

Yahara WINS 2021 Annual Report



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Cover photo: Cover crop planted in early fall after corn silage crop harvest.

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. 2022 marks the sixth full year of the initiative.

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
Monona
Stoughton
Sun Prairie

Others

Madison Metropolitan Sewerage District
Village of Oregon Wastewater Treatment Plant
Stoughton Utilities
UW-Madison
Wisconsin Department of Natural Resources

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
Rock River Coalition

Bold = Partner that has a funding agreement with Yahara WINS.

IGA Executive Committee Members

Voting Members

President: Martin Griffin, Madison Metropolitan Sewerage District
Vice President: Tom Wilson, Town of Westport
Secretary: Greg Fries, City of Madison
Treasurer: Jeff Rau, Village of Oregon
At-large member: Judd Blau, Village of DeForest

Non-voting Advisory Members

Laura Hicklin, Dane County
Bob Uphoff, Yahara Pride Farms
James Tye, Clean Lakes Alliance

President’s Message

MAKING ROOM FOR ADAPTATION



Martye Griffin, Yahara WINS president

Adaptability requires a willingness to step away from the familiar and try new things. This can be an uncomfortable step, but it is made more comfortable when there’s a support network to make that step less risky.

Yahara WINS provides the structure and support for people to take new steps to reduce phosphorus. More and more farmers across the watershed

have adopted conservation practices to reduce phosphorus as they’ve seen other farmers successfully implement these practices on their farms.

Chris Murphy, conservation specialist for Rock County, explained how Yahara WINS is encouraging adaptation and new practices. He showed staff from Madison Metropolitan Sewerage District conservation practices in place in Rock County this May. During the tour, he explained how farmers’ practices have changed under Yahara WINS.

“The key is [the farmers] get to make the decision,” he said. Unlike traditional agricultural conservation programs, Yahara WINS does not have the same level of paperwork and requirements for farmers implementing runoff control practices, which lowers the barrier to

entry for farmers to try these practices for the first time. With that flexibility, farmers and technical assistance providers can design creative approaches to conservation.

“I tell people this program is about taking things up to the next level to improve water quality,” said Murphy. This attitude encapsulates the spirit of adaptive management: this project is about changing norms. Despite this being a finite 20-year project, the changes enacted under Yahara WINS will need to become the norm for water quality protection to persist into the future.

After the project, we can’t return to the same practices that led to excessive nutrients in the lakes before the project. We’ll need to make permanent changes to our practices, adapting our actions and attitudes to sustain clean water against the shifting backdrops of land development and climate change. Changing norms takes time, but we’re planting seeds for long-term change with the strong partnerships behind Yahara WINS.

2021 PHOSPHORUS REDUCTIONS

2021 REDUCTION GOAL:

38,290 POUNDS

REPORTED 2021 REDUCTION:

88,854 POUNDS

Photo: Phosphorus monitoring station on Swan Creek



SUMMARY OF REDUCTIONS

Together, partners continued the streak of achieving higher-than-projected phosphorus retentions on the land. Despite barriers such as staffing shortages and the ongoing challenge of the pandemic, Yahara WINS partners reported 88,854 pounds of phosphorus kept on the land by practices implemented in 2021. Meanwhile, lower-than-average precipitation resulted in less runoff, corresponding to less phosphorus delivered to lakes and streams.

This reduction in 2021 was substantially higher than the goal for the year and was close to the ultimate yearly phosphorus reduction goal for the project. The high reduction reflects an encouraging level of participation in conservation practices but doesn't mean that the project is close to "over." A significant proportion of the reported reductions were from annual practices, meaning that they're not guaranteed to be repeated in future years. Sustained change takes time, so it's important for Yahara WINS to continue its support to help continue implementation of these practices in the future.

DIFFERENT CALCULATIONS FOR PHOSPHORUS REDUCTIONS

Partners implementing practices through Yahara WINS use different approved options to calculate phosphorus reductions. For some conservation practices, land managers use a tool called SnapPlus to estimate how much phosphorus loss the practice will prevent. This tool generates this estimate using factors such as cropping, soil test data, and long-term weather information, which all influence the likelihood of phosphorus runoff.

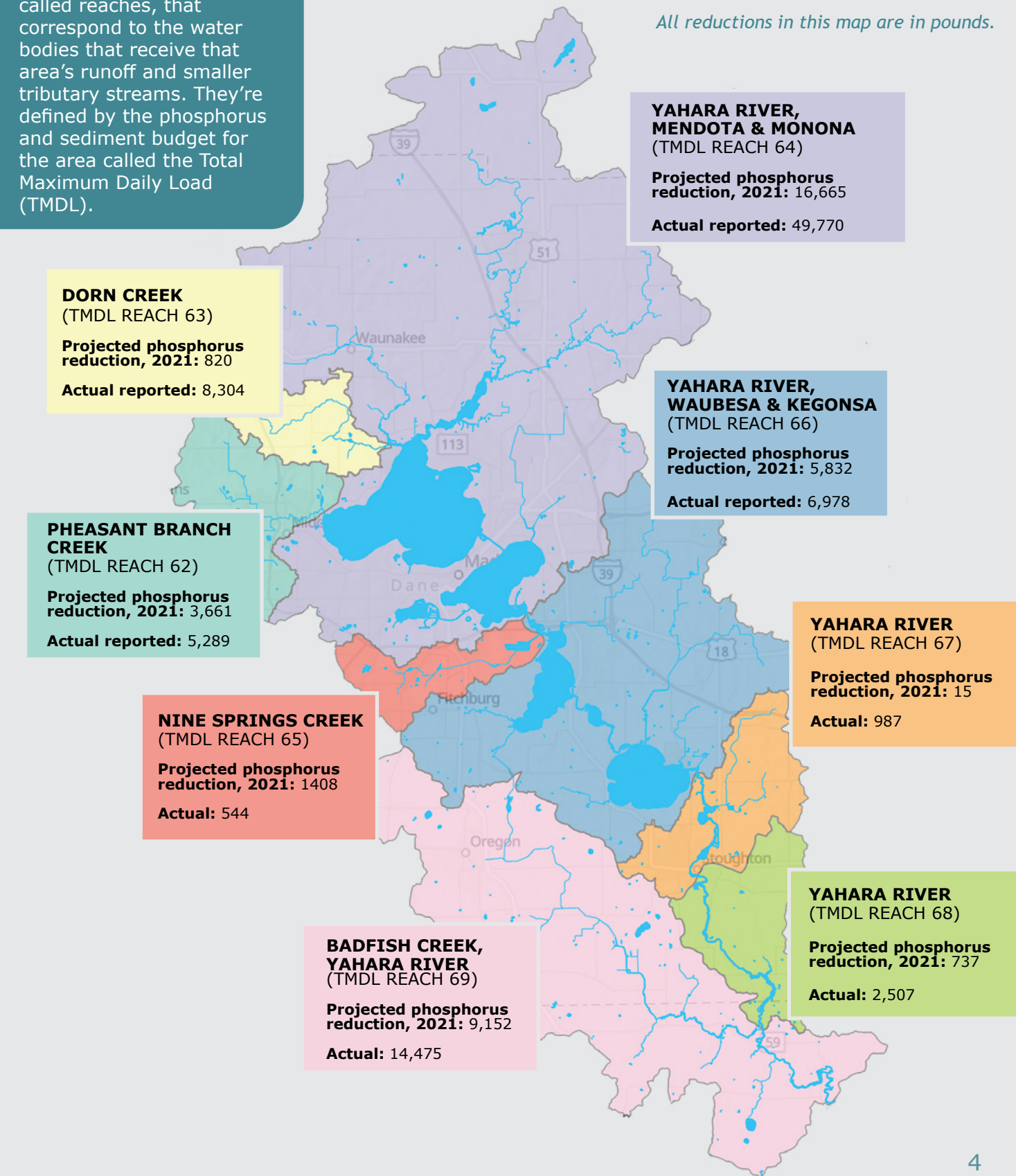
The difference between partners' phosphorus reduction calculations is the number of years that go into the SnapPlus model when estimating phosphorus loss. Dane County Land and Water Resources Department (LWRD) and Rock County Land Conservation Department (LCD) use many years of cropping data in the model. Yahara Pride Farms (YPF), which provides cost-share only for year-to-year practices, uses a one-year average to determine phosphorus reductions.

These methods are both correct, but make it difficult to standardize phosphorus reduction totals. Yahara WINS partners are having conversations about how to create consistency and comparability in phosphorus reduction reporting to best show project progress.

The Yahara Watershed is divided into eight areas, called reaches, that correspond to the water bodies that receive that area's runoff and smaller tributary streams. They're defined by the phosphorus and sediment budget for the area called the Total Maximum Daily Load (TMDL).

REDUCTIONS BY TMDL REACH

All reductions in this map are in pounds.



PARTNER HIGHLIGHTS

The practices that reduce phosphorus throughout the watershed in agricultural settings are made possible by farmers and the Yahara WINS partners who work with them to design, plan, and fund the practices. These partner organizations have deep expertise in agriculture and land conservation practices that they apply to field and barnyards to keep soil and manure on the land, preventing phosphorus from reaching waterways.

Find full partner reports at www.yaharawins.org.

Photo: Vegetative buffer along stream in Rock County



Photo: Cover crop seeding during fall tillage

ROCK COUNTY LCD

The portion of the watershed in Rock County is relatively small, but it's an important area for Yahara WINS. This area includes the Fulton gauge, the monitoring station that measures in-stream phosphorus and determines Yahara WINS's ultimate success. Rock County LCD has focused on shoring up buffers along the Yahara River and its tributaries, keeping phosphorus out of this last stretch of river before emptying into the Rock River. Yahara WINS actions completed in 2021 include:

- Completed seven new conservation practices.
- Implemented 3.7 acres of harvestable buffers, converted 5.68 acres of cropland to perennial grasses and legumes that reduce soil and phosphorus loss, and installed a grassed waterway along the Yahara River.
- Designed and planned for a barnyard runoff reduction system and more cropland near the Yahara River to be planted in perennial vegetation.
- Visited three landowners to educate them about the Yahara WINS program.

FARMER-LED GROUPS

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) is prioritizing farmer-led groups as drivers of conservation on the land. Historically, conservation cost-share programs have been led by local, state and federal government. Farmer-led groups, meanwhile, are leading conservation through peer-to-peer education and resource sharing, to change the land management status quo.

In the Yahara watershed, farmer-led group YPF has been supporting practices in the watershed since the beginning of the Yahara WINS project. In 2021, the Yahara WINS executive committee approved a grant to Biological Farming Friends (BFF), a newly-formed farmer-led group in the southern portion of the watershed. The grant provided cost-share for cover crops, which keep soil and nutrients on land over the winter. The cover crops planted by BFF farmers in 2021 were projected to keep 1440 pounds of phosphorus out of waterways. WINS supports these efforts that encourage more farmer participation, and is considering a service agreement to establish BFF as an implementation partner in the program.

DANE COUNTY LWRD

Most of the land in the Yahara Watershed is in Dane County, and the county LWRD supports practices in all TMDL reaches to reduce phosphorus. Yahara WINS funds a portion of the department's work devoted to practices that count toward Yahara WINS phosphorus reductions. In addition to staff time, the county uses Yahara WINS funding to provide cost-share to farmers to help them implement phosphorus reduction practices.

In 2021, Dane County LWRD:

- Completed 113 conservation practices and carried out 241 practice verification checks to ensure that existing practices were being maintained to continue preventing runoff.
- Reached a milestone of over 50,000 acres across the watershed covered by nutrient management plans (NMPs), which outline farming practices for those plots to reduce soil and nutrient loss.
- Covered 3,343 acres in the watershed with various conservation practices, as well as additional practices not tied to acres (such as barnyard runoff control practices).

YAHARA PRIDE FARMS

Since the beginning of Yahara WINS, YPF has recruited and assisted farmers in implementing runoff reduction practices, including farmers who had not been involved in conservation practices before. The farmer leaders in YPF have built a powerful farmer-to-farmer network that facilitates education and sharing ideas and resources. While Yahara WINS funding partially covers the costs of conservation practices, many practices are paid for by farmers themselves. Accomplishments in 2021 include:

- Achieved a 30% increase in pounds of phosphorus reduced compared to the previous year.
- Added nine farms that participate in YPF cost-share programs (for a net increase of five farms compared to 2020). Program participation has grown in recent years from 45 farms in 2019 to 63 farms in 2021.
- Restarted the YPF Watershed Conference. Two speakers from the conference were featured in a new Yahara WINS podcast.
- Recorded conservation practices on 1,312 fields covering 32,775 acres (including fields that have more than one conservation practice).

PRACTICE SPOTLIGHT

A principle of Yahara WINS is considering all sources of phosphorus for potential reductions, rather than focusing on just one sector. Any practice that reduces phosphorus runoff, whether it's an urban stormwater control structure, a change in wastewater treatment byproduct handling, or a runoff control practice on a farm field, can benefit Yahara WINS.

This section highlights some specific recent actions by Yahara WINS partners to illustrate how they contribute to Yahara WINS goals.

Photo: Incorporation of Metrogro into field with LDMI equipment

IMPROVED BIOSOLIDS APPLICATION

Madison Metropolitan Sewerage District leads the Yahara WINS project as part of its strategy to comply with regulatory limits for phosphorus. Meanwhile, the District is taking steps individually to ensure that its practices align with Yahara WINS goals.

Since 1979, the District has processed the solids removed from wastewater into Metrogro, a naturally nutrient-rich fertilizer, and applied it to local farm fields. The District has taken several steps to help fields get the most out of Metrogro and prevent it from contributing phosphorus to water bodies. Recently, the District has taken more actions to help keep phosphorus from Metrogro on the land:

2017: Began trialing low-disturbance manure injection (LDMI) equipment to incorporate Metrogro with less soil disturbance, which reduces the chance of runoff and is used by some farmers in the watershed to apply manure. Since the District started tests of this practice, the District added three LDMI implements to its Metrogro fleet.

2018: Partnered with Wisconsin Lutheran College to determine the phosphorus availability of Metrogro and other biosolids products, which allowed the District to calculate the potential phosphorus savings by implementing practices like LDMI.

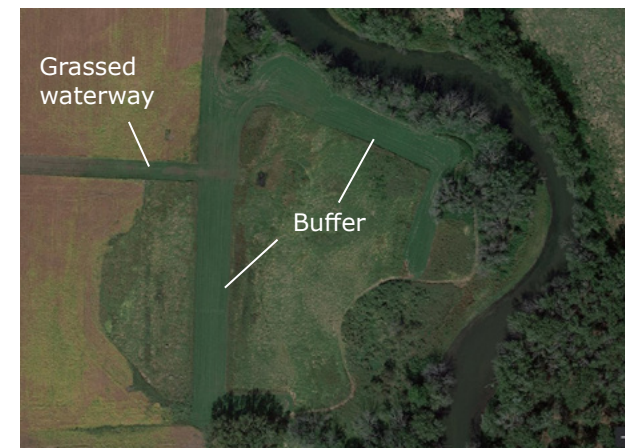
2019-2021: Evaluated alternative biosolids products to determine their potential benefits to District operations, environmental impacts, and customers. Metrogro is a valuable product but has limitations on when and where it can be applied, which can create storage and transport challenges. Composted biosolids or biosolids with a lower liquid content could diversify the District's biosolids program and provide more opportunities to recycle them as fertilizer while keeping phosphorus on land.



PRACTICE BREAKDOWN: ROCK COUNTY BUFFERS



Before: Low land that flooded often and was too wet to farm



After: Grassed waterway and buffer protect the land from flooding and control the flow of runoff

The southernmost portion of the Yahara watershed, where the Yahara River flows into the Rock River, falls in Rock County. Chris Murphy, Rock County conservation specialist, gave District staff a tour of land along the Yahara River that the landowner has transformed with the help of Yahara WINS funding and Rock County technical assistance. This visit, plus the aerial photos at left, shed light onto how conservation practices in key places help control the movement of water and nutrients.

On the day of the visit, the river was peaceful, slowly meandering under a gray spring sky. But past rainstorms have raised the river over its banks, flooding the low-lying land and making the field unfarmable. The landowner was open to modifications to the land to prevent flooding and minimize runoff into the river. He said he "wanted to see something done with it, but didn't know the answer until [he] talked to Chris [Murphy]."

With the help of Yahara WINS funding, the landowner worked with Rock County LCD to design absorbent vegetation areas to collect and slow water and nutrients, keeping them out of the river. A grassed waterway runs from below a storm drain outlet across the field, acting as a sponge for water and nutrients flowing out of the pipe. This waterway slows the flow of water, reducing soil erosion and preventing water from saturating the adjacent farm field. Additionally, the landowner addressed the flooding issue by building up the riverbank with earth and planting a buffer of grasses chosen for their ability to thrive in different conditions.

The project is win-win: the reshaped landscape helps protect adjacent farmland from floodwaters from the river while also protecting the river from excessive runoff.

WATER QUALITY MONITORING



Photo: Badfish Creek

USGS MONITORING

The U.S. Geological Survey (USGS) takes water samples in streams throughout the watershed that are analyzed for their phosphorus content, providing data about the project's progress over time. The USGS chronologically organizes annual data by Water Year (Oct. 1-Sept. 30; abbreviated as WY) to include the entire previous winter in its determination of yearly precipitation.

In WY 2021 (Oct. 1, 2020-Sept. 30, 2021), our region experienced below-average precipitation and stream flows. Less precipitation means less water and melting snow to carry phosphorus into nearby waterbodies, resulting in lower than average phosphorus loads in 2021. Only 28,000 pounds of phosphorus flowed into Lake Mendota in WY 2021, compared to an average of 65,000 pounds in recent years.

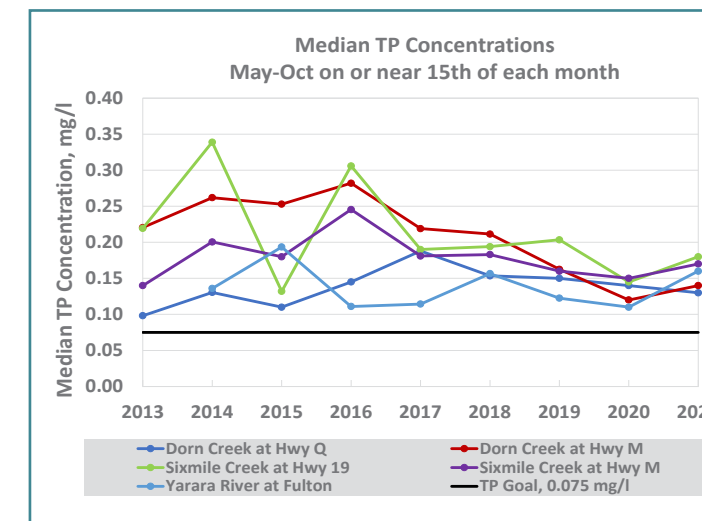
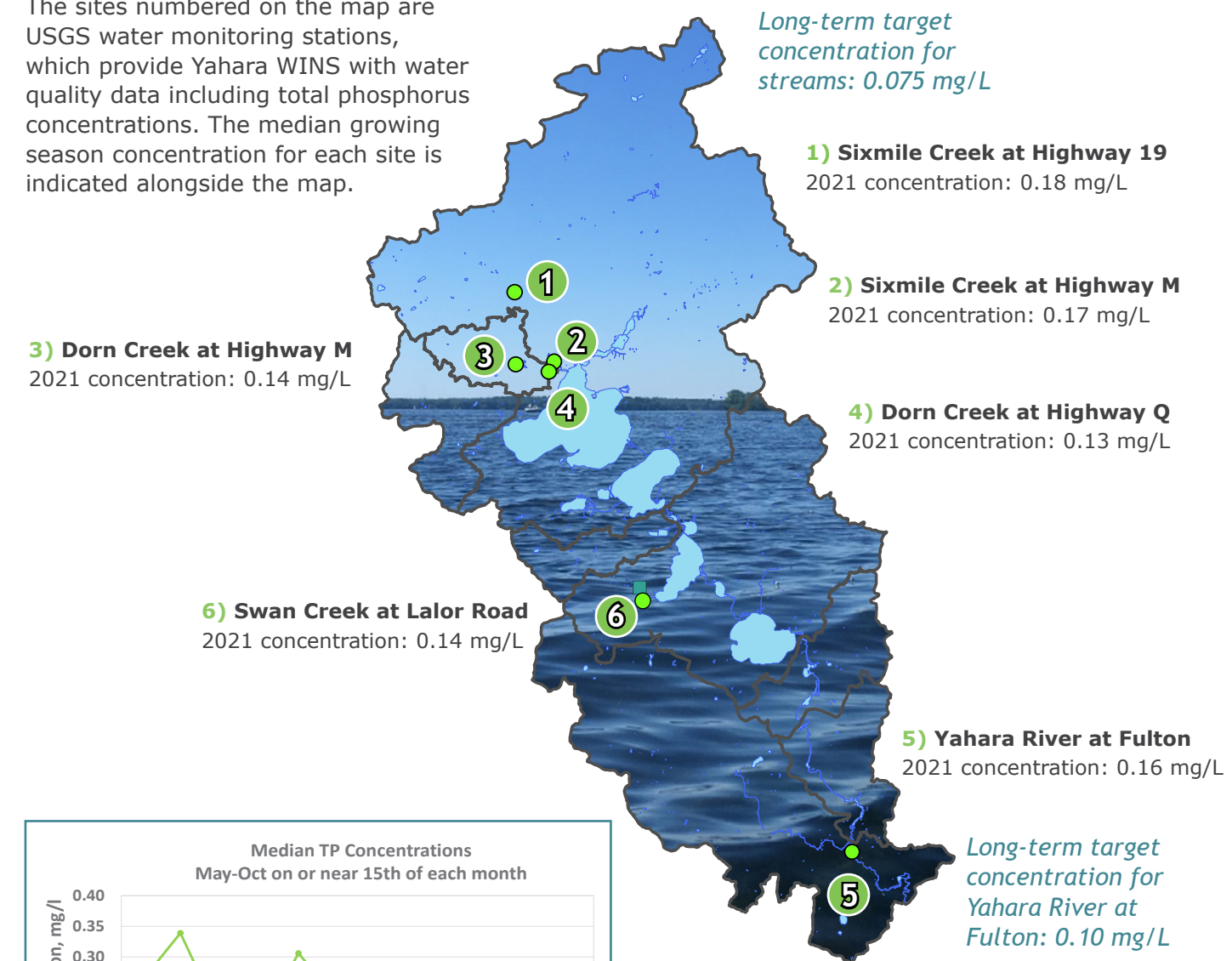
The low phosphorus loads in 2021 illustrate the importance of interpreting results on a long-term scale, rather than comparing yearly results in the short term. Phosphorus loads rise and fall from year to year based on the intensity and timing of rainstorms and snowmelts, so the phosphorus level in a given year cannot be attributed solely to land improvement activities. There's also lag time between changes on the land and water quality effects. The project goal is to see phosphorus levels gradually decrease, with lower peaks in high years and overall lower phosphorus concentrations in waterways in the watershed.

ROCK RIVER COALITION

Local nonprofit Rock River Coalition (RRC) receives Yahara WINS funding to support aspects of its water quality monitoring program to build a water data set across the watershed. RRC has worked in partnership with UW-Extension and the WDNR to coordinate water sampling since 2002, and it provides resources and training to volunteers who measure water quality indicators such as stream flow, temperature, and dissolved oxygen. Some of these volunteers also take nutrient samples, supplementing the USGS samples with additional in-stream phosphorus measurements across the watershed. In 2021, supported by Yahara WINS, WDNR and Water Action Volunteers (WAV), RRC volunteers took nutrient samples at 56 sites across the watershed.

PHOSPHORUS CONCENTRATION DATA

The sites numbered on the map are USGS water monitoring stations, which provide Yahara WINS with water quality data including total phosphorus concentrations. The median growing season concentration for each site is indicated alongside the map.



The graph at left shows in-stream phosphorus concentrations at these sampling sites (except for Swan Creek, which is new) over time. These measurements are taken on or near the 15th of each month in the growing season and typically reflect conditions when it's not storming.

FINANCIALS

2021 FINANCIAL SUMMARY

Yahara WINS receives revenue from partners that are signatories to the project’s Intergovernmental Agreement (IGA), which includes the District, other local wastewater treatment utilities, and municipal partners with phosphorus reduction obligations for their stormwater plans. Other sources of income include grants, other memoranda of understanding, funding agreements and interest income. It then uses the collected revenue to fund phosphorus reduction practices through funding to implementing partners to use as cost-share and direct project grants. Yahara WINS funding also covers partner staff time devoted to activities supporting Yahara WINS, such as identifying new nutrient reduction projects and additional funding that can go toward those projects.

(Continued on next page)

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
<i>Subtotal</i>	<i>\$1,052,000</i>
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
<i>Subtotal</i>	<i>\$180,000</i>
Supporting Services	
WINS staffing	\$60,000
Financial audit	\$9,000
Communications	\$5,000
Miscellaneous	\$5,000
Legal services agreement	\$4,000
<i>Subtotal</i>	<i>\$83,000</i>
Transfer of funds to designated operating reserve	\$197,000
Total Expenditures	\$1,512,000
Revenue minus expenditures (potential unencumbered carryover)	\$19,000

Funding partners contribute to the project in proportion to the relative amount of phosphorus they need to reduce to comply with their TMDL obligations. For municipalities, that amount is based on stormwater modeling and accounts for stormwater management practices that those municipalities have implemented. If municipal partners install more stormwater management practices on their own or update their modeling, the revenue is subject to change.

The City of Madison increased its contribution to Yahara WINS to cover its entire stormwater phosphorus reduction obligation rather than just a portion. Several municipal partners submitted updated modeling data in 2021 that adjusted their contributions to Yahara WINS. These changes will result in an overall increase in revenue of \$103,210 in 2022 compared to 2021.

2022 ADOPTED BUDGET (rounded to the nearest \$100)

Unencumbered carryover from 2021	\$19,000
REVENUE	
IGA participants	\$1,514,209
Income from grants, other MOUs, etc.	\$0
MGE Foundation	\$5,000
Savings account interest	\$4,000
<i>Total Revenue</i>	<i>\$1,523,209</i>
<i>Total Revenue plus unencumbered carryover</i>	<i>\$1,542,209</i>
EXPENDITURES	
Phosphorus reduction	
Dane County phosphorus reduction services agreement	\$540,000
Columbia County phosphorus reduction services agreement	\$50,000
Rock County phosphorus reduction services agreement	\$150,000
Yahara Pride Farms phosphorus services agreement	\$170,000
General phosphorus reduction practice funding	\$150,000
Phosphorus reduction Innovative Grant Program	\$50,000
<i>Subtotal</i>	<i>\$1,110,000</i>
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	\$36,000
<i>Subtotal</i>	<i>\$166,000</i>
Supporting Services	
MMSD service agreement	\$60,000
Financial audit	\$10,000
Communications	\$5,000
Miscellaneous	\$5,000
Legal services agreement	\$4,000
<i>Subtotal</i>	<i>\$84,000</i>
Transfer of funds to designated operating reserve	\$177,000
Total Expenditures	\$1,537,000
Revenue minus expenditures (potential unencumbered carryover)	\$5,209

LOOKING AHEAD

In 2022, Yahara WINS will continue its core work of providing funding and technical assistance from implementing partners to conservation practices on the land. Meanwhile, Yahara WINS isn't alone in phosphorus reduction work – both project partners and other entities are taking other actions to reduce phosphorus runoff in the watershed.

In the near future, Yahara WINS partners can expect to hear more about the following initiatives related to the project and overall watershed management:

- **Renew the Blue (Yahara CLEAN 3.0):** While not a Yahara WINS initiative, Yahara CLEAN is an ongoing water quality improvement outline that overlaps significantly with Yahara WINS. This compact among many local partners was initially released in 2008 and contained 70 recommendations for improving water quality. The compact has been revised twice to reflect additional data and expertise, with the recent revision emphasizing the importance of controlling late-winter runoff and accounting for more intense precipitation. As another tool in the collective local effort to reduce phosphorus pollution, Yahara WINS supports Yahara CLEAN and has been a partner since the 2.0 update to the compact.
- **Biological Farming Friends (BFF):** Yahara WINS is in communication with farmer-led group BFF about potentially becoming a formal implementing partner on the project.
- **Yahara WINS podcast:** Kim Meyer, the District's Watershed Programs Coordinator, started a podcast in 2021 to connect listeners to stories about farming and conservation. The podcast, called Soil + Water, is available at yaharawins.org/podcast and major podcast hosting platforms.

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.

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.

Phosphorus: A chemical element found in living and formerly living things. It's essential to animal and plant life, which makes it an effective fertilizer. On land, it provides vital nutrition to plants, but in water bodies, it can lead to overgrowth of undesired plants and bacteria, such as blue-green algae, which can degrade water quality.

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 including a full winter.

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: Clover cover crop growing after wheat harvest





Photo: Madison skyline seen from Lake Monona at sundown

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