PARTNERSHIP HELPS CUT PHOSPHORUS LOADINGS AROUND WISCONSIN’S CAPITAL

Everyone WINs

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A long look back at biosolids progress

BUILDING THE TEAM:
Bringing youths on board

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A salute to the “Wrenchers”
Everyone WINS

AN AMBITIOUS URBAN-RURAL PARTNERSHIP TAKES AN INNOVATIVE APPROACH TO REDUCE PHOSPHORUS LOADING TO LAKES AND STREAMS AROUND WISCONSIN’S CAPITAL

STORY: Doug Day
PHOTOGRAPHY: Lauren Justice

A stormwater retention pond empties into an infiltration pond at the Madison Metropolitan Sewerage District facility.
PLANT UPGRADES TO MEET NEW PHOSPHORUS PERMIT limits can cost clean-water agencies millions of dollars. In Wisconsin, the Madison Metropolitan Sewerage District (MMSD) is leading neighboring communities in an alternate, less costly and more effective approach.

Six cities, eight villages and five towns have joined the Yahara WINs (Watershed Improvement Network), an alliance to protect the lakes and rivers in the Yahara River watershed from excessive nutrients, notably phosphorus.

The lakes in and near Madison, Wisconsin’s capital city, are severely impaired by nutrient pollution and subject to severe summer algae blooms. Yahara WINs is a 20-year program aimed at reducing total phosphorus contributions from wastewater treatment plants, industries, urban stormwater and agriculture across the 540-square-mile watershed.

At a total cost of $104 million, the plan carries estimated savings of $13.5 million per year versus traditional point-source-centered approaches to phosphorus reduction, which would bring limited water-quality benefits in the watershed. Yahara WINs addresses point and nonpoint sources with a goal of reducing total phosphorus releases by 106,000 pounds a year. That would cut phosphorus contributions from 263,000 pounds per year to 157,000 pounds, the level the state Department of Natural Resources (DNR) has deemed sustainable.

MORE THAN TRADING

The Yahara WINs initiative is enabled by state law that allows clean-water agencies to meet phosphorus reduction goals through adaptive management — working with landowners upstream to reduce their contributions instead of, or in addition to, improving plant processes. About 10 other states have versions of adaptive management programs.

Dave Taylor, MMSD director of ecosystem services, says that while Yahara WINs has some characteristics of a nutrient credit trading program, it goes further. It includes a requirement to monitor actual phosphorus levels in the receiving water bodies.

“It’s similar to water-quality trading, but with significant differences,” he says. “It sets a higher bar than credit trading, where you purchase a pound of reduction from someone else and as long as you can document that purchase, you’re fine. With adaptive management, you also have to demonstrate that you can meet water-quality criteria.”

The approach extends across the watershed to reduce the total phosphorus loading from all sources, instead of focusing on small and increasingly expensive reductions from regulated entities such as wastewater treatment plants.
As an example, Taylor compares the $104 million Yahara WINs cost to the price of phosphorus reduction at his district’s 42 mgd Nine Springs Wastewater Treatment Plant: “If we looked at a brick-and-mortar addition to reduce just our phosphorus, it would cost more than $100 million. The adaptive management approach costs about $12 million for us. But we’re going after the sum total of phosphorus reductions required from all sources in the watershed, which is about 10 times what we are responsible for.”

**THE FARMERS’ PERSPECTIVE**

“Agriculture is in a position that we have to be proactive versus reactive, and we’re promoting things that actually work and make a difference,” say Jeff Endres, board president of Yahara Pride Farms, a key participant in the Yahara WINs initiative to reduce phosphorus releases into the rivers and lakes around Madison, Wisconsin.

Promotion of conservation and sustainability programs is not new to the group, formed in 2011 to do just that. During the Yahara WINs pilot program, Endres’ group provided cost-sharing for 2,500 acres of cover crop, yet farmers planted close to 6,000 acres.

“That tells me the farmers are very in tune to it and want to make a difference,” he observes. “That says a lot about agriculture. Yahara WINs approached farmers in a very positive way and wanted to support agriculture. They wouldn’t be where they are today without Yahara Pride Farms, and we wouldn’t be where we are without Yahara WINs.”

Yahara Pride Farms works with farmers to identify practices that protect soil and water, provides a cost-sharing program to test new and innovative technologies, and conducts education and outreach on water quality. “The bottom line is that if we don’t show that we’re making a difference, the rules and regulations will catch up with us,” says Endres.

In May 2016, the group received the Outstanding Achievement in Resource Stewardship Award from the Innovation Center for U.S. Dairy for its cost-sharing program. Since 2012, more than 45 farmers have used the program to reduce phosphorus by 15,872 pounds.

Endres says that shows farmers that it’s OK to get out and provide leadership on environmental issues. “The practices we’re using today were invented and perfected by farmers themselves — nobody else did that for them,” he notes. “So if we turn our attention to this and work together, we can probably make more positive impact faster.”

Endres says conservation practices can be good for farmers’ bottom line, and he cites reduced tillage as an example: “We’ve proven that there are a number of ways to reduce tillage that protect water quality with less erosion while maintaining crop yield. There are other effective conservation practices that may never support the bottom line. It’s important to differentiate those to understand where to target our funds. The ones that are already working for farmers will take care of themselves.”

**PROVING THE CONCEPT**

Yahara WINs officially began in April 2016, after a four-year pilot program that proved the concept was workable. It began by gaining the participation of every city, village and town identified as having a discharge to the watershed (see table).

In addition to those communities and their clean-water utilities, the Yahara WINs participants include the Clean Lakes Alliance, Dane County, Madison Gas and Electric, the U.S. Geological Survey, Yahara Pride Farms, the Wisconsin DNR Nevin Fish Hatchery, the U.S. Department of Agriculture, and the Natural Resources Conservation Service.

Other entities interested in the initiative include the Capital Area Regional Planning Commission; Friends of Badfish Creek Watershed; River Alliance of Wisconsin; Rock River Coalition; the U.S. EPA, the Wisconsin Department of Agriculture, Trade and Consumer Protection; the Yahara Lakes Association; and Friends of Pheasant Branch.

“The goal of the pilot project was to see if we could get them all working together for four years and see if by working collaboratively we could get conservation practices on the landscape that would reduce phosphorus loads,” says Taylor. “We were successful in both regards. We reduced phosphorus loads by more than 20,000 pounds during the pilot project by working collaboratively with rural and urban partners.”

**Yahara WINs participants**

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One successful tool was a grant program that focused primarily on urban reductions, says Taylor: “WINs helped fund a proprietary stormwater treatment practice, increased construction site inspections, and helped fund a leaf management study. Leaves are a big source of phosphorus in the urban environment.”

In the first half of 2015 alone, five mini grants reduced phosphorus loading by 483 pounds per year. Dane County, home to the city of Madison, established plans that reduce loading by more than 3,500 pounds per year.

ENGAGING AGRICULTURE

On the rural side, agriculture is a leading source of phosphorus and is generally regulated less strictly than urban sources. A 2011 study of the Yahara watershed showed that 90 percent of the sediment and 84 percent of the phosphorus entering area lakes came from agriculture, according to Yahara Pride Farms, a partner in Yahara WINs and a pilot program participant.

“WINs provided funding for Yahara Pride Farms, which worked with farmers to use strip tillage, cover crops, low-disturbance manure injection, and other practices that agricultural producers can use to reduce phosphorus loads,” says Taylor.

More important, the experience showed that farmers were willing to do projects on their own. “Yahara Pride quantified how many practices the farmers put on their land in the absence of any cost-sharing, and the number was really high,” says Taylor. “That shows they have a commitment and strong desire to leave the world in a better position than it currently exists for their kids and grandkids. There’s a tremendous willingness on the part of agriculture to work for a variety of reasons to implement conservation practices.”

In 2014, an $80,000 grant to Yahara Pride Farms resulted in:
- Strip tillage of 52.5 acres, reducing phosphorus by 47 pounds
- Vertical manure injection on 273 acres, reducing 164 pounds
- Cover crops on 1,329 acres reducing 3,786 pounds

In 2015, farmers reduced phosphorus loading by another 2,159 pounds through cost-share programs funded by Yahara WINs, but another 6,483 pounds was removed from the environment through individual projects not covered by cost-sharing.

PAYING THE BILLS

Nearly half of the Yahara WINs budget will be covered by municipalities and government entities based on the amount of phosphorus reduction they are required to make to achieve their total maximum daily load as established by the DNR.

“About 45 percent of the phosphorus load comes from those entities, so they’re covering about 45 percent of the cost,” says Taylor. The rest comes from a combination of cost-sharing by agriculture producers and the U.S. Geological Survey, contributions from Dane County, state and federal programs, and funding from groups such as the Clean Lakes Alliance. An executive committee decides how to disburse funds contributed by municipal entities.

“We’re moving toward the ‘one water’ concept, rather than just focusing on wastewater treatment plant effluent,” says Taylor. “If we’re really going to make meaningful improvements to water quality, we have to think of this more broadly.”

The wastewater treatment plants in Madison, Stoughton and Oregon will have a series of four five-year discharge permits that include language relating to adaptive management along with specific phosphorus targets.

“The first set of limits we have to meet are the interim effluent phosphorus concentrations,” says Taylor. “That says we have to be down to 0.6 mg/L”

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DAVE TAYLOR
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Taylor says the key to putting together such a large group of collaborators was building trusting relationships. “That’s part of what the pilot project was all about, reaching out to those municipal entities and the agricultural community,” he says. “We’ve gone beyond the finger-pointing to a mentality that says we’re all in this together — let’s roll up our sleeves and get it done. From the municipal side, it was important to make the business case for adaptive management and to demonstrate that it’s less expensive than the traditional alternatives.”

He adds that adaptive management isn’t for everyone. “It starts by looking at the watershed. Can you easily identify the players? And how likely is it that they’d be willing to work together? It’s one tool. There are certainly places where water-quality trading or plant additions make more sense.”

by the end of the first permit term, and then 0.5 mg/L by the end of the next permit term. Our Madison plant is already below those limits. Stoughton and Oregon are close to 0.6 and should be able to meet the 0.5 limit in the next 10 years.”

MAKING IT WORK

An example of poor practices leading to water impaired by nutrient pollution.