



## NORTH CENTRAL REGION WATER NETWORK

An Extension-led partnership of land-grant colleges and universities



# PROSPECTUS

Return on Investment and Opportunities for the Future



## MISSION

We work together to ensure safe and sufficient water supplies by increasing the scope and positive impact of multi-state water outreach and research efforts in the North Central Region of the United States.

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## VISION

We are recognized leaders in lifelong learning and citizen engagement, resulting in safe, accessible water supplies and sustainable, resilient communities.

# Executive Summary

## A Solid Foundation

Water, food, and energy systems are critical for human life. These systems are interconnected and function in complex and nonlinear ways. Land-grant universities, with sound science and effective outreach and engagement, are uniquely positioned to help individuals, businesses, organizations, and communities adapt in the face of complexity and change. A substantial body of research demonstrates that strengthening networks and learning within networks can increase the ability of complex systems to adapt more quickly and in positive ways.

Through the generous investment of Extension Directors, Program Leaders, and all Network participants, the North Central Region Water Network (NCRWN) has increased the capacity of extension educators and researchers in each state and across the region to address water issues by connecting them to professional networks that include expertise from multiple states, disciplines, and sectors.

In just over 2 1/2 years, the NCRWN has fostered the development of 19 new multistate initiatives addressing eight priority water-related issues. Several initiatives work closely with projects funded through the USDA NIFA Hatch Multistate Research Fund (e.g., SERA-46, NCERA 217, NC1190). All 12 North Central Region states have led at least one initiative and all 12 states have participated in at least three initiatives, with most participating in five or more.

### **EXTENSION EDUCATORS AND RESEARCHERS LEADING MULTISTATE INITIATIVES PRODUCED:**

- New science-based curriculum and outreach/education materials available for educators to use across the North Central Region.
- Needs assessments and competency frameworks to support extension professional development, support high quality extension programs, and identify gaps in related research.
- Training and professional development programs for land-grant researchers, educators, and partners across the North Central Region. Example topics include irrigation efficiency, management of livestock in Northern Great Plains watersheds, addressing climate change, and growing youth water literacy.

### **BASED ON STRONG SUPPORTING EVIDENCE COLLECTED BY THE UNIVERSITY OF MINNESOTA AND UNIVERSITY OF WISCONSIN-EXTENSION EVALUATORS, NETWORK INITIATIVES HAVE:**

- Built professional capacity for team participants, including the capacity to secure funding
- Strengthened state programs
- Strengthened collaboration with partners on multistate issues such as state nutrient strategies and hypoxia in the Gulf of Mexico and the Western Lake Erie Basin.

**IN ADDITION, UNIVERSITY OF MINNESOTA EVALUATORS IDENTIFIED FOUR THEMES IN RESPONSES FROM NETWORK PARTICIPANTS:**

- New educators/specialists have a much bigger network and knowledge pool from which to draw.
- Innovations have resulted from people coming together through the Network (especially through multistate initiatives and conferences).
- Innovations in one state become more readily available for replication in other states.
- States have enhanced their programming based on learning from other states.

## Investing in the Future

The North Central Region Water Network Leadership Team and Regional Administrative Council members agree on the value of investing in the North Central Region Water Network because of clear benefits across priority water-related issues. They also agree that translating stronger connections and stronger programs into social and environmental impact takes time. Future investment in the North Central Region Water Network is needed to help us capitalize on previous investment and focus land-grant institutional resources in areas where we can have a transformative impacts on water, food, and energy systems in the North Central Region and beyond.

Continued investment would support the following strategies:

**CONTINUE STRENGTHENING WATER-RELATED NETWORKS, EXTENSION PROGRAMS, AND RESEARCH:**

- Continue investing in the development of a culture of learning and collaboration across states.
- Maintain a culture of applied research, extension, and program co-development and delivery with partners.
- Expand collaboration with North Central Region Experiment Stations and Water Resources Research Institutes to address pressing water-related research questions. Expanded collaboration with Experiment Stations could be implemented as a three-year pilot.
- Strengthen collaboration with eXtension. eXtension supports innovation and access to extension programs in the North Central Region and nationally.
- Strengthen collaboration with 1994 land-grant institutions in the North Central Region.

**FOCUS NETWORK-AFFILIATED EXTENSION AND RESEARCH ON SYSTEMS APPROACHES TO WATER RESOURCE MANAGEMENT AND AREAS OF CORE LAND-GRANT STRENGTH AND NEED; CONTINUE TO FUND WORK IN OTHER AREAS AT LOWER LEVELS:**

- Based on Network discussions during the pilot period, identify 2-3 systems-level areas of core land-grant strength and need across the North Central Region on which to focus. Example focus areas include: increasing nutrient use efficiency and reducing nutrient pollution; maintaining sufficient water supplies for agriculture and communities; addressing water-related climate challenges in urban and agricultural landscapes; and growing the next generation of informed and engaged civic leaders through water, STEM, and place-based education approaches.
- With partners, develop short issue papers for each focus area articulating a) achievable, systems approaches improving water-related management and policy, b) research, extension, and partner roles in improving water-related management and policy resources that are available and applicable to the issue, and c) resource gaps, such as gaps in extension programs, research, or personnel. Impact issue papers will be written by researchers, educators, and partners from a diversity of disciplines and sectors.
- Develop and support regional initiatives that operationalize issue papers.
- For each focus area, work within land-grant institutions and with partners to close resource gaps in expertise or funding.
- Continue investing a lower level of seed resources across a diversity of land-grant extension and research on water-related topics.

**MAINTAIN AND DIVERSIFY THE NETWORK RESOURCE BASE:**

- Request continued administrative and funding support from North Central Region Extension Directors, maintaining a collective annual investment of \$250,000.
- Request that Extension Directors consider removing the Network's pilot designation and commit to funding the Network through at least December 2019.
- Request that states make more equitable financial investments in the Network.
- Request that Experiment Station Directors consider a collective investment comparable to the Extension Director investment for a pilot period of three years.
- Develop and implement a new model for partner contributions with a focus on sponsorships and organizational/corporate giving.

2<sup>1/2</sup>

years

12

North Central  
Region states

8

priority  
water-related  
issues

19

new multistate  
initiatives

# 1 The Value Proposition: Science to Success

- *Water, food, and energy systems are critical for human life. These systems are interconnected and function in complex and nonlinear ways.*
- *Land-grant universities, with sound science and effective outreach and engagement, are uniquely positioned to help individuals, businesses, organizations, and communities adapt in the face of complexity and change.*
- *A substantial body of research demonstrates that strengthening networks and learning within networks can increase the ability of complex systems to adapt more quickly and in positive ways.*
- *The North Central Region Water Network (NCRWN) increases the capacity of educators and researchers in each state to address water issues by connecting them to professional networks that include expertise from multiple states, disciplines, and sectors.*
- *The NCRWN increases the capacity of land-grant universities to address issues that are regional in nature, such as water allocation and hypoxic zones and harmful algal blooms such as those in the Western Lake Erie Basin and Gulf of Mexico.*

The resilience of human societies depends upon functional water, food, and energy systems. Scientist from a diversity of disciplines say we are in a new geologic era – the Anthropocene – an era in which human activity drives changes in the earth’s physical, chemical, and biological systems. In addition, new science is showing where humans are exceeding “planetary boundaries,” the biophysical parameters that delineate a “safe operating space” for human life<sup>1</sup>.

Water, food, and energy systems are complex and interconnected<sup>2</sup>. In the North Central Region, we are the largest producer of corn and soybeans in the world and keepers of the deep soils of the tallgrass prairie. We are also home to the upper reaches of the Mississippi River, the Red River of the North, and the Laurentian Great Lakes. We are caretakers for much of the great Ohio and Missouri Rivers before they join the Mississippi and make their way to the Gulf of Mexico. When these systems are functioning optimally, we produce abundant food and renewable energy supplies and maintain clean water sufficient for our needs.

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<sup>1</sup> Steffen, W. et al. 2015. Planetary boundaries: guiding human development on a changing planet. *Science* 347, 1259855. DOI: 10.1126/science.1259855

<sup>2</sup> Zeitoun, M. 2011. The global web of national water security. *Global Policy* 2: 286–296. DOI: 10.1111/j.1758-5899.2011.00097.x

Rivers are vital arteries for all aspects of life in the Midwestern United States. The region's industries, including agriculture, rely on the use and availability of water. Much of the region relies on rain to grow crops, however, the region also contains 25% of the irrigated acreage in the U.S. The water for over half the irrigated acreage comes from groundwater sources. Communities rely on water for households, recreation and many other ecosystem services to maintain the standard of living of their populations. The quantity and quality of water in the region is challenged by increasing severity and frequency of storm events and drought resulting from climate change; increasing population and changing demographics; intensification of agriculture; new forms of energy production; and changing attitude towards water use and water conservation.

Land-grant universities and university extension have helped generations of farmers and Midwestern communities improve their economic well-being and quality of life. Food production and preservation have been primary areas of emphasis for land-grant university science and education in the past<sup>1</sup> and today. As demand for water increases and the Midwest experiences more frequent extremes in weather, maintaining the soil and water resources that support Midwestern communities is becoming an increasingly critical **issue** for universities to **address with targeted research and extension education programs**.

The North Central Region Water Network is designed to reflect these complexities and connections inherent in water, food, and energy systems and to foster learning, action, and impact across states and disciplines. This prospectus describes the Network and its activities, the return on the investment of time and resources by land-grant universities and our partners, and proposes future directions for the Network that will build on current investments and focus resources in areas where land-grant universities can have a transformative impact on water, food, and energy systems.

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<sup>1</sup> Rasmussen, W. D. 1989. Taking the university to the people: Seventy-five years of cooperative extension. Ames: Iowa State University Press.

## 2 The Network

In June 2013, Extension Directors in all 12 North Central Region states approved a three-year pilot investment in a multistate network to build land-grant capacity address water resource issues. Water, food, and energy systems are critical for human life. These systems are interconnected and function in complex and nonlinear ways.

### **THE GOALS OF THE NCRWN ARE TO:**

- Increase connectivity and learning among university professionals and our partners engaged in water-related research, education, and management.
- Strengthen the resource base available for Extension education. Extension provides a critical bridge between applied research and the people, organizations, and communities that can use that research to strengthen decision-making.
- Generate measurable environmental and social impacts in the short and long-term.

### **THE NETWORK COMPRISES:**

- A dedicated team of professionals in water-related disciplines appointed by land-grant university Extension Directors.
- Staff that provide critical support in communication, evaluation, graphic design, and program administration.
- Liaisons to Extension Directors and three Extension Program Areas: Agriculture and Natural Resources, Community Resource and Economic Development, and 4H and Youth Development.
- A diversity of educators and specialists that lead and participate in multistate initiatives.
- A Regional Administrative Council representing Extension Directors, state and federal agencies, farmers and other industry, advocacy organizations, foundations, and 1890 and 1994 land-grant institutions.

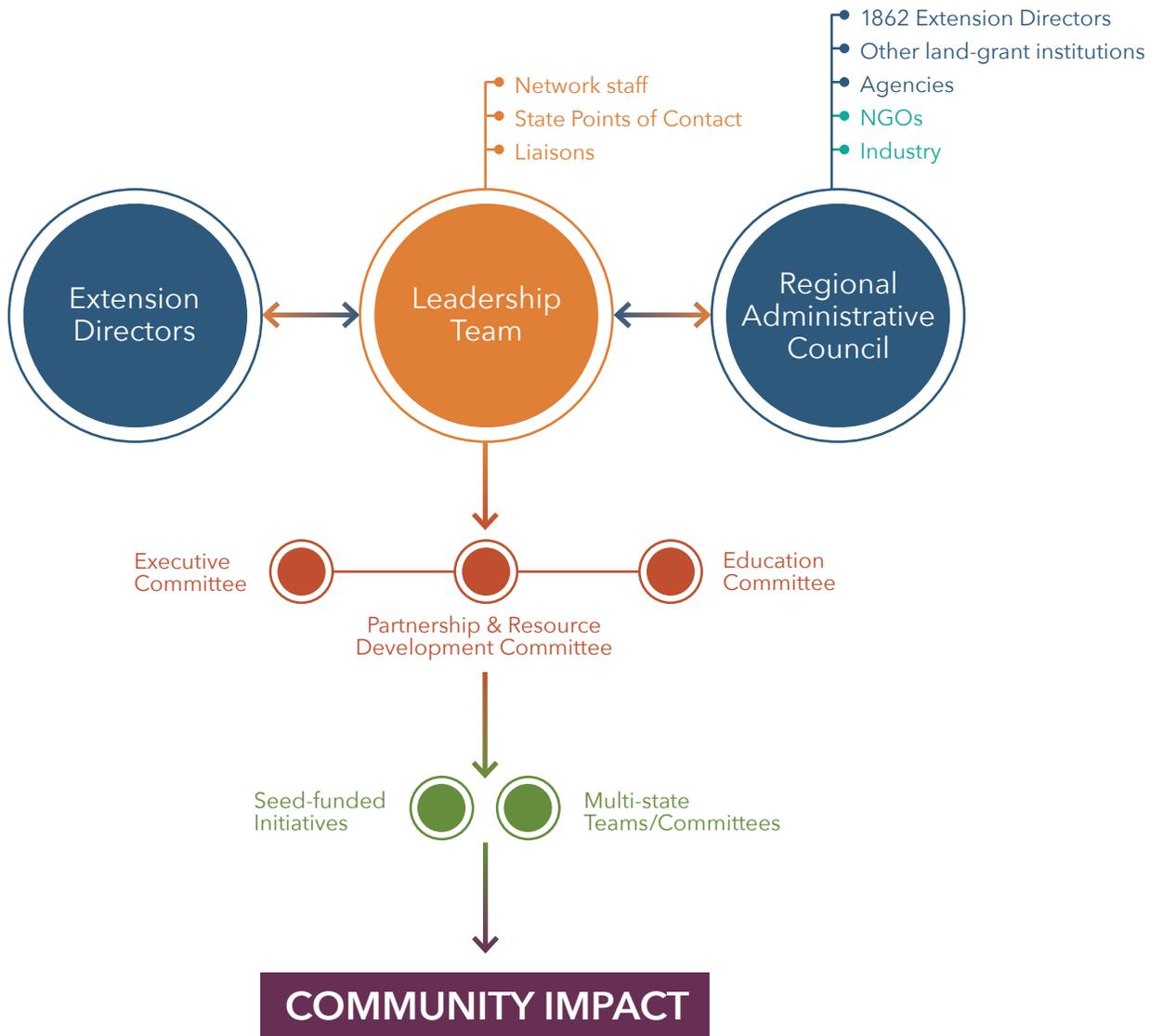


Figure 2a. Current organizational model for the North Central Region Water Network.

## Leadership Team



**WISCONSIN**  
**Richard Klemme**  
Extension Director Liaison  
University of Wisconsin-Extension



**WISCONSIN**  
**Rebecca Power**  
Network Director  
University of Wisconsin-Extension



**ILLINOIS**  
**Laura Christianson**  
University of Illinois



**INDIANA**  
**Jane Frankenberger**  
Purdue University



**INDIANA**  
**Walt Sell**  
Purdue University



**IOWA**  
**Jamie Benning**  
Iowa State University



**KANSAS**  
**Daniel Devlin**  
Kansas State University



**MICHIGAN**  
**Lois Wolfson**  
Michigan State University



**MINNESOTA**  
**Faye Sleeper**  
University of Minnesota



**MISSOURI**  
**Dan Downing**  
University of Missouri



**NEBRASKA**  
**Suat Irmak**  
University of Nebraska-Lincoln



**NEBRASKA**  
**Rick Rasby**  
University of Nebraska-Lincoln



**NORTH DAKOTA**  
**Naeem Kalwar**  
North Dakota State University



**NORTH DAKOTA**  
**Tom Scherer**  
North Dakota State University



**OHIO**  
**Joe Bonnell**  
The Ohio State University



**SOUTH DAKOTA**  
**Erin Cortus**  
South Dakota State University



**WISCONSIN**  
**Ken Genskow**  
University of Wisconsin

## Regional Administrative Council Co-Chairs

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**WISCONSIN**

**Richard Klemme**

Dean and Director,  
University of Wisconsin-Extension  
Cooperative Extension



**KANSAS**

**Josh Roe**

Kansas Department of Agriculture

## Regional Administrative Council (original organizations)

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**Mia Adams**

3M

**Todd Ambs**

Healing our Waters -  
Great Lakes Coalition

**Laura Campbell**

Michigan Farm Bureau

**Tom Christensen**

USDA Natural Resources  
Conservation Service

**James Gaffney**

Pioneer Hi-Bred International, Inc.

**Majed Dweik**

Lincoln University

**David Glatt**

North Dakota Department of Health

**Jerry Hatfield**

USDA Agriculture Research Service

**Chuck Hibberd**

North Central Region Extension Director,  
University of Nebraska-Lincoln

**Stephanie Lindloff**

Great Lakes Protection Fund

**Mark Muller**

McKnight Foundation

**Brian Olson**

Monsanto Water Utilization  
Learning Center

**Katie Flahive**

U.S. Environmental  
Protection Agency

**Chad Watts**

Conservation Technology  
Information Center

**Hal Sprague**

Center for Neighborhood Technology

**Bill Welton**

Haskell Indian Nations University

**Roger Wolf**

Iowa Soybean Association

## Program Leader Liaisons

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**Kent Olson**

University of Minnesota,  
CRED Development

**Peter Neilson**

South Dakota State University,  
4H and Youth Development

**Andy Londo**

Ohio State University,  
Agriculture and Natural Resources

## Evaluators

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**Scott Chazdon**

University of Minnesota Extension

**Somongkol Teng**

University of Minnesota Extension

**Whitney Meredith**

University of Minnesota

**Jenna Klink**

University of Wisconsin

**Amber Mase**

University of Wisconsin

**Kim Kies**

University of Wisconsin

## Proposed Investment

In July 2013, Extension Directors approved an annual \$250,000 investment for a three-year Network pilot. The approved allocation is outlined in Figure 2b. Core support is provided by University of Wisconsin–Extension and University of Nebraska–Lincoln. Core support is leveraged by contributions from the other 10 states in the North Central Region.

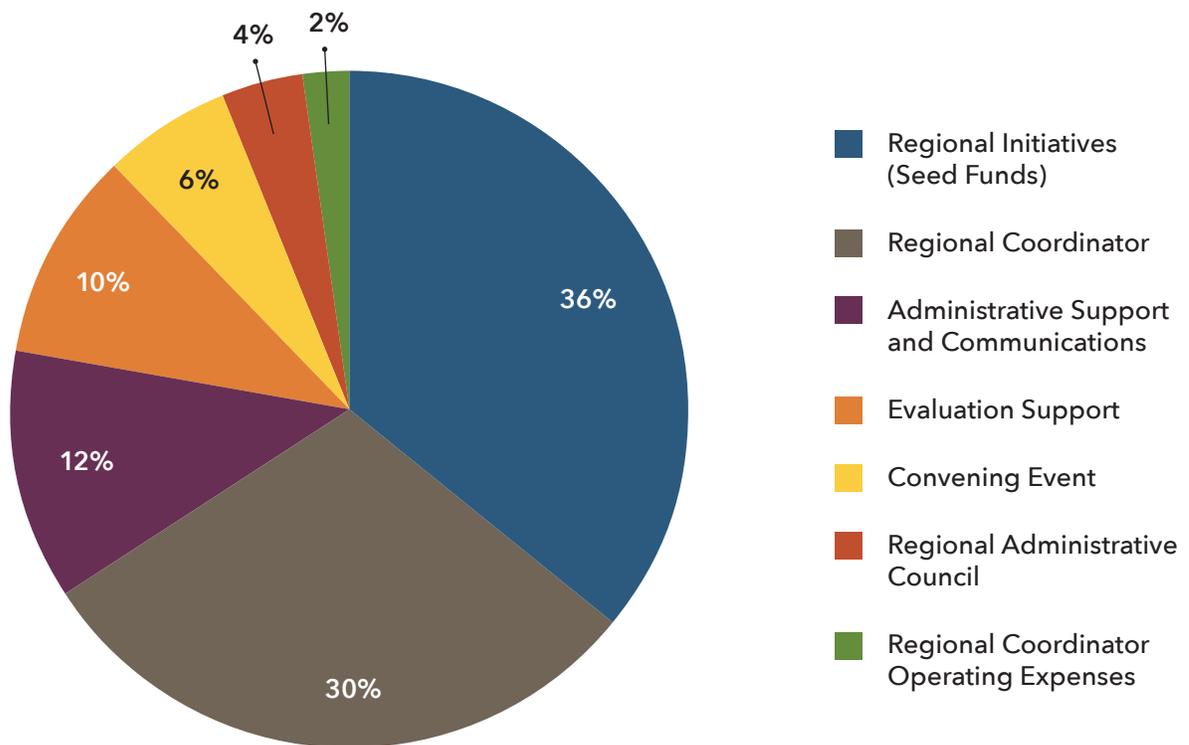


Figure 2b. Investment categories and percentages in approved 2013 proposal to Extension Directors. Total approved budget was \$250,000 annually during the three-year Network pilot.

## Actual Investment

Figure 2c shows a breakdown of resource investment by function. The majority of Network resources are invested in multistate initiatives. That category includes seed funding and Network staff time spent directly on multistate initiatives. Communication was the second largest investment. The communication category includes Network communication staff time (e.g., Network website, social media, production of *The Current* webinar series and the Network e-newsletter). Network administration includes Network staff time spent on Network meetings, budgets, and other administrative tasks. The evaluation category includes the University of Minnesota evaluation contract and Network staff time spent on evaluation of the Network as a whole.

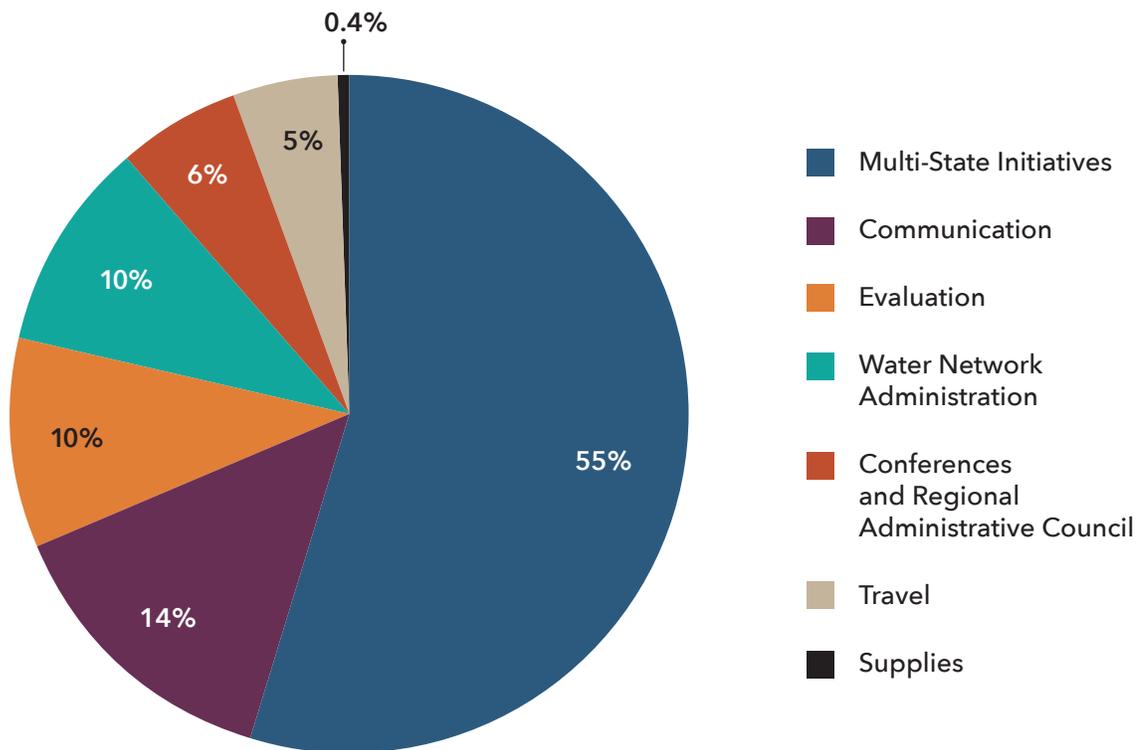


Figure 2c. Investment categories and percentages as of July 2016.

## 3 The Return

CEOs have known for decades that organizational culture and strategy work together to drive business success. Ensor and Harvey's (2015) research exemplify findings that systems-level change in institutions is needed to achieve systems-level social and environmental change. While smaller extension investments have led to valuable programs and increased funding, the North Central Region Water Network is a culture-changing investment in land-grant capacity to adapt and respond more efficiently to pressing water resource-related issues.

Evaluation data collected during the first few months of the Network pilot period and in spring of 2016, show that the NCRWN has strengthened connections among educators and researchers in the North Central Region, fostered innovation, and enhanced extension programming. Land-grant universities are better prepared to support resilient water, food, and energy systems by strengthening our resource base available for extension education. The culture-changing and decentralized nature of our impact means that changes are more likely to last.

- New educators/specialists have a much bigger network and knowledge pool to draw from.
- Innovations have resulted from people coming together through the Network (especially through Seed Grants and conferences)
- Innovations in one state are more readily available for replication in other states
- States have enhanced their programming based on learning from other states

The remainder of this section will expand upon and provide evidence for these returns.

### Ways That Participation in Multistate Initiatives Strengthened the Network

**84%**

Increased their awareness of people in other states who are working on similar topics.

**73%**

Increased their awareness of where to find information and resources about similar topics.

**68%**

Formed new working relationships with University Extension professionals across states.

**73%**

Deepened existing working relationships with University Extension professionals across states.

**51%**

Expanded their working relationships with other professionals (non-University/non-Extension) working on similar topics across states.

**92%**

Are interested in engaging in future North Central region collaborative efforts.

## Stronger Connections, Bigger Knowledge Pool

The North Central Region Water Network was created to promote collaboration and learning among states. Strong networks are important because they create opportunities for rapid diffusion of ideas, promote connections across geographic and social distance, and create resilient structures of information exchange beyond individual connections. Social Network Analysis (SNA) was used as an evaluation tool to document the degree to which the North Central Region Water Network is evolving at the state level, and around the seven priority issue areas of the Network.

A social network analysis, led by the University of Minnesota, indicates both increased density of the North Central Region’s water network and strengthening of extension ties across states.

The Social Network Analysis survey, conducted at a baseline point in time (May 2014) and at the end of the pilot (June 2016), asked participants to list up to ten people within their own state, and up to ten people in other states, with whom they had shared information and/or collaborated on water-related Extension education or research during the past year. The response rate for both the baseline and post-survey was 33%.

Respondents in evaluation surveys frequently noted the ways that the Network had enhanced their abilities to share information and collaborate with colleagues across the region. These strengthened connections are graphically represented by the following network analysis diagrams. The diagrams show changes in the regional water connections overall and by priority issue, aggregated by state. The thickness of the lines reflects the number of relationships reported between states (both to and from each state). The size of the squares is based on the state’s overall strategic importance (Eigenvector centrality) in the twelve state network. Eigenvector centrality is a measure of how well a state is connected to other well-connected states in this network. State location on a diagram is not significant. Note that due to the nature of respondents, the network diagrams emphasize extension relationships.

The density of the network is a useful metric for making comparisons across time. At the baseline measurement in spring 2014, the overall interstate network had a density of 61.4 percent (Fig. 3a). This means that about 40 percent of the possible connections among states in the region were not reported. In the post-survey in spring 2016, the density of the network had risen to 80.3%, meaning that only 20 percent of possible interstate connections were not reported. There was an increase in densities in most of the issue areas during the pilot, with the largest increase observed in the area of Nutrient and Manure Management.

Table 3a: Issue area network densities at baseline and post-pilot

ISSUE AREA	BASELINE DENSITY	POST-PILOT DENSITY	DIFFERENCE
Nutrient and manure management	37.1%	63.6%	26.5%
Soil health	23.5%	44.7%	21.2%
Climate change adaptation	29.5%	41.7%	12.2%
Land use and development	41.7%	50.8%	9.1%
Sustainable water supply	47.7%	56.1%	8.4%
Youth water literacy and stewardship	12.9%	18.2%	5.3%
Aquatic invasive species prevention and management	18.9%	16.7%	-2.2%

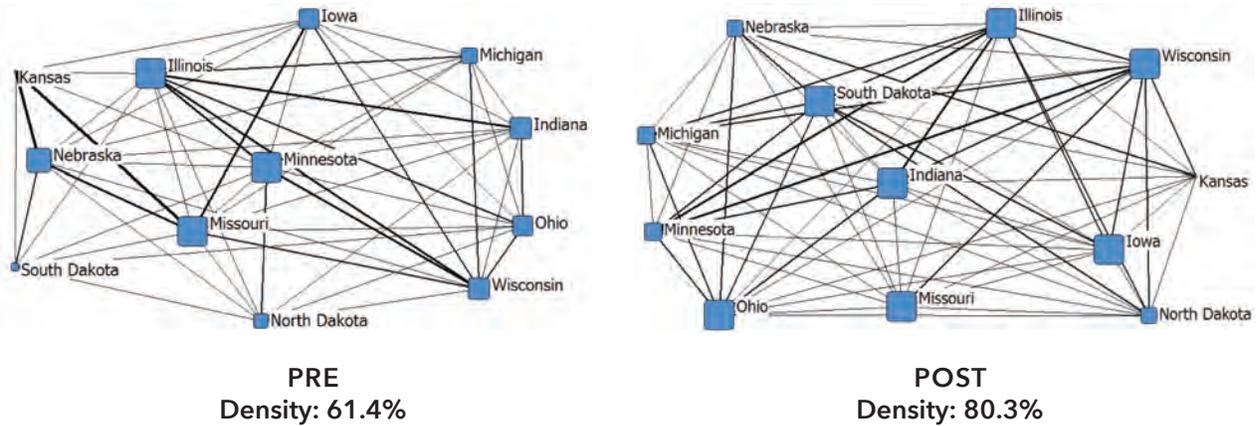


Figure 3a. Interstate water social network measured in spring 2014 (prior to substantial NCRWN activity) and spring 2016.

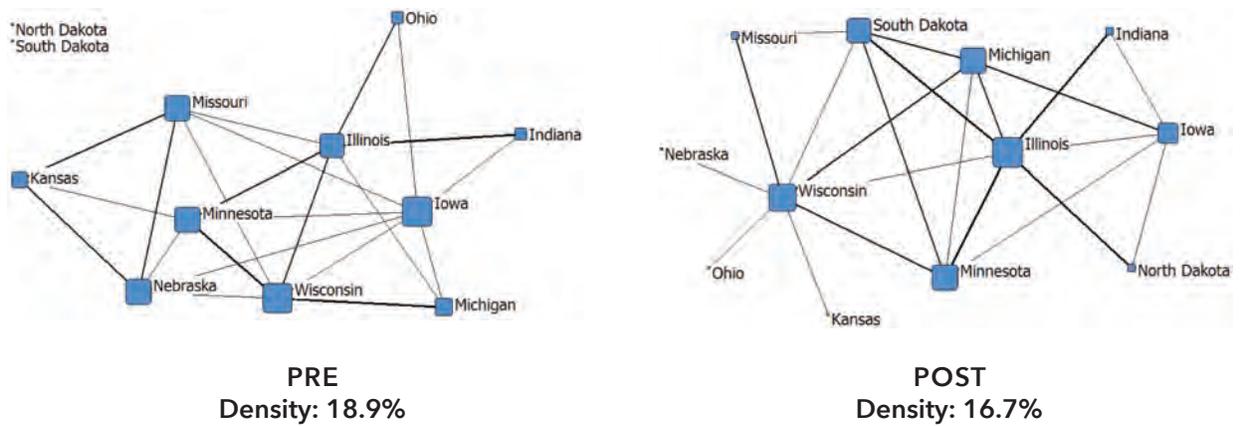
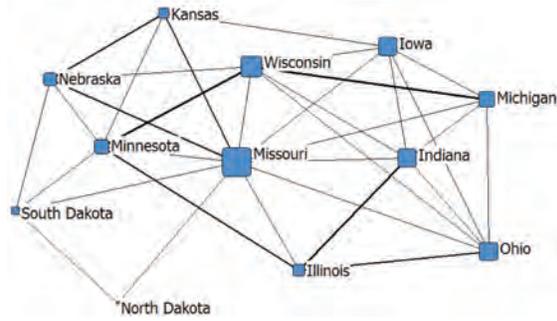
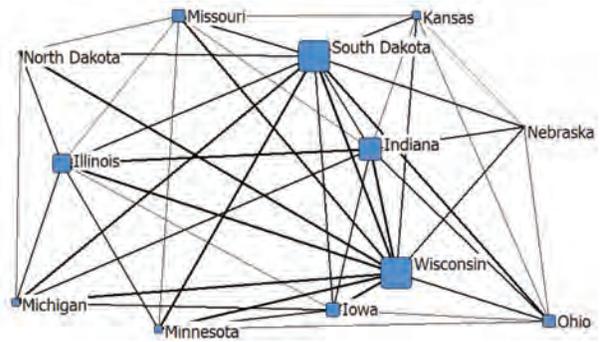


Figure 3b. Aquatic Invasive Species Prevention and Management interstate networks. This is the only one out of the seven issue areas that saw a decline in network density, decreasing from 18.9 percent at baseline to 16.7 percent at the end of the pilot. In spite of the decline, it appeared that connections between some of the states had strengthened over the years. The first seed funded project in this issue area was established after the spring 2016 survey.

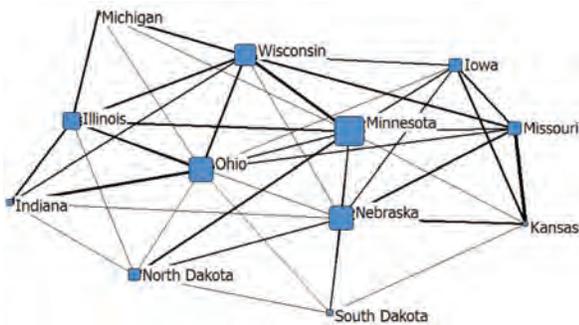


**PRE**  
Density: 29.5%

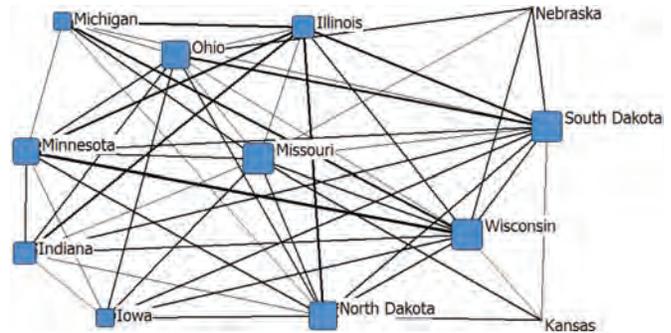


**POST**  
Density: 41.7%

Figure 3c. Climate Change Adaptation interstate network. More connections were reported between states, resulting in the density level increasing from 29.5 percent at baseline to 41.7 percent at the end of the pilot. As represented by the thickness of the lines, many of the interstate connections also appeared to have strengthened over the years.

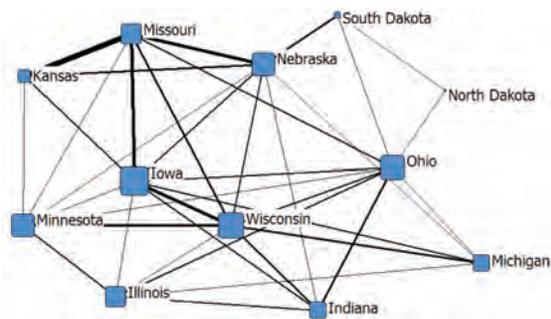


**PRE**  
Density: 41.7%

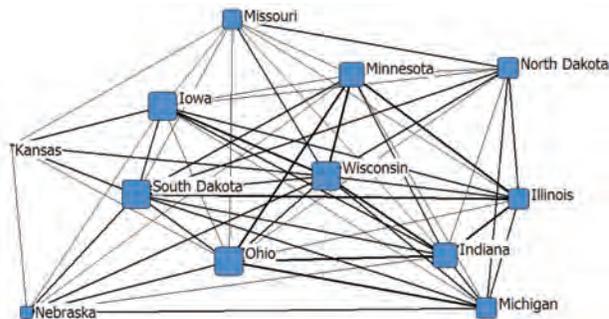


**POST**  
Density: 50.8%

Figure 3d. Land Use and Development interstate network. This network, whose density was at 41.7 percent at baseline, is more connected at the end of the pilot, as represented by a higher density level of 50.8 percent and thicker lines.

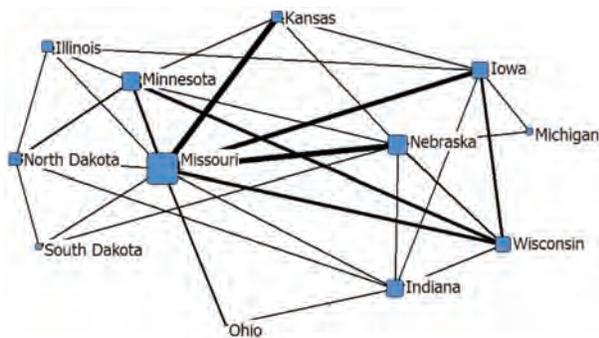


**PRE**  
Density: 37.1%

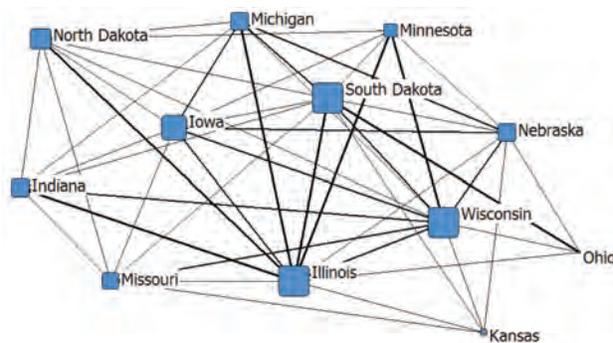


**POST**  
Density: 63.6%

Figure 3e. Nutrient and Manure Management interstate networks. This issue area saw the largest increase in density, from 37.1 percent at baseline to 63.6 percent at the end of the pilot. As of the post-pilot evaluation, connections were reported between all participating states, with the most reported for Ohio, Iowa, Wisconsin and South Dakota.

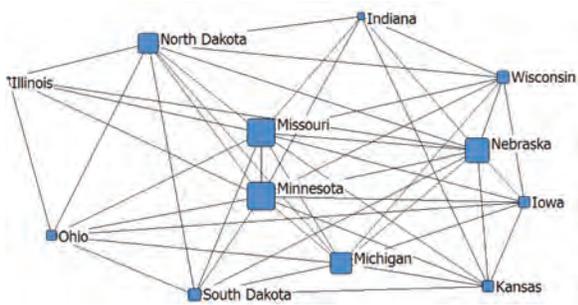


**PRE**  
Density: 23.5%

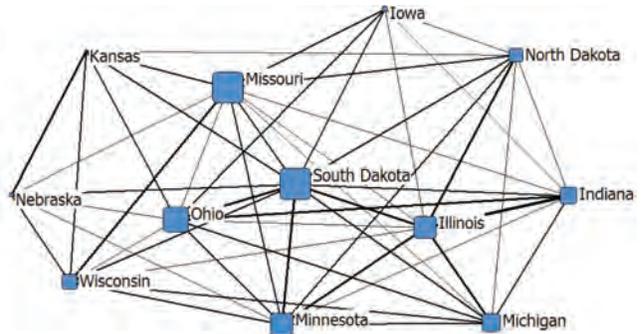


**POST**  
Density: 44.7%

Figure 3f. Soil Health interstate networks. Once again, more connections were reported between states, with the density level increasing from 23.5 percent at baseline to 44.7 percent at the end of the pilot.

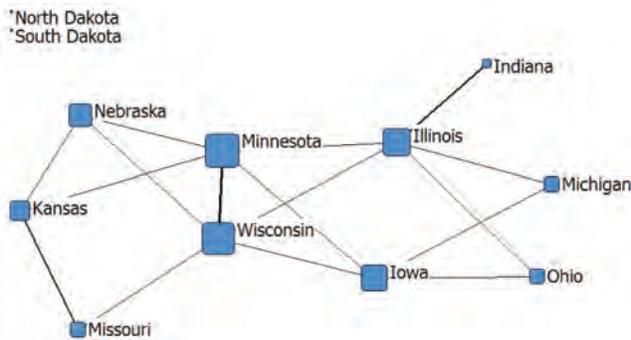


**PRE**  
Density: 47.7%

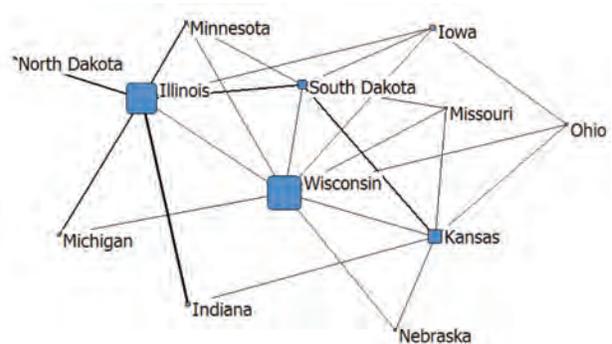


**POST**  
Density: 56.1%

Figure 3g. Sustainable Water Supply interstate networks. More connections between states were reported, with the density level increasing slightly from 47.7 percent at baseline to 56.1 percent at the end of the pilot.



**PRE**  
Density: 12.9%



**POST**  
Density: 18.2%

Figure 3h. Youth Water Literacy and Stewardship interstate networks. This was one of the least dense of the issue area networks. Overall, more connections were reported between states between baseline and post-pilot, with the density level increasing from 12.9 percent at baseline to 18.2 percent at the end of the pilot.

## The Current Webinar Series

The Current webinar series is a speed networking webinar series for professionals engaged in water-related extension, research, and conservation activities. The series highlights the best water-related research and Extension programming in the region. Webinars run for 60 minutes, with three 10-minute project snapshots and 30 minutes of Q&A interaction. This unique format allows water professional to highlight their work while connecting with their peers.

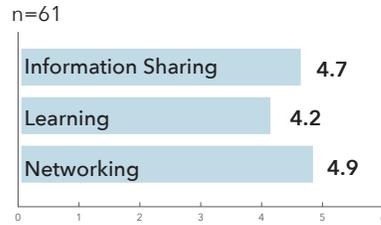


Figure 3i. The Current webinar series: Effectiveness of North Central Region Water Network Program components in promoting networking, learning, and information sharing. Scale is from 1-6, with 1 being the lowest effectiveness and 6 being the highest.

### Growing Networks



20+

Presenters representing more than 20 different land grant universities, partners and NGO's

20+

Over 20 different topic areas have been highlighted

80+

Featured more than 80 educators and researchers

600

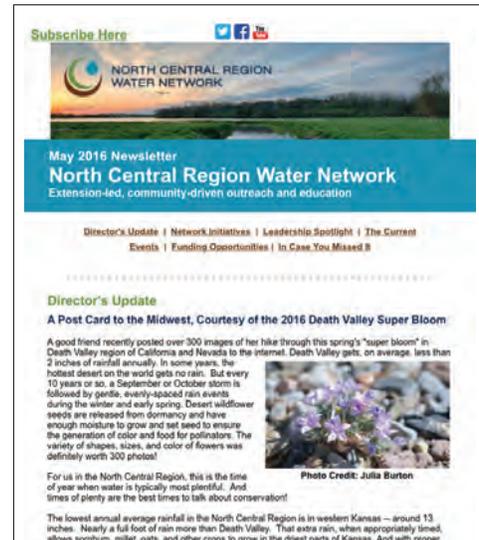
Nearly 600 people have participated to date

1,000+

More than 1,000 views of archived webinars on YouTube

## Monthly E-Newsletter

The North Central Region Water Network monthly newsletter features educators, specialists, research, and extension programs from each state, relays important news and events involving water, and promotes funding opportunities. The newsletter increases access to research and education resources across the region.



## Increasing Access



# 1,500+

Connects over 1,500 university, agency, and private sector partners to valuable news and resources that impact the entire region.

# 20

20 newsletters have been sent

# 28%

Average open rate of 28% (Industry average is 22-24%)

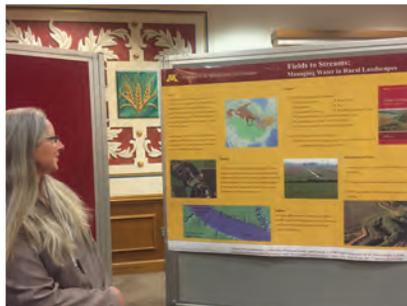
# 20%

Average bounce rate of 20%, excellent according to industry standards

## Network Conferences

### Bringing Water Professionals Together

The purpose of the network conferences is to bring extension educators and researchers together to meet and learn from their colleagues, meet and learn from selected partners, including potential funding partners; and establish foundational relationships and ideas for the next generation of water programs and projects.



 Featured more than 80 educators and researchers

# 2014

## Extension Beyond Borders: Strengthening Networks for Water Resource Management

September 30-October 2, 2014  
Bloomington, Minnesota

120 people attended  
from all 12 North Central Region states

Substantial interest and momentum  
were built through the conference

 Deepened connections  
& met new people

### Attendees said:

*“The networking will assist in training for  
and execution of water quality programming.”*

*“The conference provided an opportunity to develop a  
proposal for a regional soil health collaboration.”*

*“By gaining greater awareness of what others are doing it  
inspired me to think beyond our state’s extension borders.”*

*“The soil health discussion was excellent. Most of the group  
stayed together through each discussion session so we were  
able to learn about soil health programming in most of the  
states in the region, discuss needs for additional research  
and extension programs, and plan for future projects.”*

*“I am a local educator so what I found most valuable was  
learning about the wider context of the water issues in  
my county and connecting with regional specialists whose  
larger projects I may be able to hook my county into.”*

# 2016

## From Science to Success: Bridging the Gap Between Knowledge & Practice in Water Resource Management

March 21-23, 2016  
Lincoln, Nebraska

134 people attended  
from all 12 North Central Region states

Participants ranked the  
break-out sessions most highly

Regional Administrative Council members  
were highly supportive of the Network.  
They suggested that the Network would benefit  
from more time to develop.



Met new people who shared similar interests.  
People deepened existing connections.  
People are likely to follow up on these connections.

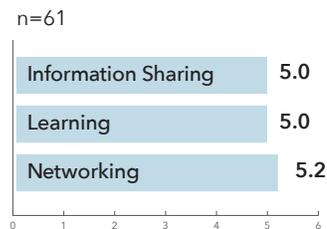
### Attendees said:

*“The open space session on 1994/1862 collaboration provided a  
great opportunity to learn and discuss common interests  
and areas of potential collaboration.”*

*“Meeting face-to-face and getting that interaction  
was of high value.”*

*“I met several people that I intend to bring in as guest speakers  
for programs I’m planning.”*

Figure 3j. Network conferences: Effectiveness of North Central Region Water Network Program components in promoting networking, learning, and information sharing. Scale is from 1-6, with 1 being the lowest effectiveness and 6 being the highest.



## Stronger Programs, Innovation

### Multistate Initiatives: Harnessing the Value of Networks

Multistate initiatives are the program delivery arm of the Network. The NCRWN, through seed-funding and the efforts of Network leaders, has fostered the development of 19 new multistate initiatives in addressing eight priority issues. Several initiatives work closely with projects funded through the USDA NIFA Hatch Multistate Research Fund (e.g., SERA-46, NCERA 217, NC1190). All 12 North Central Region States have led at least one initiative and all 12 states have participated in at least three initiatives, with most participating in five or more (See Figure 3k).

### What Network Educators, Researchers, and Partners Said About the Value of Multistate Initiatives:

#### CONNECTING WITH OTHERS

- Allows for dissemination of research to those who can implement change
- Increases potential to standardize practices
- Allowing quality time with peers in the region to deepen communication
- Strengthening relationships between Extension and other groups

*“We don’t work with Extension on a regular basis in our state and I think the project strengthened those relationships to help build outreach on water quality issues and volunteer monitoring.”*

#### INCREASING AWARENESS

- More aware of programs in other states
- Exposure to new technology to improve best practices
- Gaining new perspective
- Opportunity to reflect on their own programming

*“Rather than working in a single-state ‘silo,’ I was able to (and will continue to) collaborate with colleagues with similar Extension goals across the North Central region, sharing experiences and resources. I learned a great deal about other states’ programs and came away with ideas of areas where new resources/programming would enhance our collective impact.”*

#### INCREASING CAPACITY

- Learning from colleagues across the region better than just one or two neighboring states
- Learned different approaches to creating programs, ways to increase program quality
- Identified ways to leverage existing program ideas and materials from other states to expand programs
- Network of colleagues made it possible to brainstorm collaborative efforts

*“Getting the opportunity to develop a process for needs assessment that also allowed for relationship building and building a shared understanding of what a program should look like . . . was useful.”*

**Aquatic Invasive Species Prevention and Management**



**Climate Change and Adaptation**



**Land Use and Development Practices**



**Nutrient and Manure Management**



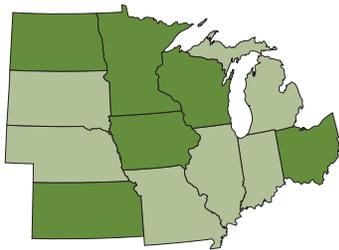
**Soil Health**



**Sustainable Water Supply**



**Watershed Management**



**Youth Water Literacy and Stewardship**



■ States providing leadership  
 ■ States participating on initiative teams

Figure 3k. Leadership and Participation in North Central Region Water Network Initiatives 2014-2016 By Priority Issue. States providing leadership for initiatives are in dark green; states participating on initiative teams are in light green. Other states may have participated in programming, but not as active team members.

Figure 3l. Seed-grant funded initiatives: Effectiveness of North Central Region Water Network Program components in promoting networking, learning, and information sharing. Scale is from 1-6, with 1 being the lowest effectiveness and 6 being the highest.

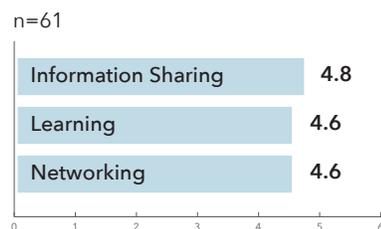


Table 3b: Overview of multistate seed funded projects that the North Central Region Water Network has supported through four rounds of funding

### AQUATIC INVASIVE SPECIES

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
July 2016	\$9,060	Establishing an Aquatic Invasive Species Working Group for the North Central Region	Establish a strong NCRWN AIS Working Group that can leverage regional AIS programs and resources, and is prepared to address AIS issues at local, state, and regional levels.	IA, IL, IN, MI*, MN, OH, WI*, SD

### CLIMATE CHANGE AND ADAPTATION

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
February 2015	\$12,041	Climate Change and Water for Agriculture Education for Extension Professionals	Webinar series that enables Extension personnel and partners in the NC region to build their individual intellectual capacity, recognize peers and specialists that can further their own professional development or community development goals, and adopt strategies for more impactful programming in their area.	IN, NE, KS, SD*
July 2016	\$6,000	Expanding the Role of Extension Professionals in National Drought Monitoring	Webinar series that made Extension professionals and partners more aware of existing water resources and how they relate to weather and climate in North Central region.	KS, NE, SD*

### LAND USE AND DEVELOPMENT PRACTICES; WATERSHED MANAGEMENT

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
Aug. 2014	\$30,000	National Stormwater Core Curriculum	A collaborative that developed a publicly available, uniform, research based, stormwater core curriculum that can be readily used by educators, local governments and professionals.	IL, MI, MN*, MO, NE, WI

\* STATE LEAD

Table 3b: Overview of multistate seed funded projects that the North Central Region Water Network has supported through four rounds of funding continued

## NUTRIENT AND MANURE MANAGEMENT

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
August 2014	\$17,100	Improving Nutrient Management Extension Programming	Designed a mentoring program for early-career Extension Educators focusing on systems approaches to nutrient management for water quality at the field, farm, and watershed scale.	IA, IL, IN, MI, MN, MO, OH*, WI
February 2015	\$25,658	Mapping the Pathways for Effective Information Dissemination and Education between Manure Nutrient Management Agriculture Professionals	The information pathways and communication tools developed by this project will be used by agriculture professionals in development of more successful and end-user focused outreach and education programs.	ID, MO, ND, NE, OK, SD*, TX, UT
July 2016	\$16,134	Ten Ways to Reduce Nitrate Loss From Drained Lands: A Comprehensive Multimedia Outreach Package	New products supporting the nearly complete 44-pg Ten Ways to Reduce Nitrogen Loads from Drained Cropland in the Midwest booklet will increase the reach of this material, and will improve understanding of these practices across the multistate region.	IA*, IL*, IN, MN

## SOIL HEALTH

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
July 2016	\$23,000	Manure and Soil Health: Understanding and Advancing the State of the Science	Connectivity and learning between university professionals and partners across a diversity of water-related disciplines and roles will be increased by bringing together experts to evaluate the current state of knowledge and identify critical issues in manure management related to soil health.	IA, MI, MN, MO, NE*, SD
February 2015	\$15,000	Regional Soil Health Capacity Building	This team is the foundation for an ongoing collaborative multi state network that's goal is to increase the visibility and understanding of soil health for Extension educators, agency professionals, agronomists, Certified Crop Advisors and farmers in the North Central Region. The team will develop and deliver soil health education at field days, workshops, webinars and printed resources.	IA, MI, WI*

## SUSTAINABLE WATER SUPPLY

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
August 2014	\$16,034	Capacity Building Workshop for Irrigation Professionals in the North Central Region	Giving technical assistance providers consistent irrigation training and updates while closing the knowledge gaps around irrigation water management, to ensure that future generations have access to abundant, high quality groundwater.	MI, MN*, NE, ND, SD

\* STATE LEAD

Table 3b: Overview of multistate seed funded projects that the North Central Region Water Network has supported through four rounds of funding continued

## YOUTH WATER LITERACY AND STEWARDSHIP

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
October 2015	\$28,414	Multistate Water Rocks! Youth Education Summit	Educating today's youth about the importance of water, giving them the knowledge to influence change when they become adult members of their communities.	IA*, IL, MO, SD

## WATERSHED MANAGEMENT

START DATE	FUNDING	SEED FUNDED PROJECT	DESCRIPTION	CORE PROJECT TEAM MEMBER STATES
August 2014	\$10,000	Expanding Web-based Community Environmental Tools in the North Central Region	Webinar series that made Extension professionals and partners more aware of existing water resources and how they relate to weather and climate in North Central region.	MI, OH, WI*
August 2014	\$26,480	Integrating Volunteer Nutrient Monitoring and Outreach with Extension across State	Increased knowledge across participating states of existing educational outreach materials and programs related to nutrients and resulting impacts on waters.	IA, IL, MO, SD, WI*
February 2015	\$22,945	Watershed Management: Developing Capacity in Collaboration and Civic Engagement for Collective Action	Conducted an assessment of the need for educational programming on collaboration and civic engagement among watershed leaders. This increased knowledge and awareness among university educators of the competencies.	IA, MI, MN, OH*, WI
October 2015	\$29,267	Daily Erosion Project and Agricultural Conservation Planning Framework - Extension Tools for Addressing Soil and Water Degradation	Approximately 40 ACPF and DEP trained professionals from across multiple states will gain the capacity to use two of the most sophisticated soil and water quality improvement tools available in the North Central Region.	IA*, KS, MN, MO, NE, WI
October 2015	\$15,000	Professional Development for Extension Professionals and Educators on Land Use and Management Practice to Enhance Water Quality	Training (onsite) and capacity building; Curriculum development	ND*, NE, SD
July 2016	\$25,000	Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region	Organize and support an "Extension Water Summit" which will lead to improved communication and collaboration amongst 1994 land grants (Tribal Colleges) and the 1862 land grants (state universities).	KS*, MN, MO, ND, NE, SD, WI
		SERA-46	SERA-46 is a combined research and extension effort in the North Central and Southern land-grant regions to work with the Mississippi River and Gulf of Mexico Watershed Nutrient Task Force (Hypoxia Task Force) and its member agencies to increase adoption of nutrient management practices for agricultural productivity and water quality.	IA, IL, IN, MN, MO, OH, WI

\* STATE LEAD

## Multistate Initiatives Built Capacity for Team Participants

At the end of multistate seed-funded projects, participants were asked about the value of the in-pilot period, key informants from each state were interviewed and asked questions about programming. As seen in Figure 3m, the majority of seed grant participants reported increased ability to provide educational programming, share expertise, communicate science-based information, and work collaboratively.



Figure 3m. Increased educational capacity from seed-funded initiatives.

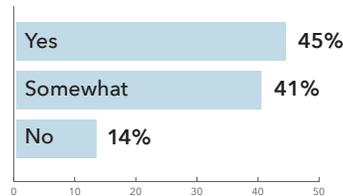
### Strengthened State Programs

Fifty percent of respondents indicated that participation in a multistate initiative strengthened the effectiveness of their state's efforts in the topic the initiative addressed (n=60). Another 25% say that it's too soon to tell, indicating the value of additional time to develop and evaluate the return from Network multistate initiatives.

## Build Capacity to Secure Funding

Eighty-six percent of respondents indicated that they felt better prepared or somewhat better prepared to compete for additional funding (n=58). This increase in preparedness demonstrates value, however there is more work to be done.

Figure 3n. Preparation to compete for additional funding (n=58).



When we surveyed each of the seed-funded projects as they ended, 3% had received additional funding; 19% had applied for additional funding, 22% participated in a related application for funding and were not successful; and 41% had not yet applied for additional funding but intended to. Following up with each of the projects in six months to a year will provide us with a more robust view of the Network's ability to increase land-grant financial capacity in water-related research and outreach.

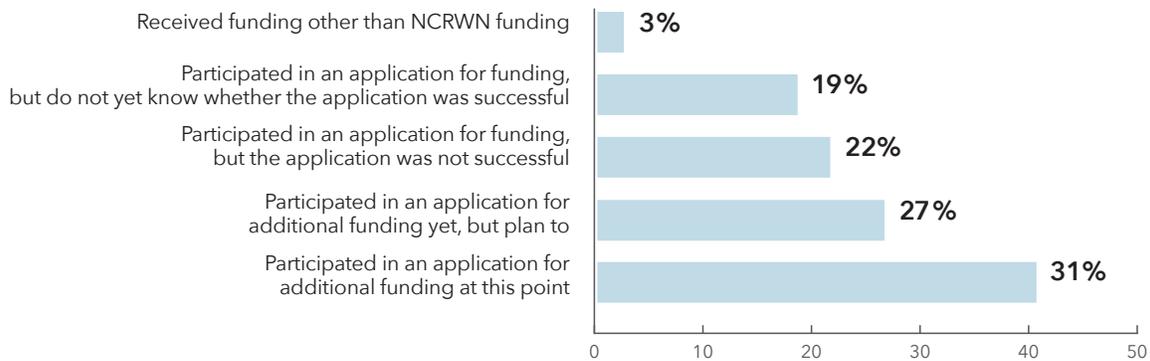


Figure 3o. Have you increased funding for ANY water related projects (other than through the NCRWN funding) as a result of participation in this project? (n=66)

### EXAMPLES OF NEW FUNDING ASSOCIATED WITH NORTH CENTRAL REGION WATER NETWORK MULTISTATE INITIATIVES

- SERA-46 has resulted in over \$600,000 in new resources for extension and research related to nutrient management in the North Central and Southern Regions.
- Daily Erosion Project (DEP) and Agricultural Conservation Planning Framework (ACPF) efforts have secured over \$500,000 in new funding to increase geographic coverage and training for these decision support models.

## Summary of Returns on Investment by Network Priority Issue

### Watershed Management and Land Use

- Developed an online framework and first module of a stormwater curriculum that can be used to train stormwater managers and educators.
- Identified research and practitioner-based core competencies for watershed leadership and civic engagement and improved extension programs on these topics.
- Provided in-service training and program curriculum on 1) land use of riparian ecosystems and 2) manure and nutrient management for Extension Specialists, Extension Agents, Educators at Regional Universities, Community Colleges and 1994 Institutions, and Technical Service Providers in North Dakota, South Dakota, and Nebraska.
- Partnered with the Agricultural Research Service, NRCS, and USEPA to increase adoption of the Agricultural Conservation Planning Framework and the Daily Erosion Project across the North Central Region.
- Developed land-grant partnership with the Hypoxia Task Force, leading to greater integration of land-grant research and extension into state nutrient strategies and public policy related to nutrient management, as well as new funding for related research and extension programs.

### Nutrient Management

- Identified professional development needs of early career extension educators designed to foster systems approaches to nutrient management and created a learning network for interested professionals.
- Documented pathways for effective manure management information dissemination and use to facilitate successful integrated (research/outreach/education) projects and programs. Substantial outreach to ensure educators across the region benefitted from findings.
- Determine the needs of outreach professionals in the five states regarding their use of water quality data in nutrient management education, including the use of water quality data collected by volunteers.

## Sustainable Water Supply and Climate Change and Adaptation

- Increasing precision in irrigation practices across the North Central Region is critical for agricultural production and sustainably managing water resources. Network members participating in this initiative are increasing the ability of Extension and other knowledge providers to help farmers with irrigation management, ultimately leading to increased water and nutrient use efficiency, energy savings, and long-term water availability. This group submitted an unsuccessful AFRI proposal in 2015. They resubmitted in 2016.
- Climate Change and Water for Agriculture Education for Extension Professionals webinar series and formation of a new North Central Region Climate and Ag Team.

## Youth Water Literacy and Stewardship

- Formed a North Central Region Youth Water Workgroup with assistance from the 4-H and Youth Development Program Area and leadership from across the North Central Region. Participants from North Central states are sharing a growing list of educational resources and have completed a white paper outlining priorities for youth water education in the region. The white paper emphasizes water literacy, STEM and technology education as important skills for 21st Century workforce, and place-based education and civic engagement as rich frameworks for youth education that addresses water resource issues.
- The award-winning Iowa State University Extension and Outreach Water Rocks! Program will host a multistate Water Rocks! Youth Education Summit in November 2016, expanding an innovative and successful youth water stewardship program to five additional states in the North Central Region.

## Highlight Initiatives

### SERA-46

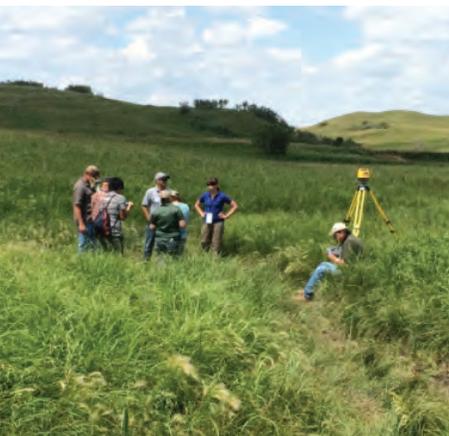
Efficient use of nutrients in agriculture benefits farmers and water quality. SERA-46 is a combined research and extension effort in the North Central and Southern land-grant regions to work with the Mississippi River and Gulf of Mexico Watershed Nutrient Task Force (Hypoxia Task Force) and its member agencies to increase adoption of effective nutrient management practices for agricultural productivity and water quality. SERA-46 and the Hypoxia Task Force have developed a list of shared priorities and are currently completing the first round of research and outreach products. At least seven land-grant universities in the North Central Region have received new USEPA funding for SERA-46-related projects.

### Youth Water Literacy and Stewardship

A Youth Water Workgroup has been formed with assistance from the 4-H and Youth Development Program Area and leadership from across the North Central Region. Participants from North Central states are sharing a growing list of educational resources and have completed a white paper outlining priorities for youth water education in the region. The white paper emphasizes water literacy, STEM and technology education as important skills for 21st Century workforce, and place-based education and civic engagement as rich frameworks for youth education that addresses water resource issues.

### Professional Development for Extension Professionals and Educators on Land Use and Management Practice to Enhance Water Quality

This project is providing in-service training and program curriculum on land use of riparian ecosystems and manure and nutrient management for Extension Specialists, Extension Agents, Educators at Regional Universities, Community Colleges and 1994 Institutions, and Technical Service Providers within North Dakota, South Dakota and Nebraska. Two in-service trainings took place June 2016 in Sioux Falls, SD and Bismarck, ND. The in-service and curriculum is empowering Extension Professionals and Educators to conduct programs and course work on nutrient and manure management and land use within riparian ecosystems, increasing the awareness of producers and students on the topic in the short term and resulting in changes in land management and water quality in the long term.



## Selected List of Federally Funded Projects That Have Expanded Reach and Leveraging Expertise through the North Central Region Water Network

- USDA National Institute of Food and Agriculture Sustainable Corn Coordinated Agricultural Project
- USDA National Institute of Food and Agriculture Useful to Usable Project
- USDA Climate Hubs
- USDA National Institute of Food and Agriculture Transforming Drainage Coordinated Agricultural Project
- USDA National Institute of Food and Agriculture Great Plains Grazing: Cattle, Climate, Culture and Change Coordinated Agricultural Project
- The National Oceanic and Atmospheric Administration’s National Integrated Drought Information System
- USEPA Training for a Watershed Approach Using the Agricultural Conservation Planning Framework
- USEPA Building Capacity for Watershed Leadership and Management in Twelve Mississippi River Basin States in the long term

## Selected List of USDA NIFA Hatch Multistate Research Fund Committees That Have Expanded Reach and Leveraging Expertise through the North Central Region Water Network

- NC1190: Catalysts for Water Resources Protection and Restoration: Applied Social Science Research
- NCERA217: Drainage Design and Management Practices to Improve Water Quality
- SERA46: Framework for Nutrient Reduction Strategy Collaboration: the Role for Land Grant Universities
- NCCC9: MWPS: Research and Extension Educational Materials

## Selected List of Publications and Materials Produced by North Central Region Water Network Initiatives

- Professional Development for Extension Professionals and Educators on Land Use and Management Practice to Enhance Water Quality: Curriculum and Teaching Materials (2016)
- Watershed management: Developing leadership capacity in collaboration and civic engagement for collective action (2015)
- Stormwater Practices and Maintenance Core Course (2015)
- Pathways for Information Transfer between Manure Nutrient Management Agriculture Professionals (2015)
- Results of a Five State Upper Midwest Nutrient-Related Water Quality Outreach Survey and Needs Assessment (2015)



## 4 State Leadership and Benefits of the Network

The following pages provide state-by-state “snapshots” of participation in North Central Region Water Network multistate initiatives and key informant identification of multistate achievements resulting from Network contributions.

### Illinois

#### INITIATIVE LEADERSHIP

- Improving Nutrient Management Extension Programming
- **STATE LEAD** Ten Ways to Reduce Nitrate Loss from Drained Lands:  
A comprehensive Multimedia Outreach Package
- National Stormwater Core Curriculum
- Integrating Volunteer Nutrient Monitoring & Outreach with Extension Across States
- SERA-46
- Establishing an Aquatic Invasive Species Working Group for the North Central Region
- Multi-state Water Rocks! Youth Education Summit

#### BENEFITS OF THE NETWORK

##### Implementing the Illinois Nutrient Loss Reduction Strategy (INLRS)

- NCRWN (especially through SERA 46) helped by making connections with other states implementing their strategies.
- Iowa Extension instrumental in helping us think about how to track BMP adoption and to report on measures of success.

##### Northeastern Illinois Regional Water Supply/Demand Plan

- Helped develop education programs and manuals
- Specialists have delivered webinars for NCRWN

##### Illinois-Indiana Sea Grant

- Multiple climate change programs, regional in scale

##### Tipping Points and Indicators Project

- Growing in scope and adoption
- Tool has been piloted in all Great Lakes states
- Deployed in 3 communities in Illinois and Indiana for comprehensive planning and watershed planning.
- Purdue and Illinois extension specialist and researchers worked (and continue working) collaboratively

##### Urban Stormwater

- Working group is emerging in the NCRWN and 2 of our specialists are helping lead a national community of practice.
- Adding a stormwater specialist in partnership with the Illinois Coastal Management Program along the Chicago coast.

# Indiana

## INITIATIVE LEADERSHIP

- Improving Nutrient Management Extension Programming
- Climate Change and Water for Agriculture Education for Extension Professionals
- Establishing an Aquatic Invasive Species Working Group for the North Central Region
- Ten Ways to Reduce Nitrate Loss From Drained Lands: A Comprehensive Multimedia Outreach Package

## BENEFITS OF THE NETWORK

### Cover crops and soil health

- Indiana is a leading state in cover crop acreage in the country
- Efforts to promote soil health are strong and growing
- Regional collaboration through the Midwest Cover Crops Council

### Climate Change and Water for Agriculture Education for Extension Professionals

- Collaborated in planning six webinars
- Provided web meeting technology, instructions, and recorded versions to reach a broader audience (currently 213 YouTube views, in addition to 237 webinar registrants)
- Presented on water management under climate change

### Indiana Watershed Leadership Academy

- Strengthens local capacity for successful watershed management, with 30 new participants each year.
- Regional connections have strengthened the program
- Collaborated with Ohio, Michigan, Minnesota to publish paper summarizing academy lessons learned

### Youth Water Programming

- Co-lead development of a white paper on youth water programming, outlining existing resources and regional priorities for youth water programming in the North Central Region

### Agricultural Drainage and Water Quality

- Indiana leads the eight-state Transforming Drainage Coordinated Agricultural Project funded by USDA-NIFA, which is working to promote storage of drainage water in the landscape
- Drainage water storage is needed to improve water quality and increase yields under climate change
- Presented a webinar through the NCRWN on drainage water storage opportunities
- Acquired funding through USEPA to add an additional state to the network

# Iowa

## INITIATIVE LEADERSHIP

- Improving Nutrient Management Extension Programming
- Integrating Volunteer Nutrient Monitoring and outreach with Extension across State
- Watershed Management: Developing Capacity in Collaboration and Civic Engagement for Collective Action
- Regional Soil Health Capacity Building
- **STATE LEAD** Daily Erosion Project and Agricultural Conservation Planning Framework-Extension Tools for Addressing Soil and Water Degradation
- **STATE LEAD** Multi-State Water Rocks! Youth Education Summit
- Manure and Soil Health: Understanding and Advancing the State of the Science
- Establishing an Aquatic Invasive Species Working Group for the North Central Region
- Ten Ways to Reduce Nitrate Loss From Drained Lands: A Comprehensive Multimedia Outreach Package

## BENEFITS OF THE NETWORK

### Iowa Nutrient Reduction Strategy

- Specialists are connecting with other states in the region that also have Nutrient reduction strategies.
- NCRWN gives us more opportunities to share ideas and collaborate and develop research projects.

### Sustainable Corn Project (USDA CAP)

- Building decision support tools for farmers influenced by climate science
- We would be doing the project without the network, but NCRWN enables more sharing and collaboration

### Iowa Watershed Academy

- Observing and sharing ideas with others in the region - thinking about core competencies

### Held first Soil Health conference

- NCRWN seed funding allowed for broader participation
- NRCS funds supported our conference and helped us reach a much larger audience

### Increase in rural-urban partnerships around watersheds and land use planning.

- Building resilience in communities that have experienced flooding.

### Water Rocks!

- Iowa's Youth Water Literacy Program gets regional exposure through seed funding.
- Will broaden reach, bring in outside ideas.

# Kansas

## INITIATIVE LEADERSHIP

- Climate Change and Water for Agriculture Education for Extension Professionals
- Daily Erosion Project and Agricultural Conservation Planning Framework–Extension Tools for Addressing Soil and Water Degradation
- Expanding the Role of Extension Professionals in National Drought Monitoring
- **STATE LEAD** Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region

## BENEFITS OF THE NETWORK

### Sustainable Water Supply - new CAP grant

- Networking allows K-State faculty and extension people to collaborate with colleagues in IA, NE, and other states to the south and west.

### Climate Change CAP Grant -- K-State is lead

- Only state in the North Central Region in this.
- Able to share information with other states in region

### Nutrient and Manure Management

- Biggest development has been the ability of our people to meet new extension educators and professionals that they can work with.
- This offers a particular advantage for new extension educators

### Interest in Seed Grants

- K-State is part of two projects in the most recent round of funding. People are getting more comfortable with the Network

# Michigan

## INITIATIVE LEADERSHIP

- Improving Nutrient Management Extension Programming
- National Stormwater Core Curriculum
- Expanding Web-based Community Environmental Tools in the North Central Region
- Capacity Building Workshop for Irrigation Professionals in the North Central Region
- Watershed Management: Developing Capacity in Collaboration and Civic Engagement for Collective Action
- Regional Soil Health Capacity Building
- Manure and Soil Health: Understanding and Advancing the State of the Science
- **STATE LEAD** Establishing an Aquatic Invasive Species Working Group for the North Central Region

## BENEFITS OF THE NETWORK

### Climate Academy 101

- Goal to educate extension staff to answer climate change and variability questions
- The network provided group with links to several webinars and resources

### Aquatic Invasive Species

- Strengthened several programs, guides
- Network provided connections at conferences to experts, resources in other states
- NCRWN funding has helped in development of an aquatic invasive species workgroup for inland waters

### Watershed Leadership

- Two new comprehensive programs developed, directed toward decision makers and community and riparian leaders, respectively.
- States sharing successes, modules, curriculum

### Soil Health

- NCRWN funding enabled the development of a series of webinars highlighting manure and soil health issues for educators and specialists.

### Sustainable Water Supply

- Funding from NCRWN was used to help develop a \$10 million NIFA multi-state CAP grant in 2015. When not funded, the grant was reworked and resubmitted for \$5 million in 2016.
- Contacts made from Capacity Building Workshop for Irrigation Professionals in the North Central Region workshop continue to be beneficial in sharing information across the region.

### Expanding Web-based Environmental Tools

- A regional web-based program is helping states to network across region and share tools and resources

# Minnesota

## INITIATIVE LEADERSHIP

- Improving Nutrient Management Extension Programming
- **STATE LEAD** National Stormwater Core Curriculum
- **STATE LEAD** Capacity Building Workshop for Irrigation Professionals in the North Central Region
- Watershed Management: Developing Capacity in Collaboration and Civic Engagement for Collective Action
- Daily Erosion Project and Agricultural Conservation Planning Framework-Extension Tools for Addressing Soil and Water Degradation
- Ten Ways to Reduce Nitrate Loss From Drained Lands: A Comprehensive Multimedia Outreach Package
- Manure and Soil Health: Understanding and Advancing the State of the Science
- Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region
- Establishing an Aquatic Invasive Species Working Group for the North Central Region

## BENEFITS OF THE NETWORK

### Nutrient and Manure Management

- Nitrogen SMART - Educational outreach to farmers on nitrogen management
- Connection to state Dept. of Agriculture around Nitrogen Fertilizer Management - funded two local positions
- Able to learn from other states about manure management - other states have had more consistent positions doing this
- Community conversation tool developed for nitrogen impaired townships

### Youth Water Literacy

- Robotics water literacy program - educator made connections in region at conference

### Stormwater

- Seed funded project created online course that has been integrated into programming
- Able to bring novices up to speed by having them first do online session

### Watershed Leadership

- Tapped into program knowledge from Purdue, Ohio State, Michigan
- Developed joint presentations and a white paper
- Enhancements to watershed specialist training
- Civic Engagement Cohorts for Water Quality funded by state Pollution Control Agency

# Missouri

## INITIATIVE LEADERSHIP

- Improving Nutrient Management Extension Programming
- National Stormwater Core Curriculum
- Integrating Volunteer Nutrient Monitoring and Outreach with Extension across State
- Mapping the Pathways for Effective Information Dissemination and Education between Manure Nutrient Management Agriculture Professionals
- Daily Erosion Project and Agricultural Conservation Planning Framework-Extension Tools for Addressing Soil and Water Degradation
- Multi-State Water Rocks! Youth Education Summit
- Manure and Soil Health: Understanding and Advancing the State of the Science
- Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region

## BENEFITS OF THE NETWORK

### Nutrient and Manure Management

- Developing new web-based nutrient use and planner tools
- Focus on Precision Agriculture technology for controlling nitrogen run-offs

### Soil Health

- Organizing a field day focusing on cover crops for mid-June 2016
- Network provided opportunities to talk and learn from other states' approach to claypan soil problems

### Youth Water Literacy and Stewardship

- Bringing Water Rocks! curriculum to Missouri, starting this October
- Lots of watershed and water management programs in schools and camps

# Nebraska

## INITIATIVE LEADERSHIP

- National Stormwater Core Curriculum
- Capacity Building Workshop for Irrigation Professionals in the North Central Region
- Mapping the Pathways for Effective Information Dissemination and Education between Manure Nutrient Management Agriculture Professionals
- Climate Change and Water for Agriculture Education for Extension Professionals
- Daily Erosion Project and Agricultural Conservation Planning Framework–Extension Tools for Addressing Soil and Water Degradation
- Professional Development for Extension Professionals and Educators on Land Use and Management Practice to Enhance Water Quality
- Expanding the Role of Extension Professionals in National Drought Monitoring
- **STATE LEAD** Manure and Soil Health: Understanding and Advancing the State of the Science
- Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region

## BENEFITS OF THE NETWORK

### Climate Change

- Resources going into new programming
- Focus on resilience from heavy rainfalls
- Network has supported collaboration (mainly South Dakota and Kansas).

### Soil Health

- No-till experimentation
- Network webinars and website have provided new teaching concepts

### Irrigation

- Joint project with Michigan
- Experimenting with different irrigation technologies

# North Dakota

## INITIATIVE LEADERSHIP

- Mapping the Pathways for Effective Information Dissemination and Education between Manure Nutrient Management Agricultural Professionals
- **STATE LEAD** Professional Development for Extension Professionals and Educators on Land Use and Management Practice to Enhance Water Quality
- Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region
- Capacity Building Workshop for Irrigation Professionals in the North Central Region

## BENEFITS OF THE NETWORK

### Nutrient and Manure Management

- Reaching manure haulers, built on Wisconsin success
- Seed-grant funded training conference for SD, NE, ND

### Climate Change

- Sustainable Agriculture Research and Education Initiative increasing awareness

### Soil Health

- Working on salt reduction
- Strong connections to other states in the region
- Coffee gatherings and field days with farmers

### Youth Water Literacy

- “Our Water World” backpacks

### Irrigation

- Made major contributions to two AFRI grants (research and extension)
- Developed stronger connections with Minnesota colleagues

# Ohio

## INITIATIVE LEADERSHIP

- **STATE LEAD** Improving Nutrient Management Extension Programming
- Expanding Web-based Community Environmental Tools in the North Central Region
- **STATE LEAD** Watershed Management: Developing Capacity in Collaboration and Civic Engagement for Collective Action
- Establishing an Aquatic Invasive Species Working Group for the North Central Region

## BENEFITS OF THE NETWORK

### Nutrient and Manure Management

- Applicator certification program now required for those applying fertilizer on more than 50 acres
- Many new participants have not attended Extension programs before
- Able to use ideas from other states in the Network

### Soil Health

- In-service training led to better understanding of how to quantify soil health
- Network has provided materials used in programs

### Watershed Leadership

- Watershed Academy is a regional model
- Led seed funded initiative to identify core competencies of watershed leaders

# South Dakota

## INITIATIVE LEADERSHIP

- Capacity Building Workshop for Irrigation Professionals in the North Central Region
- Integrating Volunteer Nutrient Monitoring and Outreach with Extension across State
- **STATE LEAD** Mapping the Pathways for Effective Information Dissemination and Education between Manure Nutrient Management Agricultural Professionals
- **STATE LEAD** Climate Change and Water for Agriculture Education for Extension Professionals
- Professional Development for Extension Professionals and Educators on Land Use and Management Practice to Enhance Water Quality
- Multi-State Water Rocks! Youth Education Summit
- **STATE LEAD** Expanding the Role of Extension Professionals in National Drought Monitoring
- Manure and Soil Health: Understanding and Advancing the State of the Science
- Establishing an Aquatic Invasive Species Working Group for the North Central Region
- Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region

## BENEFITS OF THE NETWORK

### Nutrient and Manure Management

- Developed train-the-trainer program in collaboration with ND and NE
- Seed Grant has informed decision-making process for reaching target audiences

### Climate Change

- State summer study on climate change
- Work with USDA Northern Plains Climate Hub
- Developing extension webinars and training

### Soil Health

- Formation of SD soil health coalition, a collective effort to increase sustainable agricultural production

# Wisconsin

## INITIATIVE LEADERSHIP

- Improving Nutrient Management Extension Programming
- National Stormwater Core Curriculum
- **STATE LEAD** Expanding Web-based Community Environmental Tools in the North Central Region
- **STATE LEAD** Integrating Volunteer Nutrient Monitoring and Outreach with Extension across State
- Watershed Management: Developing Capacity in Collaboration and Civic Engagement for Collective Action
- **STATE LEAD** Regional Soil Health Capacity Building
- Daily Erosion Project and Agricultural Conservation Planning Framework-Extension Tools for Addressing Soil and Water Degradation
- Establishing an Aquatic Invasive Species Working Group for the North Central Region
- Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region

## BENEFITS OF THE NETWORK

### Nutrient and Manure Management

- Farmer-led councils going strong
- Balancing of nutrient and soil health concerns
- Information coming in from the Network

### Aquatic Invasive Species

- Robust response to Starry Stonewort
- Much multi-state cooperation more broadly on invasive species

### Soil Health

- Has become an effective way to address water quality
- Finding ways to work with both producers and AgEd Extension

Through the North Central Region Water Network, we have clearly built land-grant university capacity to support resilient water, food, and energy systems. The next stage of Network development will continue to grow this capacity and deepen investment in focused areas to fulfill our third goal: ***generating measurable environmental and social impacts***. The next section of this prospectus outlines our proposal for the future of a North Central Region Water Network that leverages other land-grant investments in water, food, and energy systems research and extension.



UNIVERSITY OF MINNESOTA | EXTENSION

AGRICULTURE | COMMUNITY | ENVIRONMENT | FAMILY | FOOD | GARDEN | HEALTH | HOUSING

### Stormwater Education Program

Extension & Development | Stormwater Education Program | Stormwater Practices and Maintenance Core Course

#### Stormwater Practices and Maintenance Core Course

This curriculum was developed to provide a uniform, publicly available, research-based stormwater core curriculum for stormwater managers and educators to:

- Build comprehension of the fundamentals of stormwater management, stormwater practices and maintenance processes
- Develop understanding and skills that support communicating the importance of stormwater management to community stakeholders

The course module can be used to train staff. It consists of three chapters and an overview. The first chapter, Stormwater 101 (Understanding stormwater) teaches stormwater fundamentals, including how stormwater is generated, the relationship between development and stormwater, and the impacts of stormwater on human health. Chapter two details 100 stormwater management practices with an introduction to their purpose and benefits. Chapter three focuses on the specifics of stormwater maintenance.

Future modules are being developed to provide in-depth information on stormwater practices that consider site assessment, design and implementation (including how to work with contractors), and writing a request for proposals (RFP).

This course is offered free of charge at \$30/session.

Follow these steps to access the course:

1. Watch an overview video of the Stormwater Practices and Maintenance Core Course.
2. Enroll in the course on the extension.org. You must create a new account or login with an existing account.



## 5 Investing in the Future

The North Central Region Water Network Leadership Team and Regional Administrative Council members agree on the value of investing in the North Central Region Water Network because of clear benefits across priority water-related issues. They also agree that translating stronger connections and stronger programs into social and environmental impact takes time. Future investment in the North Central Region Water Network will help us capitalize on the current investment and focus land-grant institutional resources in areas where we can have a transformative impacts on water, food, and energy systems in the North Central Region and beyond.

Future investment would support the following strategies. (Figure 5a shows Network model modified to reflect and operationalize these strategies.)

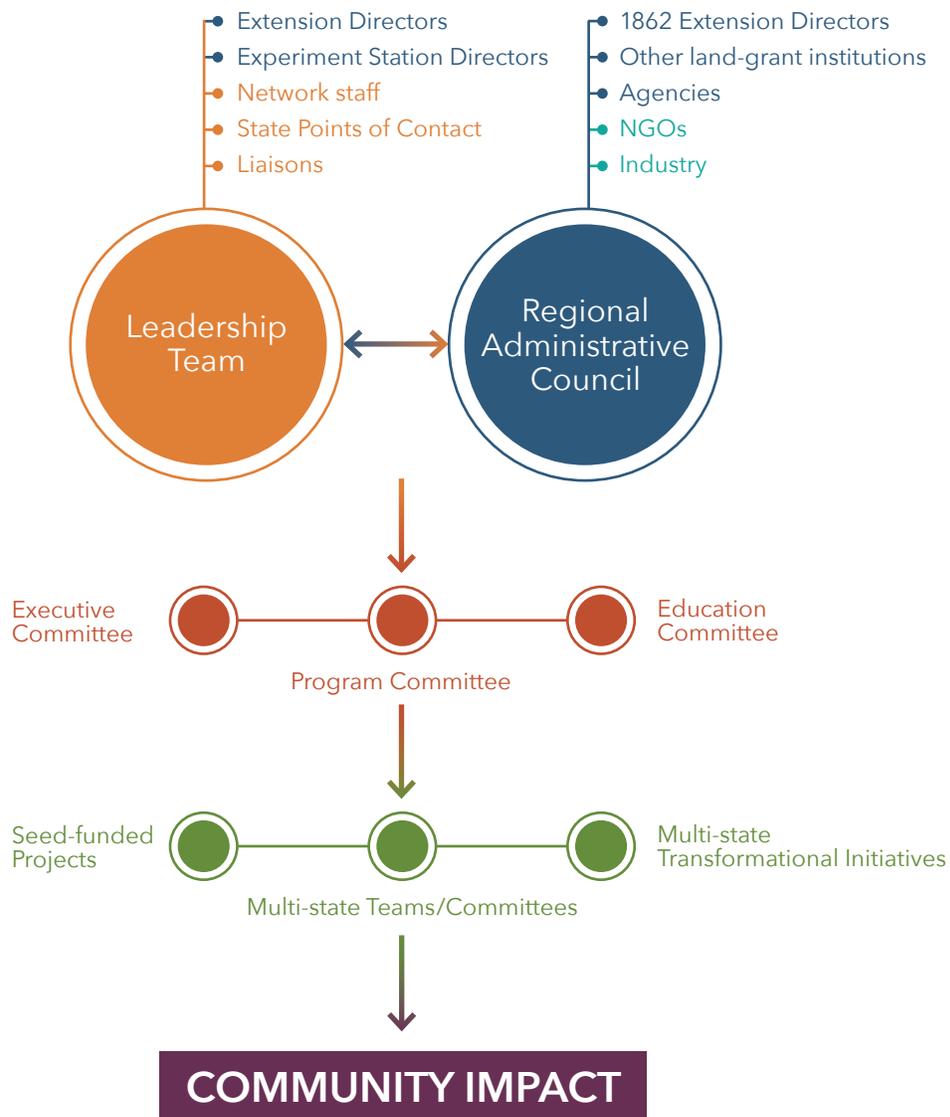


Figure 5a. Proposed future model for the North Central Region Water Network.

## Stronger Networks, Stronger Programs

1. **Continue investing in the development of a culture of learning and collaboration across states.** Land-grant educators and researchers touch and influence a diversity of water-related topics in each North Central Region state. From drinking water to drought, we propose ongoing investment in 1) communication and conferences that connect educators and researchers and 2) seed-funded initiatives. While we will continue to invest across the range of land-grant university contributions to water-related science, education, and civic engagement, we will focus a larger share of new investment in areas of land-grant core strength. Example focus areas include: increasing nutrient use efficiency and reducing nutrient pollution; maintaining sufficient water supplies for agriculture and communities; addressing water-related climate challenges in urban and agricultural landscapes; and growing the next generation of informed and engaged civic leaders through water, STEM, and place-based education approaches.
2. **Maintain a culture of applied research, extension, and program co-production with partners.** In medicine, energy, agriculture, the environment, and other arenas of human discovery, there is a known “valley of death,” a gap between research and adoption of research findings. We will continue to position the Network in the center of the land-grant research and extension continuum, collaborating with end-users to generate and apply the best knowledge to managing water, food, and energy systems.
3. **Expand collaboration with North Central Region Experiment Stations and Water Resources Research Institutes to address pressing water-related research questions. Expanded collaboration with Experiment Stations could be implemented as a three-year pilot.** The NCRWN already benefits from having Leadership Team members with Experiment Station and Water Resources Research Institute affiliation. We have featured research led by Experiment Station and WRRRI affiliates in our webinar series and prioritize seed-funded projects that work with multistate committees funded through the USDA NIFA Hatch Multistate Research Fund. We believe that through a stronger multistate collaboration among researchers and extension specialists and educators, we can increase our impact on water-related issues such as nutrient use efficiency, sustainable irrigation systems, climate change, and the social dimensions of water resource management. We can also prepare the next generation of decision-makers to be effective stewards of our water, food, and energy systems. Potential options for increasing collaboration include:
  - a. Work with NCR Experiment Station Directors to select a state point of contact for each state.
  - b. Grow the participation of colleagues with research and teaching appointments on current and future Network initiatives and provide seed funding to these expanded teams. Initiatives would continue to draw from the expertise of Hatch-funded multistate committees and the Water Resources Research Institutes. They will expand application of water-related research across the North Central Region and help shape new applied research questions.
  - c. Host a joint North Central Region Water workshop that convenes water-related multistate committees and other researchers, extension educators, and partners to develop systems and solution-oriented approaches to water issues in the North Central Region.

- d. Form a water NCERA to increase connections among faculty and educators addressing a diversity of water-related topics
  - e. Explore opportunities to partner with Water Resource Research Institutes to focus funding on multistate initiatives.
4. **Strengthen collaboration with eXtension.** eXtension supports innovation and access to extension programs in the North Central Region and nationally. The NCRWN can leverage substantial extension investment in eXtension by:
- a. Continuing to offer NCRWN products through eXtension to increase reach and impact. The Current webinar series is already jointly listed with eXtension, as is the Stormwater Practices and Maintenance Core Course.
  - b. Co-planning and co-hosting Design-A-Thon workshops for developing and existing teams. Workshops will focus on generating and pitching innovative programs/projects in areas that land-grant institutions can have a transformative impact on water resource management.
  - c. Partnering with eXtension to expand the use and implementation of core competencies and competency frameworks in training for educators, specialists, and the people we serve.
  - d. Exploring the potential for a joint fellowship with eXtension. The fellowship would support innovative water education, research, and management by coupling eXtension's expertise in educational technology with the Network's content expertise.
5. **Strengthen collaboration with 1994 land-grant institutions in the North Central Region.** Our colleagues in 1994 land-grant institutions have a depth of knowledge and experience with water issues in the North Central Region that can help us sustain water, food, and energy systems. 1862 and 1994 land-grant institutions often have strong relationships in their respective states. We will use the results of the recently funded Network initiative "Building Collaboration Between 1862 Land Grant Universities and Tribal Colleges in the North Central Region" to prioritize opportunities for collaboration among 1994 and 1862 land-grant institutions. This project is led by Kansas State University in partnership with the First Americans Land-grant Consortium.

## Focus on Systems, Impact

1. **Focus extension and research on systems approaches to water resource management.** In addition to the strength of our combined research and extension mission, land-grant universities are also uniquely positioned to support systems approaches to both water challenges and opportunities. With increasing competition and connectivity locally and globally, systems approaches will be the only approaches that generate long-term solutions.
2. **In the first half of 2017, convene NCRWN Leadership Team, land-grant administrative leaders across program areas, Regional Administrative Council members, and other key partners to identify 2-3 strategic areas to concentrate our investment based on the knowledge gained through Network discussion during the pilot. These areas will be areas of core land-grant strength and need across the North Central Region.** Example focus areas include: increasing nutrient use efficiency and reducing nutrient pollution; maintaining sufficient water supplies for agriculture and communities; addressing water-related climate challenges in urban and agricultural landscapes; and growing the next generation of informed and engaged civic leaders through water, STEM, and place-based education approaches.
3. **With partners, develop short issue papers for each focus area articulating a) achievable, systems approaches improving water-related management and policy, b) resources that are available and applicable to the issue, and c) resource gaps, such as gaps in extension programs, research, or personnel.** Impact issue papers will be written by researchers from the natural and social sciences, the humanities, educators, and partners.
4. **Develop and support regional initiatives that operationalize issue papers.** We will focus team-building and funding support toward multistate initiatives with the potential for high impact. Foundations of these teams may already exist as current Network initiatives or Hatch-funded multistate committees. In addition, we will modify our committee structure to form a Program Committee (Fig. 5a). The Program Committee will provide additional Leadership Team support for these focus areas, including assistance connecting to institutional and funding resources.
5. **For each focus area, work within land-grant institutions and with partners to close resource gaps in expertise or funding.** While land-grant institutions in the North Central Region are already making substantial contributions to sustaining water, food, and energy systems in our states and around the globe, necessary expertise may be outside of our existing networks or additional financial resources may be needed. The Network Leadership Team and our Regional Administrative Council are well-positioned to help topic teams close resource gaps.
6. **Continue investing a lower level of seed resources across a diversity of land-grant extension and research on water-related topics.** Water issues are connected across states, across rural and urban communities, and across disciplines. Supporting land-grant capacity across water issues increases our ability to adapt and respond as new research and new needs emerge. We will continue to invest in issues such as aquatic invasive species and stormwater management where we have opportunities to grow.

## Maintain and Diversify Resource Base

1. **Maintain administrative and funding support from North Central Region Extension Directors.** The Network Leadership Team is appreciative of the administrative and financial support that Extension Directors and Program Leaders have provided leading up to and during the Network pilot. We request that:
  - a. Extension Directors continue their financial commitment of \$250,000 annually
  - b. Extension Directors consider removing the Network's pilot designation and commit to funding the Network through at least December 2019
2. **Strengthen collaboration with North Central Region Experiment Stations to address pressing water-related research questions.** In addition to the opportunities for more formal collaboration highlighted on page 46, we request that Experiment Station Directors consider a collective investment comparable to the Extension Director investment for a pilot period of three years. In addition to the value of more formal engagement of Experiment Stations in the Network, financial contributions from the Experiment Stations would grow the resources available for multistate research and extension initiatives. These initiatives will increase competitiveness for grant and foundation resources increasingly targeted toward multistate, interdisciplinary projects. They will also expand implementation of land-grant research by deepening connections with extension across the North Central Region, focusing on impacts, and connecting to industry agency, and NGO partners.
3. **Develop and implement a new model for partner contributions with a focus on sponsorships and organizational/corporate giving.** Across land-grant institutions, programs, centers, institutes, and foundations have developed a diversity of giving options for people and organizations that want to contribute to programs they care about. In 2017, the Network will bring together an experienced team of leaders to help develop a strategy for attracting sponsorships and other organizational and corporate giving. We expect to begin implementing the program in 2018.

## 6 From Investors

Water touches all of our lives. We use water, and we are its stewards. Whether we're concerned with feeding a growing population, ensuring all of our citizens have safe drinking water, or enjoying the natural beauty of region's precious lakes and rivers, we can make a difference by working more effectively together.

The North Central Region Water Network is organized around the operating principle that we are stronger together than we are apart. As principal investors in the Network, we want to thank our fellow Extension Directors for embarking with us on this experiment. We know you have supported the Network with your time and the time of educators and specialists in your respective states, as well as investing financially.

We also want to thank all of our extension colleagues and partners across the region for your hard work and thoughtful perspectives during the Network's pilot phase. You are the North Central Region Water Network. The products and return on investment documented in this prospectus show the value of collaboration, partnerships and resource sharing!

The Administrative Council has provided the arms-length advice that is so valuable to an entity that is built on internal (academic) collaboration. Their support and ideas for our future have provided an additional impetus to build on our first three years as a network!

Finally, we think this prospectus highlights the opportunities that we have to grow the value of our investment. We can do this by strengthening partnerships and emphasizing areas of core strength. We are looking forward to working closely with land-grant university Experiment Stations, Water Resource Research Institutes, eXtension, our colleagues at land-grant Tribal Colleges and Universities in the North Central Region, as well as expanding collaborations with agricultural advisors, local government, and other key partners in the next phase of the Network's development.

We hope you will consider joining us in ensuring that this important work continues.

Sincerely,



**Richard Klemme**  
Dean and Director  
University of Wisconsin-Extension



**Chuck Hibberd**  
Dean and Director  
University of Nebraska-Lincoln Extension



**NORTH CENTRAL REGION  
WATER NETWORK**

An Extension-led partnership of land-grant colleges and universities

northcentralwater.org



An Extension-led partnership of 12 land-grant colleges and universities

