



2020 Annual Report





ABOUT YAHARA WINS

The Yahara Watershed Improvement Network, known as Yahara WINS, is a long-term initiative to achieve clean water goals for the Yahara watershed. In this effort, community partners, led by Madison Metropolitan Sewerage District, are collaborating on a strategy called watershed adaptive management in which all sources of phosphorus in the watershed work together to reduce nutrient runoff over 20 years. The work began in 2012 and following a four-year pilot effort, it has transitioned to the full-scale implementation throughout the whole watershed. 2021 marks the fifth full year of the initiative.

Photo descriptions:

Cover: Fall-planted winter rye cover crop the spring after it was planted.

Above: Corn silage residue with fall-planted winter rye cover crop. This photo was taken following low-disturbance manure injection.

President's Message

INGENUITY and ADAPTATION



*Martye Griffin,
Yahara WINS
president*

This past year emphasized that nothing is certain. Who would have imagined at the beginning of 2020 how much different our lives would look by the end of it? For many of us, our plans and routines were dramatically altered. Even now, there is still uncertainty about how our lives will look in the future, from how we work to how we'll respond to other crises like climate change.

But 2020 also showed us that in the face of daunting challenges and uncertainty, people can be resilient and ingenious. It only took a year from the beginning of the pandemic in the U.S. to the availability of multiple safe and effective vaccines — a remarkable human achievement. Meanwhile, on a more personal scale, many people adapted their behaviors to a new situation to help others by working remotely, social distancing, and contributing aid to their communities.

It's accomplishments like this that can give hope for tackling the complex challenges we face, from global threats like climate change to local issues like water pollution. We see examples of innovation and creativity right here in the Yahara watershed. In 2020, conservation practices continued to gain popularity among local farmers, helped along by early leaders who demonstrated how these practices can work on their farms. Yahara WINS grants funded research and exploration of new practices, such as treating manure to remove phosphorus, that could pave the way for new approaches to

CONTENTS

2020 Phosphorus Reductions	3-4
Partner Highlights	5-6
Growing Participation	7
Yahara Pride Farmer Profile	8
Innovation Projects	9-10
Water Quality Data	11-12
Water Quality Q&A with Todd Stuntebeck	13-14
Financials	15-16

phosphorus reduction in the future. And beyond Yahara WINS, project partners are finding innovative ways to reduce phosphorus, such as Dane County's legacy sediment "Suck the Muck," which are projects that are achieving success across the watershed.

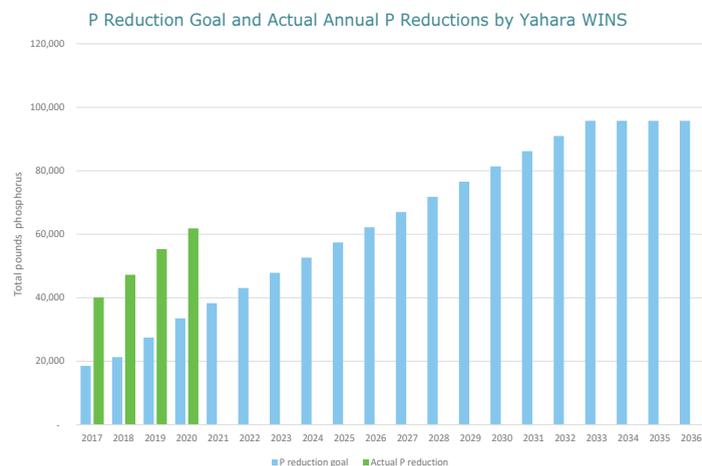
Where there is a large challenge, there can be uncertainty, but there can also be optimism. Here in the Yahara watershed, although we face the uncertainties of climate change and evolving land use patterns when looking to the future of what our regional water quality can be, we find optimism in the dedication and ingenuity of project partners to solve problems — and what they have already accomplished so far.

2020 PHOSPHORUS REDUCTIONS

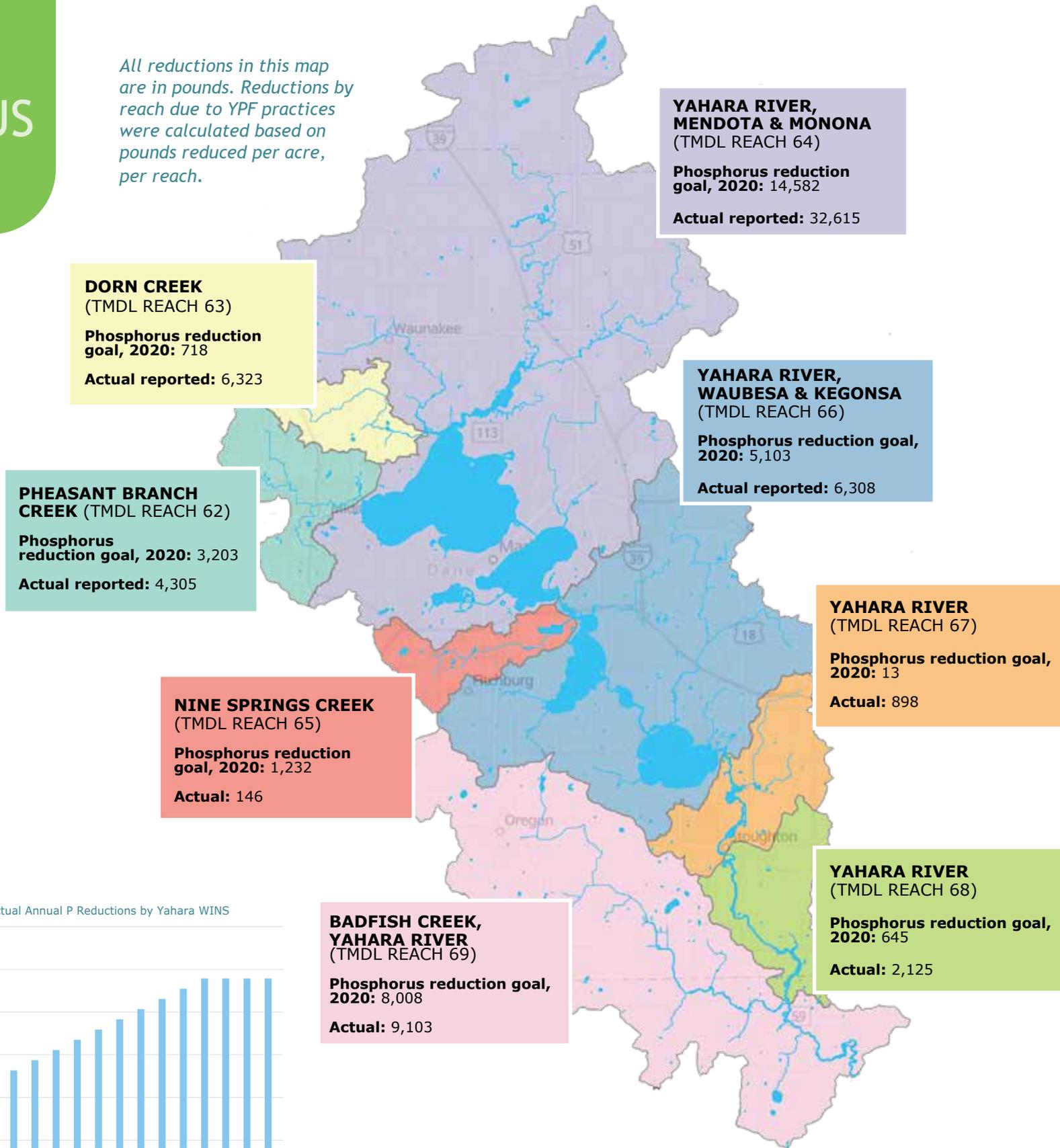
SUMMARY OF REDUCTIONS

Yahara WINS partners reported phosphorus reductions significantly above the reduction goals for 2020 in the project's cost model, meaning the project is exceeding expectations for modeled phosphorus reductions at this point of the project. The annual reduction goal for 2020 was 33,503 pounds, and partners reported a **total annual reduction of 61,823 pounds.**

The map at right shows how much phosphorus was reduced in 2020 per reach (sub-area) of the Total Maximum Daily Load (TMDL) area. Note that the pounds reduced per TMDL reach will vary from year to year, with some reaches above and some below their projected reduction. This is because opportunities for phosphorus reduction in the early years of the project have arisen in certain areas of the watershed, leading to greater reductions in those areas.



All reductions in this map are in pounds. Reductions by reach due to YPF practices were calculated based on pounds reduced per acre, per reach.



HOW PHOSPHORUS REDUCTIONS ARE DETERMINED

The pounds of phosphorus reduced by each TMDL reach are reported by the partners that help implement phosphorus-reducing practices: Dane County Land and Water Resources Department (LWRD), Yahara Pride Farms (YPF), Rock County Land Conservation Department (LCD), Columbia County Land Conservation Department (LCD), and Yahara WINS grant recipients. Partners determine the amount of phosphorus reduced based on models, which predict how much a given conservation practice (or mix of practices) will reduce phosphorus runoff.

No model can capture 100 percent of the complexity of a real-world watershed, including unpredictable weather and changes to practices on the land, but these models represent best available current data and are periodically updated as conservation experts learn more about factors that affect phosphorus runoff.

In addition to tracking modeled pounds, Yahara WINS collects water quality monitoring data to determine what phosphorus levels are present in water bodies while practices are being implemented on the land. The modeled phosphorus reductions count toward the District's phosphorus reduction goals for the adaptive management project, while the water quality monitoring data can tell how effective those on-land practices are over time and can indicate whether more actions are needed to achieve the in-stream phosphorus concentration standard.

PARTNER HIGHLIGHTS



Photo: fall-planted winter rye cover crop

Yahara WINS provides funding to conservation partners to incentivize and facilitate implementation of conservation practices throughout the watershed that are designed to keep nutrients on the land. Dane County LWRD, YPF, Rock County LCD,

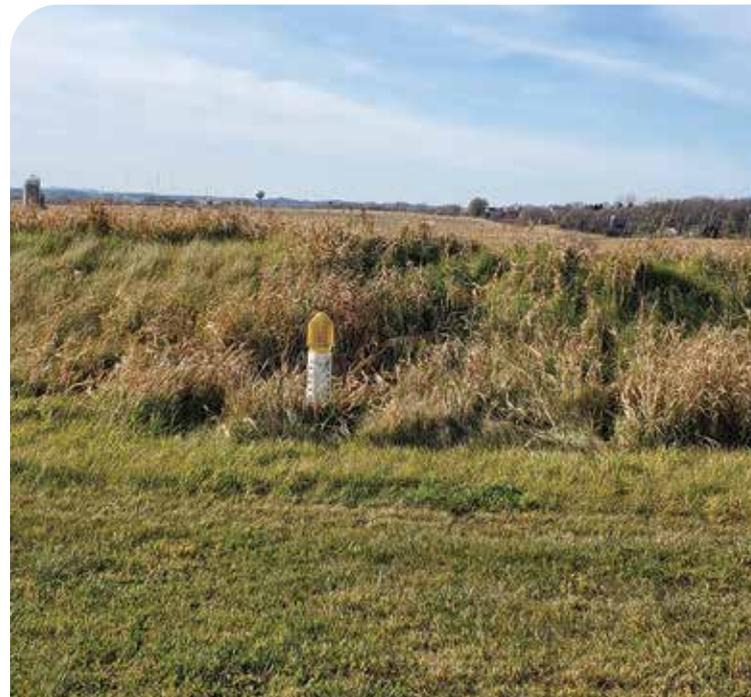
and Columbia County LCD receive Yahara WINS funding that is used to support staff time and cost-share to assist farmers with the implementation of phosphorus reduction practices. This section contains highlights of their work to support Yahara WINS in 2020.

DANE COUNTY LWRD

Dane County performs some conservation activities specifically in support of Yahara WINS and with WINS funding, and conducts many other activities with its own funding and elsewhere in the county. Efforts in the Yahara watershed in 2020 include:

- Reduced a total of **20,150 pounds of phosphorus** from new and existing conservation practices
- Assisted 215 farmers in conservation activities and environmental compliance.
- Implemented 138 new conservation practices in the watershed.

Outside of Yahara WINS, Dane County also completed other conservation actions individually that will help water quality in the watershed, including acquisition of lands for conservation and completion of sediment removal in Token Creek, a Class II trout stream, through its Suck the Muck initiative.



A water and sediment control structure constructed by Dane County LWRD staff in 2015.

Photo: Dane County

ROCK COUNTY LCD

Rock County contains a small portion of the Yahara watershed, where the Yahara River enters the Rock River. Many practices that Rock County helped implement in 2020 took place along the Yahara River, directly preventing runoff into the river.

- Reduced a total of **3,247 pounds of phosphorus** from practices including harvestable buffers, a grassed waterway to control gully erosion, and wetland development within cropland to retain runoff. Of the total pounds reduced, 1,669 were from new practices in 2020, and 1,578 pounds were carryover from existing practices.
- Educated 5 landowners in the Yahara watershed about the Yahara WINS project.
- Planned for 4 additional harvestable buffers and a new wetland restoration in 2021.

COLUMBIA COUNTY LCD

The small, northernmost part of the Yahara Watershed is in Columbia County. Yahara WINS entered into a phosphorus reduction agreement with Columbia County in 2018, making them the most recent conservation partner to join Yahara WINS. Columbia County has not yet reported phosphorus reductions as a part of Yahara WINS, but is in the process of gaining landowner support for voluntary implementation of conservation practices on their land.

Full partner reports describing activities performed for Yahara WINS in 2020 are available at:

www.yaharawins.org

YAHARA PRIDE FARMS

Yahara Pride Farms (YPF) is a farmer-led watershed group, established in 2011, that promotes the implementation of conservation practices on farms in the Yahara watershed. In addition to distributing cost-share to fund these practices, YPF conducts extensive education to area farmers to introduce them to new farming practices that can keep soil and nutrients on the fields where they belong. Highlights of 2020 include:

- A record-high number of sign-ups for cost-share (see page 7 for more information)
- Reduced a total of **39,950 pounds of phosphorus** (rounded to nearest 10).
- Added new practices eligible for cost-share: seeding grasses with alfalfa to increase the vegetative cover on alfalfa fields and delayed termination of alfalfa from fall to spring to keep roots in the soil over winter.
- Added about 600 acres of fields with multiple conservation practices, providing extra runoff protection to high-risk fields.

GROWING PARTICIPATION



RECORD-HIGH YAHARA PRIDE FARMS SIGNUPS

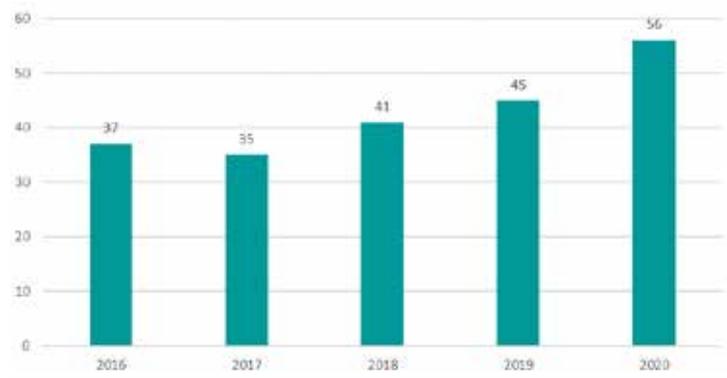
In 2020, a record number of farmers in the watershed signed up for cost-share for conservation practices through Yahara Pride Farms (YPF), which receives funding from Yahara WINS. With the addition of 18 new farms in 2020 (a net increase of 11 from 2019), 56 farms implemented one or more conservation practices with the help of YPF cost-share. According to YPF, the increased signups may have partially been due to favorable weather for conservation practices, but also the increasing interest in conservation practices.

The practice with the biggest increase in signups from 2019 to 2020 was overwintering of cover crops, a practice that has been shown to result in 55% less water runoff and 50% less

soil loss annually than on fields with no cover crops. Additionally, YPF began offering cost-share in 2020 for a new practice of delayed termination of alfalfa, which keeps alfalfa on fields over the winter rather than terminating it in the fall. Twenty-three farmers signed up for this practice, which acts like a cover crop to stabilize soil to prevent runoff.

YPF has been helping local farmers become more familiar with new conservation practices and learn how they can be implemented on their farms. Before implementing new practices, farmers need to have confidence that the practice will work on their farms. Through demonstration days and peer education, YPF is helping farmers grow that confidence in new practices and is providing resources to make implementation of those practices possible.

Number of participating farms in YPF cost-share programs by year



Signups for YPF cost-share have increased as the Yahara WINS project progresses and area farmers learn from other farmers about successfully implementing conservation practices.

YAHARA PRIDE FARMS FARMER PROFILE

We talked to Al Kalscheur, a farmer in the Sixmile Creek watershed north of Lake Mendota, about his runoff management practices and participation in YPF's cost-share program.

About the farm: Kalscheur operates a third-generation dairy farm. He milked cows until 2011, and now raises young heifers for other dairy farms in the community. He also grows crops on about 200 acres to feed the youngstock, and other area farmers use some of his acres to grow corn.

Conservation practices on the farm: Kalscheur has implemented several practices with the help of YPF cost-share:

- **Cover crops.** He plants winter rye, which not only helps keep soil on the land over the winter and spring, but also is used as a feed source for the youngstock.
- **Delayed alfalfa termination,** in which alfalfa is kept on fields until spring rather than being terminated in the fall. This practice helps prevent runoff, but may create less-than-ideal field conditions in the spring; the cost-share helps compensate for the less desirable conditions.
- **No-till practices,** which reduce soil disruption and nutrient loss.

Involvement with YPF: He got involved with YPF because he had interest in conservation activities that aligned with the practices YPF promotes. Previously, he had worked with Dane County LWRD to install a manure collection and diversion system, which had the dual benefits of reducing runoff to a nearby ditch and helping to mix his manure storage pit.

"When I heard about the program, I thought, 'Well, that's kind of what I'm doing,'" Kalscheur said about the types of conservation practices YPF promotes. He said that the incentives and opportunities to learn about what other farmers were doing were additional motivations to participate in YPF conservation programs.

Farmers in the area are constantly learning from each other, he said, getting ideas for their own farms by seeing conservation practices working on other farms. The result is more and more farmers having success with conservation practices that at one time wouldn't have seemed possible. Kalscheur said his grandfather would have said some modern conservation practices, like no-till, would never work.

"But that's not the case," said Kalscheur. "It can be done."



"Around here, I think everybody is pretty much in [Yahara Pride Farms], or knows about it for sure ... we're all pretty aggressive around here, and if something works, they're going to try it, too."

- Al Kalscheur

Below: A stalk of winter rye from a cover crop Kalscheur planted.



INNOVATION PROJECTS



Yahara WINS prioritizes creative approaches to reducing nutrient pollution. New approaches to conservation can help overcome barriers to implementation, allowing farmers to incorporate conservation practices in ways that work for their farming operation. The following examples highlight how Yahara WINS funding is helping partners test out and implement new conservation practices that reduce phosphorus runoff.

TRC MANURE AERATION STUDY

Untreated manure is high in phosphorus, so farmers face a difficult choice between applying too much phosphorus to a parcel of land or transporting manure farther away, which is time-consuming and expensive. Yahara WINS awarded a grant in 2020 to TRC, a consulting firm, to test methods for treating manure to reduce its phosphorus content.

In the project, manure from storage lagoons on a beef cattle farm was aerated to reduce their phosphorus content. In the aeration process, microbes consume phosphorus out of nutrient-rich wastewater and settle out, leaving less phosphorus in the liquid portion. There had been previous studies conducted in a lab to aerate the wastewater from the beef cattle farm, but the Yahara WINS grant funded this process at a larger scale to see if it would work in practice on a farm.

The study found that aeration of beef cattle manure reduces the phosphorus content of

liquid manure by 90%. This means that if a cattle farmer were able to implement manure treatment on site, they could spread the same amount of manure on the same amount of land with a much lower phosphorus impact on that parcel of land.

This manure aeration tank, onsite at a beef cattle farm, treats manure to separate phosphorus from the liquid portion, similar to how a wastewater treatment plant operates.



Photo: TRC

DANE COUNTY COVER CROPPING ENHANCEMENTS

Cover crops are a conservation practice that reduce runoff by holding soil in place between the harvesting and planting of cash crops. They have been a popular practice in the Yahara WINS project, with several area farmers implementing cover crops. In 2020, Dane County LWRD and UW-Extension received a Yahara WINS grant to support testing of innovative approaches to cover cropping to increase the efficiency and effectiveness of implementing this practice.

The project involved the use of a farm implement called a roller crimper to streamline the transition between cash crops and cover crops. A front-mounted roller crimper flattens the cover crop in the spring while simultaneously planting, allowing the farmer to reduce passes over the field, which saves time while avoiding the use of herbicides to terminate the cover crop. Another configuration of the roller crimper allows for crimping in-row while planting.

The project resulted in a modeled phosphorus reduction of 895 pounds in 2020 at a cost of \$28 per pound, making it a relatively low-cost phosphorus management technique. Dane County plans to continue assessing the return on investment of this practice and demonstrating it to local farmers to help increase its adoption.



This front-mounted roller crimper allows for simultaneous flattening of a cover crop while planting a new cash crop.

Photo: Dane County

Top photo: Manure composting at Berryridge Farm, Waunakee. YPF is leading an effort to encourage more manure composting, an innovative practice supported by Yahara WINS.

WATER QUALITY Q&A

Yahara WINS receives water quality monitoring data that shows phosphorus contributions to local lakes and in-stream phosphorus concentrations each year. So what does this data mean? USGS scientist and Yahara WINS partner Todd Stuntebeck provides more context for water quality monitoring data in the following Q&A.

How does USGS monitor water quality throughout the watershed for Yahara WINS?

The Sixmile Creek watershed was selected by Yahara WINS as a pilot watershed to begin data collection. One of the reasons it was selected was to fill a known data gap — both Sixmile Creek and Dorn Creek (a subwatershed of Sixmile Creek) were both unmonitored tributaries to Lake Mendota — and because the Sixmile Creek watershed was an identified “pour point” by the Rock River TMDL. At each monitoring location, we collect water samples via an automated sampler during snowmelt or rainfall-induced runoff events. Selected samples are sent to the District laboratory for suspended solids and nutrients analyses. The resultant concentrations are used in conjunction with continuous streamflow data to compute daily loads (pounds or tons). These data help us understand annual and seasonal loads to Lake Mendota, and to help determine the long-term effects of urban and rural conservation practices applied to the watershed landscape. We also collect and analyze a water sample on or near the 15th of the month between May and October. The phosphorus concentrations from these samples are used to compute the median Growing Season phosphorus concentration, which is targeted to be 0.075 mg/l or lower.

How do you distinguish between trends and variation from year to year?

Annual trends of loads in a stream can really only be properly evaluated after a number of years of data are collected —some may say as many as 10 or even 20 or more, but it is highly dependent upon the system one is measuring. This is because variation in loads from year to year can be quite substantial. As an example, during Water Year 2019, more than 150,000 pounds of phosphorus were delivered to Lake Mendota from the tributaries alone, while about only half of that was delivered in 2020. This large reduction in loading was primarily due to differences in weather patterns (snowfall and snowmelt, rainfall, rainfall intensities and frequency of rainfall events), rather than the effects of conservation practices. More years of data collection help to cut through this inter-annual variation in streamflow and phosphorus loads and allows us to “see” the true trend signal.

What does phosphorus loading data tell us compared to concentration data? What does each type of data mean for Yahara WINS?

Loads are computed by multiplying the concentrations of a particular constituent (sediment, phosphorus, nitrogen) in the stream by the amount of flow in the stream. Loading data tells us how much of a particular constituent is being delivered downstream. Many of our monitoring stations are located upstream from Lake Mendota, so we can determine how many pounds of phosphorus and other constituents are being delivered to the lake. Those data can also be used to determine how effective rural and urban conservation practices have been over time. The concentration of a constituent in the stream is what the biota [*living things*] in the stream are experiencing. Some constituents have concentration standards set; for example, the phosphorus standard established for most streams in Wisconsin is 0.075 mg/l. For the purposes of Yahara WINS, getting the growing season (May through October) concentration below that standard is the adaptive management goal.

How can the data inform future decision-making in Yahara WINS? For example, what can the data tell us about the types and locations of practices that can have the biggest impact?

It is very difficult to determine the benefits of specific practices or their locations when measuring in a stream that has a large watershed unless one makes very substantial changes to many areas in the watershed. This is because many different sources in the watershed contribute runoff and phosphorus to the monitoring locations. If we can reduce the impacts of these other sources or greatly increase the implementation of practices in critical areas, the possibilities of assessing the value of those practices is more achievable.

What should partners know as they look at Yahara WINS data?

It takes a well-organized and trained team of people to collect, analyze and interpret the data that USGS generates for Yahara WINS. There are numerous policies and procedures that we follow to assure that the data that we report are of high quality and accuracy. The weather often dictates how and when field-collection activities are conducted, so much of this work can't be planned. In addition, the times at which field efforts must be done are often the worst times to be outside weather-wise. We have a small team of people at the USGS that are dedicated to making sure the best information is provided to the District for the WINS effort.

FINANCIALS

2020 FINANCIAL SUMMARY

The accompanying tables show Yahara WINS expenditures in 2020 as well as the adopted budget for 2021. The project ended the year with more unencumbered carryover than expected due to some anticipated projects not being carried out in 2020. Specifically, partners determined that the SWAT model update was not necessary, a new USGS gauging station was not funded in 2020, and interruptions to supporting services due to COVID-19 led to lower spending than budgeted.

The vast majority of Yahara WINS funding comes from Intergovernmental Agreement (IGA) signatories, which are local municipalities and utilities with a regulatory requirement to reduce phosphorus as part of the TMDL. However, Yahara WINS leadership is exploring additional funding options to provide the project with greater financial resilience and support for creative conservation projects.

2020 ADOPTED BUDGET (rounded to the nearest \$100)

Unencumbered carryover from 2019	\$0.00
REVENUE	
IGA participants	\$1,426,035
Income from grants, other MOUs, etc.	\$0
MGE Foundation	\$5,000
Savings account interest	\$4,000
<i>Total Revenue plus unencumbered carryover</i>	<i>\$1,435,035</i>
EXPENDITURES	
Phosphorus reduction	
Dane County phosphorus reduction services agreement	\$540,000
Columbia County phosphorus reduction services agreement	\$20,000
Rock County phosphorus reduction services agreement	\$95,000
Yahara Pride Farms phosphorus services agreement	\$150,000
General phosphorus reduction practice funding	\$50,000
Phosphorus reduction Innovative Grant Program	\$50,000
Subtotal	\$905,000
Water Quality Monitoring or modeling	
Water quality monitoring analytical services (MMSD)	\$55,000
USGS joint funding agreement	\$75,000
Rock River Coalition water quality monitoring	\$29,000
USGS Gauging Station	\$20,000
SWAT model update	\$80,000
Subtotal	\$259,000
Supporting Services	
WINS staffing	\$60,000
Financial audit	\$9,000
Communications	\$5,000
Miscellaneous	\$5,000
Legal services agreement	\$4,000
Subtotal	\$83,000
Transfer of funds to designated operating reserve	\$188,000
Total Expenditures	\$1,435,000
Revenue minus expenditures (potential unencumbered carryover)	\$35



Another financial development in 2020 was the approval of a 5-year budget for 2021-2025. This budget is available at www.yaharawins.org.

2021 ADOPTED BUDGET (rounded to the nearest \$100)

Unencumbered carryover from 2020	\$110,700
REVENUE	
IGA participants	\$1,411,200
Income from grants, other MOUs, etc.	\$0
MGE Foundation	\$5,000
Savings account interest	\$4,000
<i>Total Revenue</i>	<i>\$1,420,200</i>
<i>Total Revenue plus unencumbered carryover</i>	<i>\$1,530,900</i>
EXPENDITURES	
Phosphorus reduction	
Yahara Clean 3.0 - Clean Lakes Alliance compact	\$2,000
Dane County phosphorus reduction services agreement	\$540,000
Columbia County phosphorus reduction services agreement	\$40,000
Rock County phosphorus reduction services agreement	\$150,000
Yahara Pride Farms phosphorus services agreement	\$170,000
General phosphorus reduction practice funding	\$100,000
Phosphorus reduction Innovative Grant Program	\$50,000
Subtotal	\$1,052,000
Water Quality Monitoring or modeling	
Water quality monitoring analytical services (MMSD)	\$55,000
USGS joint funding agreement	\$75,000
Rock River Coalition water quality monitoring	\$30,000
USGS Gauging Station	\$20,000
Subtotal	\$180,000
Supporting Services	
WINS staffing	\$60,000
Financial audit	\$9,000
Communications	\$5,000
Miscellaneous	\$5,000
Legal services agreement	\$4,000
Subtotal	\$83,000
Transfer of funds to designated operating reserve	\$197,000
Total Expenditures	\$1,512,000
Revenue minus expenditures (potential unencumbered carryover)	\$19,000

YAHARA WINS PARTNERS

Intergovernmental Agreement (IGA) Signatories

Towns

Blooming Grove
Burke
Cottage Grove
Dunn
Middleton
Westport

Villages

Cottage Grove
DeForest
Maple Bluff
McFarland
Shorewood Hills
Waunakee
Windsor

Cities

Fitchburg
Madison
Middleton (City)
Monona
Stoughton
Sun Prairie

Others

Madison Metropolitan Sewerage District
Village of Oregon WWTP
Stoughton Utilities
UW-Madison
Wisconsin DNR

Interested Parties

Clean Lakes Alliance
Yahara Pride Farms
River Alliance of Wisconsin
U.S. Geological Survey
U.S. EPA
Madison Gas & Electric
Yahara Lakes Association
Dane County
Friends of Pheasant Branch
Wisconsin Department of Agriculture, Trade and Consumer Protection
Friends of Badfish Creek
Rock County
Columbia County

Bold = Partner that has a funding agreement with Yahara WINS for conservation practice implementation.

IGA Executive Committee Members

Martin Griffin - District (President)
Tom Wilson - Town of Westport (Vice President)
Greg Fries - City of Madison (Secretary)
Jeff Rau - Village of Oregon (Treasurer)
Judd Blau - Village of DeForest (At-large)
Laura Hicklin - Dane County
Bob Uphoff - Yahara Pride Farms
James Tye - Clean Lakes Alliance

GLOSSARY

Adaptive management option: A Wisconsin compliance strategy for phosphorus that focuses on meeting in-stream phosphorus concentration targets in water bodies by reducing phosphorus runoff from the surrounding watershed.

Growing Season: The period of the year in which plants and crops grow. In Wisconsin, this period is typically May through October. USGS water quality monitoring for Yahara WINS is conducted during this period.

Total Maximum Daily Load (TMDL): A “budget” for pollution for a water body or group of water bodies that defines the highest amount of a given pollutant that a water body can receive per day without experiencing adverse impacts. The Yahara watershed is part of the Rock River TMDL, so Yahara WINS is working to meet the phosphorus budget target defined by the TMDL.

Water Year: The 12-month period from October 1 to September 30 of the following year that is used by water scientists to measure total precipitation.

Watershed: An area of land where all surface water drains to the same water body. In the Yahara watershed, all runoff and streams lead to the Yahara river.



Photo: Application of manure using low-disturbance manure injection on a fall-planted winter rye cover crop following corn silage.

Yahara WINS
1610 Moorland Road
Madison, WI 53713

www.yaharawins.org

Contact:
Kim Meyer,
Watershed Program Coordinator
Madison Metropolitan Sewerage District
KimM@madsewer.org
608-334-6259

