater, though BMPs get SWCDs involved."

Respondents listed a number of features they would like to see in a course that raise some questions about course structure. While the overwhelming preference was for an asynchronous course, they wanted interactive features that allow them to:

- Access local data
- Ask questions of experts through chats or discussion boards
- Go through scenarios to learn how others are addressing groundwater protection
- Learn how to run groundwater models on a local scale to justify protection practices
- Access different levels of technical information
- Interact with networks of others doing similar work
- Access tools they can use to teach others
- Move from understanding to action. Learn what practices to put where, and under what conditions
- Learn how to better communicate with farmers, other landowners, and local elected officials

Some of the features noted above suggest at least some synchronous functions as the course is constructed, especially the ability to ask questions. A course would need an active, expert facilitator in order to provide that function.

### **Content**

The content of an online groundwater course would need to be directly relevant to the work SWCDs do. Respondents expressed a preference for scenario-based learning, and content that is localized to their geography.

They want to know:

- Local hydrogeology
- Sensitivity and local vulnerabilities “Why are areas sensitive and how do you communicate that to landowners.”
- The interactions between surface water and groundwater
- The effects of using groundwater
- How to accelerate recharge
- The science behind cones of depression
- How to use the County Hydrogeologic Atlas as a land use planning tool
- Where to find local groundwater data
- What practices to put where, and under what conditions
- How to run models at the local scale for both quality and quantity of groundwater
- How to run groundwater models at the local scale that quantify the impact of implementing protection practices
- What the data on groundwater means for their work
- How to work with agricultural producers on nutrient management
- How to communicate the science of groundwater to landowners

### **Five Communications Principles to Guide Conversations**

We acknowledge that our communications module should focus on *how to talk about groundwater* with landowners and other stakeholders. Noting that this is hard, we came up with a set of five principles to guide these conversations:

1. **Get to know your audience and listen.** What are their concerns? How do they talk about them? Ex: *do you know how deep your well is? Have you had it tested? What are your concerns?*
2. **Words matter.** Use plain, inclusive language, and frame your conversation in ways that capture their concerns, not your own
3. **Inclusion from the beginning.** When you start designing, or even deciding on a project, make sure there is room for those impacted to have a voice and enough flexibility to adjust, if possible, to what you hear.
4. **Time.** It takes time to build relationships. Engage with landowners. Assist in “random acts of conservation” when and where you can. When a project has a somewhat inflexible timetable, note that no project stands alone. How are you laying the groundwork for what needs to come next?
5. **Trust and credibility.** Invest in peer leadership. Rely on credible sources. Use the best available science and resources to explain any potential groundwater impacts. Reach out for assistance when you need it.

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