Iowa Nutrient Research Center

Science for Iowa's Water

2022 Annual Review

Message from the Director

The Iowa Nutrient Research Center was established in 2013 and has since supported more than 127 diverse projects led by scientists at Iowa State University, the University of Iowa and the University of Northern Iowa, working with many partners. This work has been pivotal in developing and refining nutrient reduction practices tailored to Iowa and fitted to different landscapes and enterprises such as saturated buffers, drainage water recycling, bioreactors, multipurpose oxbows, best practices for managing cover crops in row crops and grazing systems, and human-centered studies of attitudes towards nutrient reduction practices. INRC research has contributed to important basic knowledge of the status of Iowa water quality and processes that influence nutrient flux, including better quantification of in-stream contributions of phosphorus and modeling of weather impacts on nitrogen trends. The INRC has also been active in a variety of related education and outreach activities as outlined in this report, which briefly reviews efforts during this last year and our first decade. While this work represents progress, many challenges related to nutrient-related water quality problems remain. Addressing them is a shared endeavor. We encourage you to stay tuned as we continue to pursue science-based approaches to nutrient management that can benefit our state and its communities.

- Matthew Helmers, Director

10 Years of INRC Projects by the Numbers

- 127 Awards
- >$15 Million for Research
- $62.6 Million Leveraged Funds
- 115 Peer-Reviewed Publications
- 25 Graduate Researchers*
- 67 Undergraduate Researchers*

*Tracking began in 2018

Board of Regents Review

An intensive review of INRC's first decade was conducted in 2022 as part of a regular review by the Iowa Board of Regents. The process included a self-study by INRC staff and an outside evaluation by partners at Iowa State and peer institutions. Reviewers commended INRC's impactful contributions and leadership and offered ideas for new INRC initiatives in the decade ahead.

Summary of Leveraged Funds

INRC funding has often functioned as "seed" money, allowing researchers to gain broader support. A conservative estimate is at least $62.6 million for water quality research in the state of Iowa. This includes leveraged funding through diverse organizations including the Hungry Canyon Alliance, Iowa Soybean Association, Iowa Nutrient Research and Education Council, the Leopold Center for Sustainable Agriculture, Iowa Department of Agriculture and Land Stewardship, NRCS, USDA, HUD, NOAA and EPA.

Impact of INRC Grants on Students

Student education is an important component of the INRC's long-term impacts. More than 67 undergraduate and 25 graduate students received support through INRC-funded projects at Iowa's three Regents institutions – many of them co-authored scientific publications, contributed to conferences and published Master's theses and PhD dissertations about their work.

2022 INRC Projects by the Numbers

- 12 Awards
- >$1.4 Million for Research
- $1.3 Million Leveraged Funds
- 7 Peer-Reviewed Publications
- 52 Presentations
- 7 Graduate Researchers
- 14 Undergraduate Researchers
- 4 Workshops
- 11 Field Days

INRC Researcher Directory

A Researcher Directory was created to allow individuals to quickly search for researchers based on the nutrient managment practice type they study. The directory was developed to disseminate information about INRC-funded projects and researchers, as well as facilitate networking among university faculty and staff, extension specialists and agency personnel. https://www.cals.iastate.edu/inrc/researcher-directory

International Drainage Symposium

The 11th International Drainage Symposium convened in Des Moines in 2022, co-sponsored by the INRC, the American Society of Agricultural and Biological Engineers, the Soil and Water Conservation Society and others. 207 attendees discussed the latest in drainage history research, policy and practice during more than 85 presentations by scientists and practitioners from nine countries and 10 states. Several sessions highlighted research projects originating in Iowa and INRC sponsored two well-attended field tours.

Communications

The INRC continued efforts to share knowledge from nutrient reduction research in a variety of ways, including on its website, through regular news articles and via a social media presence on Twitter. In addition, INRC developed three new short videos this year that highlight INRC projects, with assistance from talented undergraduate video interns.

Seminar Series on a Decade of Research and Impacts

INRC marks a “Decade of Research and Impacts” with a seminar series that began in Fall 2022 and continues through Spring 2023. Each month’s seminar features two researchers reviewing results of INRC-supported projects. Although the focus is on the past, the value represented here is about helping Iowa and the water quality research community prepare for the important work ahead.

National Caucus of Environmental Legislators Tour

The INRC hosted a tour of nutrient reduction practices in June for the National Caucus of Environmental Legislators. Attendees learned about in-field and edge-of-field nutrient reduction, best management practices and federal resources. The tour was led by nationally recognized INRC-funded researchers talking about their work.

2022 Funded Projects

Nutrient Management

- Assessing the effectiveness of spatial and temporal separation of a cereal rye cover crop from corn on nutrient reduction and corn yield
- Benefits of winter cereal rye cultivar selection in mitigating corn yield drag
- Spatial models for scaling optimal nutrient management research from plot to field and watershed scales

Edge-of-Field

- Evaluating the effectiveness of stacked practices: Utilizing modified blind inlets at terrace sites for N and P load reductions
- Extending saturated buffers to additional landscape positions
- Unlocking the bioreactor microbiome for nutrient management and water quality

Multi-Objective

- Evaluating the relation of phosphorus to turbidity during high flow events in western Iowa rivers to improve phosphorus load estimates
- Landowners matter too: Accelerating adoption of in-field and edge-of-field nutrient reduction practices through better-engaged landowners
- Quantifying co-benefits of water quality conservation practices for wildlife of greatest conservation need in Iowa
- Sociological water quality research: Quantifying factors at multiple scales that influence farmers to shift from being potential to actual adopters of conservation practices
- Spatially delineated carbon credit potential and implied nutrient reduction co-benefit: An assessment with integrated ecological and economic modeling framework
- IIHR Hydroscience and Engineering work plan (2022-2023)

Iowa Nutrient Research Center Advisory Council

- Iowa Secretary of Agriculture
- Administrative Director, Iowa Department of Agriculture and Land Stewardship Division of Soil Conservation
- Iowa Department of Natural Resources
- Nutrient researcher, University of Northern Iowa
- Nutrient researcher, State Association of Private Colleges
- IIHR – Hydroscience and Engineering, University of Iowa
- Vice President, Iowa State University Extension and Outreach
- Dean, College of Agriculture and Life Sciences, Iowa State University

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