

Stakeholder Engagement

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General Approach

A fundamental principle driving stakeholder engagement is that everyone has a role to play in decisions about water because it impacts and is impacted by all. A natural corollary is that more understanding and stakeholder input on a water issue is better, especially when changes are being considered that impact this shared resource.

The pandemic changed everything over the last 12 months including plans for stakeholder engagement on this project. Presentations at conferences were cancelled and those to small groups became virtual. However, the goals remained the same: 1) to increase understanding of ASR by sharing information about the study and 2) to gather stakeholder questions, concerns and ideas.

Stakeholders Engaged

Stakeholder identification in the first six months of the 18-month project resulted in a list of local government staff, water resource and supply managers, and relevant agency staff. Targeting existing groundwater-focused groups introduced an efficiency to the approach. The Interagency Groundwater Team (IAGT) which includes the Metropolitan Council, the Environmental Quality Board and existing Groundwater Management Area groups convened by the DNR were contacted multiple times. Specific stakeholders in each of the four regions were identified along with those who had a broader, statewide interest. As presentations were made, individuals and organizations were added as requested. Legislators on the water subcommittee in the House or with an interest in water in both chambers and those that sponsored the original enabling legislation were kept informed. Included in this list (table 1) are representatives from cities or their consultants that have considered using ASR.

Table 1 Stakeholder Groups and their geographic area of interest. Full contact information available upon request.

Geographic Area	Organization
General	Minnesota Department of Natural Resources
General	Minnesota Association of Soil and Water Conservation Districts
General	UMN Soil, Water and Climate
General	Washington County Conservation District

General	Legislator
General	Barr Engineering
General	Minnesota Dept. of Health
General	Minnesota Rural Water Association
General	City of Chanhassen Utility Superintendent
General	US Geological Survey, Water Resources Center
General	Riley, Purgatory, Bluff Creek Watershed District
General	Minnesota Rural Water Association
General	Minnesota Geological Survey
General	Minnesota Groundwater Association
General	Shakopee Mdewakanton Sioux Community
General	Legislative Water Commission
General	Legislator
General	Minnesota Environmental Quality Board
Moorhead	Legette, Brashears & Graham, Inc.
Moorhead	Minnesota Department of Natural Resources
Moorhead	Moorhead Public Service
Rochester	Rochester Public Utilities
Rochester	Barr Engineering
Straight	Minnesota Department of Natural Resources former groundwater management area project manager
Straight	Minnesota Dept. of Natural Resources current groundwater management area project manager
Straight	Leech Lake Band, Water Resources program manager
Straight	Leech Lake Band, Environmental. Director
Washington Co.	Minnesota Dept. of Natural Resources current groundwater management area project manager
Washington Co.	City of Woodbury Public Works
Washington Co.	Minnesota Pollution Control Agency

Presentations and other interactions were ongoing throughout the project period. Virtual presentations began with an explanation of basic concepts including what ASR is, the rationale for using it and examples from around the world. Examples that were closer to home provided more motivation for why ASR might be relevant to Minnesota. The specific drivers that might make ASR viable in parts of Minnesota were folded into a discussion of the selection of the four study areas.

Presentations

In discussions following presentations and general conversations, questions were answered if possible and also recorded for incorporation into this report, as appropriate. Stakeholder impressions of the implications of the work and potential next steps helped shape report recommendations. In addition to the presentations and other interactions listed below, there were a few academic or classroom talks given to small groups at the University including an MS thesis defense by Dr. Bill Arnold's student, Josh Kirk.

- 9/3/2019 ASR submitted as an idea for 3M settlement for Woodbury
- 9/5/2019 Presentation to Interagency Groundwater Team (IAGT)
- 9/11/2019 Proposed a session on the topic of Aquifer Storage and Recovery for the UCOWR meeting to be held in Minnesota in June 2020 (cancelled because of Covid)
- 9/18/2019 Initiated contact with DNR Groundwater Management Area leads in NE Metro GWMA and Straight River GWMA and DNR appropriations person in Moorhead
- 10/14/2019 Attended Nibi Mahnomini conference on the White Earth Reservation
- 11/6/2019 Presentation to Water Resources Center research staff and Extension Educators
- 11/7/2019 Phone meeting with DNR modeling group working with 3M settlement money on groundwater models for Washington County. Briefed them on the concept of ASR, currently not being considered in any of their scenarios to provide safe drinking water for the area.
- 11/8/2019 Presentation to NE Metro Groundwater Management Area team
- 12/6/2019 Talk at Minnesota Association of Watershed Districts Annual Meeting
- 12/10/2019 Talk at Minnesota Association of Soil and Water Conservation Districts
- 12/17/2019 Conversation with Ellen Considine, DNR Groundwater Technical Analysis Workgroup
- 1/22/2020 Conversation with Moorhead Water Plant Operator
- 2/13/2020 Submitted abstract for UCOWR meeting
- 2/19/2020 Article for Breeze, a publication for the Minnesota Section of the American Water Works Association(MN AWWA).

- 2/12/2020 Conversation with Woodbury Water Plant Operator, Rochester Environmental & Regulatory Affairs Coordinator, Rochester Public Utilities and their Consultant, Barr Engineering
- 2/26/2020 Updated bill sponsor, Rep. Sandell of Woodbury
- 3/2 - 3/10, Meetings with legislators: Bigham, Boe, Brand, Luek, Lee, Frenz, Fabian, Weber
- 3/5/2020 Presentation to IAGT
- 3/6/2020 Conversation with interim EQB director Katie Pratt
- 4/2/2020 Presentation to IAGT on progress
- 5/5/2020 EQB small group meeting about State Water Plan
- 8/4/2020 IAGT meeting update featuring policy issues
- 9/30/2020 Presentation to 3M settlement subgroup 1, drinking water planning
- 10/7/2020 Presentation to Washington County Water Consortium
- 11/9/2020 Presentation to water subcommittee in House
- 12/2/2020 Presentation at the U of M Dept. of Soil, Water and Climate seminar
- 12/9/2020 Conversation with bill sponsor, Rep. Sandell, Woodbury
- 12/11/2020 Conversation with water subcommittee staff, Jim Stark
- 12/21/2020 Conversation with water subcommittee co-chair P. Fischer
- 1/7/2021 Presentation to IAGT with recommendations
- 1/13/2021 technical presentation to MDH groundwater modeling group
- 1/14/2021 conversation with DNR management about aquifer properties database

Specific Stakeholder Input

The North and East Metro Groundwater Management Area Advisory Team attended an early, in-person presentation. They had become steeped in the water issues of the region and as a result, their questions are well informed. They asked fundamental questions about whether ASR was needed and feasible in Minnesota and the benefits of groundwater recharge over treating and storing water above ground. Thinking a step ahead, they wondered about the role that ASR played in the larger conversation about water reuse and if we could be more creative about reusing water first or using recycled water for ASR. They had technical questions about how quickly groundwater could be recharged and how to anticipate the effects of mixing water of different chemistry and measure potential groundwater contamination from ASR. Engineering questions about whether the water would corrode distribution pipes may have been informed by the Flint water crisis. On the regulatory side, they wondered if passive infiltration and injection would be regulated in the same way and what role the EPA had in regulating ASR. From a practical and local point of view, they asked if ASR could help with contamination at the Twin Cities Army and Ammunition Plant in Arden Hills and with the widespread PFAS contamination from 3M disposal sites in Washington County. The overall takeaway was that this group wanted assurances that if ASR were to be used, other approaches to water conservation would come first and that Minnesota's groundwater be protected. These are aligned with the recommendations that we have made for ASR.

An early written submission of an ASR concept to the Conceptual Drinking Water Supply Team working on the 3M PFAS settlement resulted in the project team receiving an invitation to present to them. DNR staff also advanced our idea with the 3M Settlement Team, including the MPCA and their consultant, Wood. Team members Runkel, Kang and Jennings presented an update on project activities and preliminary conclusions, particularly in Washington County. The East Metro groundwater modeling team (the developers are primarily from Wood) were also part of that dialog. Later, Rebecca Higgins, MPCA of the 3M settlement subgroup 1, drinking water planning, requested a more technical presentation for her workgroup. Kang of our team has been asked to model injection capacity in the Lake Elmo area for this workgroup.

Conversations with the Interagency Groundwater Team began prior to the official start of the project to help shape scope and design and continued with regular updates on all aspects of the project. They, in turn, communicated necessary information to appropriate staff in their respective agencies, greatly assisting with our outreach efforts. The final meeting with them focused on report recommendations.

After we reported difficulty in finding data for modeling purposes, the MnDNR gave us a status report on the aquifer property databases. The data management structure effort took six years of planning and interagency collaboration; the database has only recently begun to be populated. The work is slow and focused on priority areas such as active County Geologic atlases and Groundwater Management Areas. Entering more information is not simply a matter of typing; report results have to be interpreted by an experienced hydrologist. Currently, there are no staff dedicated full time to this effort. The database was also not designed with a user-friendly interface so retrieving information is not straightforward.

Our modelers preferred the higher quality, long-duration pump tests for modeling purposes. The MnDNR response was that longer tests were expensive and had the optics of being wasteful of water. However, MDH does require longer tests of municipalities and there are less wasteful ways to conduct them. Questions about using seasonal sources of water for recharge, for example during the spring for use later during the summer irrigation period were addressed by one of our study areas: the Buffalo aquifer in the Red River valley. There is potential to use ASR with seasonal water sources however the questioner was more interested in seasonal recharge for the Straight River GWMA. We were unable to identify even a seasonal source of water for that area.

The prospect of using surface water prompted questions about treatment; is it done before or after injection? The answer is both. Oxidized surface water can interact with unoxidized groundwater in deleterious ways so reducing dissolved oxygen as well as treating water to remove contaminants is common prior to injection. It also cannot be assumed that stored water will not pick up undesirable elements so extracted water is treated in different ways depending on the ultimate use.

Questions about the actual cost of providing a gallon of ASR water in comparison to other means and the cost of treating recharge water to the required standard cannot be answered without

reviewing the economics of a specific project. The goal of this project was to provide the framework to evaluate project-specific costs. Although it is not possible to say if ASR would be cheaper than using the existing capacity of a large water utility or treating water and reusing it, those two options should be investigated first because they are less technologically complicated. ASR is a method to be deployed after other options are exhausted. Finally, the implications of ASR for private wells was discussed. One of the limits to recharge was that ASR not flood the surface or create artesian conditions in nearby wells.

In the end, stakeholder input was sought at the beginning, during and at the conclusion of the project. Engaging with stakeholders helped create support and kept individuals and agencies informed. More importantly, questions and concerns raised provided guidance to the project team and were incorporated and led to a more robust analysis of the suitability of ASR for Minnesota.

The Executive Summary has been sent to all interested stakeholders and a link to the full report with an expanded table of contents has been provided for deeper review. The final report has been submitted to the LCCMR and project recommendations introduced in bill language during the 2021 legislative session.