Water Across Minnesota's Northern Ceded Territory: Workshop Results

Freshwater, with the help of a 7-person organizing committee and contributions from The Nature Conservancy, organized and facilitated a 2-day workshop hosted by Leech Lake Tribal College August 18-19, 2022. The conversation topic was water challenges in northern Minnesota's ceded territories, and we wanted to hear from those experiencing and working on those challenges. The organizing committee suggested individuals to be invited to the in-person workshop. Freshwater, with input from the members of the committee, designed the meeting structure. Invitees were from tribal departments of natural resources and colleges including representation from Leech Lake, White Earth, Red Lake, Mille Lacs, Bois Forte, Fond du Lac, East Lake and Sandy Lake bands of Ojibwe; treaty consortia, and advocacy groups. Also invited to listen and contribute when relevant were researchers currently or formerly with the US Geological Survey, US Forest Service, and several departments across the U of M Twin Cities and Duluth. Attendees are listed at the end of the report.

The need for such a conversation surfaced during a recent two-year project that Freshwater undertook in which 25 of 35 tribal Nations in Minn., Wisc. and Mich. were interviewed about their approach to governing groundwater. We learned that staffing challenges and reliable funding for positions and programs are impacting institutional knowledge production and continuity of programs and are barriers to addressing groundwater challenges comprehensively and proactively.

The first day of the workshop was devoted to getting to know each other, as many in the room were strangers to each other and to Freshwater. This was also to make it clear that everyone had an equal voice in the conversation. After two hours of personal introductions, we were able to have a more open conversation and focus on challenges and strategies to address them.

Attendees identified threats to surface water, groundwater and habitat from extractive industries like mining, forest harvesting, and irrigated agriculture; pipeline construction and dewatering projects, and climate change. Breakout groups focused on each topic and reported back to the group. Participants had the opportunity to focus on two topics during the first afternoon. The second day was used to select strategies to address the identified threats to water. Notes from these conversations form this report.

The group came away wanting more conversations, a snappy name for the convening group, and a commitment to next steps. This paper has been reviewed by all who attended and edited accordingly. Strategies and proposed next steps included:

- providing opportunities for meaningful community-engaged research,
- mentoring for youth and tribal college students,
- field training and funding for groundwater positions within tribal DNRs, and
- outreach.

Other far-reaching goals included establishing Minnesota-Chippewa-Tribe-wide water quality standards; getting more band members into leadership positions outside of tribal government, and fully recognizing treaty rights to water and land.

The workshop took place on the campus of Leech Lake Tribal College, a location central to those invited. The attendees' homelands span the headwaters of the Rainy, Mississippi, Red, and St. Louis River watersheds. Water flows to Hudson Bay, Lake Superior, and the Gulf of Mexico *via* the Mississippi. The name chosen for this group reflects this unique location: Headwaters Community Forum.

Agenda and Topics Covered

Day 1 Morning: Sharing Water Stories

It became clear over the course of the 2-hour introductions that all present had a deep connection to water. These personal connections led all to their current work, whether they viewed water as a sacred relative, essential to life or an interesting thing to study. It also underscored the consensus that water needs to be protected for all.

A scientific approach to understanding water is important, but with caveats. Scientists first need to acknowledge the responsibility they have to those whose land they are guests on. Scientific questions in turn will be better framed and more relevant if they include different perspectives, especially from those with deep and long-term connections to and experience of place, land and water. Settlers' descendants can collaborate with Indigenous residents of the region to understand, protect and manage water, but the ultimate goal should be to relate findings back to sustain the relationship to water that the indigenous residents of the region have.

Members of the community have fundamental questions about whether the water they drink is good for them and their children, why wild rice is in decline, and how serious certain impacts from pipeline construction and mining are to water quality, along with other concerns. Community members must therefore be engaged from the formulation of questions to the reporting on outcomes and implications. Ideally community members are also meaningfully engaged in the research and decision-making as it progresses. This engagement would also expand environmental-career pathways and help close capacity gaps identified in tribal DNRs. Field days, internship programs and mentoring opportunities offered locally would build the capacity of communities to prevent or resolve issues and challenges.

While water-quality impacts of proposed construction and extraction projects rose to the forefront, it was also acknowledged that, in northern Minnesota as in much of the state, the natural hydrology has been extensively modified. So it is not just about water quality and other visible impacts, but also fundamental changes to how water moves from the atmosphere to land, through the ground, and back to the atmosphere through plants. All water pathways have been altered with consequences, some of which are known and others likely unknown.

Day 1 Afternoon: Small Group Discussions

Topics for further small group discussion were identified at the close of the morning session by compiling questions and themes that the participants identified. The topics were: 1) the altered hydrologic cycle; 2) wild rice and water quality; 3) community-engaged science; 4) science and policy making and 5) mining and water quality. Attendees chose two topics to discuss during the afternoon. Day 2 began with a check-in conversation with the full group and then the conversations at table topics shifted to

strategies that would move toward solutions.

Day 2 Morning: Debrief of Day 1.

The group met in a full circle and each person had a chance to speak without interruption. Most felt that having conversations that revealed our humanity, especially as we are emerging from pandemic-induced isolation, allowed the sharing of different perspectives and roles. We need to continue open discussions like this to make headway on complicated issues like the ones we are facing with water.

Generational trauma is present and needs to be acknowledged up front, especially in talking about the history of what has happened in this region. How then do we proceed in a way that recognizes past harms and move forward given that those past harms continue to cause harm? We can be "collaborative" – but the loss of sovereignty and the taking of the land underlies all of the issues. Can the current "land back" initiative be part of a shared "radical imagination" in envisioning a different future?

The scientists who attended the workshop expected that the discussion would be much more data focused; they ultimately appreciated that it was not a traditional conference approach or format. Still, some reported being impressed by the scientific work that had been done and described at this workshop. Others learned a lot about water quality and look forward to learning more about what has worked in other communities when setting water standards. The opportunity for true community-engaged science through research, partnerships and student mentoring, particularly at tribal and community colleges feels like a real possibility after these conversations.

Water Workshop participants met in a woodworking shop at Leech Lake Tribal College. This is a full-circle debrief conversation. *Photo by Carrie Jennings*

Some asked for examples of past government initiatives that have been successful. How do good ideas get turned into public policy that leads to real change? Do we have to make a choice to either a) dream big and work backwards, or b) think of all the issues and take the best next step for incremental change? Many participants described issues and threats to water and land in terms of David and Goliath, e.g., small, poorly resourced individuals or groups trying to respond to large, powerful, well-funded "threats". There was much discussion of where and how to find leverage, with some describing a process of incremental steps through organizing creating the potential for sudden shifts in the balance of power. Getting indigenous leaders into positions of power feels like an important strategy. When doing the "right things for the community" feels daunting, we need to leverage each other's expertise, experience, knowledge, and power to improve understanding and support tribal nations. That involves first stepping back from being action-oriented and instead listening and working on understanding first.

A true understanding of community engagement includes mentorship, connection, and support where there maybe was not any, including and recognizing the journey of water. There is no "one size

fits all" model for community engagement because there will be completely different conversations and values among communities. It takes outreach and addressing specific groups to accurately discern their questions.

Some who attended the event feel like they are constantly working to help build capacity to address issues, especially regarding groundwater. What they need is more consistent resources and funding to develop programs and build capacity. This support will allow them to find a path to continue developing expertise and capacity for working with water. Local technical experts can make an impact, improve credibility, and help focus efforts.

We could all do a better job communicating experiences, making connections and increasing awareness with different groups. For example, rather than starting with data and leading quickly into solutions, as scientists are accustomed to, this meeting began with hearing about different understandings and experiences with water which brought people more fully into the discussion. It is also helpful to proceed with the understanding that water issues should not be an "us *vs*. them" situation. Communicating through the use of images and interviews could help more people find common ground. Moving forward, this group could be a sounding board or consortium where people of different backgrounds and expertise can connect to exchange thoughts and resources. It could function as an honest collaborative space. All in the room expressed willingness to continue these conversations.

Day 2 Midday: Strategies to Address Challenges

The strategies are recounted at the end of the report by topic.

Day 2 Afternoon: Final Debrief

Comments from a full-group-circle debriefing discussion are paraphrased to reflect the meaning and intent of the individual, though not attributed.

> *Connections are important, especially in person.*
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> *I learned so much more about what's happening in my own backyard. I will continue taking in the issues and thinking about next generation engagement that may involve modeling and leveraging expertise and continuing connections. No one does it all and we need all areas / expertise and to work together – having a broad team with different personalities, this makes things happen.*
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> *I was evaluating if there was a role for me to play given my capacity and experience. I would like to tell more in-depth stories and have long-term information to shift perspectives. This will take some harder work.*
>
> *I can imagine offering groundwater classes with technical and analytical skills but those need to be bolstered by developing skills for communicating that information. I need to continue figuring out what communities' needs are and how we use this information and what we know and do to benefit them. What tools are needed? Bringing more folks into the discussion will help.*
>
> *Seeing and being with people again was so important to developing relationships, have the chance to commiserate, and become re-energized. I would like to continue connecting, am*

interested in learning more about wild rice and will continue policy connections.

I was so happy this workshop happened! I already have a list of people to follow up and touch base with after the workshop.

I am thankful to have a chance to continue expanding my network of trusted collaborators. I am coming away with many to-do lists. I am planning to reach out about joining a water quality modeling project. Could this be a working group of expertise and collaboration? Messaging is extremely important and we need a snappy name!

I will continue looking for more networking opportunities, especially for students to grow mentoring programs.

I look forward to learning more about hydrology, including wild rice. I plan on connecting with another participant, hearing more about their career path, and having them speak to students.

I am grateful to be back in this region. I see another participant here as being a major connector and a doer.

I have so many more takeaways from all the different perspectives. We have just started discussing hydrogeology and wild rice. It is important to speak from the head AND heart. I will look into supporting efforts through the St. Croix Watershed Research Station (SCWRS), particularly involving monitoring and wild rice.

We are all overwhelmed, but can put it into perspective if we stay connected moving forward.

Finding what this was all about was key for me. I liked being exposed to everyone and having new ways of thinking. I will look into specific platforms for sharing such as Discord. It is helpful to use smaller ideas to build up and support big ones. Let's move forward as a group.

The intersection of water science, public policy, and tribal power is engaging at many levels. Freshwater's report on groundwater governance will include these thoughts and conversations. I look forward to continuing to connect and explore future career opportunities.

Exposure to a high level of science and I now have a lot of questions! I will continue asking questions, involving those in my community, and looking for workshops, meetings, conferences, and research to advance my understanding.

I appreciated these opportunities to learn from one another. These are conversations we will want to share and have with many more people. This forum emphasized the importance of creating relationships between policy-makers, scientists, and communities – we need actual interaction between all different groups to create the change!

Each one of the topics discussed focused on the need to shift core beliefs before actions would change.

There is a lot to do, but we can make progress together. I've got a to-do list and will be following up on next steps.

Water Challenges and Strategies Discussed

1. Groundwater and altered movement of water through the hydrologic cycle

There are many and varied impacts to the hydrologic cycle. Climate change is altering the movement of water as temperature increases, weather patterns shift, extreme weather events become more common and seasonality changes. As a result, it is becoming increasingly difficult to predict how the water balance will shift. This influences our ability to understand and predict water availability into the future. Water solutions and systems must therefore be flexible and resilient.

Groundwater and surface water are linked but are treated as if they are separate in the political and regulatory arena. There are differences in the rules and regulations between states, federal, and tribal entities leading to conflicts and arbitrary boundaries. Groundwater flows across political boundaries and while it may be that reservation boundaries are coincident with watershed boundaries, those are not necessarily coincident with groundwater-shed boundaries.

Once surface water contaminants enter the ground, they become very difficult to treat. There are few resources available to monitor, track and document the extent of contamination. This contamination can result in large financial liabilities, e.g. superfund designation, and lack of accountability because bankruptcy and reorganization can sometimes allow actors to escape negative consequences.

Strategies

Methods that demonstrate surface water-groundwater connectivity are needed to point out where the groundwater is most sensitive to change. There are ways to demonstrate this sensitivity through common contaminants (e.g. road salt), isotopic analysis of water and even temperature. These could be used to refine where data collection is needed along with the outreach to bring awareness to sensitive areas.

Many factors influence a safe water supply for indigenous communities and it is important to have training at all levels (scientists, community members, local officials, young people, etc.) so that knowledge is shared by everyone. Scientists need to speak and communicate in a way that all can understand and relate to.

Tribes are at a level of government that allow them to work across political boundaries (e.g. states and counties). The long-term residence of band members on this land puts them in a unique position to provide memory of past events and connections. Maintaining a history of what has happened on the land is important and mapping may be important is that respect.

2. Wild rice and water quality challenges

Threats to wild rice or manoomin include aquatic invasive species, population increase in the region, lake and watershed development, poor management, and changing water quality. In 1973, Minnesota adopted a sulfate standard specifically to protect wild rice waters; however, this has been unevenly enforced and has been insufficient to completely protect wild rice waters due to the broader array of threats. More recently, the MPCA proposed to update the standard with a variable targeted water quality standard based on scientific studies, but ultimately withdrew the proposal, partly in response to public comment opposing the change from across the spectrum, partly because

of concerns about feasibility of implementation as well as political will for enforcement. Many at the workshop expressed concerns about the potential to reverse the decline of wild rice in the short term, as water quality, climate, and habitat trends impacting wild rice appear to be getting progressively worse. Some options to protect wild rice were proposed, such as closing reservations, taking land back, or restricting access to lakes (i.e., to limit overharvest and/or introduction of invasive species). However, discussion acknowledged that many of these options could also have potentially negative or unintended economic consequences. What are other potential strategies?

Wild Rice in Leech Lake. *Photo by Carrie Jennings*

As of 2022, the state of Minnesota still does not have a coordinated, standardized statewide approach to wild rice monitoring and management. The longest-running, most comprehensive and extensive monitoring program is that of the 1854 Treaty Authority, initiated in 1998. In 2007, monitoring efforts were expanded through a cooperative effort with other partners including MN DNR, Fond du Lac Band, and USFS. More recently, in part based on recommendations from both the Minnesota Tribal Wild Rice Task Force and the Governor's Task Force on Wild Rice, a Collaborative State and Tribal Wild Rice Monitoring effort has been initiated (funded by LCCMR) to develop and coordinate expanded statewide monitoring. The initiative includes providing grants to individual partners to establish their own monitoring programs. Additional approaches to understanding long-term trends with wild rice were discussed. Long-term knowledge and records collected by the tribes are invaluable; however, there are valid concerns about data sovereignty and sharing based on past experience. Expanded monitoring of water levels and flows from the cooperative stream gage network would be helpful. However, there is still an under-representation of wild rice streams in the gauging network, in part due to the cost of stream gauges and the fact that most gages are located on larger streams. This is important because while some rice lakes are connected to large streams, many are not. Note that stream-gage water levels are almost never corrected and calibrated to discrete water level measurements; the focus is always on correcting flow. If stream level measurements are important, and those in the room thought that they are, we should be lobbying for the DNR and the USGS to correct and calibrate their water-level records in addition to their flow measurements.

> **Long-term knowledge and records collected by the tribes are invaluable; however, there are valid concerns about data sovereignty and sharing based on past experience.**

There is a fundamental need for hydrologists in tribal DNRs. A few tribes and bands have the financial resources for hydrologists but they do not fund these positions with their own resources. There are no non-competitive, non-programmatic funds for groundwater from the EPA. Other programmatic funding is not long-lasting, and does not grow, nor is there money for a hydrologist or groundwater position and no specific training is being offered. The tribes need assistance in developing and sustaining groundwater programs that would include independent hydrologic modeling so that models are not being developed without data for testing and validation. There is the sense that models developed by project proponents manipulate or inadvertently leave out key details in order to tell a desired story. The USGS has this expertise and a reputation for objectivity and has the charge to serve tribal governments. However, they can usually only come up with about 25% of the funds needed to provide the assistance.

There are different groups working on wild rice including multiple wild rice consortia. With each passing generation, there is less knowledge of wild rice. Having a unified voice across the Minnesota Chippewa Tribes would provide a unified front. Tribes with "Treatment as a State" (TAS) have authority to set water quality standards, and narrative standards (that are more comprehensive than the sulfate standard, for example) exist. However, there is also a need/role for additional science, criteria and thresholds to support legal interpretation under those narrative standards.

> "Establishing more comprehensive hydrologic standards would help prepare for future events and challenges like changes in flow, water level and chemistry, including those expected with climate change."

Strategies

With respect to reducing the risk and threat of invasive species, in the short term, boat-wash stations, effective enforcement and fewer access points could reduce the spread of invasive species. Enforcement of the existing sulfate standard would help protect wild rice waters, but does not completely address acid mine drainage and other threats. A long-term goal of water-quality standards that are protective of wild rice under the baseline was voiced. There are already about 50 tribes that have shared water quality standards nationally. Those entities with hydrologists and other science or engineering capacity could help other tribes develop water quality and quantity standards. Establishing more comprehensive hydrologic standards would help prepare for future events and challenges like changes in flow, water level and chemistry, including those expected with climate change. Narrative standards supported by quantitative data allows more specific information to be used at the table to make decisions. Army Corps (USACE) funding could potentially be pursued to support some of this work, for example, to look at flow throughout the region. Particularly where projects are proposed that potentially impact public waters or wetlands, USACE review is required. By pursuing analysis and modeling of flow, habitat and water quality relationships using existing USACE software tools and funding programs, it might be possible to be proactive about understanding ecological needs ahead of any proposed projects.

Establishing hydrologic standards and protective environmental flow criteria for wild rice involves long-term sampling and gaging of lakes and streams, organizing and then integrating that information with hydrologic and biologic expertise. One potential focus area to strategically advance this approach (i.e., creating a hydrologic model of the flowage using USACE funding and tools in collaboration with partners and interested parties), would be the Big Sandy Lake flowage., Fond du Lac, Sandy Lake and Mille Lacs bands of Ojibwe could jointly apply.

The existing narrative standard for Fond du Lac promulgated under EPA could be used to inform adoption of a broader wild rice standard across the northern ceded territories. The USGS and The Nature Conservancy could work with tribal partners to coordinate efforts to develop flow-based standards. A future workshop specific to establishing wild rice standards may be warranted.

Another approach might be to pursue a category of protection for wild rice waters at the state level, similar to special protections afforded calcareous fens and trout streams under Minnesota state law. With respect to establishing a baseline for designation of wild rice waters, obtaining paleo-records by coring wild rice waters can extend the study into the past to show where wild rice has thrived previously.

In order to pursue a strategy of training on wild rice, we would need to establish a program either through the USGS, the Bureau of Indian Affairs, Great Lakes Indian Fish and Wildlife Commission or some combination. Training specific to the hydrology, ideal conditions and monitoring approaches for wild rice is needed at both the student and professional level. Environment, Social, Governance (ESG) programming for companies and corporations might bring resources to this cause.

Floating platform with weather and water monitoring equipment at Shingobee Lake. *Photo by Carrie Jennings*

To address capacity needs, although there is no dedicated funding from the EPA (which does provide some seed funding/support for tribal water resource programs) to hire or train groundwater scientists, the USGS does have a training fund for tribes. The Legacy Amendment and the Minnesota Chippewa Tribes funds are both possible sources of grant support. One hydrologist could potentially be shared in the region. This person could interpret the geologic atlases, establish an environmental monitoring program across the region, and assess groundwater models that are developed by the USGS or consultants. This would be the ideal but would require a person with fairly advanced expertise.

A training solution may exist in our own backyard by leveraging existing programs and historic work of:

- the U of M, Dept. of Earth and Environmental Sciences Hydrogeology Field Camp which trains undergraduate students from across the country in technical aspects of wells, pumping, and groundwater modeling;
- former US Geological Survey Shingobee Research Station which has installations for long-term surface water-groundwater exchange as well as climate and phenology records,
- and the Marcell Experimental Forest of the US Forest Service where hydrologic response to forest management practices have been studied. The Experimental Forest has a bunkhouse, monitoring installations and a chemistry laboratory that can be low cost or free to collaborators.

Piezometers measuring groundwater level on hillside as it flows towards the creek discharge area, near Shingobee Lake. *Photo by Carrie Jennings*

Together, these facilities, records, and associated researchers could create programming to align with tribal DNR and college needs and build on existing relationships between tribal colleges and universities, e.g. Red Lake Nation Tribal College with Bemidji State University and Fond du Lac Tribal College with UMD. The curriculum could also be integrated into the existing UMD Master of Tribal Resource and Environmental Stewardship program. Note, there is great need to get the historical Shingobee data fully archived and preserved with appropriate metadata as the USGS hands it over to Bemidji State University.

A shift in who has the burden of proof was proposed—i.e. requiring project or activity proponents to prove a proposed project or activity will not impact water, rather than requiring those potentially impacted to continually organize and respond to threats. To elevate general public awareness and understanding of the emotional, spiritual and cultural aspects of manoomin, an effective outreach and marketing strategy that targets emotions and values was suggested, leading to greater understanding and support for protection. Given the role of mining in the history, ecology, and economy of Minnesota since statehood, and the significant differences between past mining versus the types of future mining activities being proposed, messaging is also needed to clarify the difference between oxide mining (creates rust) and sulfide mining (creates acid). It was noted that Friends of the Boundary Waters has been doing some messaging around this.

All potential solutions need to be discussed in terms of finding a positive outcome such as connecting tribes, rural communities and cities through stories as well as science. The book "Unlikely Alliances"

was recommended. Meaningfully including all voices to build a common understanding of the cultural importance of wild rice could also help those who protect water and manoomin feel less like targets.

3. Community-engaged science and community engagement

Definitions of community-engaged science varied among participants. At one end of the spectrum, community members ask questions to address a need and then sometimes help with the research. This model was contrasted with academics who ask community members for labor, which generates data that then leaves a community and belongs to a researcher or institution. Others see an approach of translating science to make it accessible for community members. In all cases, community engagement might start out strong, but may not be carried through.

The process of doing science or looking at the data can be completely different depending on one's perspective. Communities interact in and with the real world while scientists may develop research questions from a published body of knowledge. However, many scientists are motivated by real-world problems too. Not valuing different perspectives, work with engagement and a lack of follow-through are all-too-common leaving the impression of community engagement that amounted to "box-checking" and "cherry-picking" efforts.

Many do not feel they have a role to play in science or have the necessary background or credentials to participate or do not see science as a career path because of their socioeconomic status. Others have assumptions about science, who is good at it, and may have a sense of "imposter syndrome" when trying to participate. It must also be acknowledged that historic and current racism continue to be barriers to STEM diversification and participation in field work.

Some in environmental activist communities find it challenging to understand the science. It is difficult for others to see those people with the same goal not listening or trying to understand the nuances. Direct actions can be distracting, disheartening and frustrating but people engage in them because they do not trust science because it has been used against them. To some, science is extractive.

How we navigate knowledge and experiences, honor those, and incorporate them into the conversations is at the core of earnest community-engaged work including scientific study. Seeing a topic or problem through different lenses early on is key. Scientists should therefore strive to be welcoming and inviting so that community members feel valued. Storytelling helps bridge understanding and allow a connection with science.

A sense of ownership will likely result in passing on skills and understanding within the community. Mentorship, especially for young scientists, is an important aspect of community engagement and will result in long-term capacity building in the community.

Strategies

A conceptual framework for Indigenous research has been developed by L. Lambert along with a visual component. Co-production of science means finding a topic of common interest that answers a question that supports meaningful science with elder and traditional input. Activism can then focus on community-building and education around water and health through workshops and other programs. The goal is to pass on knowledge and skills to help the community by bringing new understanding of concepts.

Internships with tribal college students are an important component of community engagement. Student mentoring improves overall community development as well as the individual student's. Hiring high school and college students and working with cohorts in college programs can build authentic bonds and long-lasting mentoring relationships. A crowd-sourced list of trusted professional profiles could help with information gathering and networking. Peer-to-peer networks and mentorships are also important. Connecting individuals across the bands in tribal DNRs and colleges can build capacity in the region. Financial resources are needed to make all of this a reality in order to get students to the field, have technology for communication networks, and access to databases.

Research faculty at universities have typically not been rewarded by their institutions for community-engaged or local, applied research. However, this appears to be changing, at least in the earth sciences. The American Geophysical Union (AGU) has launched a new platform for community science exchange and a journal focused on interdisciplinary, community-engaged research that provides an avenue for publications. AGU defines community science as "the equitable collaboration of science with communities primarily aimed at outcomes for the benefit of communities. Work can be collaboratively or community-led." The goal is "…to help "democratize science—making science a valued, accessible, and meaningful way of solving problems that affect all communities, especially those that may not have access to scientists but are experiencing very significant impacts of economic marginalization, climate change, environmental pollution and related health problems."

There are many ways to share knowledge with the broader community. Engaging youth leads to engaging entire families. Successful engagement means meeting communities on their level and making needed connections between the datasets, the information they convey and how this addresses the questions the community has. Community-initiated outreach could include efforts like short radio spots to share water facts. *Engaging Minnesotans with Phenology* is a simple effort to get teachers and kids outdoors making observations. They then have the opportunity to present their information in short radio reports. This impacts multiple levels of the community.

As a slightly separate topic in the communication category, this group could benefit f rom a communication network of sorts to share information; Discord is one platform option.

4. Science to Policy

The path from science to policy-making has many pitfalls and detours. The current strategies of writing reports for publication and expecting them to make their way to policy is not realistic. Scientists could better understand the system of making policy and policy makers the process of making science. Some characterize policy as a "kludgeocracy" or series of clumsy fixes and patches that are vulnerable to crashes.

Part of the problem may be the long road between scientific data collection, conclusions and legislation. Along the way, there are many opportunities for the misunderstanding or politicization of results. A good scientific body of evidence may also need to be well timed to hit the "policy window of opportunity". There is also concern that government-subsidized industries are hard to fight.

However, in today's political climate, scientific expertise and even facts are rejected. Very few elected officials are scientifically trained but everyone can google a topic and find "science" to support their personal perspective. Both sides of a scientific argument are given equal weight despite the sometimes overwhelming evidence in support of one side.

Finally and fundamentally, there is no recognition of the real value of water.

Strategies

Building relationships with policy makers can have an impact. These relationships take time to develop. Translating ideas, providing legislative language and even talking points for testifying is helpful for busy legislators who do not have expertise in an area. Politicians need scientific information and are mainly getting it from one side of the issue. Typically, moneyed interests prevail because that "side" can better afford outreach and influence forums where decisions are made. We could learn from this approach and better use psychology in messaging.

Good background data collection and well-supported scientific arguments can help provide a policy path for tribes that can then be deployed broadly and long in advance of specific threats to water and calls for direct action. Science can be deployed either against our values or for them. Creating legitimacy by doing authentic community-engaged science demonstrates the relationships between water, science and values. Having a cogent, robust, funded, long-term data collection system in place before asking a scientific question is a good practice. The DNR groundwater-level network is the only such system and it also has certain drawbacks with being cogent and struggles with ongoing funding.

Persistence and consistency in communication is important because, ultimately, values and core beliefs may need to shift for change to occur. If not that, new experiences can show a person that someone else actually shares their values, thus allowing better communications and decision making. Understanding what influences an individual's stance and using outreach to shift that is the goal. Story Maps, existing websites with information on pollution sites, and podcasts can be persuasive. Story Maps present geographic information and help give meaning and context to the information that is being shared. A StoryMap with a tribal perspective could be used to shift core beliefs. The software used to create StoryMaps can be prohibitively expensive but ESRI has a Tribal Mapping Program and the BIA can set tribal governments up. Using GIS to display information in this way could be capacity-building for the Tribes. Existing mapping efforts by the MPCA can be adapted to a tribal perspective. For example, the MN.gov – What's In My Neighborhood shows all permits and registrations and potentially contaminated sites in Minnesota. Audible formats (radio, podcasts) can be more appropriate for those that do not relate to maps or have access to computer resources.

5. Mining and water quality

The proposed Talon copper-nickel mine is a perceived threat to wild rice that is sacred and important to the East Lake and Sandy Lake bands of Ojibwe. These are non-federally recognized bands but some are enrolled in the Mille Lacs Band. They have always been on this land. Treaty rights are not being acknowledged in this issue.

Tribes have been meeting quarterly since 2008 with the MnDNR and cooperating agencies. They have a chance to know and learn more about the impact of any potential mining. However, the capacities to address mining challenges are very unequal and those from outside the immediate impact area do not see the big picture. They mainly hear the marketing about who benefits from "green energy".

No permit to mine has yet been filed with the DNR but there is baseline environmental monitoring occurring and locals in the area are organizing to oppose the mine. The main environmental issue is similar to recently proposed mining projects that release sulfur to the environment creating acidic conditions and potentially heavy metals. PolyMet is still wending its way through multiple court challenges and Twin Metals has sued the federal government to reinstate their leases. Similar mines have a reverse osmosis process to treat mine site water but there are questions about how the waste concentrate from that process is being handled.

The messaging from the pro-mining side is making the tribes look like they do not support climate-change mitigation efforts because the mine has an agreement with Tesla to provide a domestic supply chain of nickel for electric vehicle batteries. Department of Energy money is being used to study the potential to sequester carbon dioxide in one part of the rock formation underground. This effort raises questions about the footprint and energy needs of an entirely separate operation in a wetland setting. It also makes the mining project more palatable to environmentally conscious residents of the region.

Copper-Nickel-Sulfide ore from the Eagle Mine, Upper Peninsula of Michigan is similar to ore being explored near Tamarack, Minnesota. *Photo by Carrie Jennings*

What is not being discussed currently is the legacy of historic damages from mines including the boom-and-bust cycle, the legacy of waste, and the militarization of the police force and its deployment against protestors. As a result of recent and past history, the state agencies and executive branch are not trusted in this area.

Strategies

Messaging is key. These are resources that belong to the Earth and were stolen from Anishinaabe. These people were not included in conversations about how those resources are being used. The starvation of hundreds of Ojibwe at Big Sandy Lake in 1850 because the Federal Government did not uphold its treaty obligations is all too recent in the minds of the people here. This feels like yet another example of potentially traumatic and damaging action by the government. Approaches to counter the messaging of the other side have to be well planned before they are implemented. Mapping and storytelling can be combined with past events and threats to present a better understanding. Presenting risks and best-versus-worst-case scenarios could help communities as well as the mining company reach a common understanding of the true risks.

The 1855 treaty rights take precedence over subsequent severing of mineral rights. True government-to-government consultation needs to happen along with genuine community consultation. This consultation would involve EPA Region 5 and the Minnesota Chippewa Tribes as well as a state review of the permitting process. For example, why have tribal water-level and streamflow data not been used? Part of the permit process includes presenting viable options for not mining. For example, there are alternatives to explore such as introducing a bill to create an EV battery recycling facility to make sure that critical elements are recycled, not landfilled. The MCT can learn from the experiences of the Keweenaw Bay Indian Community with the Eagle Mine. The so-called “textbook example” of mining with community engagement is not universally liked.

The proposed Talon Mine location is swampy and watery with a lot of biodiversity. The vegetation and bird data from shrub-carr environments and wetlands farther south in Aitkin County is potentially applicable to that area.

Workshop Participants

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