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August 14, 2017

Chris Steller
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St Paul, MN 55155

RE: PT contract #112630 MN Department of Agriculture (MDA) and Environmental Initiative Nitrate Workshops Final Report

Project: Agricultural Water Quality Solutions Project

Dear Chris:

Here is complete copy of the final report submitted to the Minnesota Department of Agriculture Pesticide and Management Division. The electronic copy was emailed to you on August 14, 2017.

I am submitting only one print copy. This report was prepared by the contractor and according to the project manager is not mandated by law.

Please contact me at (651) 201-6196 if you have questions.

Sincerely,

Kam Carlson

Kam Carlson
Contracts & Grants Coordinator
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Enclosures: One copy of final report for project listed above

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Agricultural Water Quality Solutions Project: Final Report

June 30, 2017

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Executive Summary

In late summer 2016, the Minnesota Department of Agriculture (MDA) commissioned Environmental Initiative to bring individuals and organizations representing the agricultural sector in Minnesota together to proactively develop a set of policy recommendations and industry commitments that would build on current efforts and meaningfully accelerate progress toward water quality goals in Minnesota. This aligned with Governor Dayton’s focus on improving water quality in Minnesota, and his call for solutions and ideas emerging from all sectors.

Environmental Initiative, in partnership with MDA, convened a conversation between agricultural associations, farmer-owned cooperatives and companies (the “Work Group”) in a proactive and positive way to develop a suite of meaningful commitments, that, if implemented, would lead to accelerated progress towards water quality improvements for Minnesota’s ground and surface waters. Technical and subject matter experts from academia, agricultural businesses, local government and farmers also contributed their time to develop ideas for how to implement farming practices, technology and policy changes that could meet these needs. After a series of meetings in fall 2016, the technical experts’ ideas and comments were presented to the Work Group.

After several additional meetings in November and December 2016, all members of the Work Group unanimously approved a single recommendation—to create and fund capacity for farmer-led councils to help implement new practices or enhance current Best Management Practices relating to agricultural water quality. On February 3, 2017, the Agricultural Water Quality Solutions Work Group met with Governor Mark Dayton to share their proposal to develop farmer-led councils to advance water stewardship across Minnesota.

Governor Dayton supported the Agricultural Water Quality Work Group proposal to develop farmer-led councils that will work to improve Minnesota’s water quality. Governor Dayton believes that farmer-led councils could also be important collaborators and contributors to extend the work of Soil and Water Conservation Districts, USDA conservation programs and the emerging One Watershed, One Plan process.

Following this meeting, members of the Work Group worked with Minnesota legislative leaders to successfully insert authorizing language for farmer-led councils in the FY 2018 omnibus agriculture finance bill, HF1545. The bill, containing that authorizing language, was passed into law on May 30, 2017.

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Project Narrative

In response to Governor Dayton's call for ideas for how all Minnesotans can contribute to improving water quality, the Minnesota Department of Agriculture (MDA)—in its dual role as promoter of Minnesota agriculture and steward of Minnesota's natural resources—asked and funded Environmental Initiative to convene and facilitate a series of meetings with Minnesota's agricultural sector. The goal of this process was to engage the industry in a proactive and positive approach to water quality improvement by identifying and creating a proposal or set of recommendations that, if implemented, would accelerate progress toward improved water quality in Minnesota.

Environmental Initiative facilitated a series of technical working group meetings with technical experts, scientists and industry innovators, which included individuals from academia, state and federal government agencies and individuals who farm or work directly with farmers. Technical working group meetings focused on generating diverse strategy proposals, which were then presented to the Work Group for consideration and robust discussion.

Environmental Initiative and the Minnesota Department of Agriculture identified and invited individuals who represent commodity crop groups, livestock growers, food processors and other parts of the agricultural industry to participate in the process as members of a Work Group. Others were added to this group based on suggestions by agriculture industry leaders who were themselves participating. Ultimately, most of the invited organizations/companies participated, but a few declined to participate or decided that their members' perspectives were well-represented by the other organizations involved.

Through a facilitated process, participants brainstormed, developed and refined proposals that they believed would be beneficial for both water quality and farmers. The final proposal of the Work Group is the sum of those efforts and represents what the signed-on organizations believe to be their most transformative idea for increasing implementation of practices that can improve water quality, soil health and farm profitability. The resulting recommendation represents the perspective of the agricultural industry itself. Other constituencies and individuals have also been invited through other mechanisms and processes to offer their best ideas on how to improve water quality to the Administration, and many have already done so.

The Work Group arrived at this recommendation because it had the strongest, widest support among representatives of the agricultural sector in the discussion, and because the members of the Work Group chose to focus their support behind what they believe to be the idea with the greatest potential to effectively increase the implementation of a broad suite of practices that can improve water quality, soil health, and farm profitability.

The following sections are a collection of the major documents and commitments produced during the Agricultural Water Quality Solutions project, presented roughly in reverse chronological order, with those created toward the end of the project listed first. The exception is the Charge to the Work Group, which was the organizing document for the entire process.



Charge to the Work Group

The Charge was verbally agreed to by Work Group members to define their participation in the Agricultural Water Quality Solutions project. It was used to guide the process and the conversation. The Work Group charge is reproduced below, as adopted by the Work Group on November 4, 2016.

Charge to the Work Group Adopted November 4, 2016

Despite our shared commitment to clean water, many of Minnesota's assessed water bodies, including surface waters and groundwater, do not meet water quality standards. Every sector of society has a role to play in addressing this problem, and given that surface water and groundwater quality is directly connected to land use, the agriculture industry is uniquely positioned to offer critical solutions. Excess agricultural inputs that are not absorbed by plants, fixed into the soil, or naturally degrade will migrate, infiltrating into groundwater or draining into surface water. Soil that is not protected and healthy can erode into surface water, carrying with it bacteria, phosphorus, and other contaminants.

Farmers are stewards of the land they operate, holding it in trust for future generations of farmers. Many operate their land with the specific intent to protect it, and the agriculture industry continues to innovate and bring new technologies to market that can maximize yields and resource efficiency. However, more can be done to ensure healthy, productive farms while protecting and improving Minnesota's famous lakes and rivers for current and future generations.

Water quality is a top priority for the Dayton administration, and Governor Dayton has declared 2016 the "Year of Water." The Minnesota Department of Agriculture is bringing key players in the agricultural sector together to proactively develop a set of policy recommendations and industry commitments that, building on current efforts, would reflect a meaningful commitment on the part of Minnesota's agricultural sector to improve agriculture's impact on groundwater and surface water quality.

Agricultural Water Quality Solutions Project Charge

Environmental Initiative is convening decision makers in the agriculture industry together with, and on behalf of, the Minnesota Department of Agriculture. The charge to members of the Work Group is to develop a suite of meaningful new recommendations by agriculture, including support for public policies and business commitments, that, if implemented, will lead to water quality improvements for Minnesota's ground and surface waters. These recommendations will be presented to Governor Dayton for consideration and possible inclusion in the Governor's 2017 legislative package.



The recommendations will be developed through a process that:

1. Reviews and builds on existing public and private investments to consider new/additional actions that will accelerate the adoption of practices and behaviors that are proven to protect or improve water quality.
2. Considers both policy solutions, as well as industry commitments to action.
3. Does not attempt to build a definitive plan for addressing all water quality concerns, but instead defines concrete actions that can be taken by the agricultural industry and/or the State of Minnesota.
4. Concerns itself exclusively with solutions and strategies that capitalize on agriculture's unique opportunity to address water quality issues associated with farming and agricultural land use.
5. Focuses on progress towards existing standards and goals, rather than seeking to develop new standards or goals.
6. Does not preclude any participating organization from developing or supporting other strategies or policies independent of this process.

Project Approach

Steering Committee

A steering committee of five leaders within the agricultural industry was formed at the beginning of the project in mid-August. This group is made up of leaders who will work with Environmental Initiative and MDA to identify participants for the Work Group and Technical Working Groups and provide feedback on project direction, agendas and other project materials ahead of meetings throughout the process.

Work Group

The Work Group is the decision-making body of the process and will be the one to officially develop the final policy recommendations. This group will be made up of formal leaders within the agricultural industry. Participants will be selected based on both their interest in and willingness to seek innovative and constructive solutions to water quality issues and their influence and reach within the agricultural community, in order to maximize the value of the final agreement.

Technical Working Groups

The Technical Working Groups (TWGs) are the source of ideas and innovation within the process. The TWGs will be comprised of a combination of formally recognized agricultural industry leaders, industry thought leaders and innovators, and technical experts. All Work Group members will serve on one or more TWGs.

The TWGs will be tasked with generating specific proposals for consideration by the Work Group. The TWGs will be divided as follows:

- Living Cover & Tillage
- Fertilizer & Manure Management



- Drainage & Water Management

Timeline

The Agricultural Water Quality Solutions Project Work Group is expected to meet four times between September and December of 2016. Initial strategies for consideration will be developed by three Technical Working Groups between late September and early November, and the Work Group will discuss and align on final recommendations between November and December. Final recommendations will be presented to Governor Dayton in January of 2017.



Farmer-Led Council Framework

This document was collaboratively written by the Work Group and the Minnesota Department of Agriculture, with facilitation provided by Environmental Initiative, and is intended to be used as the fullest, most complete version of the Work Group's vision for farmer-led councils. The framework below was adopted by consensus of the organizations listed at the end of this section on March 20, 2017.

Farmer-Led Council Framework Adopted March 20, 2017

Executive Summary

In fall and winter of 2016, the Minnesota Department of Agriculture and Environmental Initiative convened 15 Minnesota agricultural organizations, cooperatives, and companies to create a plan that would significantly improve water quality practices related to agriculture. The Agricultural (Ag) Water Quality Solutions Workgroup worked with technical experts across academia, private industry, and government to help find strategies and technologies that would both create significant progress in water quality practices based on the best science available and lead to widespread adoption of those practices.

While Minnesota is moving toward watershed-based restoration and protection through its One Watershed, One Plan approach, current resources are not enough to ensure implementation of every project or set of practices identified in these plans, particularly if resources are spread equally across the state.

Therefore, the Ag Water Quality Solutions Workgroup unanimously agreed to a single idea that could improve water quality practices and would also be generally accepted by farmers—to establish and fund voluntary Farmer-Led Councils to implement and demonstrate practices in an area. The group explained the idea to Governor Mark Dayton on February 3, 2017.

Governor Dayton supported the Agricultural Water Quality Solutions Workgroup proposal to develop Farmer-Led Councils that will work to improve our state's water quality. He instructed the Department of Agriculture and Board of Water and Soil Resources to work with the Ag Water Quality Solutions Work Group to implement the plan without delay.

To continue the work, legislative action will be required to create a Statewide Advisory Group that can set the parameters for Farmer-Led Councils. Once these parameters have been established, each Farmer-Led Council will need to apply for funding to retain a coordinator for the council whom can carry out the voluntary activities as directed by that group of farmers.

The Ag Water Quality Solutions Work Group agreed that current water quality funding should be redirected to this effort from federal, state, and local government sources, as well as potential



public-private partnerships. The program would be run through the Board of Water and Soil Resources and directed by an Advisory Group, staffed and convened by the Minnesota Department of Agriculture, to locate and secure funding for the efforts identified by the Farmer-Led Councils.

Overview

Minnesota's agriculture sector shares the goal of all Minnesotans of protecting our water and soil natural resources. The success of agriculture in Minnesota has been a story of continuous improvement—using the best of science, research, and innovation to ensure the sustainability of our sector—from both an environmental and economic perspective. Minnesota farmers and agribusinesses continue to explore new initiatives, invest in new technology, and adopt new practices that demonstrate our commitment to protecting and improving our water resources.

Minnesota is moving toward watershed-based restoration and protection through its One Watershed, One Plan approach. However, current resources are not enough to ensure implementation of every project or set of practices identified in these plans, particularly if resources are spread equally across the state.

A greater concentration of resources in watersheds of both exceptional need and opportunity would enable local, state, and federal partners to offer incentives at a level that more substantially reduces risk to farmers and is more likely to result in their adoption of key practices at a scale sufficient to have significant impact. Providing landowners and producers the opportunity to identify and try relevant new practices and techniques without substantial up-front investment and the associated financial risk can eliminate one of the most significant barriers to practice change. Farmers who try new practices also need a means to share their results and lessons learned with neighbors to promote large-scale adoption.

In addition, no mechanism currently exists to deliberately coordinate and leverage existing private-sector networks alongside public conservation delivery infrastructure to reach a larger and more diverse audience of farmers. Better engagement of, and connections to, trusted sources of agronomic, research, and Best Management Practices information—commodity and farm organizations, agribusinesses and ag service providers, and their associated networks—could vastly expand the delivery of information about conservation and water quality protection practices to producers.

Leveraging public and private resources has the potential to strengthen rural economies while advancing continuous improvement in agronomic practices—progress that can lead, and has led, to improvements in water quality and soil health. Leveraging of these resources can also form the groundwork for a replicable public-private partnership from which we can learn and develop relationships and programs that can spread across Minnesota and crop-producing regions throughout the Midwest.

The goal of this approach is to develop replicable public-private partnerships that focus resources and decision-making at the local level. The Ag Water Quality Solutions Work Group believes



this approach will maximize voluntary implementation of conservation, water quality restoration, and protection practices in the areas where implementation is most needed. Farmer leaders, in collaboration with landowners and private entities such as processors, crop consultants, retailers, and input suppliers, could take advantage of existing relationships, networks, and infrastructure to deliver conservation education and technical assistance. This approach may support rural economies by increasing business opportunities associated with implementing conservation practices and precision agronomics assistance.

Process

To speed progress, in late summer 2016 the Minnesota Department of Agriculture engaged Environmental Initiative to convene a Work Group of agricultural associations, farmer-owned cooperatives, and companies to identify the best collective ideas that would result in significant progress in the implementation of water quality practices related to agriculture.

The Agricultural Water Quality Solutions Work Group enlisted technical experts from academia, private and government research institutions to help learn about the potential technologies and strategies available to today's farmers and agribusinesses. After a series of meetings in fall 2016, the technical experts' ideas and comments were presented to the Work Group. After several additional meetings in November and December 2016, all members of the Work Group unanimously approved a single recommendation—to create and fund capacity for Farmer-Led Councils to implement new practices or enhance current Best Management Practices relating to agricultural water quality.

On February 3, 2017, the Ag Water Solutions Work Group met with Governor Mark Dayton to share their proposal to develop farmer-led councils to advance water stewardship across Minnesota.

Governor Dayton supported the Ag Water Quality Work Group proposal to develop Farmer-Led Councils that will work to improve our state's water quality. Governor Dayton believes that Farmer-Led Councils could also be important collaborators and contributors to extend the work of Soil and Water Conservation Districts, USDA conservation programs, and the emerging One Watershed, One Plan process.

The Governor wants to begin this important work without delay. He has directed the Department of Agriculture and the Board of Water and Soil Resources to work with the Ag Water Quality Solutions Work Group to develop the start-up and implementation steps needed for Farmer-Led Councils to succeed. The Governor also believes that it will be possible to establish the initial infrastructure by utilizing existing and anticipated conservation funds, including Clean Water Funds.

To continue the work, legislative action will be required to create a Statewide Advisory Group that can set the parameters for Farmer-Led Councils. At the conclusion of the meeting, the Governor asked the Administration and the Work Group to develop the following framework of next steps for implementation:



Next Steps for Implementation

- 1) Develop a Statewide Advisory Group:** A Statewide Farmer-Led Council Advisory Group will be developed under the jurisdiction of the Board of Water and Soil Resources. This Advisory Group will be staffed and convened by the Minnesota Department of Agriculture. The Group will initially have the following key responsibilities:

 - a. Develop the framework for Farmer-Led Council implementation.
 - b. Establish criteria to recognize local Farmer-Led Councils.
 - c. Establish criteria for connections to local water management officials.
 - d. Develop a job description template with key responsibilities, knowledge, skills, and abilities for local Farmer-Led Council coordinators.
 - e. Develop eligibility and performance criteria for local Farmer-Led Councils to access funding to hire/contract with a local coordinator.
 - f. Develop recommendations to agency(s) on eligibility, scoring and disbursement processes to support Farmer-Led Council projects.
 - g. Evaluate local Farmer-Led Council and annual projects/practices readiness and funding needs and provide ongoing recommendations for implementation.
 - h. Provide accountability, assurance and evaluation of Farmer-Led Council outcomes.
 - i. Invite participation from USDA state leaders.
 - j. Advise agency(s) on opportunities, barriers, and challenges to implementation.

- 2) Develop Framework for Local Farmer-Led Councils:** Local Farmer-Led Councils will provide leadership at the local level to identify projects and practices, annual readiness and funding needs, and metrics of success. The Farmer-Led Council would be supported by a local coordinator and work with other conservation partners, including local water management officials. Local processes would include:

 - a. Local farmers voluntarily petition to officially establish a recognized Farmer-Led Council for their area.
 - b. Approved petitions would lead to state funding to hire or contract for access to the services of a council coordinator.
 - c. The Farmer-Led Council, in consultation with farmers and conservation partners in the area, will create a prioritized, targeted, and ready-to-go list of practices/projects.
 - d. The Farmer-Led Council will submit an annual request for funding for practices/projects implementation to potential funding sources.
 - e. The Farmer-Led Council will measure and report on metrics of success and progress to the Statewide Advisory Group and local water management officials.
 - f. The Farmer-Led Council will advise the Statewide Advisory Group on opportunities, barriers, and challenges to implementation.

- 3) Role of the Local Coordinator:**



- a. Coordinate / convene local Farmer-Led Council meetings.
 - b. With input and support from the local Farmer-Led Council, determine initial focus based on unique water challenges within the area.
 - c. Provide farmer outreach / education as needed on local / state / federal conservation tools, resources, and incentives available to farmers and landowners.
 - d. Engage local, state, and federal officials and involve them in the work of the council as appropriate or requested, including establishing connections to local water and watershed management plans.
 - e. Provide annual recommendations to agency(s) and local officials on prioritized ready-to-go projects and practices.
 - f. Proactively engage local ag retailers, consultants, and other business entities in the work of the council.
 - g. Provide information to growers on existing public / private sector programs and partnerships available (e.g., MAWQCP, Field to Market, GreenStar, 4Rs, etc.).
 - h. Coordinate local research and demonstration projects on soil health and nutrient management BMPs that are scalable and relevant.
 - i. Develop initial goals and benchmark metrics to measure success.
 - j. Prepare annual reports as requested by agency(s) or the Statewide Advisory Group to measure progress and outcomes.
- 4) Overview of Potential Funding Sources:** There are several options and sources of funding for conservation and clean water work in Minnesota that could be aligned with water quality improvement work emanating from the efforts of Farmer-Led Councils, including but not limited to:
- a. Clean Water Fund – There are several categories of planned appropriations that could be made available for either technical assistance or financial assistance.
 - b. USDA Farm Bill conservation programs – NRCS has several general programs such as CSP, EQIP, WRP, and continuous CRP. They also have access to some “designated” funds such as MRBI and some competitive funds via RCCP that could be developed specific to a Farmer-Led Council approach.
 - c. Local government programs or projects funds through counties, soil and water conservation districts, or watershed districts.
 - d. Infrastructure management funds from road or public drainage system authorities.
 - e. Public-private partnership funding.

Supporting Organizations

- Cargill
- CHS Inc.
- Cooperative Network
- Land O’Lakes, Inc.
- Minnesota AgriGrowth Council



- Minnesota Association of Wheat Growers
- Minnesota Corn Growers Association
- Minnesota Crop Production Retailers Association
- Minnesota Farm Bureau
- Minnesota Farmers Union
- Minnesota Milk Producers Association
- Minnesota Pork Producers Association
- Minnesota Soybean Growers Association
- Minnesota State Cattlemen's Association
- The Mosaic Company



Final Strategy from the Work Group

The document below is the strategy the Work Group believes has the best chance for transformational improvement in accelerating Minnesota's progress toward water quality goals. This is the version that was presented to Governor Dayton on February 3, 2017. "Final Strategy" in this context means that it was the final strategy selected from a suite of options the Work Group considered. Subsequent meetings of the Work Group further developed and expanded this strategy into the Farmer-Led Councils Framework in the preceding section.

Final Strategy from the Work Group
Approved by the Work Group on December 22, 2016

Context

Minnesota's agriculture sector shares the goal of all Minnesotans in protecting our water and soil natural resources. The success of agriculture in Minnesota has been a story of continuous improvement—using the best of science, research, and innovation to ensure the sustainability of our sector—from both an environmental and economic perspective. Minnesota farmers and agribusinesses continue to explore new initiatives, invest in new technology, and adopt new practices that demonstrate our commitment to protecting and improving our water resources.

The ability to sustain agricultural productivity, to maintain and increase production while minimizing impacts on natural resources, is a complex issue that will require unprecedented coordination at the local level among farmers, farm/commodity organizations, crop retailers, agribusinesses, crop advisors, landowners, government, and academia. This work group is proposing a new approach that would provide opportunities for farmers at a local level to lead and develop relevant, localized solutions related to water focused on adoption of best practices, innovation, prioritization of resources, and benchmarking success.

Minnesota is moving toward watershed-based restoration and protection through its One Watershed, One Plan approach. However, current resources are not enough to ensure implementation of every project or set of practices identified in these plans, particularly if resources are spread equally across the state.

A greater concentration of resources in watersheds of both exceptional need and opportunity would enable local, state, and federal partners to offer incentives at a level that more substantially reduces risk to farmers and is more likely to result in their adoption of key practices at a scale sufficient to have significant impact. Providing landowners and producers the opportunity to try out new practices and techniques without substantial up-front investment and the associated financial risk can eliminate one of the most significant barriers to practice change. Farmers who try new practices also need a means to share their results and lessons learned with neighbors to promote large-scale adoption.

In addition, no mechanism currently exists to deliberately coordinate and leverage existing private-sector networks alongside public conservation delivery infrastructure to reach a larger and more diverse audience of farmers. Better engagement of, and connections to, trusted sources of agronomic, research, and Best Management Practices information—commodity and farm organizations, agribusinesses and ag service providers, and their associated networks—could vastly expand the delivery of information about conservation and water quality protection practices to producers.

Leveraging public and private resources has the potential to strengthen rural economies while advancing continuous improvement in agronomic practices—progress that can lead, and has led, to improvements in water quality and soil health. Leveraging of these resources can also form the groundwork for a replicable public-private partnership from which we can learn and develop relationships and programs that can spread across Minnesota and crop-producing regions throughout the Midwest.

Description

The goal of this approach is to develop replicable public-private partnerships that focus resources at the local level to maximize implementation of conservation, water quality restoration, and protection practices in the areas where implementation is most needed. Collaboration with farmers, landowners, and private entities such as processors, crop consultants, retailers, and input suppliers could take advantage of existing relationships, networks, and infrastructure to deliver conservation education and technical assistance. This approach may support rural economies by increasing business opportunities associated with implementing conservation practices and precision agronomics assistance.

Phase 1—Establish a governance board

- Administer within the Minnesota Department of Agriculture (MDA) or Board of Water and Soil Resources (BWSR) with a separate governance board that drives decision making, modeled after the Agricultural Fertilizer Research & Education Council (AFREC).
 - Board to be comprised of agricultural industry representatives, with the potential for ex-officio members
 - Board will evaluate projects and lessons learned based on regular reports sent by project managers/coordinators

Phase 2—Support the creation of farmer-led councils

- Establish a formal process whereby local farmer leaders could apply for state grants to help establish a farmer-led watershed council. A successful application could include:
 - Letters of support from local farm/commodity organization chapters and their state organization affiliations
 - Letters of support from local agricultural retailers
 - Commitments of support from farm/commodity groups/agribusinesses
- Retain project managers/coordinators to manage grant funding and implementation with the farmer-led councils.



- Develop a job description with key responsibilities, knowledge, skills, and abilities
 - Includes knowledge of government (local, state, and federal) and private programs that are available to farmers to test and/or adopt these key practices
- Some representation of the local watershed council should be part of the selection process to ensure the person retained has the confidence/support of the council

Phase 3—Implementation at the local level

- Includes development of a work plan with goals, benchmarks, and accountability and reporting mechanisms

Phase 4—Reporting from councils to the governance board to enable knowledge sharing, improvements, and replication

- Identify ways to communicate lessons learned and success stories
- Continuously work towards improved implementation

Project selection:

Create a challenge grant process for watersheds with applications coming from farmer-led councils.

- Each farmer-led council should determine the top priorities for the watershed.
 - With input and support from local advisory council, determine initial areas of focus based on the unique water challenges within the watershed (or sub-watersheds as appropriate).
- Water quality assessments for the watershed/sub-watershed should be complete prior to application. Projects should leverage private industry and ag service provider networks to deliver conservation education and assistance.

Watershed councils will:

- a. Inform and engage the agricultural sector, especially farmers, in their watershed/sub-watershed, on programs, practices, tools, and/or innovation, that help farmers measure, demonstrate, and improve the sustainability of their operations, and assist farmers in accessing the programs that best fit their operations.¹

¹ Some of these programs and tools could include:

- Minnesota Agricultural Water Quality Certification Program
- Field to Market
- Conservation Stewardship Program
- Green Star Farms
- 4R Nutrient Stewardship Certification Program
- Minnesota Crop Production Retailers' Soil Fertility Environmental Risk Assessment Tool
- U.S. Soybean Sustainability Assurance Protocol

- b. Develop a specific plan for how to track, measure, and communicate successful implementation and lessons learned to demonstrate continuous improvement and accountability.
- Establish a baseline understanding of the current practices on the landscape to measure progress against.²
 - Determine how to aggregate existing farm data to protect privacy while promoting transparency.

Costs and Funding

The purpose of this approach is to better utilize existing program resources and funding through the creation of farmer-led councils that scale the adoption of best management practices. Funding would come through the redirection of existing state Clean Water funds, and does not require new funds. The intent would be to provide a significant influx of conservation cost-share and incentive funds to help farmers/landowners address local (watershed/sub-watershed) water quality challenges. State funding would be supplemented by private, local, and federal funds where available and appropriate.³

Figures are per annum:

- Administration through MDA or BWSR: up to \$250,000
- Local project coordination (estimated to fund ten positions or fewer): \$1,000,000

² For example, using Fieldprint Calculator, Water Quality Index, or aggregated precision ag data to measure adoption.

³ Create opportunities to leverage existing state funding and programs for implementation, including, but not limited to:

- Existing state funding, including but not limited to:
 - Explore options to access funding from the Clean Water Fund
 - Water Legacy Grants Program in BWSR from Clean Water Legacy funds
 - Erosion Control and Water Management Program (“State Cost-Share”) (BWSR)
 - Agriculture Best Management Practices Loan Program (MDA)
 - Dairy Modernization Loan Program (MDA)
 - Clean Water Partnership (MPCA)
- Federal cost share or incentives (would require grants or a re-valuing of federal cost share for particular practices in targeted watersheds), including but not limited to:
 - Section 319 Nonpoint Source Management Program (EPA)
 - Regional Conservation Partnership Program (USDA)
 - Mississippi River Basin Healthy Watersheds Initiative (USDA)
 - Conservation Innovation Grant (USDA)
 - Use MAWQCP as one means to help farmers access state and federal cost share (certified producers already have priority access to federal funding)
- Local funds
- Private industry
- Foundations



- Seed money for projects: \$500,000

It is anticipated that future implementation will require the redirection of additional funds for increased incentive payments for best management practices. Request is for \$20 million per biennium of existing Clean Water Fund appropriations.

Implementation Steps and Timeline

Realizing measurable water quality benefits from changes in farm practices takes time and a long-term commitment from all stakeholders. A new public-private partnership model that relies on self-organized farmer-led councils is dependent on building relationships, trust, and consensus in the community to drive progress—all of which can be a slow, complicated process. This is a new model for engaging farmers, agricultural companies and organizations, and government—it will require commitment and patience to realize water quality and soil health benefits.

Supporting Organizations

Cargill
CHS Inc.
Cooperative Network
Land O'Lakes, Inc.
Minnesota AgriGrowth Council
Minnesota Association of Wheat Growers
Minnesota Corn Growers Association
Minnesota Crop Production Retailers Association
Minnesota Farm Bureau
Minnesota Farmers Union
Minnesota Milk Producers Association
Minnesota Pork Producers Association
Minnesota Soybean Growers Association
Minnesota State Cattlemen's Association
The Mosaic Company



Work Group Sustainability Programs

This document was written mid-way through the process as the Work Group was also drafting the previous section's Final Strategy. The two documents are complementary and are meant to be seen as two parts to a whole. The Final Strategy is the forward-looking idea put forth by the Work Group, and is intended to build on the progress already made by many of the Work Group members in addressing water quality challenges in Minnesota. The document below was written and edited by Work Group members and details their many existing and ongoing sustainability efforts. This document was approved by consensus of the Work Group on December 22, 2016.

Minnesota Agriculture's Approach to Water Quality Adopted on December 22, 2016

Background

Farmers and related businesses in Minnesota have long understood the need for clean water and a healthy environment. We have, do, and will continue to commit to a model of continuous improvement for both agronomic and water quality practices.

With the realization that some waters in our great state fall below standards, agriculture has long committed to negating any impact it has on the situation. In fact, Minnesota Pollution Control Agency data⁴ shows that many pollutants are seeing significant reductions, making our state's water quality situation better, and not worse. Other problems require more study and commitment as we continue to discover which strategies will create the fastest and most effective adoption of practices.

In an effort to create fast, effective adoption, a collection of Minnesota agricultural interests met to create a strategy to intensify efforts to improve Minnesota waters. Throughout the process, agricultural groups quickly agreed to several key points, and noted the strides that individual companies and industries have already committed to:

- Complying with current laws related to the environment and water quality
- When financially neutral or beneficial, going beyond the current laws to do what is best for the environment
- Research and a long-term outlook to continue improving the environmental and water quality impact of our individual commodities and agriculture as a whole

The attached recommendation is our collective best idea for a new approach that we will all stand behind. The idea is a delivery mechanism for programs created by both public and private entities that will support on-the-ground implementation and put those existing programs to work.

⁴ Water Quality Trends for Minnesota Rivers and Streams at Milestone Sites, June 2014 (wq-s1-71).



Many of our organizations have already committed to strategies that will improve water quality and overall sustainability. Here are a few current strategies that our new approach could bolster:

Cargill

At Cargill, we aim to be the most trusted source of sustainable products and services for our customers. We know that sustainable business is good business. As a company that takes a long-term view, our continued success will depend on joining with others to build a food system that meets the needs of today while providing for the needs of tomorrow.

Working with farmers has been central to Cargill's business for 150 years, and we're using our experience to make the global food system more efficient and sustainable, and to strengthen the rural communities we serve in two key focus areas where we can use our expertise and scale to have the greatest positive impact: water resources and farmer livelihoods.

- **Water Resources:** Cargill is in a position to leverage our unique expertise to conserve water in areas of scarcity, improve water quality in areas impacted by agriculture, promote access to clean water in areas where we live and work, and partner with farmers to help agriculture adapt to climate change.
- **Farmer livelihoods:** We are dedicated to promoting sustainable agricultural practices to help farmers increase efficiencies, yields and incomes, while promoting the social well-being of the agricultural communities we serve.

As a company, we sit at the intersection of farmers, food companies, governments, civil society organizations and consumers that make up the incredibly complex web of the global food system. The challenges facing the system are significant. The world's population is expected to rise to at least nine billion by 2050. Rising incomes are enabling consumers to add more variety to their diets, and today more than half of the world's people are living in urban areas, far from where food is grown. Natural resources are under increasing stress, and climate change threatens to compound all of these factors with unpredictable results.

However, we are optimistic. The global agricultural system has historically shown remarkable resilience. We recognize we don't have all the answers, but we believe that the diversity of participants involved in the system is its greatest strength. That's why Cargill partners with a wide variety of organizations to discover the best solutions and help the system work well.

Cooperative Network

Cooperative Network is an association of more than 400 cooperative businesses that are owned by more than 6.1 million residents of Minnesota and Wisconsin. Our diverse membership includes member-owned farm supply, dairy marketing, livestock marketing, electric, telecommunications, consumer, financial, health care, mutual insurance, housing, school district, and worker-owned cooperatives, among others.



Cooperative Network supports maintaining and improving the quality of the state's waters. When implementing any state water quality program, cost-sharing resources should be provided to farmers who work to reduce erosion and animal waste runoff. Cost sharing should also be available to producers who install buffer strips.

We also believe that pollution controls should be of a practicable and workable nature, protecting the gains made in agricultural production and the living standards of both rural and urban people. Financial consideration should be provided to processing plants and other wet industries when excessive costs are involved in upgrading pollution control equipment.

In addition, the waste pesticide collection and pesticide container collection programs are excellent examples of cooperation between government and industry. We urge the use of flexible performance-based approaches to environmental compliance that is of a practicable and workable nature. We continue to urge our members to publicize and utilize these programs.

Lastly, Cooperative Network continues to urge Congress to take actions necessary to protect the interests of cooperatives and their members by ensuring that Clean Air Act and Clean Water Act regulations and programs are cost-effective, sensible and address scientifically demonstrable and significant environmental principles.

Innovation Center for U.S. Dairy

The U.S. Dairy Sustainability Commitment builds on the legacy of dairy farm families and businesses. Today, we are working together to provide consumers with the nutritious, responsibly produced products they want while developing a more sustainable food system for the 21st century and beyond.

The U.S. Dairy Industry supports socially responsible, economically viable and environmentally sound dairy food systems that promote the current and future health and wellbeing of:

- Our consumers: through access to safe, nutritious, high-quality products.
- Our communities: through contributing, participating, and investing where we live and operate.
- Our cows: through animal stewardship.
- Our employees: through ensuring a safe and respectful workplace.
- Our planet: through the stewardship and responsible use of natural resources.
- Our businesses: through a focus on long-term economic vitality.

Through the stewardship and responsible use of natural resources, producing a gallon of milk now requires much fewer resources than 1944.

Our next steps are to enhance trust and demonstrate continuous improvement to consumers, research the intersection between nutrition, health, hunger, food waste, and the environment, create partnerships across agriculture, non-governmental organizations, and the marketplace, and



create economically viable solutions for nutrient management and the generation of renewable energy.

Land O'Lakes, Inc.

Land O'Lakes, Inc. continued commitment to sustainability is demonstrated by the formation of its newest business unit, *Land O'Lakes SUSTAIN*[®]. The new business unit uses Land O'Lakes' unique point of view of being a farmer-owned food company, with businesses that participate in every step of the agri-food value chain from farm-to-fork.

Land O'Lakes SUSTAIN works with ag retailers, growers and dairy producers to identify opportunities to optimize output per unit of input and implement precision conservation practices that improve nutrient use efficiency, soil health and water management at the field level. Another important component of Land O'Lakes SUSTAIN is to partner with other entities across the agri-food value chain, government and conservation organizations to advocate and collaborate on sustainability programs that improve environmental and productivity outcomes.

The Dairy On-Farm Sustainability Program at Land O'Lakes measures the environmental profile of our member's farms and identifies opportunities for continuous improvement. To date, we have participation from 35% of our member-milk supply with a goal of 100% by 2020. We also encourage participation in the Minnesota Agricultural Water Quality Certification Program for our Minnesota based members.

Land O'Lakes, Inc. was the first to enter into a public-private partnership to protect and improve water quality across Minnesota. This partnership connects the State of Minnesota's Agricultural Water Quality Certification Program with Land O'Lakes retail network to improve water quality and stewardship standards on farm. Land O'Lakes SUSTAIN will use the tools, technology and insights delivered through our WinField[®] United and SoilVantage[®] portfolios to expand the reach through our network of member-owners. We will help increase awareness and bring scale to this pilot program. Our vision is that this can become a national model for other states to follow Minnesota's lead.

Land O'Lakes SUSTAIN serves as a connection point between production agriculture, the food industry and consumers to improve visibility in production practices to deliver authentic sustainability by quantifying continuous improvement. The business unit brings focus and expertise in soil and water management to the WinField United and Dairy businesses to support the agronomic and production insight services currently being delivered. Land O'Lakes SUSTAIN is also a platform to tell the story of continuous improvement and stewardship of modern farmers to today's curious consumers.

Minnesota AgriGrowth Council

Minnesota AgriGrowth Council (AgriGrowth) and its members are committed to proactive efforts and initiatives that enhance the long-term sustainability (both economic and environmental) of Minnesota's agriculture and food sector. Over the past year, AgriGrowth has



engaged in the development of a Working Lands Conservation Pilot program for Minnesota. AgriGrowth also recently became a member of Field to Market, and is currently working to establish Field to Market initiatives in Minnesota beginning in 2017.

AgriGrowth supports other industry developed and led programs and initiatives, including the 4R nutrient stewardship program (AgriGrowth is a 4R Partner).

Minnesota Beef

To the beef community, sustainability means balancing environmental responsibility, social diligence and economic opportunity while meeting the growing demand for beef. Improving the sustainability of the beef industry is of the utmost importance to cattlemen and women in Minnesota who are working to ensure the longevity of the industry and are committed to continually improve how beef is responsibly raised. The strides made by one generation will continue to be carried out and improved upon by the next generation because we recognize that sustainability is a journey, not a destination.

The Minnesota State Cattlemen's Association (MSCA) had and will continue to engage in efforts to further refine the definition of sustainably raised beef. As a part of a nationwide study, three members of MSCA have personally opened their farms to a national research effort that examined the sustainability of the entire beef supply chain from pasture to plate and beyond. This study accounted for all inputs and outputs, such as energy use in feed production, water use and greenhouse gas emissions at each production stage. MSCA is a founding member of the US Round Table for Sustainable Beef, a multi-stakeholder initiative developed to advance, support and communicate continuous improvement in sustainability of the U.S. beef value chain.

Because ruminant animals can adapt to multiple environments, cattle thrive on grazed or harvested forages grown on land unsuitable for production of food crops. Minnesota cattle farmers and ranchers use modern, intensified grazing systems to produce more beef on less land compared with conventional grazing, while regenerating land and rural economies and keeping families on farms. Adding a grain-based finishing stage creates efficiencies while also enhancing beef quality. Good animal welfare and animal health are also critical for efficiency in the beef supply chain. Ensuring resources are available for cattlemen to excel in each of each of these areas through beef checkoff programs and collaboration with state and federal agencies are a priority to our organization.

Minnesota Corn

Minnesota corn farmers are continuously working to improve and become better stewards of our state's natural resources while maintaining a thriving rural economy. That's why the Minnesota Corn Growers Association is committed to the following goal:

Minnesota's corn farmers will become the most sustainable and environmentally responsible corn farmers in the United States.



What do we mean by sustainability?

Minnesota Corn's approach to sustainability is made of three equally important elements, all of which relate to and influence each other.

- People: Our model of sustainability strengthens farms and rural communities while enabling a safe and healthy quality of life for all Minnesotans.
- Planet: Sustainable practices responsibly manage and replenish finite resources critical to agricultural success and protect and enhance the environment impacted by farming.
- Profit: Sustainability provides a fair margin of profit for farmers while delivering equitably priced goods to all.

MCGA has outlined five specific initiatives that will help our corn farmers achieve the critical goal of environmental responsibility.

- 1) Promote sustainability programs: We encourage Minnesota's corn farmers to research, evaluate and engage in a sustainability program that best fits the needs of their farm.
- 2) Support innovation: We will significantly expand our efforts to increase innovative practices.
- 3) Advocate best practices: We will promote best practices for nitrogen management in Minnesota corn production.
- 4) Foster new uses: We will identify and promote new opportunities for corn in the production of sustainable polymers, ethanol and bio-based chemicals. We will implement ethanol infrastructure, improve ethanol marketing efforts and increase utilization options.
- 5) Strengthen partnerships: We will commit to working collaboratively with a variety of partners to achieve success in fulfilling our vision.

In reference to initiative #3, MCGA encourages all farmers to engage in a sustainability program, including Field to Market, GreenStar or the Minnesota Agriculture Water Quality Certification program, which best fits their farm. MCGA has also endorsed use of University of Minnesota nitrogen best management practices as a starting point for optimizing nitrogen management and reducing loss potential on each field. Find more information about MCGA's strategic plan and our commitment to conservation here: <http://www.mncorn.org/wp-content/uploads/2016/11/Committed-to-Conservation.pdf>

The Minnesota Corn Research & Promotion Council (MCR&PC) in conjunction with the Minnesota Corn Growers Association (MCGA) has a strong history of funding research aimed at improving water quality in Minnesota.

Since 2010, corn check-off funds have been used to support five research and education programs or positions in both the private sector and in academia. These programs include: 1) Discovery Farms, which evaluates the relationship between on-farm agricultural management and water quality by measuring nitrogen and other variables in tile and surface runoff in real world applications; 2) University of Minnesota research and extension faculty positions working



in water quality, nutrient management and drainage education; 3) a nutrient management specialist for agronomic cropping systems; and 4) a cropping systems specialist for sustainable production practices and the assessment of climate and weather risks to crops.

The fifth supported program was the development and implementation of the University of Minnesota Nitrogen Smart educational training program (Read more here: <http://www.extension.umn.edu/agriculture/crops/events/nitrogen-smart/>). First year farmer attendees represented more than 180,000 acres of production agriculture across Minnesota. Of those attending, nearly 40 percent later reported reducing their overall nitrogen rate even though reducing nitrogen is not part of the education program. Sixty-nine percent changed their nitrogen fertilizer management and 55% indicated that they would begin moving toward use of cover crops to aid in nitrogen management during non-crop growing months. In addition, 89% of those attending indicated they would recommend the program to others and 91% intend to maintain their Nitrogen Smart status.

Funding since 2010 also included eight projects (two still active) evaluating nitrogen management and application rates and four projects evaluating timing of nitrogen application such as split-applications rather than a single application event. Two projects evaluated drainage management practices toward optimizing designs to maximize ROI and conserve water and nutrients and the design of drainage water treatment practices that can be implemented in riparian or buffer zones (For current MN Corn research projects, go to <http://www.mncorn.org/research-rfps/>.)

Current research funding includes seven additional projects focused on efficient nitrogen management to increase measurable improvement of water quality, and reducing nutrient loss to surface and ground water. Funding also includes three projects investigating cover crop establishment and impact, or reduced tillage systems. Of those, one particular project is evaluating a perennial cover cropping system where row crops might be planted into an existing perennial cover with potential for use on vulnerable areas of production fields or on riparian and buffer zones.

Minnesota Corn also initiated an Innovation Grant process where research funding is used to support farmer-developed ideas to improve nitrogen management, reduce nitrate loss, reduce soil erosion and improve soil health. Five projects were funded in 2016 to evaluate establishment of cover crops, at mid-growth stage within the main crop and remain through the fall and winter months; utilizing the Maximum Return to Nitrogen calculator to reduce or optimize nitrogen use toward reduced field loss; or improve field drainage systems to hold water and soil nutrients in the soil through the growing season. A sixth project hosted a field day highlighting improved drainage system practices also designed to retain moisture and reduce nitrate loss through tile.

Minnesota Crop Production Retailers

Minnesota Crop Production Retailers (MCPR) has invested significant resources in integrating sustainability metrics into ag retailers' precision ag programs, enabling crop advisors to model advanced agronomic farm practices for farmers to reduce environmental risk. Ag retailers plan to



impact millions of Minnesota agricultural acres in reducing environmental risk. We designed this web based software and data collection process to allow the agronomy sales person to use their proprietary system within their established trusted relationship with their growers to substantially reduce agronomy staff double entry into this software.

The software allows the agronomy sales person to drop their geospatial field data into the assessment software tool prior to presenting it to the grower, allowing the grower to examine at the point of sale the alternative environmentally sensitive field practices to increase their environment score. In the next phase of development, the software will generate a profit and loss estimate to evaluate the profitability of each practice consideration so they can estimate the ROI on each decision prior to a final determination of nutrient application.

MCPR has collaborated with university faculty and department of agriculture agronomy staff to develop and test precise environmental risk metrics which can serve to be evaluated on predictability, reliability and sensitivity. The metrics also reflect the recommended practices for each Best Management Practice region of Minnesota and can be scaled to any landscape to ensure precise environmental sensitivity. The design enables the agronomy sales person to respectfully request that the grower allow the assessment tool program to confidentially store with the grower's permission the data for aggregated collection reporting of current field practices across our agricultural acres to track current practices and trends for improving the environmental metrics. This program has been developed to be scalable from watershed, to county, to state and nationally. The farming practices within this software are divided and can be reported according to the 4R's practices.

Minnesota Farm Bureau Federation

The Minnesota Farm Bureau Federation (MFBF) encourages farmers of all types and across the state to implement sound water quality practices that are economically sustainable, based on their fit with individual farms and ranches. Farmers can achieve this through many different activities including federal programs funded through the Farm Bill, state programs such as the MDA Agricultural Water Quality Certification Program, and local efforts. MFBF also supports farmer advances in conservation through industry-led efforts such as the Fertilizer Institute's 4R Nutrient Stewardship Program and associated projects, land grant university research projects (many of which are funded by farmers through commodity check-off programs) and the Discovery Farms and Green Star Farms tools available through the Minnesota Agricultural Water Resource Center. Multiple opportunities exist within these current networks to accelerate the adoption of improved practices. The state of Minnesota should augment current funding for these programs to expand their effectiveness.

Minnesota Pork Board

Nationally, Minnesota ranks second in the nation in the number of pigs its farmers raise and second in the value of pigs that Minnesota farmers sell for processing into meat products. This previous year's gross income from Minnesota pig production was \$2.6 billion, and the total



economic generation from Minnesota's pork production in 2013 was \$7.28 billion. (Each \$1 in gross income generates \$2.80 in economic spinoff.)

Over the past 50 years, U.S. hog farmers have made great strides in sustainability. Per pound of pork:

- Acreage requirements decreased 78 percent (from 1959 to 2009)
- Water use per pound of pork declined 41 percent (from 1959 to 2009)
- Carbon footprint was reduced 45 percent (from 1959 to 2009)
- Grain fed to market hogs decreased from 3.82 to 2.75 (from 1982 to 2015)

Practices Leading to Sustainability:

- Improvements in pig genetics
- Barn equipment that saves feed, water and energy
- Climate-controlled barns designed for pig care, protection and health
- Advances in understanding the nutritional needs of pigs
- Use of precision agriculture methods when fertilizing crop land with manure
- All-around better care of the pigs

Pig Manure: Valuable Soil Fertilizer

- The nutrients found in swine manure are important to Minnesota crop production. These nutrients add beneficial fertilizers and organic matter to the soils on which farmers grow their crops.
- University of Minnesota research demonstrates significant economic and environmental benefits from using pig manure as a fertilizer.
- The research finds that the organic compounds in pig manure:
 - provide yield advantages for corn when compared to using synthetic, commercial fertilizers;
 - help build and maintain soil structure, which aids soils' ability to hold water.
 - improves soil aeration;
 - reduces soil erosion.

Minnesota Soybean

Minnesota Soybean growers are committed to protecting Minnesota's natural resources while increasing soybean production and profitability in the state. The Minnesota Soybean Research and Promotion Council has funded many different research projects directly with the University of Minnesota and other institutions to look at ways to limit soil and nutrient loss to waters. In addition, through partnership with the North Central Soybean Research Program, MSR&PC has funded these efforts at a national level with 13 other states. In the past year, MSR&PC worked with Houston Engineering to develop The WRAPS handbook. The handbook encourages farmers to engage more in the WRAPS process, which will lead to a more robust strategy with farmer buy-in that will result in better water quality in the state. MSR&PC is a large supporter of Minnesota's Discovery Farms program that looks at real life runoff and helps tell stories from those farms to help farmers address nutrient and soil loss on their farms.



The Minnesota Soybean Growers Association has also worked to promote different conservation and sustainability programs in the state. Those efforts include promotion of the Minnesota Agricultural Water Quality Certification Program, the 4R program, Field to Market, and other efforts to help farmers maximize their profits while reducing their environmental footprint. MSGA is a member of the Minnesota Agriculture Water Resource Center and has promoted farmers to look at their stewardship through the Green Star Farms program.

The Mosaic Company

The Mosaic Company is the world's leading integrated producer and marketer of concentrated phosphate and potash for crop nutrients. Fertilizers account for about half of the world's crop yields, are critically important to global food production systems and proper use is imperative. Mosaic is dedicated to helping increase the sustainability of the global food value chain. We demonstrate this commitment by maximizing efficiencies and minimizing our use of energy and natural resources. For fertilizer use to be sustainable, it must support cropping systems that provide economic, environmental and social benefits. Mosaic supports and promotes the 4R Nutrient Stewardship framework.

4R Nutrient Stewardship encompasses fertilizer best management practices to achieve specific cropping system goals, including environmental protection. To achieve these goals, the 4Rs framework incorporates the Right nutrient source, at the Right rate, at the Right time, and in the Right place. The concept of 4R Nutrient Stewardship is simple, but implementation is knowledge-intensive and site-specific. The Mosaic Company works with farmers through our retailer customer relationships and partnerships with various non-profits to educate and implement 4R Nutrient Stewardship.

Since 2004, The Mosaic Company and The Mosaic Company Foundation have invested more than \$17 million in water-focused programs and partnerships promoting nutrient stewardship, habitat conservation, and watershed restoration in priority watersheds. In addition, Mosaic partnered with 89 organizations on water-focused initiatives, including 20 organizations on nutrient stewardship initiatives. Some of the organizations Mosaic has partnered with in North America include The Nature Conservancy, Ducks Unlimited, American Farmland Trust, the Western Lake Erie Basin Nutrient Stewardship Council, and Field to Market: Alliance for Sustainable Agriculture. Mosaic is committed to working with partners to deliver solutions for improving water quality.

Draft Strategies from the Technical Working Groups

The below section contains the full set of draft strategies that were created by the Technical Working Groups (TWGs). There were three TWGs, roughly organized according to a category of best practices and solutions: Drainage and Water Management; Living Cover and Tillage; and Fertilizer and Manure Management. The strategies below are cross-cutting and reflect the ideas of multiple TWGs and their participants. All of these draft strategies were brainstormed, drafted, and edited over the course of three meetings of each TWG. Environmental Initiative staff organized and facilitated these meetings and, at the direction of TWG participants, drafted and live-edited the strategies below. The strategies were then presented to the Work Group for consideration.

It is important to note that TWG participants were not asked to support the draft strategies by consensus: they were only asked to contribute their ideas and direction in shaping them. No particular strategy, section or sentence comes from any one person or group. Instead, these strategies reflect a multiplicity of ideas from some of Minnesota agriculture's pre-eminent thought leaders and are included here for others to draw from and as inspiration for future efforts. These strategies are presented here in the same rough draft format as they were presented to the Work Group on November 4, 2016. When reviewing these draft strategies, the sections shaded gray should be taken as context. Those gray sections were not the focus of group efforts to develop these ideas, but were used as a parking lot during brainstorms to identify and record information that is not central to the core concept.

1	Intensive targeting of funds and conservation practices in sensitive watersheds and sub-watersheds
<i>Context</i>	Minnesota is moving towards a watershed based approach to water quality protection and improvement with recognition that some areas are more sensitive or impaired than others. Watershed monitoring and WRAPS provide foundational information. This strategy would intensively target highly sensitive watersheds and areas with additional funding and incentives to implement high impact practices in an attempt to get as much water quality protection on the landscape as possible. This can include commitments from private entities such as processors, retailers, and input suppliers to help support this effort by utilizing their own networks and relationships.
<i>Description</i>	<ul style="list-style-type: none"> a. Target additional funding toward higher risk watersheds and sub-watersheds. b. Target high risk areas within watersheds. <ul style="list-style-type: none"> a. Source water protection areas b. Projects identified through 1W1P c. Areas with high concentrations of contaminated wells as identified through the Township Testing Program c. Employ the approach of multi-level on-farm research and demonstration within each targeted area.

	<ul style="list-style-type: none"> a. Track outcomes through monitoring, learning about barriers to application, etc. d. Utilize local advisory teams with strong representation from agricultural industry and farmers or farmer-led councils to target and guide implementation process within watersheds. e. Deliver intensive education and assessment through the public and private service networks (SWCDs, NRCS, UMN, retailers and co-ops). <ul style="list-style-type: none"> a. Include crop consultants in this effort to develop a team of conservation professionals and a level of expertise in a region. b. Fund specialized extension agents for cover crops/soil health who can target high risk areas or watersheds and assist farmers, bring the research to the field level, and help disseminate knowledge in the private farm services industry in an area, and include both retail agronomists and independent crop consultants. f. Provide additional incentives for adoption of high-impact practices (e.g., offer per acre payments, increased cost-share, improve awareness of and access to low interest loans for practices covered by cost-share). Some examples could include: <ul style="list-style-type: none"> a. Cover and perennial crops b. Manure storage and application c. Assistance to farm advisors to develop Comprehensive Nutrient Management Plans d. Conservation tillage practices e. Use MAWQCP as a means to coordinate and access funding
<p><i>Funding Mechanisms</i></p>	<ul style="list-style-type: none"> • The “monitoring” dividend (as the initial monitoring and assessment work under the Clean Water Fund is finished, there may become available additional funds for implementation) • Increased state cost share • Federal cost share or incentives (would require grants or a re-valuing of federal cost share for particular practices in targeted watersheds) <ul style="list-style-type: none"> ○ EQIP, CSP, CRP ○ Section 319 Program ○ RCPP ○ Mississippi River Basin Initiative ○ Use MAWQCP to help prioritize cost share in particular watersheds • Low-interest conservation practice loans (AgBMP Loans) • Private industry funding or education • Existing state programs and funding (CWF, Cost-Share) • Private community partners

	<ul style="list-style-type: none"> Local funds (associated with wastewater or drinking water management)
<i>Costs</i>	<ul style="list-style-type: none"> This approach necessitates either a re-allocation of resources or an increase in state or federal funding in order to make greater cost-share available to farmers in prioritized areas. Should be paired with private sector actions to leverage their networks and maximize impact.
<i>Expected Benefits</i>	<ul style="list-style-type: none"> Targets funding to areas where the problem is most acute and where the effect of practices will be greatest. <ul style="list-style-type: none"> By targeting drinking water source protection areas, this addresses an urgent public health need to prevent and mitigate contamination of drinking water Prioritizes practices that have multiple benefits (soil, water, productivity). <ul style="list-style-type: none"> Prioritizes no-till or conservation tillage—long-term practices that will have multiple benefits over many years and that will improve the profitability and resiliency of row-crop agriculture by decreasing tillage, improving long-term soil health, improving water retention, etc. Manure storage has direct and indirect water quality benefits and leads to additional BMPs. <ul style="list-style-type: none"> Better manure storage reduces need for farmers to spread manure when weather conditions are not favorable, including winter application Prevents runoff from manure piles First step for farmers to homogenize manure and turn it into a solid or liquid application whose nutrient content can be estimated, allowing for additional nutrient application BMPs Better local distribution of manure resources can displace use of commercial fertilizer—keeping more money circulating in the community.
<i>Barriers/Limitations</i>	<ul style="list-style-type: none"> Even with increased state or federal cost share, low prices for agricultural products reduce the ability of farmers to come up with match for cost share. Federal resources are difficult for farmers to easily access because of limited local services and administrative processes. Reallocating resources to come up with increased financial incentives for certain geographies could be politically difficult – potentially creating winners and losers. Federal grants can't be used as the non-federal cost share, limiting their applicability. Cover crop research and best practices need to catch up with needs and opportunities in some regions. Private industry is interested in supporting <i>implementation</i>.

	<ul style="list-style-type: none"> • Capacity has been built up around monitoring and assessment, and may need to be reallocated to focus on implementation in the future. • Need to look at and connect to strategies to address other sources of contaminants, such as septic systems. • Intensive approach will place additional technical assistance capacity burdens on local jurisdictions such as SWCDs—would need to have additional funds for capacity.
<i>Parties Involved</i>	<p>State</p> <ul style="list-style-type: none"> • Targeting how state cost share is allocated, based on practices and watersheds and sub-watersheds, will require the support of state water quality agencies, the Governor’s office, and likely the legislature. <ul style="list-style-type: none"> ○ Changing the allocation of money under the Clean Water Fund will require legislative involvement. <p>Private</p> <ul style="list-style-type: none"> • Private industry would need to be vocal in pushing for this change and in supporting the effort through their networks. <p>Federal</p> <ul style="list-style-type: none"> • Changing federal cost share for targeted watersheds will require USDA involvement and potentially Farm Bill authorization. <ul style="list-style-type: none"> ○ Securing federal grants requires state and federal agency cooperation <p>Local</p> <ul style="list-style-type: none"> • Local implementers will be involved in the planning and design process.
<i>Estimated Timeline</i>	<p>Long Term</p> <ul style="list-style-type: none"> • Results will likely not be seen for years. <p>Medium Term</p> <ul style="list-style-type: none"> • Increased cover crops and/or conservation tillage cost share could be pegged to when farm productivity and soil health are likely to be realized – not a forever subsidy. <p>Short Term</p> <ul style="list-style-type: none"> • Manure storage could be a short term push, sub-watershed by sub-watershed.
<i>Type(s)</i>	<ul style="list-style-type: none"> • State and/or federal government funding • Local government implementation • Financial incentives • Private industry commitments

2	Leverage the agriculture industry’s existing networks and structures to encourage water quality protection
<i>Context</i>	<p>Research indicates that, for an increasing number of farmers, crop advisors/consultants are the most important and trusted source of agronomic information, including information on BMPs. Better engagement of, and connections to, ag retailers and their associated networks could vastly expand the delivery of information to producers about conservation and water quality protection practices.</p> <p>In addition, some retailers and input providers have their own research and demonstration plots. Leveraging this private research network with greater connections to academic research focused on conservation practices, cover crops, and nutrient efficiency/uptake could help distribute critical conservation information to a broader audience of farmers.</p>
<i>Description</i>	<p>Leverage retailers’ and local farming and conservation organizations’ research and service delivery activities and networks to develop and deliver more conservation services and information.</p> <ol style="list-style-type: none"> a. Invest in the use of technology to collect and utilize information that can support both environmental and economic decision-making. For example, a platform to aggregate and utilize farm data collected through private applications for water quality benefits. <ul style="list-style-type: none"> • Encourage development and utilization of the MCPR Soil Fertility Environmental Risk Assessment Tool. b. Create a challenge grant to support hiring paid coordinators/project managers to assemble and support farmer-led councils. c. Provide greater opportunities to understand and demonstrate the value of key BMPs and other practices to producers. For example: <ul style="list-style-type: none"> • Utilize private trials and demonstration plots to showcase conservation research in order to leverage research ideas and demonstrate new techniques within the industry. • Increase understanding of targeted practices through the development and promotion of more long-term local and regional demonstration sites. d. Establish a public-private partnership to deliver targeted outreach and education for crop consultants and local farmer-leaders. <ul style="list-style-type: none"> • Provide extension services to retailers and crop consultants. • Connect agronomists/crop advisors with those selling controlled drainage and irrigation systems so that they are more likely to promote the installation of these systems. e. Provide direct incentives to crop consultants to support the implementation of conservation practices.

	<ul style="list-style-type: none"> • Broaden the Nutrient Management Initiative Program (or develop a similar program that provides financial incentives to both farmers and crop advisors). • Expand and support MAWQCP’s fee-for-service program for private consultants to work with their clients on certification. • Provide incentives to connect clients to opportunities to access shared or subsidized equipment needed for practices that protect water quality. • Provide financial incentives to crop consultants to adopt and demonstrate the MCPR Assessment Tool. <p>f. Expand the 4R nutrient stewardship certification program to Minnesota.</p> <ul style="list-style-type: none"> • Utilize Nutrient Stewardship Council expansion document to establish this program. • Use the University of Minnesota and MDA nitrogen BMP program to use as audit criteria for record keeping at the retailer level. • Utilize phosphorus index and other resources to establish phosphorus criteria. • Establish an advisory committee to oversee implementation.
<i>Funding Mechanisms</i>	
<i>Costs</i>	<ul style="list-style-type: none"> • Public and/or private resources could be used to support the build-out of extension services and other educational resources for crop consultants • Public and/or private resources could be used to support the development of technologies that combine agronomic and conservation/environmental data and decision tools. • Direct incentives to crop consultants would be a public expense
<i>Expected Benefits</i>	<p>Incorporation of conservation research and services delivery into the existing retail model has the potential to vastly expand producer awareness and adoption of BMPs and other practices that protect and improve water quality. Many farmers perceive public agencies and their representatives to be adversarial to their interests, and using private advisors to connect with these producers would enable the engagement of a segment of farmers that are not reachable through existing public programs.</p>
<i>Barriers/Limitations</i>	<ul style="list-style-type: none"> • Retailers and input providers are already trying to sell a range of services and products, and have limited bandwidth for communicating practices. • Crop consultants and retailers are businesses—changes to their way of doing business need to help them deliver better services to their clients and help their clients make additional money.

	<ul style="list-style-type: none"> • Politically difficult to divert resources from other education and outreach efforts, likely needs to be additional resources provided
<i>Parties Involved</i>	<ul style="list-style-type: none"> • Ag retailers • Minnesota Crop Production Retailers Association • Crop consultants • University of Minnesota Extension • Contractors • Drainage engineers • Technical service providers • Local drainage staff • Local drainage authorities • Agricultural Utilization Research Institute • Food and input companies that are committed to corporate social responsibility • Field to Market (FTM) and other industry programs • Legislature • Governor • State and federal agencies • Soil and Water Conservation Districts
<i>Estimated Timeline</i>	
<i>Type(s)</i>	Education, industry commitment

3	Increase opportunities for low-risk experimentation with conservation practices
<i>Context</i>	<p>Giving landowners and producers the opportunity to try out new practices and techniques without substantial up-front investment and the associated financial risk can eliminate one of the most significant barriers to practice change. In addition, farmers who try new practices need to share their results and lessons learned with neighbors in order to promote large-scale adoption.</p> <p>Ways to reduce the risk of this experimentation could include decreasing up-front costs, providing opportunities to access shared equipment before (or instead of) purchasing it, and opportunities to participate in subsidized on-farm trials or demonstrations. Local demonstrations also provide opportunities for producer-to-producer education and the ability for producers to more easily and accurately determine what practices will be applicable to their specific growing conditions.</p>
<i>Description</i>	<ul style="list-style-type: none"> a. Expand Minnesota Department of Agriculture’s Nutrient Management Initiative Program (or develop a similar program that provides financial incentives to both farmers and crop advisors) to include alternative conservation practices (e.g., cover crops, strip tillage, drainage water management practices, water measurement and monitoring). <ul style="list-style-type: none"> a. Include a field day component for crop consultants and farmers to learn about practices. b. Coordinate technical assistance and outreach through SWCDs. b. Increase awareness of financial incentives for equipment needed for practices that protect water quality (e.g., no-till drills, strip till). <ul style="list-style-type: none"> a. Minnesota Department of Agriculture’s Agriculture Best Management Practices Loan Program (AgBMP Loan Program) b. State cost-share programs c. Provide or finance shared equipment needed for practices that protect water quality. <ul style="list-style-type: none"> a. Could be provided to and managed by SWCDs, retailers/co-ops, or another public or private organization. b. Must be accompanied by funded capacity to maintain the equipment and educate farmers on equipment use (through financial assistance or incentives). d. Increase opportunities to learn from, and participate in, local and regional demonstration sites. <ul style="list-style-type: none"> a. Emphasize participation in an expanded and modified NMI program.

	<p>e. Use MAWQCP to demonstrate the use of multiple practices in a whole-farm context.</p> <p>a. Where possible, pair long-term demonstration sites with controlled trial (research) sites in order to maximize learning as BMPs evolve and gain and disseminate insight into what best practices work where.</p>
<i>Funding Mechanisms</i>	<p>Financial incentives for equipment would likely involve a change to the tax code.</p> <p>Other actions could be funded through increases to existing programs.</p>
<i>Costs</i>	<ul style="list-style-type: none"> • Public: direct financial incentives for equipment • Public: financial incentives to participate in trials (e.g., Nutrient Management Initiative Program) • Private or public: fund increased demonstration sites and field days • Public or private: fund equipment loan/shared equipment programs
<i>Expected Benefits</i>	<p>Reducing barriers to adopting conservation practices should result in adoption of practices by producers that would not have otherwise engaged in conservation or water quality protection.</p>
<i>Barriers/Limitations</i>	<ul style="list-style-type: none"> • BMPs and understanding of their effects on farm management are constantly changing – tough to decide what to include/incentivize for demonstration when research isn’t settled • Soil health benefits from no-till, strip till and cover crops take a long-term approach to demonstrate conservation benefits and economic benefits. • SWCDs are limited by demands on their technical staff – they likely do not have the capacity to take on an equipment sharing program without allocation of ongoing resources • Farmers are expanding the number of acres on each farm, and shared equipment would be needed by all potential users at the same time (when field conditions in an area are right). • Improving soil health is a major objective, but long-term demonstrations are necessary to see results, and generally Farm Bill grants are limited to 3 years or less. This limits the ability of the state to offer longer term funding.
<i>Parties Involved</i>	<ul style="list-style-type: none"> • Minnesota Department of Agriculture • Soil and Water Conservation Districts – manage equipment loan programs • Farm groups/associations – fund/organize demonstrations and field days • Legislature – tax incentives for equipment or for retailer/crop advisor services would require legislative approval • Lenders/banks
<i>Estimated Timeline</i>	

<i>Type(s)</i>	Financial incentives (public), industry commitments
4	Create an ongoing Conservation Roundtable
<i>Context</i>	<p>Currently, there is no formal, regular method of convening agricultural trade group representatives together with experts and government decision makers to consider conservation trends and issues in Minnesota and develop new ideas for consideration and action.</p> <p>A regular meeting would allow groups to coordinate strategy, proactively respond to emerging trends in conservation, and consider innovative ideas from inside and outside the agricultural community.</p>
<i>Description</i>	<p>a. Privately fund a conservation roundtable that convenes agricultural industry representatives on a regular basis.</p> <ul style="list-style-type: none"> • Engage a neutral facilitator to plan topics and meetings based on community needs. • Use the roundtable as a forum to privately consider conservation actions at the state level. <ul style="list-style-type: none"> ○ Invite government decision makers to present on policy proposals in a moderated conversation. • Assemble a mix of funding from private sources, allowing meetings to stay private and preventing the discussion from being tied to one particular organization’s agenda.
<i>Funding Mechanisms</i>	Aggregated funding from private sources, potentially including foundational support.
<i>Costs</i>	Ongoing funding for a facilitator/meeting organizer
<i>Expected Benefits</i>	<ul style="list-style-type: none"> • A stronger, more coordinated voice for agriculture on conservation issues • Better information dissemination among industry groups • A forum to consider new ideas and an incubator for collaboration on conservation issues • Flexibility on meetings and topics allow participants to respond to issues proactively.
<i>Barriers/Limitations</i>	
<i>Parties Involved</i>	<ul style="list-style-type: none"> • Agricultural trade groups • Agricultural businesses • Farmer organizations • Foundations
<i>Estimated Timeline</i>	Ongoing
<i>Type(s)</i>	Private action, commitment by industry and farm groups

5	Support research funding for cover crops and perennial crops
<i>Context</i>	<p>The “Minnesota Nutrient Reduction Strategy” report suggests that it will not be possible for Minnesota to meet proposed water quality goals without incorporating winter annual and perennial crops into Minnesota’s agriculture landscapes. The primary challenge facing successful cover cropping in Minnesota is the short growing season. Time and favorable field conditions limit farmers’ ability to plant and establish a cover crop.</p> <p>A number of research efforts across the state are working to increase the economic viability of incorporating cover crops and perennials into existing row-crop systems. These include efforts to:</p> <ul style="list-style-type: none"> - Develop new or expanded markets for cover crops - Develop perennial and winter-tolerant annual cover crops that are well-suited to Minnesota’s growing conditions - Identify and develop viable options for interseeding and overseeding cover crops into standing corn and soybeans - Evaluate appropriate cover crop mixes for different regions of the state - Evaluate and document the environmental and economic benefits of cover crops
<i>Description</i>	<ol style="list-style-type: none"> a. Market development for cover crops b. Support continued breeding and development of Minnesota-friendly cover crops. <ul style="list-style-type: none"> • Minnesota’s agricultural industry supports promising research into cover crops and perennials through a number of existing programs and funding streams. In addition, the State of Minnesota supports numerous research programs. • Evaluate what additional support is needed and where support should be focused c. Support research on the primary crop so that it can be better used with cover crops. <ul style="list-style-type: none"> • Some research could be done by industry to work on new strains d. Research impacts on farm costs and profitability for the producer.
<i>Funding Mechanisms</i>	
<i>Costs</i>	<ul style="list-style-type: none"> • Funding for research at the University of Minnesota and other state research institutions • Funding for research by industry
<i>Expected Benefits</i>	Cover crops and perennials are a very important tool in the conservation and water quality toolbox. Unlocking their full potential



	will greatly benefit water quality efforts and encourage their adoption across larger areas of Minnesota.
<i>Barriers/Limitations</i>	
<i>Parties Involved</i>	<ul style="list-style-type: none"> • University of Minnesota – research on cover crops and perennials • Minnesota Department of Agriculture • Industry associations or companies with private research programs
<i>Estimated Timeline</i>	Ongoing
<i>Type(s)</i>	Research, funding allocations

6	Support improved manure management and use
<i>Context</i>	<p>Manure handling and management has a direct relationship to water quality. There may exist opportunities to improve the handling and storage of manure so as to prevent water quality impacts and improve the profitability of farmers. MPCA regulations limiting manure stockpiling and inadequate distribution avenues may be incentivizing farmers to spread manure on fields at times and in quantities that lead to nitrogen loss to ground water and nitrogen and phosphorus loss to surface water.</p> <p>In areas with high concentrations of livestock operations, it may be beneficial to establish a manure co-op structure that allows farmers to share storage and treatment costs as well as work together to identify opportunities to turn manure from a waste into a valued-added product that can displace commercial fertilizer.</p> <p>Instinct, a manure treatment and nitrogen stabilizer, may significantly inhibit nitrification of manure and therefore nitrate contamination of surface and groundwater. However, there are pesticide regulations that have the effect of limiting the ability of farmers to use it.</p> <p>These changes to manure stockpiling, treatment, and distribution may have significant water quality benefits; however, more research is needed to understand exactly what the benefits would be and to determine if the changes are worth implementing.</p>
<i>Description</i>	<ol style="list-style-type: none"> a. Develop alternative solutions for manure handling and storage. <ul style="list-style-type: none"> • Reduce costs • Develop value-added markets • Public-private partnership • Explore the feasibility of manure co-op / improved local distribution • Research the nutrient benefits and availability of dry manure b. Initiate a targeted educational effort to help small- to medium-sized farms improve manure management. <ul style="list-style-type: none"> • Accelerate education on manure crediting c. Review existing rules on a regular basis and address regulatory barriers related to dry manure handling. <ul style="list-style-type: none"> • Use an advisory group that includes state agencies, extension, livestock organizations, and commercial waste applicators, to make recommendations. d. Create new dedicated funding for manure-related research. <ul style="list-style-type: none"> • Authorize AFREC to route and guide new research funding for manure management.

	<ul style="list-style-type: none"> ○ Add expertise in animal/livestock manure management to AFREC. e. Review nitrification inhibitors (e.g., Instinct) classification in light of opportunities for increased water quality benefits. <ul style="list-style-type: none"> • Consider including a training module in the Certified Waste Applicators license so that application of this product does not require a commercial applicators license for all employees of the commercial applicator (farmer or contractor).
<i>Funding Mechanisms</i>	<ul style="list-style-type: none"> • Legislative appropriation <p>Evaluate the feasibility of a manure check-off program to help fund research, education, and implementation of improved manure management, and to improve producers' valuation of manure.</p>
<i>Costs</i>	<ul style="list-style-type: none"> • Cost of additional research
<i>Expected Benefits</i>	<p>Improved local distribution of manure, potentially through the creation of manure co-ops can homogenize manure, improving use as a fertilizer and making it easier for farmers to conform to nutrient BMPs. Better nutrient efficiency can save farmers in application costs and better management of manure benefits water quality. Making manure a valued by-product potentially displaces commercial fertilizer, keeping money in the community. Instinct's reclassification could increase water quality benefits.</p>
<i>Barriers/Limitations</i>	<ul style="list-style-type: none"> • Need to account for unintended consequences of regulatory change around manure handling and pesticide reclassification • Need to utilize existing revenue sources • Risks associated with opening up an amendment process on existing rules—need to scope the change ahead of time and stick to that scope
<i>Parties Involved</i>	<ul style="list-style-type: none"> • MDA • AFREC • Legislature • University of Minnesota – research function
<i>Estimated Timeline</i>	1-2 years for study, 1-2 years for regulatory change
<i>Type(s)</i>	Research, address regulatory barriers

7	Increase and stabilize funding for drainage and water management practices related to water quality improvements
<i>Context</i>	Drainage and water management practices are recognized as a way to improve water quality. These practices include a host of opportunities such as saturated buffers, wetland restorations, denitrifying bioreactors, sediment basins, detention and retention systems, diversions, water and sediment control basins, drainage systems, well sealing and repair, and others, with drainage systems being the largest and longest-term investment. By increasing financial incentives to improve field infrastructure, old surface and subsurface systems can be replaced with new practices that improve water quality and new tile systems can be installed with water quality benefits.
<i>Description</i>	<ol style="list-style-type: none"> a. Create consistency and adequacy in state-level funding for multi-purpose drainage management. b. Increase stable funding through the State Cost-Share Program and allow for the local use of funds including for single practices. c. Expand the scope of cost-share and low interest loans for controlled subsurface drainage water management systems when new tile is being installed. d. Increased state financial assistance for sealing abandoned wells and repairing degrading wells. e. Increase awareness by landowners of low interest loans for practices covered by cost-share. f. Increase funding for research on how drainage and water management practices impact water quality.
<i>Funding Mechanisms</i>	<ul style="list-style-type: none"> • Dedicated funding for the State Cost-Share Program • Local contributions – Integrating Chapter 103 drainage management funds with public funds • Grants from corporate foundations
<i>Costs</i>	<ul style="list-style-type: none"> • Adequate funding for staff to deliver programs • Financial incentives for cost-share program and loan program • Landowners and producers – cost to implement • Public and Private Combination – funding for research • Private – grants from corporate foundations to help with financial costs
<i>Expected Benefits</i>	Providing secure and adequate funding, with projects determined at the local level, limits the time it takes to receive financial incentives and should result in increased adoption of practices by producers. Many of these practices reduce peak flows, reduce erosion and sediment, reduce pollutant carrying capacity, and trap otherwise lost nutrients. Further research can help determine which practices are most valuable in different regions.

<i>Barriers/Limitations</i>	<ul style="list-style-type: none"> • State Cost Share Program – because this is supported by the general fund, there is considerable competition for this money • How state agencies will deal with practices that require equipment investment, as equipment is not covered by cost-share • Most increases in funding would come through additional taxing
<i>Parties Involved</i>	<ul style="list-style-type: none"> • State agencies – current statewide cost-share and loan programs • Soil and Water Conservation Districts – manage local cost-share programs • Legislature – increased allocations to the State Cost-Share program • Corporate foundations – potentially help pay for research • University of Minnesota – research function
<i>Estimated Timeline</i>	
<i>Type(s)</i>	Financial incentives, funding allocations, regulatory barriers

8	One stop shop for practices, bottom line impacts, and access to services for implementation
<i>Context</i>	Increasing farmer and producer understanding of different practices that improve water quality, in addition to information on the financial impacts and how to find help with implementation, may help increase adoption of those practices.
<i>Description</i>	<p>a. Handbook or web portal of practices and infrastructure improvements that includes examples to explain the incentives offered, financial impacts, permitting needs, and service availability. Examples of how to do so include:</p> <ul style="list-style-type: none"> • Expand the MDA’s Agricultural BMP Handbook to include economic, permitting, and service information. • Integrate the Conservation Funding Guide with other resources and actively maintain it. • Model on successful resources produced elsewhere.
<i>Funding Mechanisms</i>	<ul style="list-style-type: none"> • State resources, including legacy fund • University resources • Could incorporate private funding and support
<i>Costs</i>	<ul style="list-style-type: none"> • Cost of staff time to develop a handbook or database • Cost to maintain and coordinate information sharing
<i>Expected Benefits</i>	A central source of information that is well maintained allows producers to access the latest understanding of BMPs, associated financial incentives, and technical service for implementation. Easier access to information may help increase adoption of practices that improve water quality.
<i>Barriers/Limitations</i>	<ul style="list-style-type: none"> • Will need funding to maintain the handbook or online resources, both for research and collection of ideas and for staff time. • Translation of at least some of the currently available information is required, because it is not readily understood or accepted by farm operators and other decision makers.
<i>Parties Involved</i>	<ul style="list-style-type: none"> • Farmers – provide case examples from across the state for the resource • Technical service providers (and groups thereof) – listing in the resource so farmers better understand where to find technical assistance • Federal, state, and local agencies that provide funding – review resource to make sure financial incentives are included accurately • University researchers – to inform updates on BMP and other new practice ideas
<i>Estimated Timeline</i>	1-2 years to develop the resource and then ongoing updates
<i>Type(s)</i>	Education

9	Encourage non-farming landowners in rural communities to support water quality protection on their land
<i>Context</i>	A significant percentage (50-60%) of Minnesota farmland is rented. Demographics point to a shift in farmland ownership from retired farmers to surviving spouses to descendant-controlled trusts or shared ownership. Increasingly, farmland is treated solely as an investment by owners distant from the operation, and many of these landowners do not understand or value the long-term investments in conservation needed to protect farm productivity and water quality. This strategy responds to the accelerating demographic changes in land ownership.
<i>Description</i>	<ol style="list-style-type: none"> a. Support and expand programs that educate non-farming landowners. <ul style="list-style-type: none"> • Support nonprofit programs that target female and widowed landowners. • Target absentee landowners no longer located in the same community as the land, including descendent trusts. b. Provide property tax incentives for meeting a standard for water quality protection or conservation (e.g., MAWQCP). c. Develop and promote model rental contracts that incorporate conservation and water quality protection. <ul style="list-style-type: none"> • Promote MAWQCP conservation plans as a basis for lease agreements. • Support non-profits and other entities who are working to develop and draft model rental contract language. d. Enable state cost share and competitive grants to consider conservation rental agreements in ranking criteria.
<i>Funding Mechanisms</i>	<ul style="list-style-type: none"> • Public or private funding for these education programs • State funded RFP for education programs • Public tax incentives for conservation
<i>Costs</i>	<ul style="list-style-type: none"> • Opportunity cost from property tax breaks • Cost of education and outreach programs
<i>Expected Benefits</i>	Targeting non-farming landowners can help increase adoption of practices that benefit water quality. These tactics can work to change the current landowning ethic to one that values conservation and water quality protection alongside financial returns on investment.
<i>Barriers/Limitations</i>	<ul style="list-style-type: none"> • Tax breaks for conservation need to be targeted to working lands in order to avoid subsidizing non-farm lands • Could impact funding for critical services in cash strapped jurisdictions at the state and local level
<i>Parties Involved</i>	<ul style="list-style-type: none"> • Marketing and technical assistance through SWCDs, NRCS, and crop advisors for long-term sustainability and financial incentives • MDA – sets standards for what land is eligible for tax break • Governor – recommends tax change



	<ul style="list-style-type: none"> • Legislature – adopts tax change • Agriculture Sector – advocates for tax change • Association of Minnesota Counties – provides guidance to member counties on how to implement county level tax break • SWCDs • NRCS • Non-farming landowners in rural communities
<i>Estimated Timeline</i>	1-2 year start up. Could take time to see progress.
<i>Type(s)</i>	Education and outreach, financial incentives

10	Support the expansion and promotion of the Minnesota Agricultural Water Quality Certification Program
<i>Context</i>	<p>MAWQCP continues to expand in Minnesota and is intended and funded as a pilot to see if voluntary certification in exchange for regulatory certainty is a viable method for promoting conservation and water quality protection.</p> <p>Currently over 100,000 acres and hundreds of farmers have been certified in Minnesota, and the program is expanding to include public-private partnerships with businesses like Land O' Lakes and Conservis.</p>
<i>Description</i>	<ol style="list-style-type: none"> a. Commit to promoting MAWQCP program. <ul style="list-style-type: none"> • Leverage relationships to educate producers about MAWQCP program and opportunities for participation. b. Work with MAWQCP to train crop consultants on certification and conservation practices in order to expand network of trained certifiers and enroll more acres in the program. c. Support MAWQCP funding proposals at the state and federal levels.
<i>Funding Mechanisms</i>	
<i>Costs</i>	
<i>Expected Benefits</i>	MAWQCP is an effective way to line up sources of conservation funding, streamline access, and address whole farm conservation for multiple years.
<i>Barriers/Limitations</i>	
<i>Parties Involved</i>	
<i>Estimated Timeline</i>	
<i>Type(s)</i>	Public-private partnership on education, funding, and service delivery

11	Offer tax incentives to farmers and food companies for engaging in conservation and supply chain sustainability
<i>Context</i>	Aligning private industry interests (growth, profitability) with conservation and water quality protection can unlock additional resources for conservation efforts. Changing tax incentives can help align these interests.
<i>Description</i>	Examples of possible tax incentives include: <ol style="list-style-type: none"> a. Offer tax credit for MAWQCP certified farms. b. Offer tax incentives for buffers. c. Provide state and federal cost share and technical assistance priority for conservation practices implemented by farmers participating in industry sustainability programs. d. Offer tax incentives to businesses engaging in supply chain sustainability programs that involve continuous environmental improvement for farm operations.
<i>Funding Mechanisms</i>	
<i>Costs</i>	Tax incentives have a budgetary impact on the state
<i>Expected Benefits</i>	Unlocks additional investment in water quality protection from the private sector
<i>Barriers/Limitations</i>	
<i>Parties Involved</i>	
<i>Estimated Timeline</i>	
<i>Type(s)</i>	Public tax policy

12	Support statewide public-private partnership to advance conservation
<i>Context</i>	<p>There is currently limited collaboration between the state and business interests on conservation, most of the focus is instead on producers.</p> <p>A broad, public-private partnership on conservation that brings together state and local governments, business, trade groups, and non-profit actors could leverage disparate networks and resources to impact conservation practices adoption and protection of natural resources.</p>
<i>Description</i>	<ol style="list-style-type: none"> a. Convene and support the development of a broad public-private partnership between government, business, non-profits, and agricultural groups. b. Coordinate to address federal regulatory and policy barriers to water quality protection with a unified voice.
<i>Funding Mechanisms</i>	<ul style="list-style-type: none"> • Federal and state grants • Business foundations and contributions • Foundational support
<i>Costs</i>	<ul style="list-style-type: none"> • Funding for public, business, and foundational resources
<i>Expected Benefits</i>	Additional resources and networks leveraged in pursuit of water quality and conservation goals.
<i>Barriers/Limitations</i>	
<i>Parties Involved</i>	
<i>Estimated Timeline</i>	
<i>Type(s)</i>	Public executive action, private business commitment



Work Group Participants

The purpose of this process was to directly engage the agriculture industry in creating solutions to Minnesota’s water quality challenges. Therefore, Environmental Initiative and the Minnesota Department of Agriculture identified and invited individuals who represent crop commodity groups, livestock commodity groups, general farm organizations, food companies and industry retailers to participate in the process as members of a Work Group. Others were added to this group based on suggestions by agriculture industry leaders who were themselves participating. Ultimately, most of the invited organizations/companies participated, but a few decided that their members’ perspectives were well-represented by the other organizations involved.

Work Group Participants

First Name	Last Name	Company Name
Don	Brown	Cargill
Sharon	Spies	Cargill
Jake	Hamlin	CHS Inc.
Matt	Hughes	Cooperative Network
Patrick	Murray	Cooperative Network
Dana	Brooks	Land O'Lakes, Inc.
Rebecca	Kenow	Land O'Lakes, Inc.
Perry	Aasness	Minnesota AgriGrowth Council
Cory	Bennett	Minnesota AgriGrowth Council
Bruce	Kleven	Minnesota Association of Wheat Growers
David	Torgerson	Minnesota Association of Wheat Growers
Adam	Birr	Minnesota Corn Growers Association
Bill	Bond	Minnesota Crop Production Retailers Association
Kevin	Paap	Minnesota Farm Bureau
Cole	Rupprecht	Minnesota Farm Bureau
Thom	Petersen	Minnesota Farmers Union
Doug	Peterson	Minnesota Farmers Union
Gary	Wertish	Minnesota Farmers Union
Lucas	Sjostrom	Minnesota Milk Producers Association
David	Preisler	Minnesota Pork Producers Association
Joe	Smentek	Minnesota Soybean Growers Association
Ashley	Kohls	Minnesota State Cattlemen’s Association
Adam	Herges	The Mosaic Company
Ben	Pratt	The Mosaic Company

Technical Working Group Meeting Participants

Environmental Initiative facilitated a series of technical working group meetings with technical experts, scientists, and industry innovators, which included individuals from academia, state and federal government agencies and individuals who farm and work directly with farmers. Anyone who contacted Environmental Initiative and expressed an interest in participating was welcome to join the process, and several individuals did. People were invited to participate in these technical work group meetings based on their expertise and technical proficiency in conservation, water quality, implementation and many other areas. Some decided to participate in every meeting, some just came to one or two meetings, some decided to not attend at all. There was no set list of participants or attendees and people participated as they were able or motivated. These participants were divided by specialty and expertise into three general groups organized around identified practices and solutions: Living Cover and Tillage, Fertilizer and Manure Management, and Drainage and Water Management. Some individuals participated in multiple groups.

Technical working group meetings focused on generating diverse strategy proposals that were then presented to the Work Group for consideration and robust discussion. Ultimately though, this process was about bringing representatives of farm groups and the agricultural industry together to identify ideas they felt would be beneficial for Minnesota’s farm economy and accelerate progress toward better water quality. The resulting recommendation is that of the participating agricultural industry organizations and it adapts some of the strategies of the technical working groups.

Living Cover and Tillage

First Name	Last Name	Company Name
Heidi	Peterson	MDA, Pesticide and Fertilizer Management
Brad	Redlin	MDA, Water Quality Certification
John	Baker	USDA, ARS; adjunct at UMN
Bill	Bond	Minnesota Crop Production Retailers Association
Kevin	Born	Soil Warrior Environmental Tillage Systems
Brent	Brueland	Soil Warrior Environmental Tillage Systems
Carmen	Fernholz	Farmer/Extension
Axel	Garcia y Garcia	UMN, Southwest Research & Outreach Center
Jason	Garms	Dept. of Natural Resources
Mark	Johnson	Johnson Rolling Acres
David	Kee	Minnesota Soybean Growers Association
Ashley	Kohls	Minnesota State Cattlemen’s Association
Mark	Lefebvre	Stearns County Soil and Water Conservation District
Michelle	Medina	Minnesota Farmers Union
Paul	Meints	Minnesota Corn Growers Association



Cole	Rupprecht	Minnesota Farm Bureau
Lucas	Sjostrom	Minnesota Milk Producers Association
David	Torgerson	Minnesota Association of Wheat Growers
Scotty	Wells	UMN, Dept. of Agronomy and Plant Genetics

Fertilizer and Manure Management

First Name	Last Name	Company Name
Bruce	Montgomery	MDA, Pesticide and Fertilizer Management Division
Brad	Redlin	MDA, Water Quality Certification
Larry	Gunderson	MDA, Pesticide and Fertilizer Management Division
Marcie	Weinandt	MDA, Pesticide and Fertilizer Management Division
Perry	Aasness	AgriGrowth
Jared	Anez	Anez Consulting
Bill	Bond	Minnesota Crop Production Retailers Association
Mike	Bruer	Farmer, West Central MN
Brad	Carlson	UMN, Extension
Fabian	Fernandez	UMN, Dept. of Soil, Water, and Climate
Adam	Herges	Mosaic
Rebecca	Kenow	Land O'Lakes
Ashley	Kohls	Minnesota State Cattlemen's Association
Kevin	Kruize	CFS
Paul	Meints	Minnesota Corn Growers Association
Thom	Petersen	Minnesota Farmers Union
Alan	Peterson	Irrigators Association of Minnesota
Jeff	Peterson	UMN, Water Resources Center
David	Preisler	Minnesota Pork Producers Association
Cole	Rupprecht	Minnesota Farm Bureau
Michael	Russelle	USDA, ARS (retired); adjunct at UMN
Lucas	Sjostrom	Minnesota Milk Producers Association
Kate	Stenzel	CFS
David	Torgerson	Minnesota Association of Wheat Growers
Rod	Venterea	USDA, ARS; adjunct at UMN
Jeff	Vetsch	UMN, Southern Research & Outreach Center

Drainage and Water Management

First Name	Last Name	Company Name
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Bill	Bond	Minnesota Crop Production Retailers Association
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Al	Kean	Minnesota Board of Soil and Water Resources
John	Kolb	Rinke Noonan
Dave	Legvold	Farmer, Northfield MN
Mike	Lehmann	Land Improvement Contractors Association
Ann	Lewandowski	UMN, Water Resources Center
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Jeff	Strock	UMN, Dept. of Soil, Water, and Climate
Paul	Sweeney	Ecosystem Services Exchange
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David	Torgerson	Minnesota Association of Wheat Growers



Conclusion

This project laid the groundwork for the far more critical task of implementation. Members of the Work Group believe that the idea emerging from this process—farmer-led councils—has transformative power; if shown to work, this could be a new model for engaging public and private entities and networks in the shared goals of conservation, farm profitability and water quality.

The next steps of this process will happen within government, and the farmer-led council framework provided earlier in this report will serve to guide those efforts. The Minnesota Department of Agriculture, having received legislative authorization, is committed to moving forward with implementing this vision, in concert with the Board of Water and Soil Resources.

The framework around farmer-led councils is not the only important outcome of this project. Particularly in the beginning, the Technical Working Groups were given a “blue-sky” mandate and asked to create strategies and ideas that could result in meaningful improvement for Minnesota’s water quality. They answered that call, drafting the 12 strategies reproduced in this document. Though ultimately not adopted by the Work Group, these ideas have merit and can serve as the seed for additional efforts by state or private actors, especially the future farmer-led councils envisioned by the Work Group. It is the hope of the Technical Working Group participants that these ideas are read, shared and taken up by others in the collective pursuit of improved water quality for all Minnesotans.

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