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The 50-Year Clean Water Plan Scope of Work, Timeline, & Budget

University of Minnesota State Mandated Report
CHAPTER 60, H.F. No. 2310, Article 9, Sec. 12
December 1, 2023

Per the requirements set forth in Minnesota Statue 3.197, the cost to prepare this report was $121,435.66.

Authors:

Andy Erickson, Katey Pelican, Mae Davenport, Melissa A. Kenney, Melissa Mueller, Bonnie Keeler, Diana Karwan, Afton Clarke-Sather, Tony Runkel, Jeff Peterson

Project Leaders:

Andy Erickson, Chair, University of Minnesota Water Council; Research Manager, St. Anthony Falls Laboratory, University of Minnesota. eric0706@umn.edu

Mae Davenport, Professor, Department of Forest Resources; Director, Center for Changing Landscapes, University of Minnesota. mdaven@umn.edu

Melissa Kenney, Director of Research & Knowledge Initiatives; Principal Research Scholar in Environmental Decision Support Science. makenney@umn.edu

Legislative Request:

CHAPTER 60, H.F. No. 2310, Article 9, Sec. 12

50-YEAR CLEAN WATER PLAN SCOPE OF WORK.

(a) The Board of Regents of the University of Minnesota, through the University of Minnesota Water Council, is requested to develop a scope of work, timeline, and budget for a plan to promote and protect clean water in Minnesota for the next 50 years. The 50-year clean water plan must:

> *(1) provide a literature-based assessment of the current status and trends regarding the quality and quantity of all Minnesota waters, both surface and subsurface;*
> *(2) identify gaps in the data or understanding and provide recommended action steps to address gaps;*
> *(3) identify existing and potential future threats to Minnesota's waters; and*
> *(4) propose a road map of scenarios and policy recommendations to allow the state to proactively protect, remediate, and conserve clean water for human use and biodiversity for the next 50 years.*

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(b) The scope of work must outline the steps and resources necessary to develop the plan, including but not limited to:

    (1) the data sets that are required and how the University of Minnesota will obtain access;

    (2) the suite of proposed analysis methods;

    (3) the roles and responsibilities of project leaders, key personnel, and stakeholders;

    (4) the project timeline with milestones; and

    (5) a budget with expected costs for tasks and milestones.

(c) By December 1, 2023, the Board of Regents of the University of Minnesota is requested to submit the scope of work to the chairs and ranking minority members of the house of representatives and senate committees and divisions with jurisdiction over environment and natural resources.

Overview

The University of Minnesota (U of M) has developed a scope, timeline, and budget (i.e., this proposal) to create a Clean Water Plan for Minnesota to proactively protect, restore, and conserve water in Minnesota for human and ecological values and uses for the next 50 years.

Who are Clean Water Partners?

Clean Water Partners include but are not limited to representatives from state departments, agencies, boards, and offices; legislative committees, subcommittees, and commissions; international, federal, state, regional, and local governments and non-governmental organizations (NGOs); Tribes; watershed districts, watershed management organizations, soil and water conservation districts, private industry, nonprofits, and residents of Minnesota. While the term "stakeholders" is used in the legislative request, this scope of work will instead use the term "Clean Water Partners" to represent the important entities with which the U of M will engage throughout this process.

Scoping Approach

A simple logic model (Fig. 1) illustrates how the U of M—through the efforts of Water Task Forces—will use input from sources internal and external to the U of M to generate the outputs requested by the legislature (CHAPTER 60, H.F. No. 2310, Article 9, Sec. 12(a)(1) - (4)).
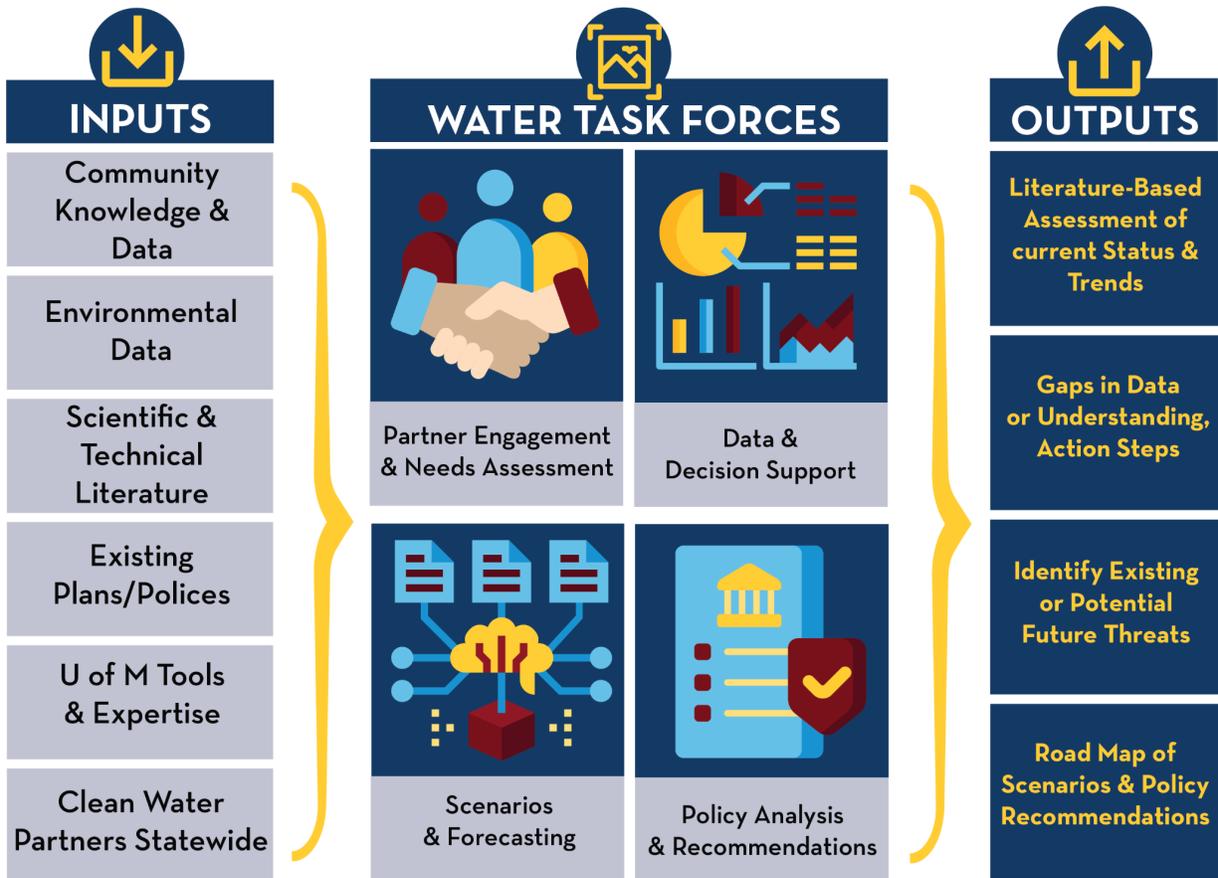
Fig. 1: Logic Model illustrating how Inputs will be used by Water Task Forces to develop the requested Outputs.

The U of M will establish interdisciplinary **Water Task Forces** composed of U of M and other experts, including the project leaders and key personnel described in Personnel & Partners below. The inaugural Water Task Forces will focus on the following four core activities:

The U of M Water Task Forces

Partner Engagement & Needs Assessment Task Force
- Develops mechanisms for continuous partner engagement across all objectives to solicit their needs, input, and priorities.
- Communicates outcomes and outputs from partner engagement to other Task Forces.
- Conducts engagement and evaluation with partners on deliverables and action steps.

Data & Decision Support Task Force
- Continually reviews, distills, and disseminates available literature, data, databases, decision support tools, and other resources.
- Recommends action steps to address gaps in data, understanding, databases, decision support tools, and other resources, as appropriate.
- Develops new databases, data support systems, decision support tools, and other resources as necessary and ensures their usability by partners.

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Scenarios & Forecasting Task Force
- 💧 Takes inputs from other Task Forces to construct, compare, and evaluate 50-year scenarios of water quality and quantity.
- 💧 Formalizes scenario and forecasting results for communication and planning.

Policy Analysis & Recommendations Task Force
- 💧 Holistically evaluates existing and proposed policy, planning, and decision-making approaches.
- 💧 Develops anticipatory policy implementation scenarios.
- 💧 Develops and communicates policy and programmatic recommendations.

Additional Task Forces will be established as needed or directed, which allows for nimble responses to emerging issues. These would be based on similar task forces, current and past, on topics such as lead in drinking water, groundwater governance, contaminants of emerging concern (e.g., PFAS), and aquatic invasive species, among others. Possible topics for Task Forces include:
- 💧 Reducing nonpoint source pollution
- 💧 Effective point source policies
- 💧 Water and environmental justice
- 💧 Protecting legacy waters
- 💧 Sustainable long-term groundwater supply
- 💧 Collaborative management and consultation with tribal nations
- 💧 Resilient water infrastructure

The Water Task Forces will collaborate to complete the objectives listed above and produce the deliverables listed below that create the 50-year Clean Water Plan.

Plan Elements, Data Sets, and Analysis Methods

The essential **Outputs** from the Clean Water Plan are to:
1. provide a literature-based assessment of the current status and trends regarding the quality and quantity of Minnesota waters, both surface and subsurface;
2. identify gaps in the data or understanding and provide recommended action steps to address gaps;
3. identify existing and potential future threats to Minnesota's waters; and
4. propose a road map of scenarios and policy recommendations to allow the state to proactively protect, remediate, and conserve clean water for human use and biodiversity for the next 50 years.

This Scope of Work lays out the steps required to create the Clean Water Plan, including:
1. the data sets required and how the University of Minnesota will obtain access;
2. the suite of proposed analysis methods;
3. the roles and responsibilities of project leaders, key personnel, and stakeholders;
4. the project timeline with milestones; and
5. a budget with expected costs for tasks and milestones.

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The **Outputs** are described below. For each, we include the <u>required steps</u>, <u>activities</u>, and <u>deliverables</u> needed to achieve that **Output**.

OUTPUT 1) LITERATURE-BASED ASSESSMENT OF THE CURRENT STATUS AND TRENDS

Achieving clean water goals in Minnesota requires many different forms and sources of knowledge and data, including environmental (e.g., climate, land cover, soil, water quantity and quality in lakes, rivers, streams, groundwater), social and cultural (e.g., population demographics and settlement patterns; economics; cultural and social values, behaviors, and norms; water justice), and systems and governance (policies, partners, collaborations, networks, and connections among actors). These knowledge and data sources are dispersed and disparate and held and managed by many entities at national to local levels.

Required Data Sets and How the University of Minnesota will Obtain Access

The Clean Water Council, Environmental Quality Board, and numerous state, federal and tribal agencies, among others, have already completed substantial efforts in status and trends analysis, which are publicly available in reports, documents, strategies, and initiatives. These sources and input directly from the Clean Water Partners represent the **data necessary** to complete Output 1, and the Water Task Forces will collaborate with authoring entities to ensure affirmative consent and **obtain access** as needed.

Suite of Proposed Analysis Methods

The Water Task Forces will **review** existing literature, databases, and decision support systems to **identify** relevant sources of information and data on status and trends, many of which are hosted on agency and council websites and databases. The Water Task Forces will **compile, review, and synthesize** these resources **to create** a directory of existing water-relevant literature (reports, strategies, documents) and databases on current status and trends of Minnesota's waters. The directory will clearly and succinctly describe what knowledge and information are currently available in each resource and how to access it. The Water Task Forces will also **highlight** existing data hubs and decision support systems that can be leveraged for the Clean Water Plan and consider **creating** new data platforms and decision support tools that better facilitate the distribution, visualization, narrative understanding, and analysis of existing and future data. The Water Task Forces will determine if additional data analysis is needed and use the most appropriate data collection and analysis methods.

Water Task Forces Activities

To deliver Output 1, the U of M proposes to 1) create a directory of existing water literature and databases on current status and trends of Minnesota's waters, including qualitative, quantitative, network, systems, and socio-cultural information and resources; and 2) synthesize the current status and trends of available data regarding the quality and quantity of Minnesota waters, both surface and subsurface.

The **Partner Engagement and Needs Assessment Task Force** will create the following ***deliverables:***

- 💧 Inventory and summary of literature, databases, and decision support tools on water identified by Clean Water Partners to include in the directory and instructions for accessing available resources.
- 💧 Needs assessment conducted with Clean Water Partners for priorities, action steps, and deliverables.

The **Data & Decision Support Task Force** will create the following ***deliverables:***

- 💧 Directory of existing databases, decision support tools, and literature that succinctly describes what is available in each, and methods for public access.
- 💧 A plan for long-term maintenance, access, and data inclusion support of the directory.
- 💧 Synthesis of existing literature, databases, and decision support tools for status and trends of clean water in Minnesota.

OUTPUT 2) GAPS IN DATA OR UNDERSTANDING

Following the literature-based assessment of Output 1, gaps in data and understanding need to be identified and action steps recommended to address these gaps. Existing planning processes operate on relatively short time horizons (1-10 years). Water resource systems on and below the surface, however, are often driven by much longer timelines (10 - 100+ years). This represents one gap between planning processes and resources management. Another gap is that some of the most negatively affected communities in the state (e.g., rural, tribal, underserved) are also the most disconnected from formal water planning and decision-making activities and programs. The relationship between environmental, system, and socio-cultural data is siloed and fragmented; diverse data is collected but rarely integrated to inform policy decisions. Gaps in data and understanding currently exist and new gaps will continue to emerge as we pursue clean water in Minnesota.

Required Data Sets and How the University of Minnesota will Obtain Access

Some key Clean Water Partners have already identified gaps in data and understanding in publicly available sources. The data synthesis and directory created in Output 1 and gaps identified by Clean Water Partners represent the ***data required*** to identify gaps in data and understanding. If the Water Task Forces do not already ***have access***, they will collaborate with the Clean Water Partners to ensure affirmative consent and ***obtain access***, when needed.

Suite of Proposed Analysis Methods

Gap analysis techniques are many, varied, and depend strongly on the source data. Numeric data may require ***outlier analysis, frequency and probability distributions, statistics and hypothesis testing, trend and regression analysis, prediction and confidence intervals***. Social science data may be integrated in new ways using Census or state/municipal datasets or ***generated by new document analysis, interviews, focus groups, and surveys*** and ***assessed via integrated socio-environmental synthesis and models, qualitative analysis, and conceptual and systems modeling***, among others. The Water Task Forces will determine if additional data analysis is needed and use the most appropriate data collection and analysis methods.

Water Task Forces Activities

The U of M proposes to collaborate with the experts, authors, and project leads for these data sources and 1) review, identify, and summarize gaps in data or understanding for databases, decision support tools, and literature that are relevant to Minnesota Water, including qualitative, quantitative, network, systems, and socio-cultural information over a 50-year time horizon; and 2) recommend action steps, including possible policy changes, to address these gaps.

The **Partner Engagement and Needs Assessment Task Force** will create the following ***deliverables*:**
- 💧 Summary of gaps in databases and literature identified by Clean Water Partners.
- 💧 Needs assessment conducted with Clean Water Partners for priorities, action steps, and deliverables.

The **Data & Decision Support Task Force** will create the following ***deliverables*:**
- 💧 Summary of existing gaps in databases, decision support tools, and literature.

The **Policy Analysis & Recommendations Task Force** will create the following ***deliverables*:**
- 💧 Recommended policy action steps to address gaps in data or understanding, including integration of environmental, systems, and socio-cultural information.

OUTPUT 3) EXISTING AND POTENTIAL FUTURE THREATS TO MINNESOTA'S WATERS

Making good decisions regarding existing and future threats to Minnesota's waters over the next 50 years will rely on accurate understanding and forecasting of water risks as well as the potential impact of interventions and actions on future water quantity and quality. The U of M houses experts studying and elucidating the complex interrelationships of water, climate, environment, people, and ecosystems in Minnesota and beyond. Impactful factors such as public perception, extreme weather, surface water-groundwater interactions, evolving legislation, and other dynamic variables must be considered when projecting future threats to clean water. Storytelling and narrative understanding with Clean Water Partners, especially residents of Minnesota, will be critical in disseminating how we respond to threats to Minnesota's waters.

Required Data Sets and How the University of Minnesota will Obtain Access

Some key Clean Water Partners have documented existing and potential threats in publicly available reports, documents, strategies, and initiatives. The data synthesis and directory created in Output 1 and other existing and potential threats identified by Clean Water Partners represent the ***data required*** to identify these threats. If the Task Forces do not already ***have access***, they will collaborate with the Clean Water Partners to ensure affirmative consent and ***obtain access*** when needed.

Suite of Proposed Analysis Methods

The Scenarios & Forecasting Task Force will ***compare*** and ***evaluate*** alternative pathways towards clean water for multiple varied inputs. U of M researchers can predict possible outcomes of decisions and interventions through ***scenario building*** and ***impact forecasting***

via **spatial, data-driven, and machine learning approaches**. Forecasting will be **systems-based** and support decisions for surface and subsurface water while incorporating other key variables such as socio-economic; political, network, and systems; and climate and environmental factors.

Water Task Forces Activities

The U of M proposes to engage with the Clean Water Partners and 1) identify high priority existing, emerging, and potential future threats to Minnesota's waters, 2) consider models, scenarios, and forecasting efforts at the state, national, and global scale to assemble relevant information for Minnesota decision makers; 3) construct, compare, and evaluate impacts of existing or potential threats via data forecasting to 2050 and 2075 with potential mitigation scenarios, 4) assess how current policies address existing and potential threats and how anticipatory policies may improve management of potential threats; 5) develop a set of policy scenarios that could address existing and potential threats to Minnesota's waters, including considering political, legal, and institutional variables that may affect water policy in the future; and 6) recommend action steps for anticipatory water programming and management for existing and potential threats to Minnesota's waters.

The **Partner Engagement and Needs Assessment Task Force** will create the following **deliverables**:
- Summary of high priority existing, emerging, and potential threats or concerns identified by Clean Water Partners.
- Needs assessment conducted with Clean Water Partners for priorities, action steps, and deliverables.

The **Data & Decision Support Task Force** will create the following **deliverables**:
- Summary of high priority existing and potential threats.
- Recommendations for user-centered improvements to existing decision support tools and resources, or development of new tools and resources to improve decision support related to threat identification and analysis.

The **Scenarios & Forecasting Task Force** will create the following **deliverables**:
- Scenario and forecasting results on the impacts of existing or potential threats.
- Recommendations for improvements to existing tools and resources, or development of new tools and resources to evaluate and predict impacts of threats to Minnesota waters under various change conditions.

The **Policy Analysis & Recommendations Task Force** will create the following **deliverables**:
- Policy scenarios that could address existing and potential threats.
- Evidence-based recommendations to manage high priority existing, emerging, and future threats to Minnesota's waters and support anticipatory water programming and management.

OUTPUT 4) ROAD MAP OF SCENARIOS AND POLICY RECOMMENDATIONS

Waters in Minnesota are governed by a variety of governmental and non-governmental entities at different scales (e.g., township, county, watershed district, state, federal, tribal, industry, nonprofit, academic). All these entities are critical to implementing a road map to clean water in

Minnesota over the next 50 years. There are already many water plans, road maps, strategies, and initiatives written for Minnesota at the state and local scale. Several of these have been authored by interagency councils and boards, representing collaboration both vertically (local to state to federal and tribal level) and horizontally (e.g., between state-level agencies and organizations), including the Environmental Quality Board (EQB), the Clean Water Council (CWC), and many others. Entities like these are critical partners for developing a road map to achieving clean water goals.

Required Data Sets and How the University of Minnesota will Obtain Access

U of M scholars have reviewed many plans by Clean Water Partners, including the MN State Water Plan (EQB, 2020), Clean Water Council Strategic Plan (2020), One Watershed, One Plan (Board of Water and Soil Resources), Minnesota's Clean Water Roadmap (2014), Minnesota Water Sustainability Framework (2011), Minnesota Statewide Conservation and Preservation Plan (2008), Minnesota Nutrient Reduction Strategy (MPCA and TetraTech, 2014), Climate Change Vulnerability Assessment and Adaptation Plan (1854 Ceded Territory including Bois Forte, Fond du Lac, and Grand Portage Reservations). These plans represent a collective, yet disparate, set of policies, decision objectives, potential solution pathways (i.e., road maps) towards clean water in Minnesota. These and other plans, policies, and strategies represent the knowledge and **data required** to develop scenarios and policy recommendations—all of which are **freely available and accessible**.

Suite of Proposed Analysis Methods

While U of M scholars are familiar with existing clean water plans, road maps, strategies, and initiatives, **problem framing** and a **thorough and integrative review** are necessary to **map existing pathways and scenarios; compare and contrast goals, objectives, and priorities; and reflect the collective wisdom** of the experts, authors, and project leads of these plans. With this foundation, the Water Task Forces can **evaluate the effectiveness** of existing programs, policies, rules, and regulations (e.g., Buffer Rule, Groundwater Protection Rule, Agricultural Water Quality Clean Water Certification Program, wellhead protection programs, Tribal water quality programs and standards, groundwater permitting programs, energy and mining permitting programs, cost-share programs, and nutrient reduction standards, among others). Note that these water policies are not currently reviewed as part of the Clean Water Council's reports or other documents. The Task Forces will **apply standard tools of policy and decision analysis**, including categorization of cost, implementation, effectiveness, adoption rates, political implications, and equity and distributional consequences. The Task Forces will also **employ a mixed methods approach** using literature review, **case studies**, and **expert elicitation** via **semi-structured interviews** with policy actors and agency staff. Work will be conducted collaboratively with U of M policy scholars, agency staff, advocates, NGOs, and community organizations to ensure research encompasses a diversity of views and perspectives.

Water Task Force Activities

The U of M proposes to engage with the experts, authors, and project leads and 1) identify plans, road maps, strategies, initiatives, programs, policies, rules, and regulations; 2) review

other state and regional water plans, road maps, strategies and consider applicability to Minnesota's waters; 3) evaluate available decision support tools for application to policy comparison; 4) evaluate effectiveness of existing programs, funding mechanisms, sustainability mandates, and policies for achieving clean water goals; 5) draft policy implementation scenarios that illustrate alternative political, legal, and institutional contexts that may affect water policy in the future; 6) construct, compare, and evaluate various scenarios of policy implementation (including no change, existing, anticipatory) for potential mitigation out to 2050 and 2075, and 7) recommend action steps towards long-term anticipatory water policy for Minnesota's waters.

The **Partner Engagement and Needs Assessment Task Force** will create the following ***deliverables***:

- 💧 Summary of plans, road maps, strategies, and other resources identified by Clean Water Partners.
- 💧 Needs assessment conducted with Clean Water Partners for priorities, action steps, and deliverables.
- 💧 Engagement on community priorities related to policy-related water quality goals

The **Data & Decision Support Task Force** will create the following ***deliverables***:

- 💧 Recommendations for improvements to existing decision support tools and resources, or development of new tools and resources to improve decision support related to policy implementation.

The **Scenarios & Forecasting Task Force** will create the following ***deliverables***:

- 💧 Scenario and forecasting results on the impacts of policy implementation to Minnesota's waters.
- 💧 Evaluation of whether existing policies and funding mechanisms will be adequate in 2050 and 2075 to protect surface and ground water quality and quantity.
- 💧 Recommendations for improvements to existing tools and resources, or development of new tools and resources to evaluate and predict policy implementation impacts to Minnesota waters under various scenarios.

The **Policy Analysis & Recommendations Task Force** will create the following ***deliverables***:

- 💧 Summary of potential scenarios and anticipatory policy implementation.
- 💧 Evaluation of the effectiveness of existing programs (e.g., Buffer Rule, Groundwater Protection Rule, etc.).
- 💧 Comparison of water quality programs and policies in Minnesota to neighboring states; identifying opportunities to adapt or adjust water quality programs or policies to improve efficiency, effectiveness, or equity.
- 💧 Set of policy scenarios that illustrate alternative political, legal, and institutional contexts that may affect water policy in the future.
- 💧 Policy and programmatic recommendations for consideration by legislators, municipalities, watershed management organizations, agencies, Tribes, and regional planning authorities.

Personnel & Partners

The U of M is one of the top 10 public research universities in the United States. As Minnesota's land grant university, our core mission is to develop solutions to meet the needs of Minnesota, our nation, and the world. U of M students, faculty, and staff collaborate with communities, nonprofit organizations, industry partners, and government agencies in every Minnesota county to address society's most pressing water issues (Fig 2). These programs and projects form a foundation of engagement, tools, and approaches that will be leveraged to support the state and the Clean Water Partners in developing a 50-year Clean Water Plan.
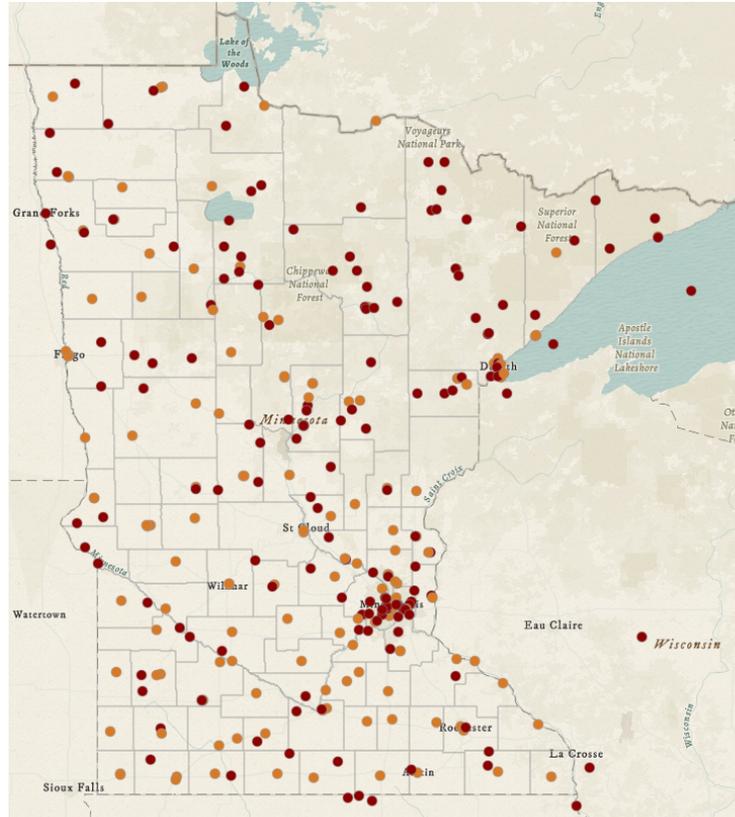

Fig. 2: U of M impacts on Sustainable Development Goals 6: Clean water and sanitation and 14: Life below water (Public Engagement Footprint, https://system.umn.edu/your-community)

Project Leaders

This project will be co-led by University of Minnesota personnel: **Andy Erickson** (eric0706@umn.edu), Chair, University of Minnesota Water Council; Research Manager, St. Anthony Falls Laboratory; **Mae Davenport** (mdaven@umn.edu), Professor, Department of Forest Resources; Director, Center for Changing Landscapes; and **Melissa Kenney** (makenney@umn.edu), Director of Research & Knowledge Initiatives; Principal Research Scholar in Environmental Decision Support Science, Institute on the Environment.

Key Personnel

The ***University of Minnesota Water Council*** (https://water.umn.edu/) will be the technical lead for developing the 50-year Clean Water Plan. It was commissioned by the Research and Innovation Office (RIO, formerly OVPR) to transcend disciplines and connect people on water, water research, and water education. The Water Council is a university-wide, interdisciplinary collaborative of experts and water-focused units composed of natural scientists, engineers, social scientists, economists, and others.

The ***role and responsibilities of the U of M Water Council members*** will be to co-lead and join Water Task Forces, create and serve on subcommittees, coordinate with Clean Water Partners and U of M water experts, contribute technical expertise and guidance, conduct analysis and research, perform engagement activities to inform decision makers, and submit

deliverables. The 2023 roster of the U of M Water Council and their respective expertise (not exhaustive) includes:

University of Minnesota Water Council
- 💧 Amber Cameron - equity, public policy, education, and civic engagement; representing the Office for Public Engagement
- 💧 Afton Clarke-Sather - political geography, environmental policy, political ecology
- 💧 Mae Davenport - human dimensions of natural resource management, community-based ecosystem management, and human beliefs, attitudes and behaviors associated with landscape change; representing the Center for Changing Landscapes
- 💧 John Downing - Limnology, aquatic ecology, biogeochemistry, fisheries, lake management and restoration, eutrophication, harmful algae blooms, groundwater, biodiversity, endangered species, carbon cycling, global role of lakes and streams, policy; representing Minnesota Sea Grant
- 💧 Andy Erickson - Stormwater runoff, urban watersheds, water quantity and quality, climate change adaptation, nonpoint source pollution; representing St. Anthony Falls Laboratory
- 💧 Diana Karwan - watershed-scale processes by which climate, landscapes, and land use combine to influence water quantity and quality;
- 💧 Bonnie Keeler - water policy; environmental justice; cost-benefit analysis; representing the Center for Science, Technology, and Environmental Policy
- 💧 Melissa Kenney - decision support and social science research, climate adaptation and mitigation, ecosystem resilience, interdependent infrastructure decisions, and water quality management; representing the Institute on the Environment
- 💧 Dave Mulla - non-point source surface water pollution and TMDLs and watershed management, the transport and modeling of water, solutes, trace metals, and organic chemicals in soil, surface and groundwater, agriculture
- 💧 Gene-Hua Crystal Ng - hydrologic cycle including the atmosphere, plants, soil, microbial activity, and geochemistry; computer models to describe dynamic connections at the land surface, in the unsaturated zone, and in groundwater aquifers
- 💧 Jeff Peterson - agricultural and resource economics, environmental policy analysis; representing the Water Resources Center
- 💧 Nick Phelps - aquatic invasive species and fish health, emerging threats to aquatic systems, representing the Minnesota Aquatic Invasive Species Research Center
- 💧 Tony Runkel - connection to MGS & studies in bedrock, groundwater flow, transport of contaminants, fractured rock hydrogeology, groundwater nitrate; representing the Minnesota Geological Survey
- 💧 Patrick Schoff - chemical and other stressors on the early developmental stages of fish and amphibians, endocrine disruption, and sustainable development; representing Natural Resources Research Institute
- 💧 Bob Sterner - Ecological stoichiometry, biological limnology and carbon:nutrient biogeochemistry; representing the Large Lakes Observatory

The University's Strategic Partnerships and Research Collaborative (**SPARC**) is a research and innovation hub that engages researchers and practitioners across disciplines to establish

large-scale programs that catalyze collaboration, innovate for new discoveries, and deliver new solutions to address critical challenges. SPARC, one of several research and support units within the U of M's Research and Innovation Office (RIO), is explicitly tasked with supporting startup and implementation of large-scale and complex programs that cut across colleges and campuses. The team has successfully managed and executed cross-disciplinary projects of up to $13 million/year and in up to 17 countries. The **role and responsibilities of SPARC** will be to provide strong and adaptive project management, implementation, coordination, and program evaluation & reporting services, both within the U of M and between the U of M and our Clean Water Partners.

Clean Water Partners

Clean Water Partners include, but are not limited to, representatives from state departments, agencies, boards, and offices; legislative committees, subcommittees, and commissions; international, federal, state, regional, and local governments; non-governmental organizations (NGOs), Tribes, watershed districts, watershed management organizations, soil and water conservation districts, public and private industry, nonprofits, and the citizens of Minnesota. The U of M Water Council will engage Clean Water Partners statewide to solicit input and feedback, request access to data, databases, decision support tools, and hubs, and re-align efforts in response to evolving needs. The **role and responsibility of our Clean Water Partners** is to join the U of M for recurring discussions of clean water priorities, efforts and initiatives, and results and recommendations.

Timeline, Milestones, and Budget

The timeline, milestones, and associated budget for the 50-year Clean Water Plan is provided in Fig. 3 below:

PROJECT YEAR (FY)	MILESTONES & DELIVERABLES	COST
Year 1 (FY25)	**OUTPUT 1:** Directory of existing data, databases, decision support tools **OUTPUT 1:** Initial Partner Engagement **OUTPUT 2:** Assessment of Gaps	$2,800,000
Year 2 (FY26)	**OUTPUT 2:** Actions steps to address gaps in data and understanding **OUTPUT 4:** Set of policy scenarios **OUTPUT 4:** Assembly of forecasting inputs	$2,600,000
Year 3 (FY27)	**OUTPUT 3:** Scenario and forecasting results: Existing or potential threats **OUTPUT 3:** Recommendations for existing or new tools: Existing or potential threats **OUTPUT 3:** Evidence-based policy recommendations: Existing or potential threats	$3,100,000
Year 4 (FY28)	**OUTPUT 4:** Scenario and forecasting results: Evaluation of existing policies and funding mechanisms	$3,200,000
Year 5 (FY29)	**OUTPUT 4:** Policy and Programmatic Recommendations **OUTPUT 4:** Final Partner Engagement	$2,900,000
	GRAND TOTAL=	$14,600,000

Fig. 3: Timeline, Milestones, and Budget for the 50-year Clean Water Plan.

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