Water Resources Center

The Water Resources Center ensures Minnesota's water decisions are grounded in rigorous, locally relevant research—delivered through trusted relationships and informed by practitioner needs.

We work toward a Minnesota where every water decision—from farm fields to state policy—is made in the interest of all who depend on Minnesota Water.

Annual Highlights 2025

University of Minnesota Water Resources Center

UMN Water Resources Center

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About the Water Resources Center

The Water Resources Center (WRC) exists because Minnesota's water decisions–from state policy to farm-level choices–should be grounded in rigorous, locally relevant research. But without our experts connecting university researchers to practitioners, those decisions can too easily default to vested-interest recommendations, national averages that don't reflect Minnesota's conditions, or outdated information that no longer serves Minnesota's water challenges.

As one of 54 National Institutes for Water Resources, and an interdisciplinary unit of the University of Minnesota's College of Food, Agricultural and Natural Resource Sciences and University of Minnesota Extension, the WRC serves as Minnesota's trusted water hub for the full research-to-practice pipeline. We fund research based on practical needs, not academic agendas. We translate science through educators with decades-long relationships in Minnesota communities. And we convene professionals, government, industry, and advocates to build solutions together, creating a two-way flow: practitioners inform what gets studied, researchers provide what practitioners need.

The result is something few states possess: a network of deep trust between researchers and practitioners making evidence-based water management possible at every scale.

WRC ROLES

The work of the Water Resources Center falls into three main roles: research, education, and engagement. At the heart of each of these roles is connection, communication, and integration with our various audiences.

Water Resources Center impacts

39:1

For every dollar of federal Water Resources Research Act (WRRA) base funds received through the 2025 appropriation, the WRC generated over **$39** in non-federal funding.

Research

$2.4M
New research project funding

9
Current/ongoing federal scientist collaborations

41
Ongoing/current projects

Engagement

$1.9M
Funding for outreach and engagement activities

927
Participants at the MN Water Resources Conference

8,720
Participants at **133** outreach and engagement events

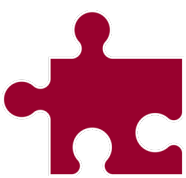
Student support

53
Students enrolled in Water Resources Science program (WRS)

92
Faculty from **33** different units and state agencies involved in WRS program

14
WRRA-supported graduate students

Communications



48,112
Organic impressions and **999** LinkedIn followers

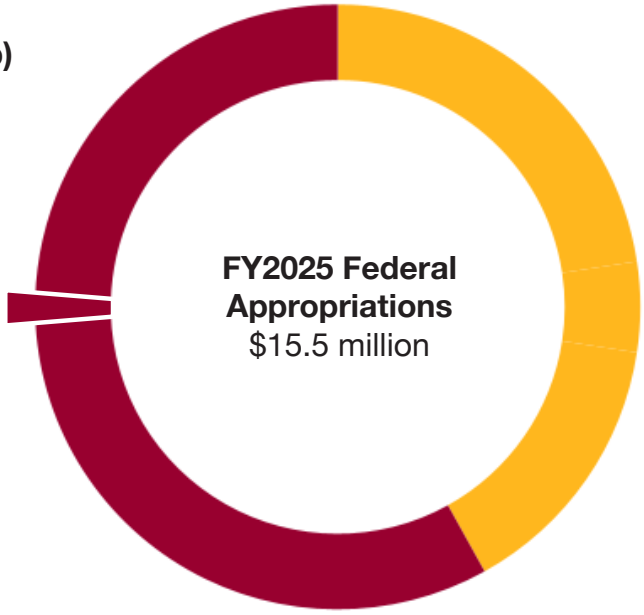
1,012
External newsletter subscribers

499
Internal newsletter subscribers

Water Resources Research Act (WRRA) funding

Annual Base Funds (104b)
$9 million
(58% of appropriations)

Minnesota Allocation
$146,052
(1.6% of 104b Funds)



***National Competitive Grants (104g)**
$6.5 million
(42% of appropriations)

**Awards have not been announced for FY2025*

Annual Base Funds (104b)

- Requires a 1:1 non-federal to federal match. MN WRC had an actual match ratio of over 39:1
- **Supports seed research projects** through the WRC's Watershed Innovations (WINS) program - see page 5 for new funded projects
- Provides support for core functions
- Leverages other sources of funding to **support additional activities** - see pages 7-8

National Competitive Grants (104g)

- Requires 1:1 non-federal to federal match
- Minnesota researchers compete for grants in three national competitions
  - Aquatic Invasive Species
  - PFAS
  - General (topics vary by year)
- Minnesota researchers were awarded $2.75 million for 12 National Competitive Grants since 2019, more than any other state from 2019-2024
- **12 students supported** since 2019

*Note about federal funding and WRRA projects

Due to delays in appropriations and the federal government shutdown in the fall of 2025, the FY2025 appropriation was not distributed to the WRC until January 2026. As of February 2026, the awards for nationally competitive grants have not yet been announced.

Watershed Innovations (WINS) projects

The Watershed Innovations (WINS) grant program leverages funding from WRRA and other sources to catalyze lasting collaborative initiatives that will build and strengthen the growing interdisciplinary expertise around water resources at the University of Minnesota.

Tribal cultural ecosystem values in the Great Lakes Basin

Principal Investigator: Mae Davenport, Dept of Forest Resources

Centering cultural ecosystem values (CEV) in water programming can guide stewardship practices to prioritize ecosystem services for those most dependent on water. This is especially true on tribal lands, where natural resources are also cultural resources. To communicate the importance of CEV in water planning, two-tribally led studies in the Great Lakes Basin have emerged with the University of Minnesota. The first study seeks to identify wetland CEV through surveys, talking circles, and interviews. The second study will implement a culturally-driven fish consumption survey.

Comparing the effects of winter rye and oat-radish mix cover crops in southern Minnesota agroecosystems

Principal Investigator: Anna Cates, Dept of Soil, Water, & Climate

Researchers will take water samples from beneath different crop types and record seeding rates to determine the effect that different cover crop species and planting densities have on nitrogen losses from agricultural fields. The loss of this vital nutrient from the soil profile not only affects crop production but is deleterious to both human and environmental health. Data from this project is important as it allows both farmers and technicians to conserve crop production resources and minimize water pollution.

Barriers and opportunities for Tribal participation in the Clean Water Act's TAS

Principal Investigator: Afton Clarke-Sather, Dept of Geography, University of Minnesota-Duluth

This study explores the challenges Native American Tribes face when trying to manage their water resources through the Treatment as a State (TAS) program, which gives Tribes the authority to manage water quality like states. The findings aim to offer strategies to improve access to grants and enhance Tribal capacity for managing water resources, ultimately strengthening Tribal sovereignty and self-determination in environmental governance.

Developing a multi-proxy varve chronology at Steel Lake, MN, USA to examine quantitative correlation to local hydroclimate and improve predictive modeling

Principal Investigators: Byron Steinman & William Daniels, Dept of Earth & Environmental Sciences, University of Minnesota-Duluth

Current statistical models of climate are restricted by short data sets that limit the ability to determine the likelihood of the largest flooding events, droughts, and other climatic hazards. To improve these models, we will use seasonally layered lake sediments calibrated by local weather and stream gage data to reconstruct the past 1000 years of climate and river flow in this region. This longer and high-resolution record will be used to improve forecasting models and ultimately impact water allocation and infrastructural design decisions in a changing climate.

Evaluating the impacts of nitrogen management, cover crop, and living mulch schemes on crop yield and water quality in Minnesota corn and soybean

Principal Investigator: Fabian Fernandez, Dept of Soil, Water, & Climate

This study will investigate how cover crops and nitrogen fertilizer rates impact agronomic performance and environmental outcomes in corn and soybean fields in central Minnesota. Ultimately, this study aims to provide insights that help farmers and landowners adopt sustainable land management practices in Minnesota agroecosystems. This research will contribute valuable insights into sustainable agricultural practices that balance productivity with environmental stewardship.

Supporting students

Kaitlyn Madden

Paul Jeffrey

Giovanni Delgado-Ortiz

Robert Fowler

Jules Witts

Abraham Underhill

Jake Kastenbauer

Kaitlyn Madden (104g, WRRA)
Water Resources Science
Next generation AIS monitoring

Paul Jeffrey (104g, WRRA)
Water Resources Science
Optimizing MinION field protocols for detecting aquatic invasive plants

Giovanni Delgado-Ortiz (104b, WINS)
Natural Resources Science & Management
Tribal cultural ecosystem values in the Great Lakes Basin

Robert Fowler (104b, WINS)
Land and Atmospheric Science
Cover crops in southern Minnesota agroecosystems

Jules Witts (104b, WINS)
Water Resources Science
Tribal participation in the Clean Water Act's "Treatment as a State" (TAS)

Abraham Underhill (104b, WINS)
Earth & Environmental Sciences
Developing a multi-proxy varve chronology at Steel Lake, MN

Jake Kastenbauer (104b, WINS)
Land and Atmospheric Science
Impacts of nitrogen management, cover crop, and living mulch schemes on crop yield and water quality

WINS professional development funds

In addition to supporting student research projects, the WRC supported students (both undergraduate and graduate) via the WINS Professional Development Fund for Students to pursue and participate in professional development activities. In 2025, we awarded $7,500+ to eight students who participated in and attended conferences and trainings across the nation.

Water Resources Center impact

Building tech transfer into stormwater research

Professionals tasked with managing stormwater in Minnesota face numerous challenges - from reducing the impacts of road salt on local water bodies, to addressing emerging threats such as “forever chemicals”, also known as per- and polyfluoroalkyl substances (PFAS), and microplastics. In 2025, the WRC awarded $2.5 million for research into practical, cost-effective ways to keep our lakes and rivers clean by improving how we manage rainwater in our cities. Stormwater research projects are informed by practitioner needs, and all funded work includes detailed plans for technology transfer and dissemination. Among the community impacts of this program, Carver County Watershed Management Organization updated its stormwater standards based on our research; and more than 4,600 stormwater professionals participated in WRC outreach and training activities across Minnesota.

> *Partnering with WRC adds their academic expertise to our program experience to more comprehensively examine drinking water issues like lead, source water protection, and strategic future directions. Working together we are better able to ensure that all drinking water is safe and sufficient for everyone, everywhere in Minnesota.*
>
> Daniel Symonik, Assistant Manager, Drinking Water Protection Section of the MN Department of Health

Smarter nutrient management saves money, protects waterways

Nitrogen is an essential nutrient for supporting crop growth - but the overapplication of nitrogen can increase costs to producers and contribute to water quality problems downstream. In collaboration with the Minnesota Corn Growers Association, the WRC’s Nitrogen Smart program has developed trusted partnerships with producers, sharing rigorous and locally-relevant research - not national averages or industry or NGO guidelines. More than 1,000 people have attended in-person Nitrogen Smart workshops since 2016, saving producers thousands of dollars each year through reduced fertilizer application, and keeping 9,000 tons of algae out of Minnesota waterways.

Water Resources Center impact

Providing critical education and certification for wastewater professionals

Every day over 180 million gallons of wastewater is treated on-site by septic systems across Minnesota. Thanks to the WRC's Onsite Sewage Treatment Program (OSTP), the professionals who design, install, and maintain those systems receive nationally-recognized education and technical support. In 2025, the OSTP program educated over 1,800 wastewater professionals through more than 40 in-person and online workshops across Minnesota. Without this program, practitioners would lose access to the state's only certified training provider - raising costs for businesses and households and threatening public health and water quality. OSTP staff also provide valued research and technical assistance that transforms decisions and saves money. In 2025, the Minnesota Department of Transportation saved more than $100,000 in replacement costs for a rest stop septic system based on OSTP analysis. And the University of Minnesota Landscape Arboretum saved more than $200,000 by using a soil-based wastewater treatment system informed by OSTP expertise.

Well education and testing to protect rural public health

Around 20% of Minnesotans, or 1.2 million people, rely on private wells for drinking water, often without knowledge of risks to their health. That's why the WRC's Private Wells Program trains community volunteers and enhances the technical expertise of local government staff who work with private well users. In the first year of the program, WRC staff distributed over 90 drinking water test kits to private well users spanning eight counties in northwest Minnesota. To expand the program's reach, staff developed a free online resource for private well users to share locally-relevant information about groundwater quality and guidance for how to manage and inspect private wells. In 2026, WRC educators will host in-person outreach and education clinics in the same communities to share test results and support households in taking action to protect drinking water. This program is the only effort in Minnesota that combines free water testing with public health expertise to help households understand and respond to potential water quality threats.

> *I really appreciate the support we get from Extension educators at the WRC. They connect us with the most current research and help us to create real, tangible change in our local communities. The WRC lives out the land-grant mission by connecting with communities, learning about our needs, and designing water resource programming to meet those needs.*
>
> Angie Hong, Education Specialist, Washington Conservation District