

BRIDGING A MAJOR DISCONNECT

IDEAS FOR FARM STANDARDS AND SYSTEMS TO ACHIEVE PHOSPHORUS GOALS IN WISCONSIN LAKES AND STREAMS

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Executive Summary

Despite decades of effort to reduce agricultural nonpoint source pollution in Wisconsin, a gap remains between current on-farm practices and what would be needed to achieve water quality goals in lakes and streams. This report summarizes perspectives on options for reducing phosphorus loss from agriculture to help achieve water quality goals in lakes and streams. We conducted 48 interviews with farmers, conservationists, scientists, crop consultants, and other groups to better understand perspectives, gaps, and opportunities for water quality policy between 2021 and 2024. We focused on Wisconsin's Northeast Lakeshore with attention to issues relevant across the state. Many people perceived important disconnects between in-field standards and in-stream goals that would need to be addressed to improve water quality. Based on interviews, we summarized and gathered diverse perspectives on the top five most commonly discussed options to bridge the disconnects between field and water.

“Water quality is obviously in the spotlight. And it's something that we need to continue to work on as farmers.”

Brody Stapel, Dairy Farmer and
President of Sheboygan River
Progressive Farmers (SRPF)

“If we're serious about water quality, we need to take a look at where our rules are in relation to water quality, and relate the fields to the water, and not have this huge disconnect.”

County conservationist
(Interview 2)

1

Revise Phosphorus Index limits

Farmers are required to meet an agricultural performance standard of a rotation-averaged Phosphorus Index of 6 and annual maximum of 12 (Natural Resources Administrative Code [NR 151.04](#)). However, Total Maximum Daily Load (TMDL) analyses by the Wisconsin Department of Natural Resources suggest that these existing state standards will not be enough to achieve the goal of fishable and swimmable lakes and rivers. To address this disconnect between water quality goals in farmland policy and in streams, we heard diverse perspectives on two options:

1a) Reduce the Phosphorus Index where needed to meet water quality goals

1b) Manage for phased improvement in the Phosphorus Index to reach TMDL edge-of-field targets, rather than a static Phosphorus Index limit

2

Shift to performance-based approaches

In contrast with practice-based conservation systems, performance-based approaches tie cost share for farmers to edge-of-field measures or field models of water quality improvement.

2a) Link payment for performance to cost share

2b) Engage private sector supply chains in payment for performance

3

Balance nutrient budgets

Some farmland in Wisconsin likely continues to accumulate soil phosphorus, according to new results from nutrient balance models. We explore participants' perspectives on two contrasting options for drawing down nutrient budgets:

3a) Invest in technology and manure distribution to balance nutrient budgets

3b) Enhance transitions to grazing and other low-input, perennial agriculture to balance nutrient budgets

4

Advance norms and farmer networks

Norms, which are informal rules about behavior, are important in shaping farm management. Farmer networks that support peer-to-peer on-farm learning and conservation norms have been growing. We heard about the importance of this option:

4) Support farmer networks to share resources and strengthen conservation norms

5

Enhance capacity for implementation and technical assistance

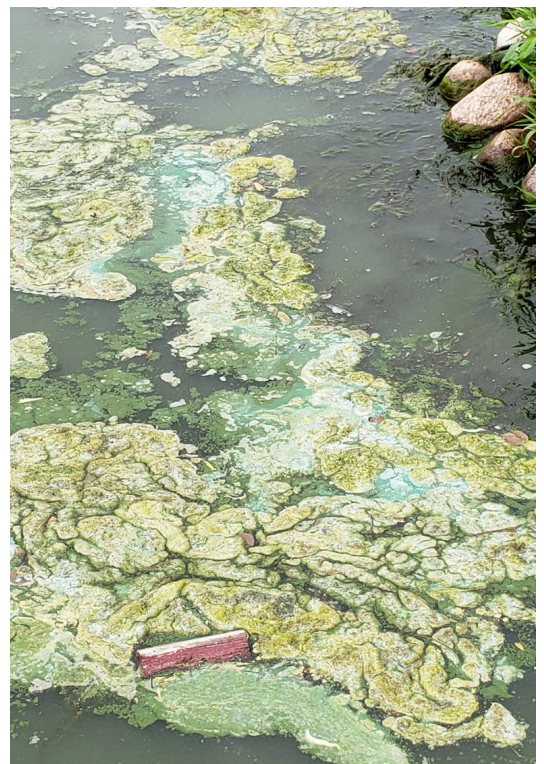
Capacity - including the cost share funds and staff to provide technical assistance - is critical for implementing soil and water conservation practices on farms. We heard about the importance of capacity:

5) More fully fund county land and water conservation staff

In conclusion, we hope that better understanding community member perspectives on policy options can help identify disconnects and innovations for helping to improve water quality and reduce farmer nutrient costs while continuing Wisconsin's proud agricultural traditions. We heard an urgent need to make progress together.

“Each one of us needs to recognize how important water is and not accept anything less than striving to improve it”

Wisconsin conservationist (Interview 8)



Algae accumulation on Long Lake near Brillion, WI (Photo by Manitowoc County Lakes Association/June Scharenbroch)

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Summary

Despite decades of effort to reduce agricultural nonpoint source pollution, a gap remains between current on-farm practices and what would be needed to achieve water quality goals in lakes and streams. This report summarizes perspectives on options for reducing phosphorus loss from agriculture to help achieve phosphorus goals in lakes and streams. We conducted 48 interviews with farmers, conservationists, scientists, crop consultants, and other groups to better understand perspectives, gaps, and opportunities for water quality policy between 2021 and 2024. We focused on Wisconsin's Northeast Lakeshore with attention to issues relevant across Wisconsin. We found that many people perceive important disconnects between in-field standards and in-stream goals. For instance, farmers are currently required to meet an agricultural performance standard ([NR 151.04](#)) of a rotation-averaged Phosphorus Index (PI) of 6 on their fields (croplands, pastures, and winter grazing areas). New analyses completed by the Wisconsin Department of Natural Resources (WDNR) and some County Land Conservation Departments show meeting the NR 151.04 PI performance standard will not be enough to achieve the goal of fishable and swimmable lakes and rivers, as defined through Total Maximum Daily Load reports and implementation plans. This is one of many disconnects we heard between water quality goals in farmland policy and in streams. Throughout the report, we identified how stakeholders with different perspectives believe these inconsistencies and gaps can be bridged to improve both water quality and workable solutions for farmers.

Introduction

Wisconsin waterways have become increasingly impaired and vulnerable to pollution due to high levels of phosphorus, nitrates, and other contaminants seeping into our waterways contributing to toxic algal blooms in our state's lakes, rivers, and streams, and nitrate or bacterial contamination of drinking water wells. The primary sources of this pollution are from agricultural nonpoint and industrial and municipal point sources, with contributions also from construction, septic systems, and urban runoff.

Losses of phosphorus from manure and fertilizer into surface water bodies can lead to eutrophication of ponds, lakes, and streams, a process in which nutrients promote algal blooms that can produce harmful toxins, reduce dissolved oxygen levels, and impair aquatic habitat. A growing number of extreme storm events, exacerbated by climate change, is increasing runoff and the transport of nutrients to water bodies. The impacts of poor water quality are significant and particularly affect rural communities while limiting everyone's use of lakes and beaches.

While this report focuses on phosphorus and surface water, nutrient management also impacts nitrogen which is a particular concern for groundwater in Wisconsin and surface water in the Gulf of Mexico. According to [the U.S. Geological Survey \(USGS\)](#), of the 43 million Americans who get their drinking water from private wells, nearly 1 million of these citizens are utilizing groundwater that exceeds federal nitrate limits. [The Environmental Protection Agency \(EPA\)](#) estimates 28% of Wisconsin's population obtains their drinking water from private groundwater wells. [Adverse health effects](#) such as blue-baby syndrome and increased risk of certain types of cancer can result from the overconsumption of nitrates in drinking water.

Blame has sometimes focused on individual farmers for their contributions towards water pollution. This ignores the financial structures and pressures of farm consolidation on farmers that limit their choices, sometimes called the treadmill of production. Agricultural investors, processors, retailers, and consumers benefit financially from externalizing the costs of pollution while taxpayers and utility ratepayers bear the costs of pollution and many of our state's farmers face mounting economic difficulties and uncertainty. Since the turn of the millennium, Wisconsin has seen a historic number of farms fall into bankruptcy. This phenomenon has especially impacted dairy farmers. In 2022, Wisconsin was home to 58,521 farms, down 6,272 farms from 2017, according to the [U.S. Department of Agriculture's Census of Agriculture](#). Dairy farms in particular decreased from 9,037 in 2017 to 6,216 in 2022 and 5,523 in June 2024. That's over 3,500 farms lost in 7 years.

To stay afloat, many farms have [expanded and consolidated](#), leading to an increase in larger-scale dairy operations. Many factors contribute to dairy farm consolidation and farm loss including international competition, shifts in federal support for dairy, and challenges in farm succession. Historically low milk prices, for example, have made it difficult for local and cooperative dairy farmers to compete with bigger farms with more cows, land, and resources. The average age of farmers has increased in the last twenty years, and many of these farmers are [shutting down operations](#) after finding themselves without a successor. This often takes the form of selling their land to other farms, contributing to the rise in larger, consolidated farms.

Additional consolidation can come from real estate companies and others looking to buy land when farmers are ready to retire. Economic pressures and high levels of debt can impact farmers' capacity to incorporate conservation practices into farm management and implement these practices on the ground, even when conservation can help farmers save money.

Many farmers are increasing their focus and community organizing on water quality and soil health for a combination of economic, environmental, and social reasons. The effects agricultural runoff presents to both public health and the environment makes the implementation of thorough policy solutions even more pressing. Farmers are not only influenced by the treadmill of production with pressure for growth in the dairy industry but also by the regulatory framework they operate in. Reaching livable compromises on agricultural water quality solutions has been a multi-decade negotiation. Many groups have been active in working to reduce phosphorus loss. The 2023 conference, Phosphorus: Lessons from 10+ Years of Numeric Standards for Wisconsin's Waters, led to a report with policy recommendations. Some of the policy options are shared between the 2023 conference report and this report, which provides perspectives from interview quotes about the top five ideas for change. It is important to understand the viewpoints of many participants in order to problem-solve. This can help identify both smaller tweaks and larger shifts that participants view as beneficial and feasible to implement.

STATEMENT OF PURPOSE

This qualitative social science and policy research report presents interviewee perspectives on options to bridge the current water-farm disconnect between stream and lake water quality standards set by Wisconsin State Statutes and administrative codes and how the NR 151 performance standards were developed to reduce agricultural nonpoint source pollution but not to achieve the goal of fishable and swimmable lakes and rivers, as defined through Total Maximum Daily Load (TMDL) reports. We worked with diverse representatives to identify pathways for profitable farming, clean water, soil health, and thriving communities. While this report examines phosphorus and surface water, some of the ideas and proposed solutions are also relevant for nitrogen and groundwater. This report is for soil and water conservation and farming leaders, policymakers, investors, researchers, and anyone interested in approaches for reducing phosphorus loss from farms.

Methods

Through support from state and federal grants, including Wisconsin Sea Grant, this project was carried out by interviewing farmers, scientists, crop consultants, and conservationists in the Northeast Lakeshore region of Wisconsin as well as professionals from statewide organizations. While the majority of interviewee perspectives originate from northeast Wisconsin, they are also relevant to other parts of the state grappling with similar challenges related to agriculture and water quality management. We convened an advisory board including government agencies, farmers, and community participants from the Northeast Lakeshore. The formation of this policy report involved literature review, interviewee consultation, and detailed policy analysis. This extensive research has brought us to highlight several policy options that emerged from differing perspectives from people within and connected to the Northeast Lakeshore region.

We conducted semi-structured interviews with 48 key informants between 2021 and 2024. These interviewees are farmers (8), citizens (3), work for county government (9), state government (6), federal government (2), university (4), or private firms (16). Topics included water quality progress, current policy environment, nutrient management plans, and perceptions of the relationships between water systems, agricultural operations, and relevant policies and programs. Interviews were primarily conducted virtually over Zoom, while 11 were conducted in-person and 3 respondents preferred to submit written responses. Interview length ranged from 30-180 minutes, with most lasting between 45-75 minutes. Interviews were audio-recorded and transcribed using Otter, a transcription software.

“People are demanding better. Complacency and doing business as usual is not an option. We're being forced to do a better job.”

Mike Vandenhouten, Crop Farmer in Door County

Understanding disconnects between agricultural nonpoint source policy and water quality standards in Wisconsin

Clean Water Act (CWA) amendments of 1972 created a regulatory framework to improve water quality in the United States with the broad goal of fishable and swimmable waterways. The CWA tasks the Environmental Protection Agency (EPA) with many of its oversight provisions, leaving a considerable amount of authority to individual states for enforcement. Section 303 of the CWA gives states the responsibility of developing water quality standards that consider the designated uses for a given water body and the criteria necessary to protect these uses. Wisconsin officially meets this requirement through NR 102, which was substantially revised in 2010 to include one of the nation's most rigorous sets of numeric water quality criteria for phosphorus in surface waters. Additionally, the CWA requires states to publish a list of all waters that do not meet water quality standards along with an overall report on surface water quality status for all waters in the state every 2 years. Today, of the 1,265 water bodies on the Impaired Waters List, 681 (54%) are impaired by excess total phosphorus with 33 newly listed in 2024. The CWA requires states to develop total maximum daily loads (TMDLs) studies for impaired water bodies. TMDLs calculate the assimilative capacity of a waterbody, assign pollutant allocations, and any needed reductions to meet water quality standards. As of 2024, approximately 50% of Wisconsin is covered by TMDLs addressing Total Suspended Solids and Total Phosphorus.

To meet water quality standards, the state, through its CWA authority, relies on a multiagency system to set standards for agricultural nonpoint source pollution and permit point sources of pollution (Figure 1). Wisconsin state statute 281.16(3)(a) states that “performance standards and prohibitions shall be designed to achieve water quality standards by limiting nonpoint source water pollution,” which is echoed in NR 151.001. For agricultural sources of pollution, the state uses a combination of runoff pollution performance standards (NR 151) and a permitting system for concentrated animal feeding operations (CAFOs) (NR 243).

STATE AND FEDERAL NUTRIENT MANAGEMENT RULES AND STANDARDS

Agency	 Wisconsin Department of Natural Resources (WDNR)	 Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP)	 Natural Resources Conservation Service (NRCS)
Rule	NR 151, 243	ATCP 50, 51	NRCS STANDARDS
	- Governing body: Natural Resources Board - Rulemaking review: Board, Governor, State Legislature - NR 151: Sets performance standards for cropland soil erosion, tillage setbacks, phosphorus index, manure, and nutrient management including Silurian bedrock. Compliance includes offers of cost share when required, Farmland Preservation Program, and CAFO permits. Finalized 2002, updated 2008, 2010. - NR 243: Sets WPDES permit requirements for large CAFOs, manure and Silurian bedrock performance standards for all farms, Notice of Discharge procedures for unacceptable practices on farms under 1000 animal units. Finalized 2007, updated 2018, 2019.	- Governing body: Board of Agriculture, Trade and Consumer Protection - Rulemaking review: Board, Governor, State Legislature - ATCP 50: Prescribes conservation and nutrient management practices to comply with NR151 including standards for nutrient management planning. Finalized 2002, updated 2024. - ATCP 51: Sets standards for siting new or expanded livestock facilities and for when a county, town, city or village may or may not prohibit or limit a facility. Finalized 2006, updated 2020.	- Advisory group: State Technical Committee - NRCS 590: Sets standards for nutrient management and other best management practices, describes strategies to manage phosphorus runoff - Soil test phosphorus - Phosphorus Index (PI) - NRCS 313: waste storage facilities standards - NRCS 629: agricultural waste treatment standards including manure and feed storage - NRCS 635: vegetated treatment area standards - Updated at national and state levels

Wisconsin Standards Oversight Council (SOC): interagency partnership to create and improve technical standards for NRCS, DNR, DATCP

Figure 1. Background on the frameworks for agricultural runoff and nutrient management rulemaking at the state and national level.

Under NR 151.07, all farms are required to operate under a nutrient management plan that meets standards set by the state Department of Agriculture, Trade, and Consumer Protection (DATCP) through ATCP 50 and the federal Natural Resources Conservation Services (NRCS) through NRCS Conservation Practice Standard 590. The main purpose for Wisconsin adopting NR 151 in 2002 was to establish runoff pollution performance standards and prohibitions for agricultural facilities and transportation facilities and practices designed to achieve water quality standards as required by s. 281.16 (2) and (3), Stats (NR 151.001).

In addition, [NR 151.04](#) clearly sets an upper threshold for rotationally-averaged phosphorus runoff from all cropland, pastures, and winter grazing areas equal to a Phosphorus Index of 6 with compliance demonstrated within a nutrient management plan. Verifying compliance with NR 151 (i.e. county and state staff reviewing submitted plans) is mostly limited to farms under CAFO permits (NR 243), public cost-share agreements (NR 151), and the Farmland Preservation Program tax credit (NR 151). Lastly, NR 151 also contains requirements related to Total Maximum Daily Loads. [NR 151.004](#) describes how implementation of the statewide performance standards and prohibitions in this chapter may not be sufficient to achieve water quality standards and provides the DNR the authority to promulgate targeted performance standards when it determines, using monitoring or modeling, that substantial implementation of the existing standards will not meet water quality or groundwater standards. [NR 151.005](#) requires all crop or livestock producers to reduce discharges of pollutants from a livestock facility or cropland to surface waters if necessary to meet a load allocation in a US EPA and state approved TMDL.

Implementation of these standards is partially tracked through publicly available datasets. The amount of farmland with a nutrient management plan increased and then plateaued in the period of data availability from DATCP (Figure 2). The annual average change in farmland with a nutrient management plan was 124,500 acres/year from 2004 to 2009, nearly doubling to 248,250 acres/year from 2010 to 2017, and then declining to 52,500 acres/year from 2018 to 2023. To calculate these averages, we compared each year to the prior year and averaged these annual changes across the time period. About forty percent or [41.8% of Wisconsin cropland](#) was covered by a submitted nutrient management plan in 2022. Nutrient management plan (NMP) adoption was required by NR 151 starting in 2010 and is incentivized by cost sharing and the Farmland Preservation Program.

We heard several factors that may have contributed to the slower rate of nutrient management plan adoption after 2018: early adopters and CAFOs are already doing planning while it has taken more effort to reach middle adopters; Farmland Preservation Program state tax credits were not keeping up with the cost of inflation and compliance with plans, which is hopefully improved by the [higher program incentives approved in 2023](#); COVID-19 pandemic disruptions; the cost of a nutrient management plan is perceived as a barrier, even if reducing fertilizer inputs often saves money; counties and other technical assistance providers lack the capacity to make and implement nutrient management, and some counties prioritize plans while others do not, leading to high variability among counties.

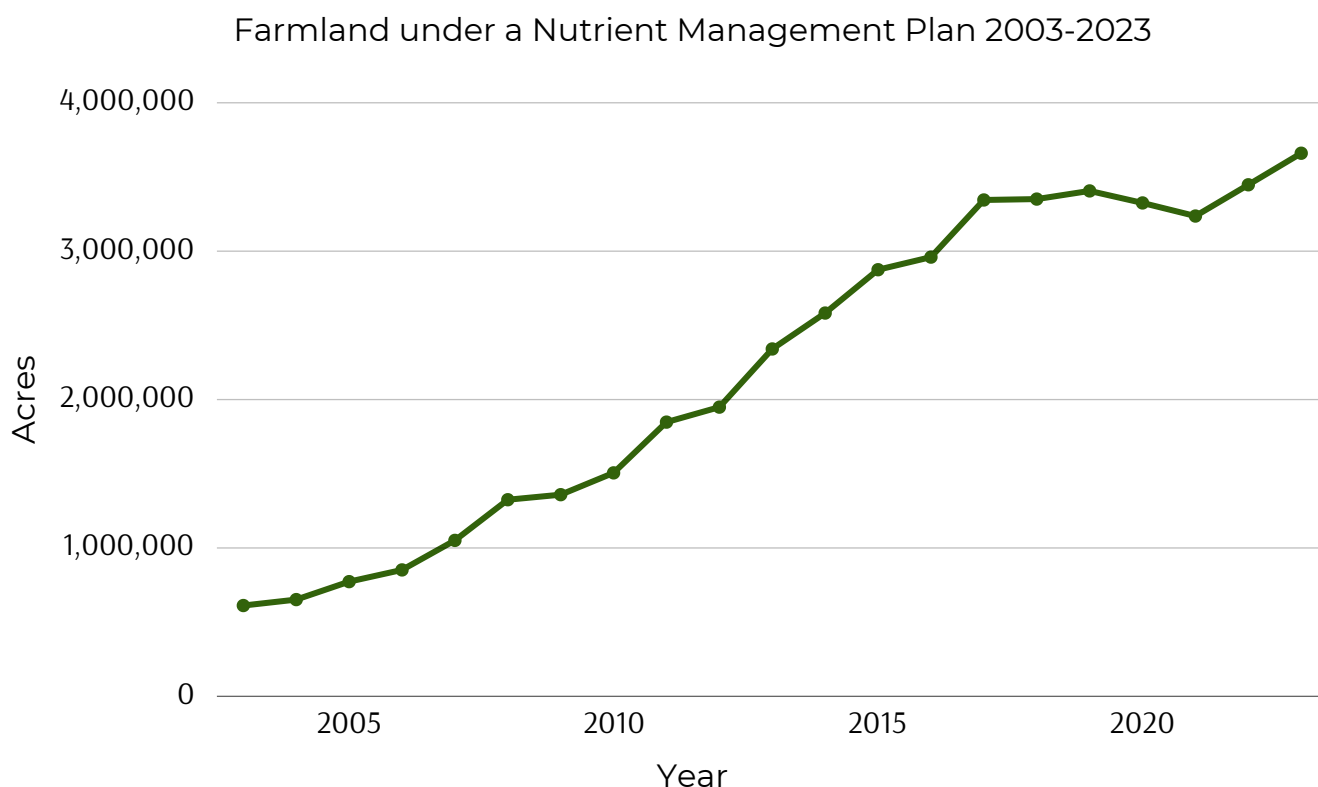


Figure 2. Areas of Wisconsin cropland with a nutrient management plan, reported to counties or DNR by agricultural producers and planning professionals, 2003 to 2023 ([DATCP 2023 nutrient management planning data](#) and DATCP 2003-2023 nutrient management planning data).

Through [NR 151.07](#), the Wisconsin DNR has established that manure or other nutrients applied directly or through contract to agricultural fields shall be applied in conformance with a nutrient management plan and such plan shall be designed to limit or reduce the discharge of nutrients to waters of the state for the purpose of complying with state water quality standards and groundwater standards. Nutrient management plans must also meet the Wisconsin Department of Agriculture, Trade, and Consumer Protection technical requirements set through [ATCP 50](#) and federal conservation practice standards set through [NRCS 590](#) (Figure 1). However, when [NR 151.07](#) was passed, TMDLs and associated pollutant allocations for agricultural lands were not considered.

Enforcing compliance with many [NR 151](#) agricultural performance standards requires an offer of bona fide cost share. Under [ATCP 50.08](#), landowners are not required to discontinue or modify livestock operations or cropping practices on existing cropland unless they receive an offer of cost share. Cost share must cover “at least 70% of the landowner's cost to install and maintain each required conservation practice, or 90% of the landowner's cost if there is an economic hardship.”

“In Wisconsin... NR 151, in terms of nonpoint agricultural performance standards has been a really good driver of conservation” Steve Richter, The Nature Conservancy’s former Director of Agriculture

Nutrient management approaches targeting areas at higher risk of phosphorus loss were influenced by the Wisconsin Buffer Initiative, a science-based multistakeholder process started in 2003. Wisconsin Buffer Initiative analyses provided a ranking of watersheds and the costs involved to improve water quality to enhance cost efficiency through targeted resources. Results highlighted the presence of disproportionality, the idea that a small proportion of the fields in a watershed contribute the majority of nutrients and sediment to streams.

Nutrient management planning - implementation gap

Many professionals talked about the need to address the gap between nutrient management planning, plan implementation, and protection of water quality. Even if nutrient management plans are specific and implementable, the lack of monitoring and accountability means that state or county agencies often do not have good information on whether the nutrient management plans are being followed. A state nutrient management policy specialist highlighted that even though the plans are comprehensive and specific, if not everyone is adopting them, that remains a major problem. While CAFOs are required to submit their nutrient management plans, the submission of plans to government programs is voluntary for non-CAFOs. Therefore compliance with conservation plans of non-CAFO farmers may not be tracked by agencies like NRCS, DATCP, the DNR, and counties.

As such, beneficial conservation work that farmers are doing may be going uncounted and unmonitored. Last, some participants thought that measuring soil test phosphorus levels could be an accurate way to verify long-term success of nutrient management plans through stable or declining levels.

“There really isn’t a good way to judge how well things are going in the state because we lack tracking systems. We lack good indicators. The reporting is hit and miss. We see reports on farm nutrient management plans, but we have no idea whether they’re implemented [on non-CAFOs].”

Jim Baumann, Retired DNR Water Quality Engineer

Wisconsin administrative rulemaking process and local government authority

The Wisconsin policy making process has changed substantially since 2010 in ways that reduced state agency rulemaking authority and local county control. Interviewees explained that state water quality administrative rules do not change very often. Under the current rulemaking process, changes require a major effort within a specific time frame with support from agency boards, the governor and legislature, and in practice, the regulated industry. For instance, rulemaking must go from scope statement publication to legislative review within 30 months, per [WI Act 39](#). This can be a tight turnaround considering the amount of research, public input, analysis, and deliberation needed when proposing rule changes. The Wisconsin Regulations from the Executive in Need of Scrutiny (REINS) Act, [WI Act 57](#), also changed the administrative rulemaking process. Under the REINS Act, proposed rules may not exceed \$10 million in implementation and compliance costs over a two year period unless specific legislation is passed authorizing such a rule. This cost limit accounts for implementation and compliance costs but not benefits of the regulation, creating another rulemaking limitation.

The NR 151 [Silurian bedrock targeted standards](#), adopted in 2018, is the only time a targeted performance standard has been developed by the DNR and approved by the governor and legislature to improve water quality. Support from across the agricultural industry, local governments and DATCP were critical to enacting these targeted standards. The DNR initiated stakeholder meetings that lasted over two years prior to proposing the targeted standards. Changes to [ATCP 50 to implement the Silurian bedrock standards](#) were approved by the Board of Agriculture, Trade and Consumer Protection in September 2023 and the final rule was published in May 2024.

In 2019, the DNR proposed a more comprehensive [targeted performance standard for nitrate](#) which was developed through 2021 but not finalized for several reasons. According to a [news report](#), a DNR staffer indicated that the short timeline of the administrative rulemaking process led the rule to remain incomplete; some pointed to the REINS Act which limits financial costs to \$10 million and does not account for financial benefits; meanwhile a legislator argued that the policy change was too extreme. Strong disagreements over the role of government in regulating industry and protecting public health have shaped water quality policy in the state and will continue to influence the pursuit of policy changes.

Local governments have experienced shrinking authority to address environmental quality concerns in their communities, specifically when it comes to siting of confined animal feeding operations (Act 235), the siting and operation of frac sand mines (Act 144), and shoreline zoning (Act 170). Interviewees cited this as a point of disconnect between agricultural point and nonpoint policy and practices and water quality outcomes, since local governments are in a unique position to create standards and ordinances tailored to their community's specific needs. State legislative changes from 2011 to 2018 created more uniformity for particular industries by preventing local governments from developing locally-based standards for environmental protection that exceed state requirements, leaving them with fewer tools to reduce economic, health, and environmental impacts of water pollution.



Bare ground on farm field from June 2, 2019, Fond du Lac County, Wisconsin (Photo by Adena Rissman)

Bridging the disconnects: Perspectives on prominent options for achieving in- stream water quality

“You need a better mechanism connecting field scale assessments and watershed phosphorus delivery.” Laura Ward Good, SnapPlus and WI Phosphorus Index Project, UW Department of Soil Science

1 Revise the Phosphorus Index limits

What is the Phosphorus Index (PI)?

The Phosphorus Index (PI) is an “agricultural land management planning tool for assessing the potential of a cropped or grazed field to contribute phosphorus to the surface water (NR 151.015).” It calculates the annual or rotational phosphorus loss from each field to the nearest surface water through the assessment of the field’s soil and slope conditions, crops, tillage, manure and fertilizer applications, and average weather patterns. The PI is reported as a whole number where the higher the number, the greater the likelihood that a field is contributing phosphorus to nearby water bodies. Knowing the factors that reduce the risk of phosphorus loss helps land managers make decisions to improve nutrient use efficiency and crop profitability and reduce phosphorus loss to surface water.

In Wisconsin, the Phosphorus Index was incorporated into the state’s Nutrient Runoff regulatory framework by the Wisconsin DNR to help reduce agricultural nonpoint source pollution and improve water quality in an amendment to NR 151 finalized in December 2010. The rule requires farm operators to maintain a rotationally-averaged PI of 6 or less for all cropland, pastures, and winter grazing areas over an 8 year period and a maximum of 12 in any individual year (NR 151.04(2)(a)).

Setting up the PI in Wisconsin was a response to the Wisconsin Buffer Initiative - a UW-Madison led effort that synthesized the current state of science on nutrient pollution - in the context of the national NRCS 590 standard that required a field runoff phosphorus risk assessment for manure applications. TMDLs for phosphorus and total suspended solids were not a consideration when establishing the PI.

The NRCS 590 standard requires a phosphorus management strategy on fields where manure or other organic by-products are applied during a crop rotation period in order to minimize the water quality impact to surface water. The NRCS encourages states to adopt and customize this standard as well as develop a PI, and Wisconsin has been a leader on this front. The Wisconsin NRCS 590 conservation practice standard allows for farmers to implement one of two strategies to manage nutrient runoff on their fields: 1) maintain a PI of 6 or lower on crop rotations with a maximum length of 8 years or 2) use soil test phosphorus to limit manure phosphorus applications and follow a plan that addresses phosphorus runoff risk. This second option has further restrictive measures based on the quantity of soil test P. The ability of farmers to execute the PI strategy requires the use of Wisconsin's nutrient management planning software, [SnapPlus](#). Although technical assistance for farmers is offered by DATCP and other crop consultants, some farmers are not utilizing this software.

“In most cases, for water quality, a PI of lower than six is necessary to meet water quality standards.”

Government Water Resources Engineer (Interview 14)

An average Phosphorus Index of 6 appears inconsistent with water quality goals

Water quality experts we interviewed suggested that the established PI maximum of 6 (averaged over a rotation) for croplands and pastures is not enough to reduce phosphorus concentrations to water quality target levels in Wisconsin waterways. The NR 151 PI of 6 standard was adopted before the WDNR had conducted extensive modeling and multiple phosphorus-based TMDLs. These [models show](#) that when agricultural fields are managed at or below a PI of 6, it is not sufficient to meet state TMDL based phosphorus reduction goals. Many of these modeling analyses confirm a rotational average of one pound of phosphorus loss per acre per year is necessary to help restore phosphorus impaired waters within approved TMDL areas.

“When the P Index of six was adopted, this was before generating a lot of TMDLs... Now we have more modeling, and in some cases monitoring data, to show that that's not going to be effective to improve water quality. There's going to be a need to have a discussion about stricter or new targeted performance standards.” Water quality administrator (Interview 15)

In talking about the creation of the PI in NR 151 before 2010, DNR had initially suggested a cap of 10 rather than 12 for a single crop year.

A summary of public comments and department responses to 2009-2020 revisions of NR 151, 153 and 155 indicates some support for the PI of 6, but many public commenters said it should be lowered to 4 while others suggested a higher PI of 8. Responses mixed opposition and support for using the PI as an enforceable performance standard rather than a management option, despite acknowledging that a PI of 6 was acceptable to most farmers. Additionally, public comments on the annual PI cap of 10 included agricultural industry concerns that it was unachievable, inflexible, and not necessary. DNR changed the cap from 10 to 12 in the final rulemaking. There was no discussion on whether the PI of 6 standard would help restore phosphorus impaired waters and address phosphorus-based TMDLs.

Policy Option 1a): Reduce the Phosphorus Index where needed to meet water quality goals

“The whole idea behind the phosphorus rule when it was passed was that each field would have to achieve a certain level in terms of the runoff, or so called Phosphorus Index, but there was going to be a way that you could actually ratchet down the Phosphorus Index if the Phosphorus Index of six was not enough to achieve water quality in the nearby waterways. Subsequent rulemakings and pressures in the last decade have kind of taken away some of those tools.”

Retired DNR Water Division Administrator

Reducing the PI threshold of 6 in NR 151 to a lower value over a transition period of time would increase the likelihood of achieving water quality goals in many of the state’s TMDL and phosphorus impaired watersheds. Allowing agricultural operations to gradually meet the lower threshold over multiple years was the phased reduction approach in which DNR regulated compliance schedules for point sources that received stricter phosphorus discharge limits.

One option mentioned for aligning field level phosphorus limits with restoring water bodies to meet water quality standards would be to reduce the PI of 6 standard within watersheds with greater water quality problems. This approach is consistent with NR 151.004, which provides the DNR the authority to develop targeted standards to improve water quality when it determines, using monitoring or modeling, that substantial implementation of the existing standards will not meet water quality or groundwater standards. We also heard questions about how that would be implemented and understood in practice. Some interviewees were concerned that reopening this part of NR 151 to administrative and legislative review would be politically infeasible and create challenges for producers.

About the PI of 6: ***“It's a number, it's a speed limit, it's something everybody can look at and point to. In a perfect world, from a completely water quality standpoint, different fields should have different thresholds. But try and explain that to a farmer when he's trying to decide where to apply manure and what fields need to get managed a certain way. It gets ridiculously complicated. So I completely understand why that compromise was made.”*** County conservationist (Interview 2)

Policy Option 1b: Manage for phased improvement in the Phosphorus Index to reach TMDL edge-of-field targets, rather than a static Phosphorus Index limit

Changing how the phosphorus performance standard is structured could have a profound effect. Many interviewees mentioned challenges with having a static PI limit. Continuous improvement could help get away from this one-size-fits-all approach while offering a range of options for each farm to achieve nutrient loss levels consistent with water quality goals.

In watersheds with phosphorus-impaired waters, recent Wisconsin TMDLs have quantified, by sub-watershed, a rotationally-based edge-of-field phosphorus loss target necessary to achieve water quality goals. The majority of the edge-of-field targets reflect a less than 1 lb/ac/yr target, which is substantially less than the PI of 6 lbs/ac/yr.

It is important to note that the PI and the TMDL edge-of-field targets are calculated differently. PI is calculated in SnapPlus using the “dominant critical area” concept that focuses on the most erosive soil type and the steepest slope on a field that is at least 10% of the field to achieve a more protective conservation planning outcome. Conversely, edge-of-field targets are calculated in SnapPlus using the predominant soil type and average slope to best reflect the average P loss from the field. This results in the PI for a field being larger than what would be calculated using the predominant soil and average slope, but the magnitude of that difference depends on the variability of soils and slopes within a field.

Under a PI improvement policy, for farms that already meet the TMDL based edge-of-field phosphorus target, no further change would be needed. For farms above that level, a program of continuous improvement would offer a pathway for continually reducing phosphorus loss over time.

For example, a farm-wide average reduction in phosphorus loss could be required after each 8-year crop rotation. If the amount of required phosphorus reduction was 1 lb/ac/yr every 8 years and a farm’s rotationally averaged phosphorus loss was 6 lb/ac/yr from 2020-2027, the new phosphorus loss target would reduce to 5 lbs/ac/yr from 2028-2035. If the farm-wide reduction was 0.5 lbs/ac/yr, then it would go from 6 to 5.5 lbs/ac/yr. Similarly, another approach would be to achieve a 50% farm wide phosphorus reduction each decade through phased reductions, until the TMDL-based reduction target is met.

A continual improvement approach with a PI level that declines each decade or rotational period would require farmers to decrease the amount of phosphorus runoff they contribute to surrounding waterways over time. The current one-size-fits-all static PI limit allows for people contributing less to total phosphorus runoff to increase their pollution while still remaining under the legal limit, and makes it difficult for farmers who need to reduce their phosphorus emissions to comply with state standards. Continual improvement would help prevent backsliding in watersheds with phosphorus impaired waters. A phased reduction in phosphorus loss target values for each watershed (e.g., an 8-10 year time period) would provide adequate time to plan and then adopt the practices necessary to achieve TMDL-based agricultural phosphorus loss targets and meet water quality standards.

Some interviewees mentioned the need for more specific and shorter compliance timeframes to meet TMDL based phosphorus reduction targets and water quality standards. Interviewees suggested that agricultural interest group support would be needed for changes to be approved through the rulemaking process.

“You could have producers that are in compliance right now, their SnapPlus runs, and everything shows they're in compliance, then modifications are made to SnapPlus to reflect changes in either understanding of processes or changes in climate data. And now they're out of compliance. And so the point is that well now suddenly, [as farmers have explained it] ‘we have to get back in compliance on our own dime, because the goalposts moved...we thought we were in compliance, we were doing everything correctly. Now, because of climate change and everything, to be in compliance now requires us to do more.’” Government Water Resources Engineer (Interview 14)

Another challenge to achieving water quality goals is that Wisconsin has been seeing more extreme weather events such as large storms. Modelers are working to update the rainfall data in SnapPlus with more recent precipitation data. However, parts of the model that rely on RUSLE2 require national updates to incorporate changes in the increasing frequency of heavy rainfall events.

2 Shift to performance-based approaches

In contrast with practice-based conservation systems, performance-based approaches tie cost share for farmers to edge-of-field measures or field models of water quality improvement.

Given that compliance with existing rules regarding nutrient management plan implementation and PI of 6 is already variable or, in the case of meeting TMDL reductions, has yet to be proposed by DNR, performance-based incentives for farmers may be an effective approach. One example would be tying cost-sharing payments to a performance-based model to reduce edge-of-field phosphorus loss. Practices are not equally effective in each field for improving water quality.

“Cover crops can be great to help control erosion and reduce nitrate leaching, but they can't fix every problem in every cropping system. In some situations, a cover crop can reduce nitrogen losses and not soil loss and vice versa. Over-wintering cover-crops that are planted late may not make enough biomass to work for either one. It's important to understand what field problems you are trying to solve and if you are using an appropriate fix. If you have a field that doesn't have much soil loss under its current management, then why add cover crops for erosion control? And if the field is losing too much dissolved phosphorus in runoff, a cover crop may not help that at all.” Laura Ward Good, SnapPlus and WI Phosphorus Index Project, UW Department of Soil Science

Policy Option 2a: Link payment for performance to cost share

“There’s been a lot of talk recently about moving from a pay for practice structure for cost share programs to a pay for performance structure. So... you run a SnapPlus model... to identify what the Phosphorus Index reduction would be... and pay accordingly.”

Sara Walling, Water & Agriculture Program Director at Clean Wisconsin

Talking about NRCS cost share programs, The Nature Conservancy’s former Director of Agriculture Steve Richter said: ***“it’s not enough... Our federal government through the Farm Bill and commodity payments, and crop insurance, we could do different things in those policies to not reward increased production at the expense of conservation. And so paying farmers more for conservation, rather than production would be, I think, a really good goal to work on.”***

Payment for performance can increase the efficiency of phosphorus measures undertaken through water quality trading and adaptive management.

One option to make cost share funding more effective is to utilize SnapPlus to identify edge-of-field phosphorus targets for individual fields that are consistent with TMDLs. Once an edge-of-field phosphorus reduction target is identified, farmers who contribute toward meeting the TMDL-based reduction target could be eligible for cost share. The use of SnapPlus modeling to receive incentive payments, and soil test phosphorus measures that are performed consistently (e.g., Bray-1) to demonstrate long term change, would also contribute to uniformity in phosphorus assessment.

We also heard varying perspectives on what measures of performance should be utilized, with some interviewees expressing a need to go beyond model-based approaches toward edge-of-field monitoring and soil testing for phosphorus as well as soil organic carbon.



We heard a desire for further prioritization and targeting of NRCS conservation cost-share implementation such as the Environmental Quality Incentives Program (EQIP) in watersheds and fields that have the highest impact on water quality. This can include helping watersheds achieve TMDLs and maintaining outstanding waters as well.

Some major challenges with payments for performance include the allocation of state or federal funds to the areas most needed to meet TMDL-based edge-of-field reduction targets, as well as the costs of monitoring and measurement to demonstrate performance. Current funding levels allocated for cost sharing to meet the existing NR 151 standards have remained far below what is necessary to achieve widespread adoption. We also heard about a need for multiple funding options including flexible, low-paperwork incentives, such as what the producer-led watershed groups offer producers, and providing incentives that incorporate targeting and prioritization to improve cost efficiency, which takes time and more reporting to complete.

Policy Option 2b: Engage private sector supply chains in payment for performance

“Consumers will continue to demand and buy food or products that have been produced and grown with less of an impact on the environment and in doing so there will be more accountability and transparency and reporting, all the way down to the farm about how their food is being grown. I believe farmers will be awarded or compensated for their environmental services they provide through the supply chain to help spur the adoption of better practices on the farms.” Steve Richter, The Nature Conservancy’s former Director of Agriculture

However, many of these potential market-based supply chain approaches are still developing in terms of water quality performance. Talking about global milk companies, one farmer and sustainable industry advisor said:

“a lot of them honestly aren't really talking about water quality. So I had a call with Hershey's this week, or Meross or, I've talked to Agropur quite often or we talk with Grande Cheese, Nestle. They're all talking about scope three greenhouse gas emissions, methane reduction, and carbon credits right now. Like yeah, water is important, but I think they've already moved past that. So I think water quality is obviously really important in our community, but a lot of these companies aren't just Wisconsin or regional so they're looking at where the pressures coming from, either the investors if they're like a Nestle or the pressures coming from Nestle to Grande Cheese as a supplier.”

Agropur's 2022 [Environmental, Social and Governance Report](#) mentions the efforts of Deer Run Dairy located in northeast Wisconsin including that they "use regenerative practices including no-till planting, cover crops, setbacks to protect waterways and an anaerobic digester." Further advancing the role of processors and supply chains to value production beyond pounds or hundredweight of milk to also include water quality has the potential to improve transparency for consumers.

However, producers also mentioned challenges of top-down approaches through supply chain management from global companies. Paul Cornette, a dairy and crop farmer in Kewaunee County, described that often companies won't take the risk on environmental improvements, and continued, ***"If they do take the risk, then they think they deserve the spoils and none of the value of the value-added product actually trickles down to the farmer, the one who actually produced the sustainable product. The end result is farmers have their business dictated to them, cost of production goes up and a hard job gets harder."***

Recognize the limitations of performance claims based on models of practices

The news shares many stories by organizations aiming to demonstrate the success of their water quality efforts, such as a [2021 Green Bay Press Gazette story](#) about modeled estimates of farm practice changes. While the practices put in place are no doubt beneficial, the metrics of success have more limitations than is sometimes recognized.

"I think it's very difficult for producers to get a full picture of the links between practices on their land and local water quality. Farmers are making changes for water quality, but it's very abstract. When someone says something like, 'Well, we cut our phosphorus runoff by 1000 pounds', what does that mean? Does it mean the stream got better? Well, maybe, maybe not. And those connections are very hard to make." Water quality scientist (Interview 36)

Scientific research and models to estimate nutrient loss take time to develop and can lag behind implementation of novel, innovative conservation practices, leading to frustration for the most progressive farmers.

"Rather than paying for practices that are supposedly resulting in something, my recommendation to you guys is you pay for performance." Mick Sagrillo, Chair, Town of Lincoln Plan Commission, Kewaunee County

3 Balance nutrient budgets

What is a nutrient budget?

Nutrient management can support crop growth, avoid wasting expensive (and often non-renewable) nutrient resources, and protect water quality via clear accounting of the inputs and outputs of nutrients from a field, farm, or watershed. Main nutrient inputs to farms include synthetic and mineral fertilizer and imported feed to meet livestock nutritional demand. Dominant nutrient outputs include crop exports and livestock products (e.g., milk, meat). Nitrogen outputs also occur through gaseous emissions. When inputs exceed outputs, nutrients accumulate within the system, making them more susceptible to loss in the future. Nutrient losses over time can cause or contribute to an impairment of a water body. In agricultural landscapes, this nutrient accumulation or loss largely takes place in soils. As soil nutrient inputs/concentrations increase, the risk of nutrient loss from land to water is enhanced.

Some phosphorus budgets are not balanced

A new analysis of county-scale inputs and outputs of agricultural phosphorus shows a lot of variability in phosphorus budgets (Figure 3). Many counties - where agricultural production is dominated by corn and soybean production and livestock populations are relatively low - have negative balances (i.e., more phosphorus outputs than inputs) that may be contributing to a lower risk of phosphorus runoff. Other counties that are dominated by dairy production show positive and increasing balances (i.e., more phosphorus inputs than outputs), which indicates a higher and growing risk of phosphorus runoff.

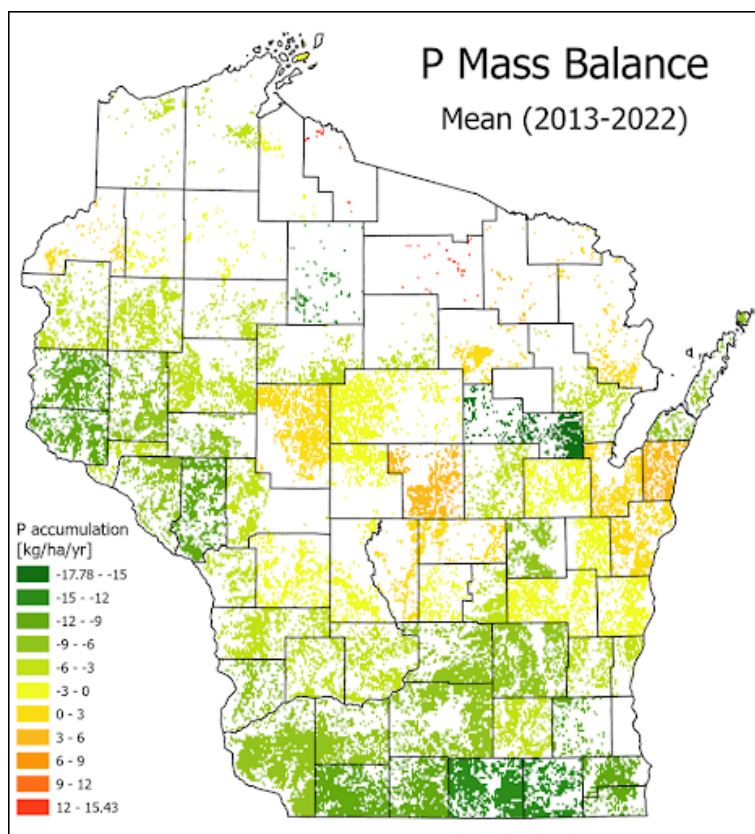


Figure 3. County-scale average annual phosphorus mass balances on agricultural land from 2013-2022 based on inputs of fertilizer, feed imports, and atmospheric deposition and outputs of crop exports, livestock products, and stream exports (Eric Booth, 2024, unpublished data).

Policy Option 3a: Invest in technology and manure distribution to balance nutrient budgets

Background on concentrated animal production and modern large-scale dairy farming

In recent decades, concentrated animal feeding operations (CAFOs) have grown in Wisconsin. As authorized by the CWA, the WDNR requires all CAFOs with more than 1,000 animal units (e.g., 700 dairy cows) to obtain and comply with a permit meant to reduce the discharge of nutrients. Given the large number of livestock situated in one place, managing their manure can be challenging but essential for protecting nearby waterways. NR 151.08 prohibits livestock operations from having direct runoff from manure storage areas or feedlots into waters of the state. In addition, NR 243 requires CAFOs to manage manure and process wastewater applications according to a nutrient management plan and meet specific phosphorus runoff performance standards.

However, this set of rules has not eliminated the debate on challenges of managing manure from CAFOs. In a 2022 study by the Environmental Working Group, researchers found that in 4 of the 9 Wisconsin counties they studied, nitrogen from fertilizer and manure is applied at a rate that is 50% above the nitrogen rates recommended by UW soil scientists to meet crop demand. Interviewees had mixed responses to this study. One interviewee responded that this result could be deceptive because the vast majority of these nutrient applications could still have been in compliance with NR 243 rules, such as manure application to alfalfa, which allows for safe disposition of manure and helps facilitate no-till and cover crops in corn. Others agreed that these applications may have been in compliance, but still represent problematic nutrient mass imbalances that can cause or contribute to water quality problems downstream.

The high fertilizer and manure application rates may have increased the risk of nutrient loss into waterways in some counties. In addition, data from DATCP from 2006 to 2023 shows that nitrogen fertilizer sales in the state of Wisconsin more than doubled from 159,000 tons to 404,000 tons suggesting an overall enhanced risk of nitrogen loss to groundwater. In dairy intensive regions, increased manure applications coupled with increases in precipitation in large storm events has multiplied negative pressures on water quality.

“From the farm perspective...there's so many newer technologies for manure on the farm, so there's less water to haul, it's easier to apply, more bioavailable.” Industry/Farmer
(Interview 17)

Manure Digestion, Nutrient Concentration Systems and Exports

Although nutrient imbalances and losses to surface or groundwater are likely occurring in some areas of Wisconsin, technological advancements show some promise to help reduce nutrient pollution from CAFOs. One example of this is the growing investment in manure digestion and nutrient concentration systems. Manure digestion is the process of using microbes to convert organic material in the manure to methane and carbon dioxide gas that can then be used for other purposes (e.g., methane for energy). The digestion process also reduces the spread of odors and can kill some pathogens in the manure. The material after digestion is called digestate and has a liquid and solid form that contains the same amount of nitrogen and phosphorus as the raw manure. Notably, digestion alone does not change the manure nutrient imbalance and management challenges.

Some digester systems are taking advantage of the collection and processing of manure for digestion by adding a nutrient concentration system that essentially separates pure water from the concentrated nutrients. Without the water, manure nutrients are much less heavy and expensive to transport to fields that could benefit from additional nutrients (i.e., moving nutrients from places of excess to places of deficit), including fields outside of the local watershed. Some newer systems are even able to separate phosphorus and nitrogen leading to more precise matching to crop demand. Although digesters have been touted by some as a major part of the solution to water quality problems and an economically viable way of producing energy, the addition of a nutrient concentration system is essential for better managing nutrients and reducing nutrient imbalances. Wider adoption of these systems has been limited due to their cost and a nascent market for the nutrient outputs. Others are also concerned that these larger costs will only be acceptable for very large operations and smaller operations will be left behind, leading to further consolidation and declines in the number of dairy farms. Lastly, solid manure can also be composted, which can reduce nutrient loss, kill pathogens, and improve the soil's water holding capacity, when properly implemented; however it still contains the nutrients which would then need to be distributed to fields lacking nutrients.

“We do have the technologies to concentrate the nutrient sources within our liquid manure systems... but it's just not economically feasible at this point to really do that on such a large scale.” UW-Madison Extension (Interview 12)

“When technology does come around for water reduction and treatment of manure, much like municipalities, the big operators are going to be able to afford that...and the smaller guys can't keep up with that technology.” County conservationist (Interview 9)

Policy Option 3b: Enhance transitions to grazing and low-input perennial agriculture to balance nutrient budgets

Perennial agriculture provides a contrasting option for drawing down nutrients in farmland, protecting the soil from erosion with year-round ground cover, and reducing runoff via higher water infiltration through active living roots and better soil health. In contrast with the technological option of nutrient concentration and distribution in Option 3a, this Option 3b envisions a transition to low-input perennial agriculture such as management-intensive rotational grazing with much lower risk of losing nutrients to downstream waters. In conjunction with incentive programs, methods of low-input perennial agriculture enable farmers to make changes to their farms to lower nutrient losses. Options in this realm include mixed-crop livestock farming, well-managed grazing, and prairie strip planting. Creating “resilient grazing lands” allows for the preservation of erosion-resistant plant cover retaining the soil's nutrients which further prevents losses to water bodies. In addition to the high environmental performance of perennial agricultural systems, the lower input costs and capital investments associated with well-managed grazing can make these systems more profitable with positive implications for the overall health of rural communities. These systems can also present a lower barrier to entry for new farmers that could help increase the number of underrepresented communities in agriculture. Examples of well-managed grazing operations in Wisconsin include those for grass-fed beef production, dairy heifer raising, and milk production.

“Consumers are ... waking up to...animal welfare standards and soil health and the benefits of grass-fed...products.”

Valerie Dantoin, Beef Grazier, Full Circle Farm & Instructor,
Northeast Wisconsin Technical College, WI

It is typically easiest for dairies to add grazing of heifers or dry cows, since lactating cows require more intensive nutrients. Some dairy farms in northeast Wisconsin have started to graze heifers. Larger dairies did not always see a transition to grazing as an easy endeavor:

“If you have a [CAFO] permit and you want to do managed grazing, there may be a lot more requirements because of your permit. It can be done, but it might be more work. So farmers may feel tired of all the paperwork they already do for their permit and don’t have the capacity to do more.”

Industry/Farmer (Interview 17)

As explained by the DNR, generally, grazing areas and pastures are excluded from CAFO permits unless they are defined as a “CAFO Outdoor Vegetated Area” which is a pasture/grazing area adjacent to the production area, according to NR 243.03(13). DNR does monitor pastures/grazing areas operated by permitted CAFOs by checking stocking densities and locations of supplementary feed sources to ensure sufficient vegetation is maintained throughout the grazing area. DNR can require a pasture management plan to bring the area back into compliance. Alternatively, CAFO pasture/grazing areas can be defined as an outdoor feedlot, in which case they would be under permit coverage and potentially need additional runoff controls.

The NRCS has recently been funding the Grassland 2.0 Academy to train Technical Service Providers to write grazing management plans. Increasing the number of people who can write plans and advise farmers during a critical transition period was mentioned as a critical strategy for increasing the number of acres under managed grazing. When managed well, grazing can be a benefit for water quality through enhanced ground cover reducing erosion and runoff and very low imports of nutrients from off-farm.

4

Advance norms and farmer networks

It is important to note that Wisconsin has had great successes as an innovator in supporting farmer networks such as producer-led watershed groups. The Wisconsin Producer-led Watershed Grant, which was started in 2016, partners farmer-led local groups with the University Extension, WDNR, and other nonprofit conservation organizations to develop innovative conservation techniques that are not already included in state and federal guidelines. These groups can then apply for grants from the Department of Agriculture, Trade, and Consumer Protection to implement these practices. As of 2024, roughly \$6.2 million has been allocated to 49 different groups since the program went underway in 2016. The community building and resource sharing model of these groups is seen as beneficial not only in expanding knowledge of soil protection measures, but also in fostering cooperation between farmers through grassroots organization.

"...the whole reason that we have this watershed group is we want to be able to show farmers in this area that no till and cover crops actually work this close to Lake Michigan. And the whole idea is that we lead by example, so that we don't have to be regulated on the backside...we really want the farmers to realize the value of what we're doing and be able to make that journey and that transition by themselves."

Brody Stapel, President of Sheboygan River Progressive Farmers (SRPF)

"So often, if somebody gets a ticket or a fine for doing something different, they're in a very negative mindset of 'what is the least amount of work and effort I can put into this, just get this off my back'? Versus our (producer-led watershed group) approach is, here's a little pot of money, here's a problem that you've been looking at for years, try something different with no strings attached...They're (the government) trying to push somebody through a pipe and we're trying to lubricate the pipe, so if they want to go through, they can get through."

Don Niles, Kewaunee Farmer and Peninsula Pride Farms Board Advisor

"It'd be naive to suggest that agriculture isn't part of the problem. It's a large part of the rural landscape and community, so it's going to be a fairly large part of the problem. But that's also an opportunity to be a large part of the solution, IF people are willing to work with agriculture. Dictating to farmers and beating up on us won't fix anything. That's been tried before."

Paul Cornette, Kewaunee Dairy Farmer

"We can be in closer intimate contact with our neighbors. And we don't have the human nature stigma of we're here to make you do something different. But we're here to help you try something different if you want to try it."

Don Niles, Kewaunee Farmer and Peninsula Pride Farms Board Advisor

There are some differences between prioritizing farmer leaders who can play key roles in the social adoption of conservation compared with prioritizing the farms and fields that most need a change in practices:

“So it's not really, you could say, prioritizing the most vulnerable fields that really need to be addressed, but we're doing it rather through gathering excitement and energy and enthusiasm within the early adopters, that ideally will then, through trust and relationships with other farmers, get those practices adopted on their farms as well.”

Steve Richter, The Nature Conservancy's former Director of Agriculture (Interview 13)

Farmer-led groups often play critical roles in promoting farm conservation practices including in-field and edge-of-field practices. Participants shared with us a need to continue supporting collaborative watershed groups with people of diverse interests and backgrounds doing watershed planning and implementation that focuses on hot-spots and downstream outcomes, as well as farm conservation practices.

Policy Option 4: Support farmer networks to share resources and strengthen conservation norms

One of the major premises of producer-led watershed groups, such as Peninsula Pride Farms, is that farmer adoption of conservation practices can be enhanced through networks of farmers and advisors who share information and resources, and deepen conservation norms. Considerable social research shows that farmer social networks and trusting relationships can enhance conservation adoption by providing a space to share knowledge and learn from others. Farm tours can provide a low-risk way to see conservation practices in action from local peers. Networks can also provide the practical resources for producers, such as seed or equipment, that create barriers to adoption. Farmer leadership is central to advancing farmer networks and organizing.



Peninsula Pride Farms Field Day, Brey Cycle Farm. Managed grazing and digging into soil health with Jamie Patton, August 2022 (Photo by Adena Rissman)

“Let's say you wanted to try a practice and you're willing to buy the seed, but you don't know where the equipment is available to even plant that seed or you read about something, you saw it on a field day somewhere else, you want to try it, but you're not sure where the resources are that help you get it done... That is a limitation of people sometimes.”

Don Niles, Kewaunee Farmer and Peninsula Pride Farms Board Advisor

5

Enhance capacity for implementation and technical assistance

We consistently heard a need for trained conservation staff to work with producers and advance management plans and cost share agreements in a timely way. A substantial increase in county conservation budgets (for both county staff and cost-share payments) is necessary to expand technical assistance and financial resources to help increase nutrient management and reduce nitrogen or phosphorus losses from cropland across the state.

“I think this gets back to funding... we don't have the people on the land providing that facilitation and or technical assistance.” Environmental NGO
(Interview 6)

“...we need to provide the necessary technical support of people and professionals to help agriculture and help farmers determine how to meet those water quality goals. We can't just tell them, ‘The downstream waterways are polluted. Fix it.’ We need to help them access technical support and appropriate levels of funding...But right now, we're just woefully short on the amount of people that it takes to do the work.” Matt Krueger,
Wisconsin Land + Water

“In areas of the Northeast Lakeshore or other areas of the state, where there's concentrated agriculture, there has been little or no progress over the last decade. Some of that is due to the fact I believe that there hasn't been enough resources, both in terms of people and funding...” Water quality administrator (Interview 15)

Policy Option 5: More fully fund county land and water conservation staff

Counties have variable budgets for land and water conservation, and the state's contribution to those county budgets has been reduced. County land and water conservation departments are responsible for boots on the ground implementation of nutrient management planning and oversight. Many of the counties with the highest percentages of agricultural land have the smallest budgets for land and water conservation. An increase in county conservation budgets can help encourage nutrient management and farm conservation practices through expanded technical assistance that aids farmers in the implementation of conservation practices.

"It takes resources. Can't be done with mailings and impersonal things. Those things help, but the one on one, somebody that they can identify with is important... When you don't have enough staffing or a lot of resources, that's a definite hindrance."

County conservationist (Interview 1)

Conclusions

We identified substantial disconnects between current agricultural runoff performance standards and their ability to attain in-stream water quality standards through interviews with a wide range of farmers, advisors, and local, state, and national governmental and civil society professionals. Although nutrient management plans are required under state rules (NR 151 or 243), interviewees pointed out several disconnects between planning, implementation, and water quality improvement. While CAFOs have to submit nutrient management plans to DNR annually (NR 243), the majority of non-CAFO farmland operators are required to have a nutrient management plan to apply manure or fertilizer, but are not required to annually submit a nutrient management plan (NR 151). Further, farm field management is not always conducted in compliance with nutrient management plans, while conservation practices on farms without plans are not tracked. Farmland Preservation Program tax credits help ensure farms meet state soil and water standards, but only a minority of farms claim the tax credit. Finally, nutrient management in compliance with NR 151 or NR 243 rules may not be sufficient to actually improve water quality in water bodies according to recent TMDL analyses.

We have summarized varying perspectives on options for aligning in-field standards with in-stream water quality standards. Some options are already underway, such as greater support for producer-led watershed groups. There is a current increase in conservation cost share funding through the federal government. Many people suggested that a combination of increases in incentives (both public and market-driven), innovations in technology, and regulatory advancements are essential for achieving water quality goals. Without broader change in markets or regulations, many thought that the actions of farmers who have been early adopters of conservation practices would be insufficient to improve water quality. Yet regulatory change to update state rulemaking to strengthen the current PI performance standard in NR 151 and 243 is a challenging process without consensus among interest groups. Considerable commentary focused on the limitations of a PI of 6 (rotationally averaged) or 12 (annual maximum) to meet water quality goals and the need for a better regulatory framework for nitrogen.

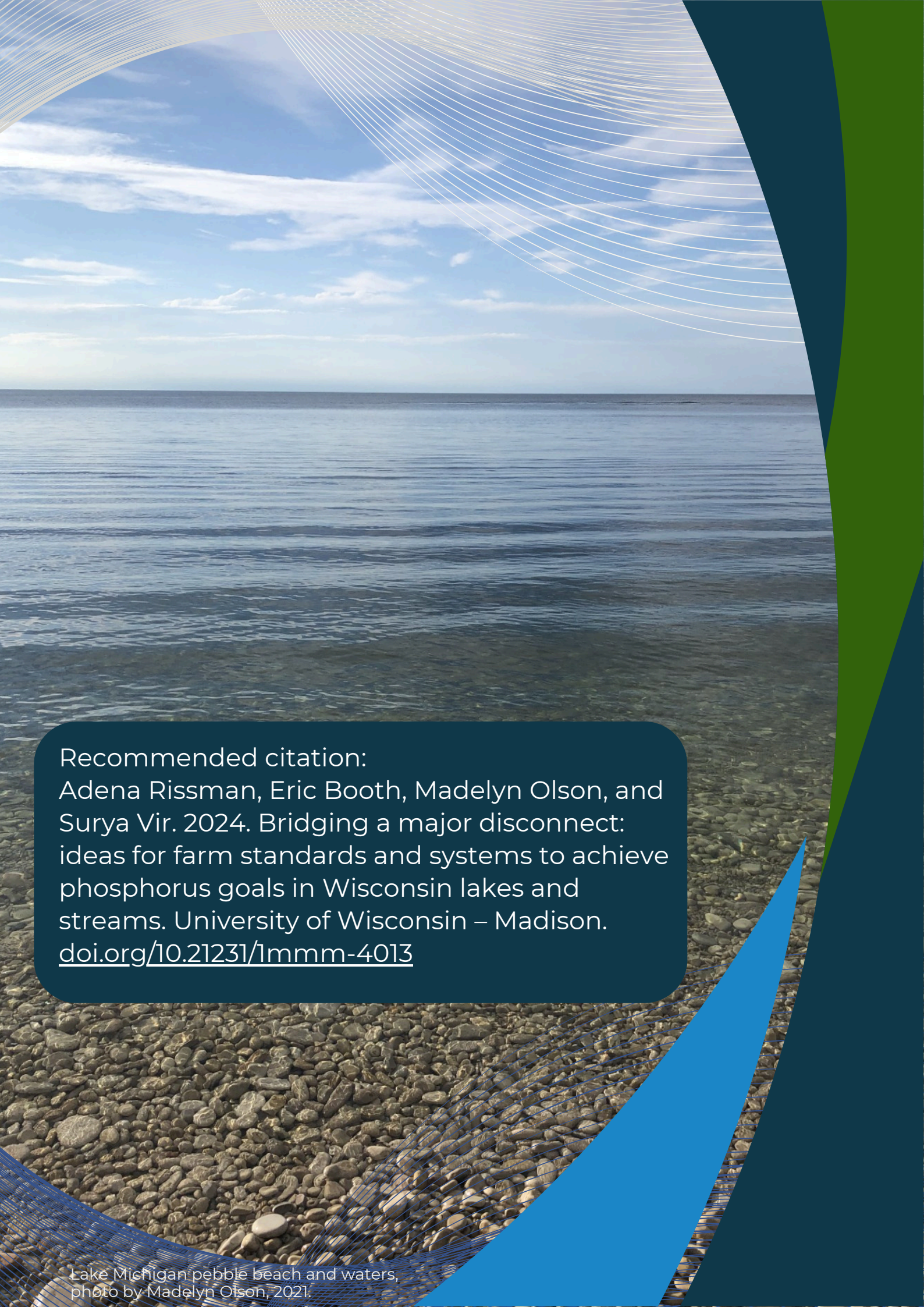
We hope that better understanding community member perspectives on policy options can help identify disconnects and innovations for helping to improve water quality and reduce farmer nutrient costs while continuing Wisconsin's proud agricultural traditions. We heard an urgent need to make progress together.

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A photograph of a pebble beach and Lake Michigan waters under a blue sky with white clouds. The foreground is filled with smooth, grey pebbles. The water is calm and blue, meeting a clear sky at the horizon. The image is framed by a large, curved white line in the upper left and a green and blue abstract shape on the right side.

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