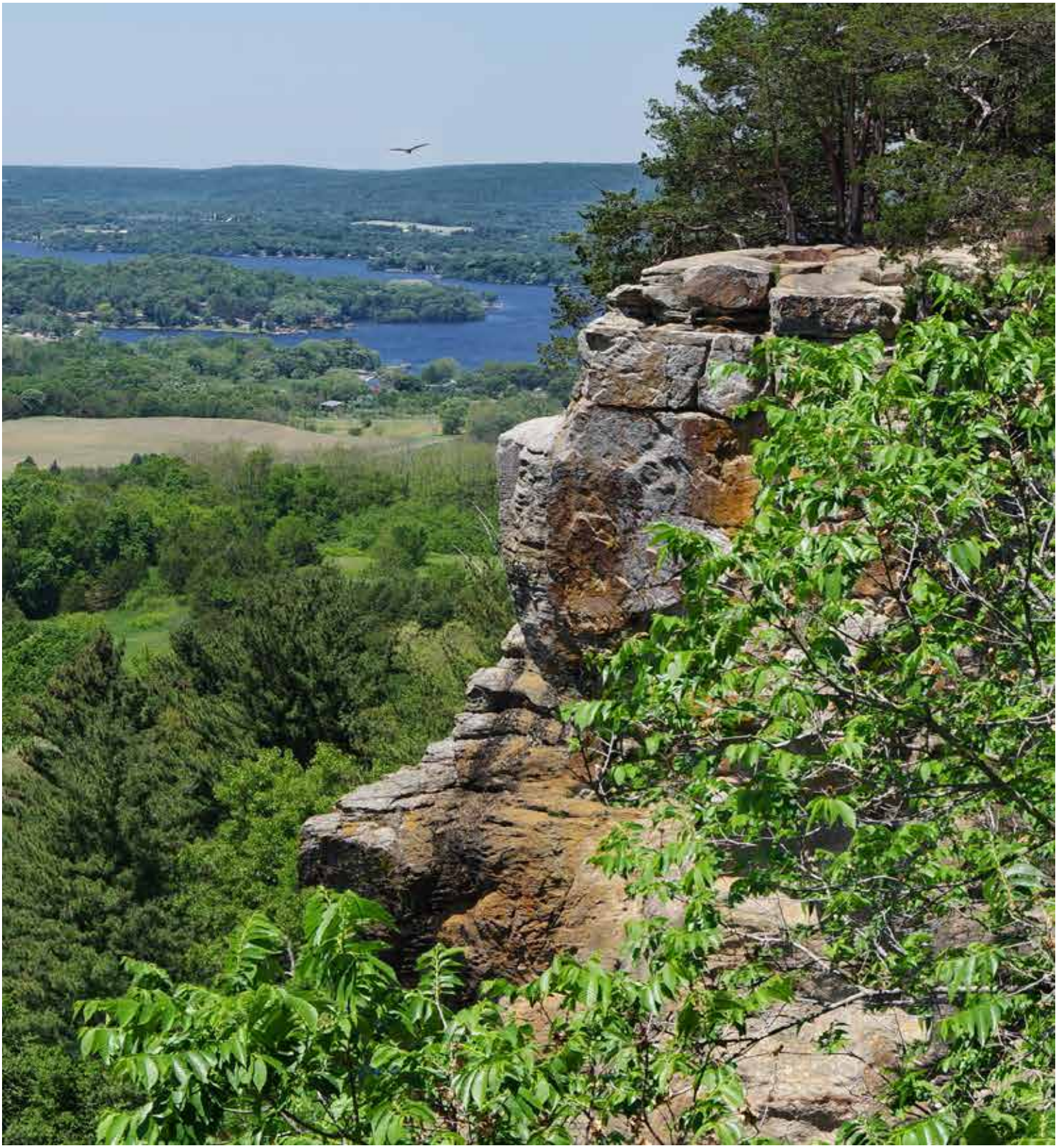
WISCONSIN SOIL & WATER CONSERVATION

ANNUAL REPORT 2019



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Introduction

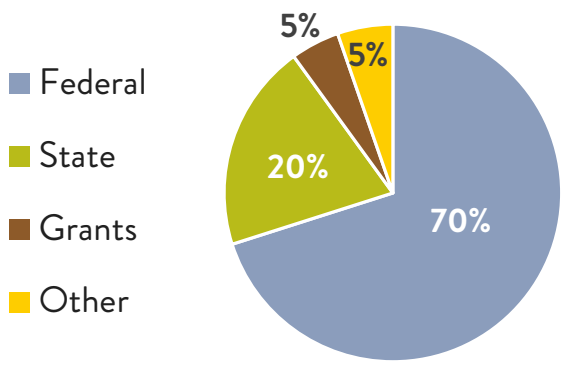
Wisconsin's natural resources are a large part of what makes the state so special. From our beautiful lakes and streams, to our extensive forests and exceptional agricultural land, the state's natural resources make the state a good place to live and play. As threats to these resources arise, the state's conservation partnership, made up of local, state, and federal government agencies, non-governmental organizations, and landowners, continue to work together to implement solutions to protect the health of our soil and water resources.

This annual report provides a few of the conservation successes from 2019. For every story you read, there are many more left untold. Each year, every county in the state completes conservation projects. These projects are critical for protecting the state's soil and water resources while helping farmers and landowners meet their conservation goals.

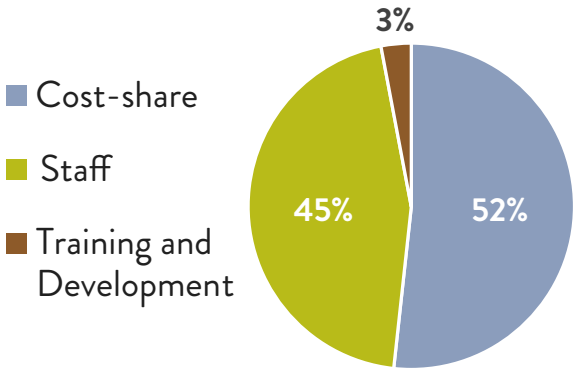
A strong commitment at all levels is needed to ensure that conservation efforts continue and effectively address priority resource issues at the local and state level. Actions taken locally have a broader impact on downstream water resources, groundwater quality, wildlife habitat, forest health, and fisheries. Working together, we can protect Wisconsin resources.

Conservation Funding in 2019

Overall Funding



State Funding



Overall Funding

Amount	Funding Source
$ 73,000,000	Federal: U.S. Department of Agriculture (USDA) Natural Resources Conservation Source (NRCS) for conservation activities through the following programs: • Environmental Quality Incentives Program ($38.2 million) • Conservation Stewardship Program ($31.8 million) • Agricultural Conservation Easement Program ($3 million)
$ 20,747,391	State (see table below)
$ 5,531,937	For agricultural and urban conservation projects and easements from other sources including county levy, lake district funds, permit fees, municipal support, donations, and federal programs other than through USDA-NRCS.*
$ 4,877,910	Grant funds for conservation projects, other than grants from DATCP and DNR, to cost-share conservation practices.*
$ 104,157,238	**Total**

* As known and reported by the counties in March 2020

State Funding.

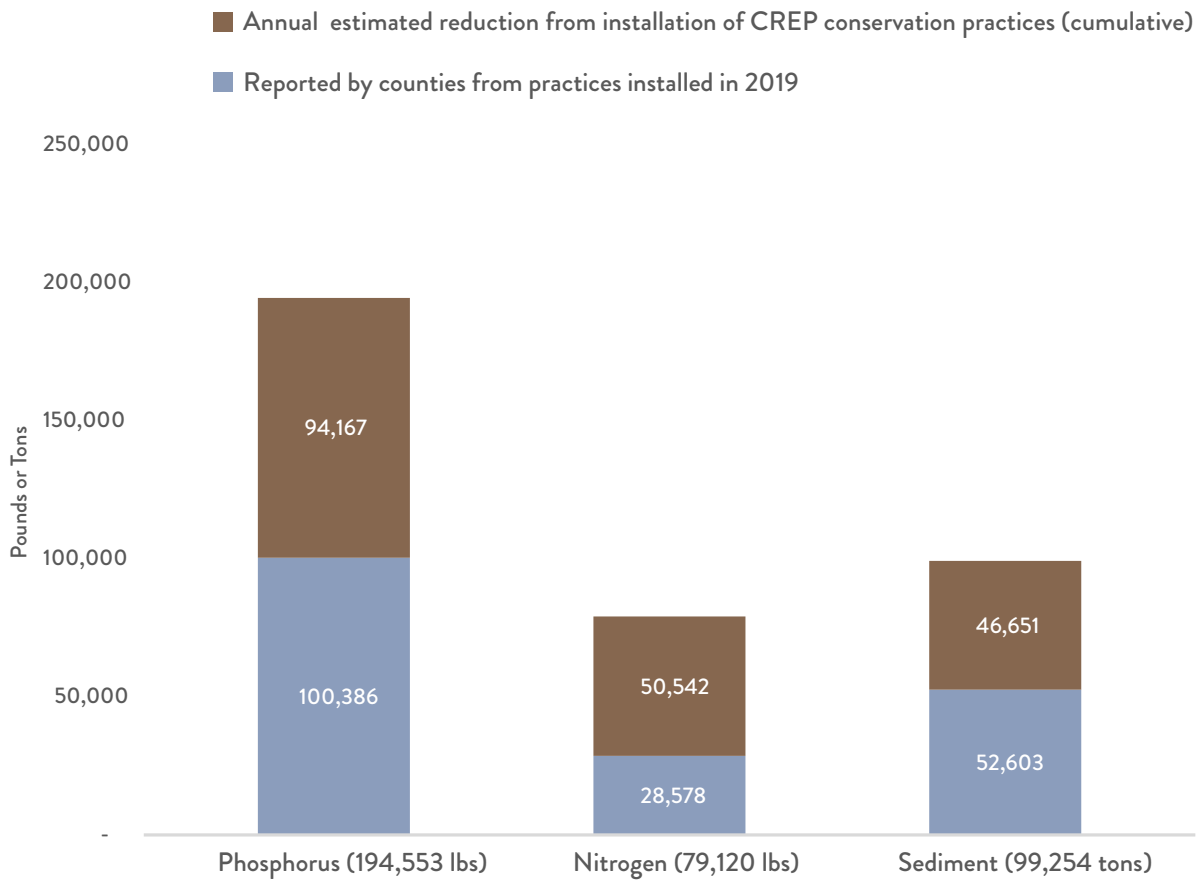
Amount	Funding Allocation
$ 10,732,083	To cost-share agricultural and urban conservation practices ($4,742,607 from DNR and $5,989,476 from DATCP).
$ 9,397,308	Available for local conservation staff and support.
$ 618,000	To support necessary training and the development of conservation tools and standards.
$ 20,747,391	**Total**

Reducing Water Pollutants through Conservation

County conservation departments use a variety of strategies and conservation practices to address specific natural resource challenges. Implementing conservation practices can lead to an improvement in the quality of soil and water resources by reducing nonpoint (pollution that comes from many places at once) and point (pollution that comes from a single place) sources of phosphorus, nitrogen and sediment, which are potential sources of water pollution. For reference, 75% of Wisconsin waters on the impaired waters list are a result of nonpoint source pollution, or a combination of nonpoint and point sources of pollution. A majority of the listings are waters that exceed total phosphorus criteria. The U.S. Environmental Protection Agency (EPA) issues the impaired waters list - last issued in 2018.

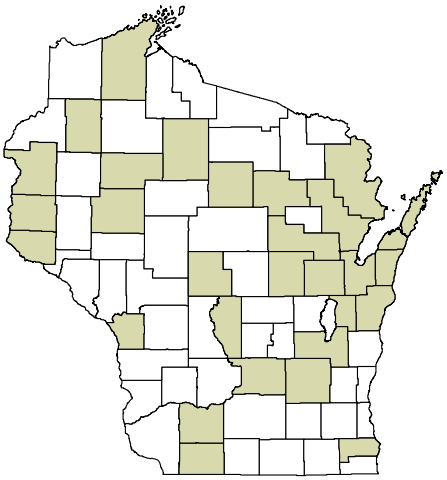
The figure below shows the amount of pollutants that were reduced as a result of conservation practices. Although all counties implement conservation practices through state, local, and federal conservation programs, not all counties use models to estimate the reductions in phosphorus, nitrogen, and sediment as a result of those efforts. Map 1 displays which models a county uses to estimate reductions following a conservation activity.

Figure 1: Estimated Water Pollution Reductions from Conservation Practices in 2019*

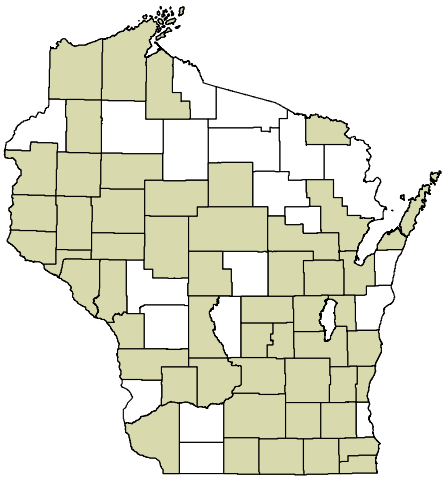


**Not all reductions of phosphorus, nitrogen and sediment achieved through conservation practices implemented in 2019 are tracked and reported. The numbers shown here capture only the known estimated reductions in 2019 as reported by counties in March 2020, or provided in the Conservation Reserve Enhancement Program (CREP) annual report. As a result, the numbers shown here are only a fraction of the likely total reductions in phosphorus, nitrogen, and sediment from conservation efforts in 2019.*

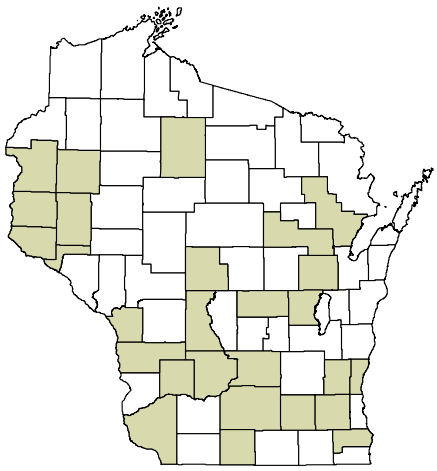
Map 1: Methods Used to Estimate Phosphorus and Sediment Reduction by County in 2019
As reported by counties in March 2020



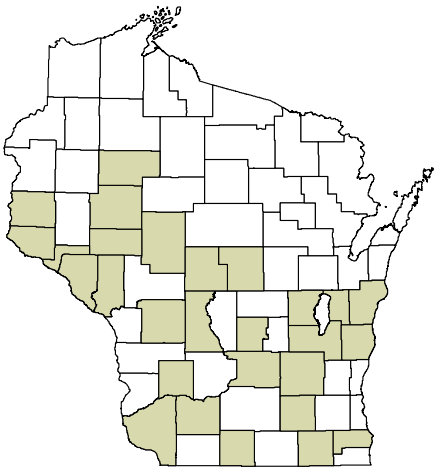
SPREADSHEET TOOL FOR ESTIMATING POLLUTANT LOADS (STEPL)



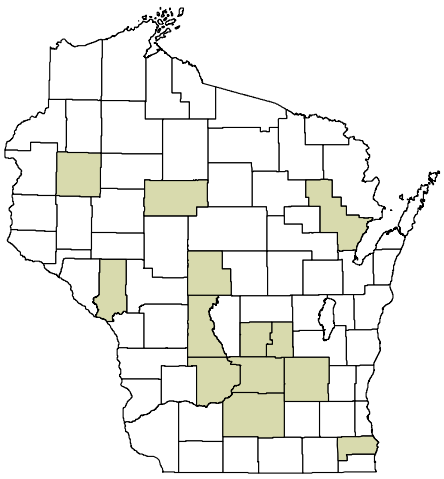
SOIL NUTRIENT APPLICATION PLANNER (SnapPlus)



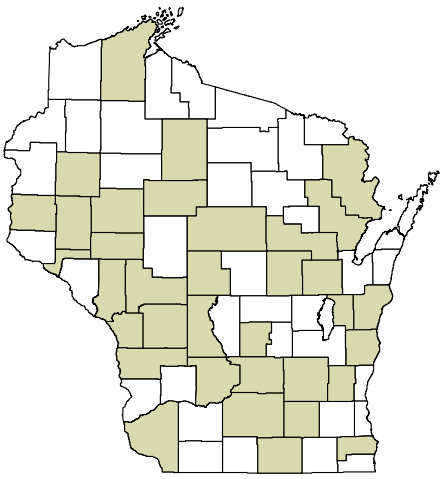
REVISED UNIVERSAL SOIL LOSS EQUATION (RUSLE2)



CONSERVATION RESERVE ENHANCEMENT PROGRAM (CREP)



BARNYARD EVALUATION RATING TOOL (BERT)



WISCONSIN BARNYARD RUNOFF MODEL (BARNY)

County Conservation Departments Address Local Groundwater Issues across Wisconsin

Designated "The Year of Clean Drinking Water" by Governor Tony Evers, 2019 was a turning point in the policy discussions about groundwater management in Wisconsin. As communities across Wisconsin continue to grapple with complex groundwater problems, the legislature launched the Speakers Task Force on Water Quality. The task force toured the state and heard testimony from many state residents and county conservation and health departments about the unique challenges they face in their regions.

County conservation committees and departments across the state respond to unique, complex problems about drinking water quality with leadership and innovation. From systematic well testing to landscape-specific conservation projects, county conservation departments pragmatically work to inform landowners about any health risks they may face and improve land management with best practices. Although many counties are experimenting with innovative projects and programs across the state, below are three examples of approaches to address local groundwater challenges.

Pierce County: Sampling Private Wells and Building Partnerships

In 2019, the Pierce County Land Conservation Department (LCD) launched a multi-year groundwater sampling study in partnership with the county's public health department. Similar to many counties in the southwestern and northeastern areas of Wisconsin, Pierce County's groundwater is at risk because of karst topography. Karst topography is characterized by shallow soils, sinkholes, and cracked bedrock, which allow nitrates and bacteria from the surface to seep into groundwater. For communities that mainly drink from private wells, understanding the extent of the threat to groundwater can be particularly challenging as many wells go untested and therefore, the public health risks are unknown.

To effectively and systemically begin addressing potential problems, Pierce County needed to collect current and accurate data from private wells. Pierce County Conservationist, Rodney "Rod" Webb, explained that there were two main catalysts for launching the private well testing program – emerging trends in recent well tests from bars, restaurants, and churches, and the age of the county's last comprehensive data set.

> *"In 1989, Pierce County LCD did a comprehensive groundwater study of the county," said Webb. "Since we were coming up on 30 years since a study had been done and were seeing some trends in the recent data collected by the county health department, we decided that we needed to do a new study."*

The Pierce County Land Conservation Committee supported the study and approved a $7,500 budget increase to cover 50 percent of the

Water samples are tested at the University of Wisconsin Steven's Point (UWSP) Water and Environmental Analysis Lab. Photo courtesy of the UWSP

cost of private well tests. The study is expected to be conducted over a three year period.

For the first year of the study, the county health and conservation departments focused on three townships in the county with the highest concentration of private wells – Clifton, Oak Grove, and River Falls. All interested residents signed up through the county health department website and received sample kits and instructions. Once collected, the samples were sent for testing. In total, 149 samples were collected and tested at the University of Wisconsin-Steven's Point (UWSP) Water and Environmental Analysis Lab. Once the tests results were finalized, all participating homeowners were invited to public information sessions where Kevin Masarik, UWSP Groundwater Education Specialist, presented on the findings from the tests and shared the health impacts of different minerals and bacteria commonly found in groundwater.

For nitrate contaminants, the most common health concern for Wisconsin communities, anything above 2 mg/L suggest a potential impact to public health is present. In the three townships in Pierce County, 57% of the wells tested were between 2-10 mg/L, meaning that although there is a potential public health impact, those wells are still considered within safe drinking limits. However, 17% of the wells tested over 10 mg/L, which is above the safe drinking limit.

"Although we still have two years to go, the data is already helping inform how we plan our work and once finished, the study will certainly be shaping much of our land and water plans for the next decade," said Webb.

With respect to partnerships, Pierce County LCD has a better understanding of how critical it was to work closely with the health department.

"From the get-go, we were collaborating with each other and they supported our efforts to launch this study. Without the staff, support, and expertise of the public health department, this program probably wouldn't have been able to be pulled off," noted Webb.

In addition to the well sampling study, Pierce County LCD also works hard to maintain strong working relationships with farmers throughout their county. This relationship is the most common way local conservation departments improve land management and decrease nutrients in both groundwater and surface water.

One of those relationships is with Jim Palin, a small family farmer who manages about 40 dairy cows. Palin allows the herd to graze during the growing season, providing him daily flexibility to tend to his crops. Although the Palin Farm is small, the soils make managing manure especially challenging. In the springtime, the ground holds a lot of moisture from the melt, which makes it difficult to haul or spread manure. Additionally, the farm is located in a discharge area of a trout tributary in the Cave Creek sub-watershed.

To give Jim Palin more flexibility with nutrient management, an increase in long-term cost savings, and protect both groundwater and surface water, Pierce County LCD helped install a waste storage facility on his farm. The open waste storage facility features reduced seepage concrete to reduce the risk to groundwater. The project was cost-shared through the USDA-NRCS Environmental Quality Incentives Program (EQIP).

"The project was pretty straightforward and turned out really well," said Webb. "We've worked with Jim on a number of projects in the past and he is certainly a land steward. He works hard, running the farm by himself. This project will hopefully help him continue to be more efficient and continue to maintain his high environmental land ethic."

Juneau and Wood Counties: United in Conservation and Public Health Efforts

For some communities across the state, certain situations can create coalition-building around private well testing. In northern Juneau County and southern Wood County, public concerns about contaminated drinking water around the towns of Armenia and Port Edwards spurred an initial testing of 104 homes on May 20, 2018. Test results showed 42% of those wells were above the safe drinking limit of 10 mg/L for nitrates, with about 24% of those wells above 20 mg/L.

Community meeting in Juneau County. Photo courtesy of Juneau County

These results prompted the Juneau County Land and Water Resources Department (LWRD) to pursue a countywide nitrate sampling strategy to capture the extent of at-risk or unsafe private wells across the county. The Juneau County Board of Supervisors approved $15,000 in funding in 2019 for this well testing program.

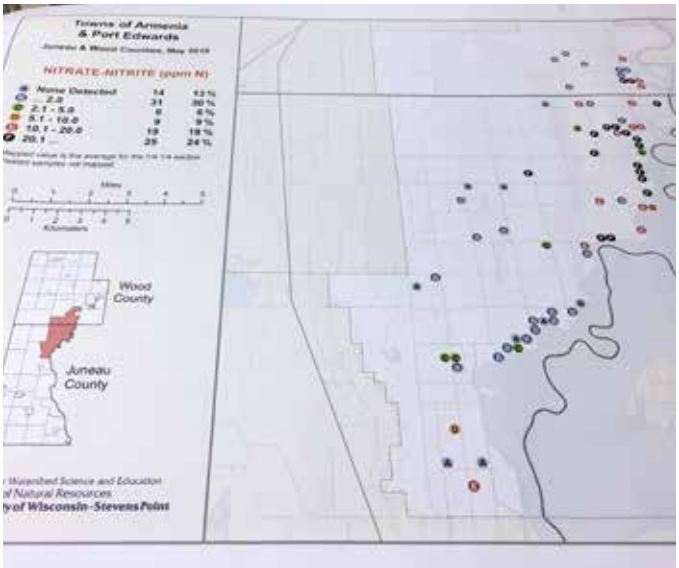
In partnership with the Juneau County and Wood County Health Departments, Juneau County sampled 289 wells since testing began in 2019. Of the wells tested, roughly 10% are above 10 mg/L. Juneau County LWRD hopes to test an additional 300 wells in 2020.

"The water quality concerns raised from citizens near Armenia really sparked the start of the local water testing efforts to be prioritized," said Dustin Ladd, Juneau County Land Conservationist. "The general awareness of the importance of water quality and health impacts of high nitrates has grown tremendously since these conversations began."

A quick response was possible in part by the cooperation between Juneau County LWRD, Juneau County Health Department, and Wood County Health Department. Timely data collection as well as the distribution of public health information enabled county officials to respond swiftly and directly to residents throughout the region.

"The data provides us with targeted messaging to homeowners regarding groundwater contamination issues, suggested frequency of testing, health effects, and land use recommendations," said Nancy Eggleston, Environmental Health and Communicable Disease Supervisor for the Wood County Health Department. "Conservation and health departments deal with different sides of the issue, but can work in tandem to attack this problem effectively at the county level."

Juneau County LWRD hopes the program is a foundation to build a larger, multi-county sampling program and groundwater study in years to come.



Map of test results in the Towns of Armenia and Port Edwards. Photo courtesy of Juneau County

"We have been working with the seven-county Central Sands Groundwater County Coalition for over a year and will be looking for grant funding opportunities," said Ladd. "In the meantime, our department purchased a water testing kit, which we plan to use in public education events for free. Ultimately, we hope the data and public awareness will help guide future decisions around nutrient management and water use in the Central Sands."

Douglas County: Education through Outreach

One of the key components to any successful program is public outreach. For private well testing, public outreach requires reaching people in a variety of formats, as well as communicating often complex information in ways that are easy to understand. Douglas County Land and Water Conservation Department (LWCD) provides an excellent model for reaching the public and raising awareness around well testing.

Douglas County LWCD launched its well testing program in late 2018 with funding through the Wisconsin Coastal Management Program. Prior to this, Douglas County did not have sufficient baseline groundwater data. With funding, the county completed about 100 well tests through UWSP's Water and Environmental Analysis Lab. The county has completed 263 tests so far, with samples in every township. These results are already informing the conservation department's resource management decisions.

To get the public engaged in this new program, Douglas County used a multi-faceted approach. An initial mailing to residents garnered low interest. The county LWCD continued to push, posting flyers around the county, using press releases, and presentations at town hall meetings. Soon, the county started gaining traction through the use of social media.

"For our most recent testing, we used Facebook to publicize the event. This was extremely successful and we likely could have reserved all our samples through the Facebook promotion," said Ashley Vande Voort, Douglas County Land Conservationist. "However, we wanted to reach a broader audience and not limit it just to people with Facebook accounts. So we advertised the sampling through informational tables at the Douglas County Fish and Game League Show and the Brule River Family Fun Days."

These two events provided the additional benefit for the public to speak directly with the conservation department staff about groundwater issues and private well testing. The presence at the booths and the Facebook promotion significantly boosted the publicity of the program and the public's general knowledge about well testing.

From a land management standpoint, Douglas County does not have the impact of heavy nutrient loadings from agriculture that affect many other counties. Much of the agricultural land use is for beef grazing, and areas that are row cropped or pastured are located on clay soils, which limit infiltration. Regardless of the generally low risk, Douglas County LWCD is taking proactive measures to ensure landowners are responsibly managing their private wells and mindful of their role in protecting groundwater quality.

"The data has already helped inform public health. Provided that we can continue to secure funding, we hope to continue sampling about 100 wells a year for the next decade," said Vande Voort. "In 2028, with 10 years of data, we hope to then start doing targeted re-samples to evaluate how our county's groundwater quality changes over time."

Collaborative Farmer Nutrient Management Training: A Recipe for Success

Collaboration, team approach, and a regional effort all helped the Marathon, Clark, Taylor, Lincoln, and Wood counties Farmer Nutrient Management Training Program (MCTLW Program) create a recipe for success. The program brings together the resources of five county conservation departments, the local University of Wisconsin (UW)-Madison Division of Extension, the area technical college, and the regional nutrient and pest management program into one unified effort. Through this partnership, farmers in the central and north-central counties that make up the Heart of America's Dairyland region learn the principles and value of farm nutrient management planning, plan development, and implementation.

Farm nutrient management planning is widely recognized as an agronomic and conservation best practice to help achieve water and soil quality protection and improvement while maintaining or increasing farm profitability. In Wisconsin, all farms that apply nutrients (fertilizer and/or manure) to cropland or pasture land, and farms with high stocking rates of livestock on pasture land are required to have a nutrient management plan. Traditionally, nutrient management plans were developed for farmers by private sector farm coops and agronomists. However, by 2002, state rules were adopted to allow farmers to develop their own nutrient management plan by participating in a DATCP-approved farmer training course. Since then, an increasing number of farmers develop their own nutrient management plans.

To meet the need for approved farmer-training courses, various agencies and entities offer local training courses. Many of these efforts are provided by only one entity, such as a single county conservation department or technical college.

The MCTLW Program decided to take a different, collaborative approach to farmer training. The MCTLW Program developed over a decade and evolved from individual county-based farmer nutrient management training efforts in the Heart of America's Dairlyand region to a broad partnership effort. In 2007, the Marathon, Clark, and Taylor county conservation departments provided farmer nutrient management training individually in their own counties, using informal collaborative arrangements to partner with the local UW-Madison Division of Extension offices. In 2008, the Marathon County Conservation, Planning, and Zoning Department reached out to the Northcentral Technical College to partner to provide farmer-training. The goal was to enhance the training and gain efficiencies through the expanded resources and expertise of a broader partnership.

Then in 2009, Clark and Taylor counties joined forces with Marathon County and the Northcentral Technical College with the goal of standardizing the training and the expectations of farmers in the Heart of America's Dairyland region. With this broader partnership, the MCTLW Program was born.

Over the next several years, the MCTLW Program secured Nutrient Management Farmer Education (NMFE) grant funds of $15,000 to $20,000 per year to augment the collaborative program and help offset the costs of training for the program partners and for the farmer participants. The MCTLW Program partnership soon expanded to include the Lincoln and Wood County's conservation departments, along with the farmers in those counties. In 2018, the MCTLW Program was further enhanced by the addition of a regional nutrient management specialist for the Nutrient and Pest Management Program. Most recently in 2019, in response to the size, scope, and success of the MCTLW Program, DATCP increased the NMFE grant fund authorization limit, allowing the MCTLW Program to secure a grant for $53,350 for the 2020 training program.

For the past several years, farmer participation in the MCTLW Program has been steady, averaging about 60 farms, covering approximately 21,000 acres annually. With the significant increase in NMFE grant funding in 2020, the program will be able to incentivize program participation through the funding of farm soil testing costs for the first time. As a result, the MCTLW Program anticipates an increase in farmer participation in 2020.

2019 Wisconsin Nutrient Management

- 8,399 nutrient management plans
- 3.4 million acres covered by a plan
- 36.9% of Wisconsin's nine million acres of cropland

Farmer Developed Plans

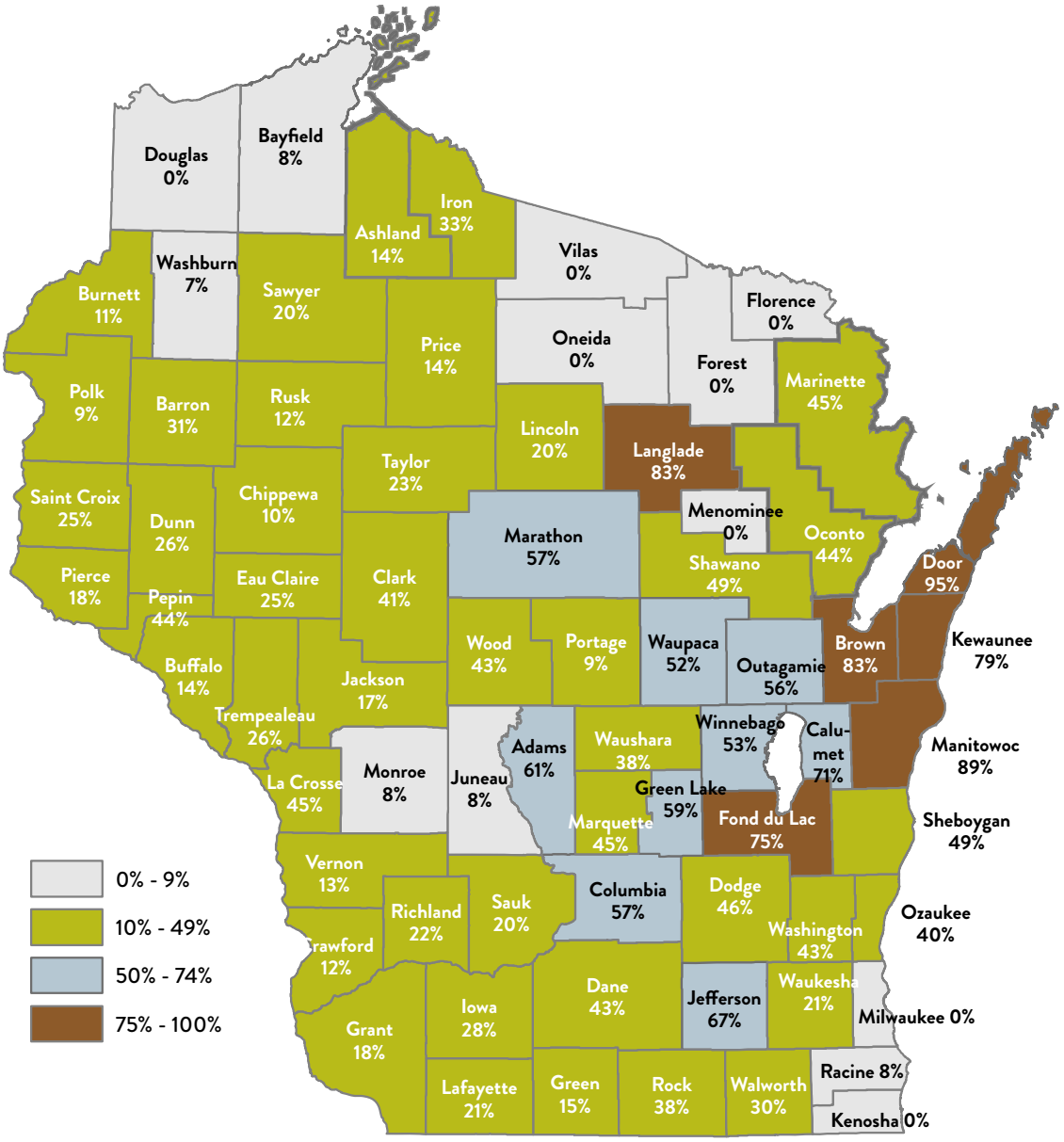
- 2,154 farmers wrote their own plans
- 620,238 acres covered by plans written by farmers
- 26% of all nutrient management plans are written by farmers

Nutrient Management Farmer Education

- Grants $182,524 awarded through six grants

Grants provide support to educational programs used to teach farmers to develop their own plans.

Map 2: Percent of County Cropland with 2019 Nutrient Management Plans

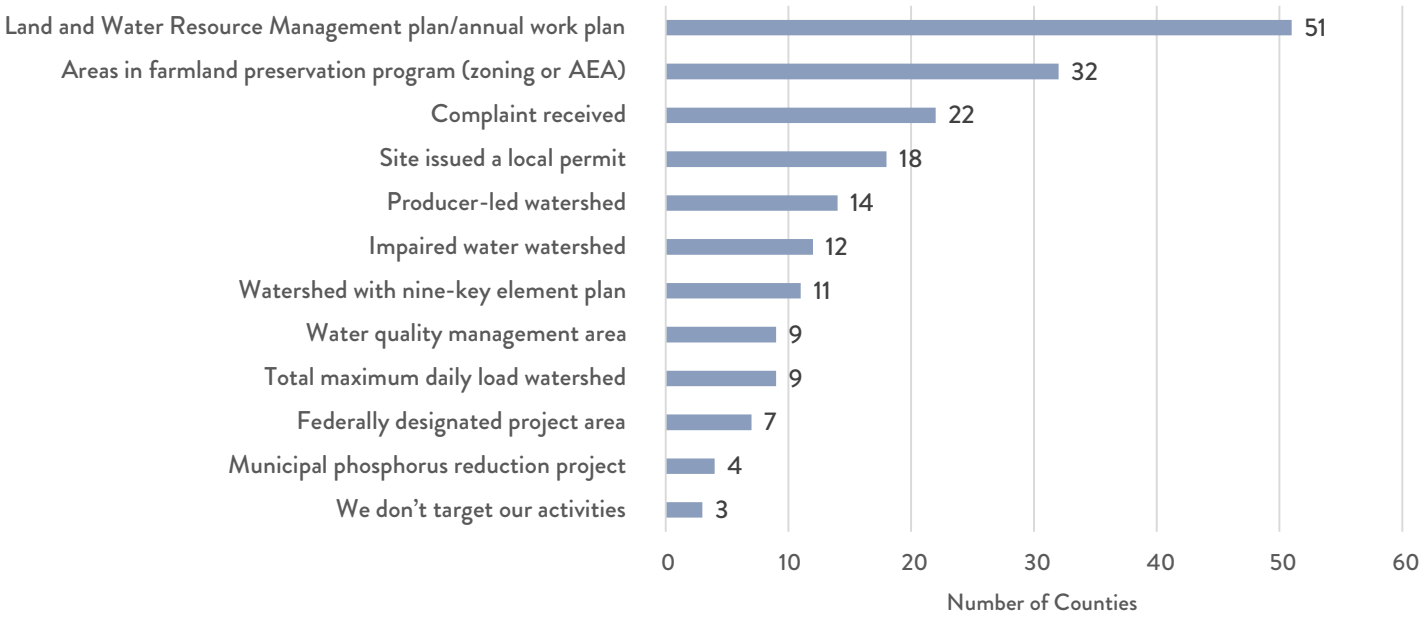


Harvested cropland acres are derived from National Agricultural Statistics Service, Census of Agriculture, 2017.
The 2012 census reported 9,148,876 harvested cropland acres; the 2017 census reported 9,234,611 harvested cropland acres.

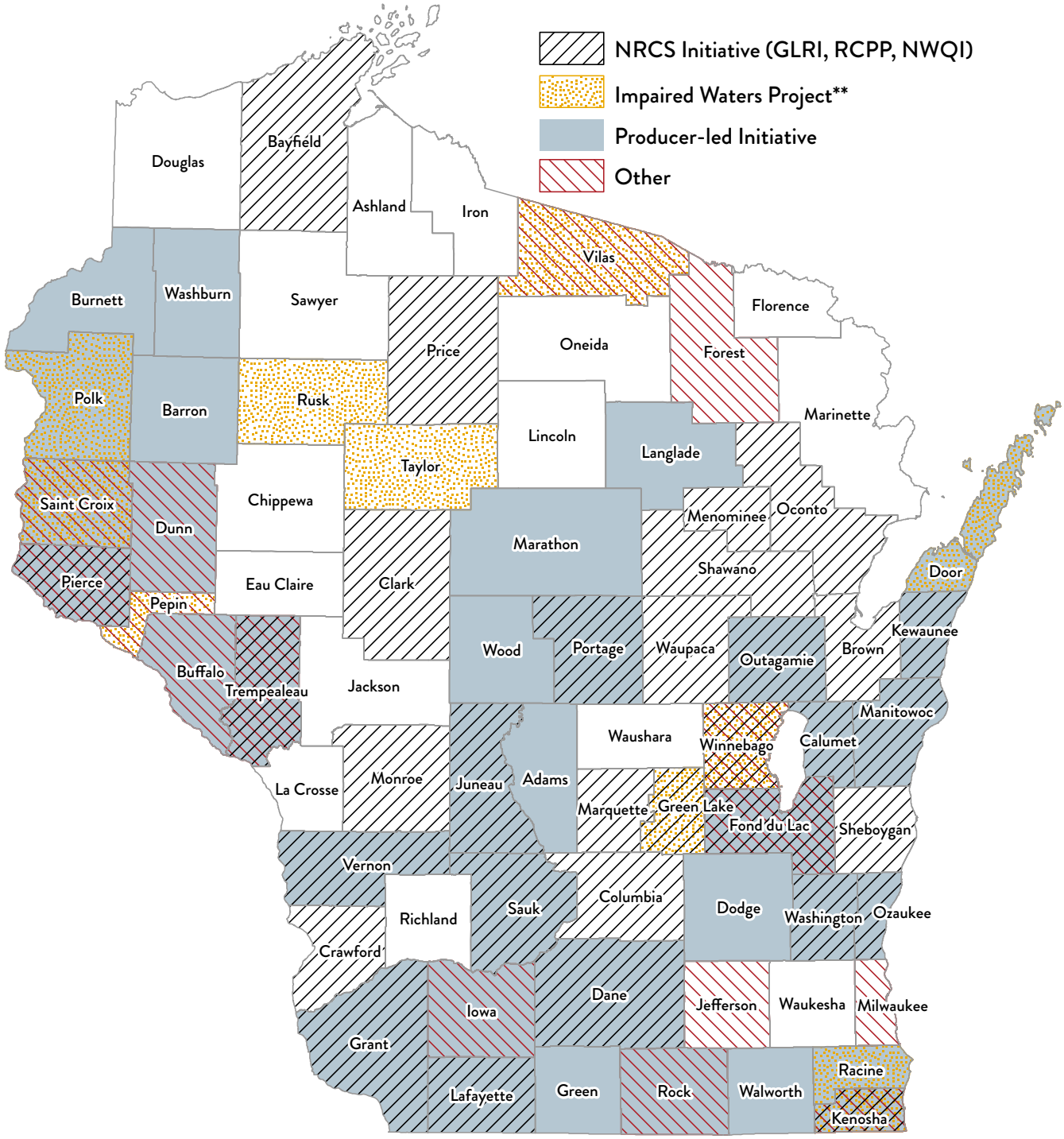
Watershed Efforts in Wisconsin

County conservation departments and partners use a variety of strategies to target areas for conservation. Among these strategies are efforts that prioritize activities within a specific watershed. A watershed is an area of land where precipitation collects and drains into a body of water. Programs and initiatives at the local, state, and federal levels support planning and implementation of conservation within watersheds. Working within a watershed can help target conservation actions to address a specific water resource concern for a location. Often, multiple watershed-focused strategies are taking place within the same county.

Figure 2: Top Strategies to Target Areas for Conservation in 2019

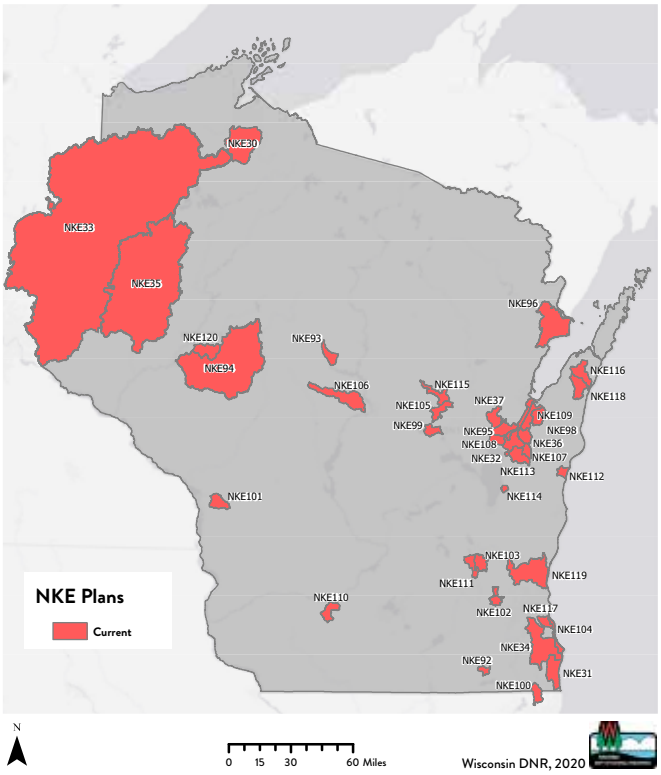


Map 3: Watershed Based Activities within Counties (as reported by counties in March 2020)*



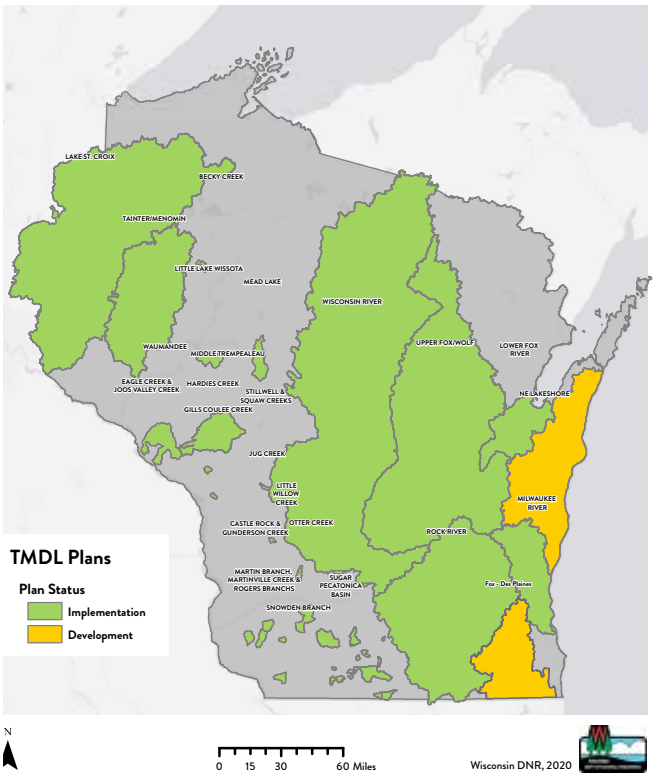
* Activities may be occuring in only a portion of the county
** Other than TMDL and 9-key element

Map 4: Nine Key Element Plans – Wisconsin 2020



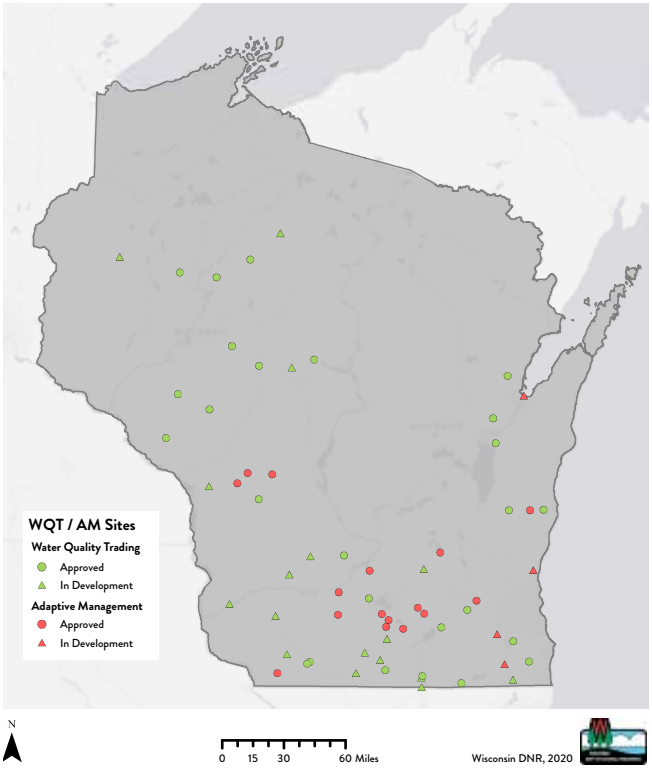
Conservation partners develop plans that meet EPA's nine key elements. These elements help assess nonpoint source pollution in watersheds to provide a framework to prioritize strategies to address water quality problems.

Map 5: Total Maximum Daily Load Plans – Wisconsin 2020



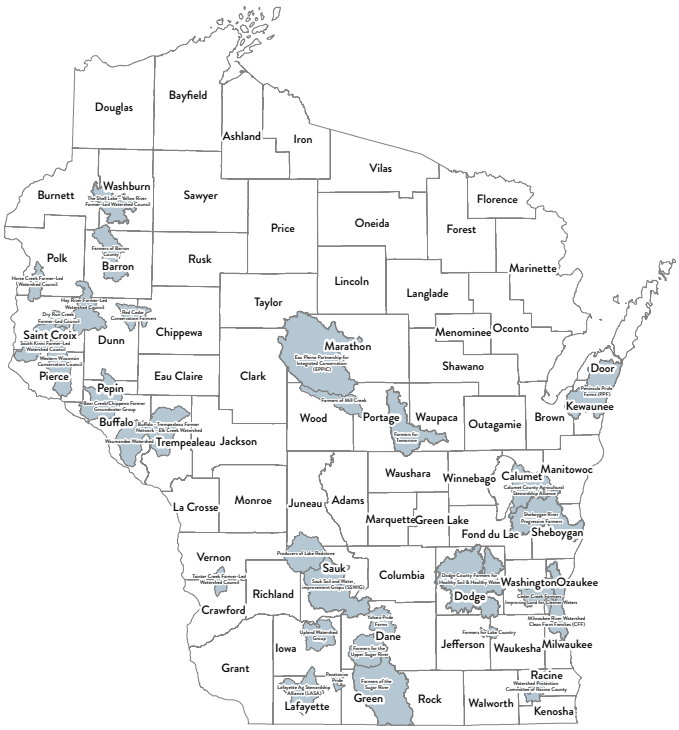
The DNR works within watersheds where water is designated as impaired to develop total maximum daily loads (of phosphorus, nitrogen, and sediment) for the watershed and to develop a plan to implement solutions to remove potential pollutants so the waters meet water quality standards.

Map 6: Water Quality Trading/Adaptive Management Sites, Wisconsin 2020



In addition, the DNR developed options to support partnerships between sources of point and nonpoint pollution through adaptive management and water quality trading. More information can be found on the DNR's website at https://dnr.wi.gov/topic/wastewater/waterqualitytrading.html.

Map 7: Producer-Led Watershed Protection Grant 2019 Recipients

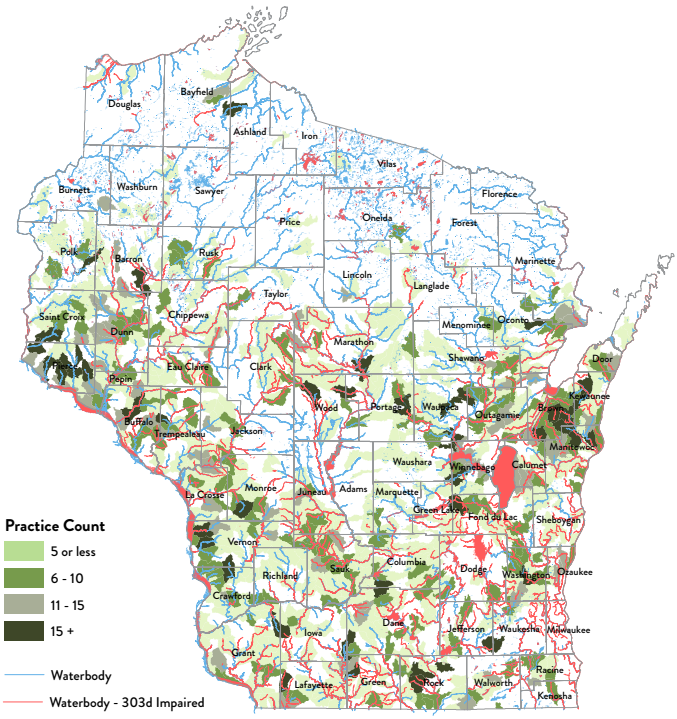


At a more local level, groups of farmers are getting together to form producer-led watershed groups to improve water quality. These groups often work closely with local county conservation departments and receive financial support from DATCP.

Conservation Practices by Watershed - Planned Through USDA-NRCS for 2019

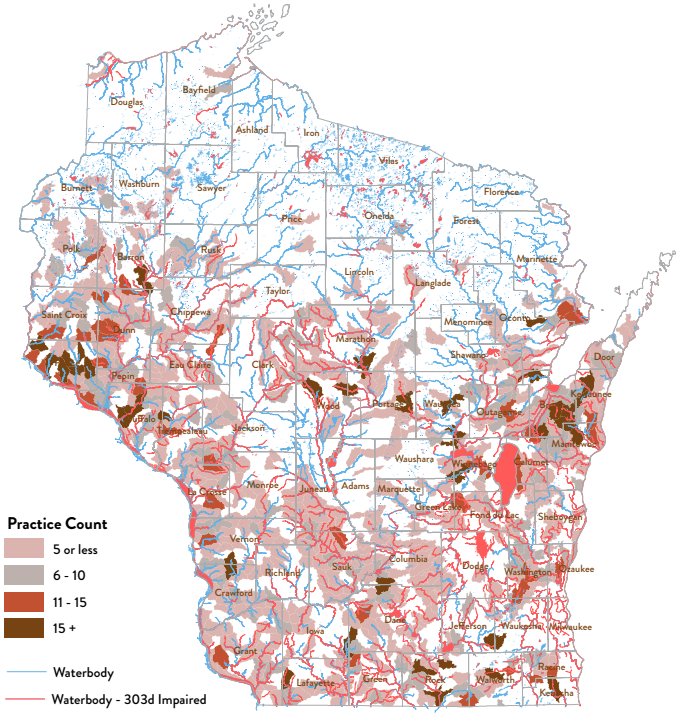
Wisconsin's conservation partnership relies on conservation professionals at the local, state, and federal levels. Conservationists from the USDA's NRCS design, implement, and install conservation practices throughout Wisconsin using programs such as EQIP. The following two maps highlight the watersheds in which practices are planned following contracts obligated in 2019. In some cases, the practice is considered both a water quality practice and a soil quality practice, and is represented on each map. Although these practices are not targeted to a specific watershed, viewing the distribution of planned practices at the watershed level can help highlight conservation work geographically across the state.

Map 8: Water Quality Practices Obligated by NRCS, by Watershed, 2019



* Activities may be occuring in only a portion of the watershed

Map 9: Soil Quality Practices Obligated by NRCS, by Watershed, 2019



* Activities may be occuring in only a portion of the watershed

Cleaner Waters in Iowa County through Farmland Preservation

Iowa County's lakes, streams, and rivers benefit from the county's efforts to plan for farmland preservation. Farmland preservation planning not only provides an opportunity to protect the most productive agricultural lands of the state, but it is a foundation for soil and water conservation efforts. Located among the hills and coulees of southwestern Wisconsin, Iowa County is home to over 470,000 acres of land planned for farmland preservation, including 445,000 acres in certified farmland preservation zoning districts. In the zoning district, farmers who take steps to meet Wisconsin's soil and water conservation standards receive an annual tax credit incentive. In 2018, Iowa County had 566 total claims, totaling more than $1 million in farmland preservation tax credits. Those numbers translate to soil and water conservation on over 136,000 acres.

Farmers who need help to meet conservation standards to claim the credit can work with the Iowa County Land Conservation Department (LCD) to establish conservation practices. These practices can help prevent nutrient runoff and soil erosion resulting in better soil and water quality resources.

County Helps Landowner Implement Conservation

Landon Baumgartner, Iowa County conservation specialist, conducted a site visit with landowner Bob Laeser. Mr. Laeser was an active participant in DATCP's Farmland Preservation Program and had recently acquired property with three barns and several animal lots on a small slope directly adjacent to a tributary stream (a freshwater stream that feeds into a larger stream or river). The tributary stream connects to Livingston Branch, a river listed on the DNR's impaired waters list for high levels of ammonia and total phosphorus. During the site visit, Baumgartner found the lower buildings and lots had no stormwater runoff diversions. As a result, clean rainwater ran off of the lower buildings, across the lots, and to the nearby stream. This was cause for concern as the closest lot was about 40-feet from the stream banks and contained manure from the beef herd.

After evaluation, Baumgartner informed Mr. Laeser that stormwater runoff diversions were needed to meet the conservation standards for farmland preservation participants. Mr. Laeser reached out to Sarah Hovis, Iowa County conservation technician, for technical assistance and cost sharing for the project. With the assistance of Kelli Neitzl, DATCP environmental specialist, planning and design for the project was completed. Mr. Laeser also received financial support for the project through Iowa County LCD's soil and water resource management grant.

Hovis and Neitzl designed a series of three roof gutters on the two lower barns to divert clean rainwater off of the buildings and away from the animal lots. The design also included two underground outlets to diffuse the diverted rainwater directly into the ground and avoid contamination. During an average year of rainfall, with storms at or below the 25-year, 24-hour mark, the gutters will divert over 152,000 gallons of clean rainwater away from the animal lots - enough to fill a football field with over 2.5 feet of standing water.

> *"It was definitely a challenge at times to get everything in order, but Mr. Laeser was great to work with and is very conservation minded," said Hovis.*

Successful implementation of projects like this have an immediate impact on an impaired water, and encourage additional conservation activities. Through the planning for the project, Mr. Laeser was able to discuss other conservation practices with the Iowa County LCD and DATCP to achieve further conservation goals. The impacts reach beyond one field or farm and result in cleaner water and healthier soils.

> *"This was one of my favorite landowner interactions because the landowner was looking at the bigger picture and how this project fit into the overall goal he shares with the conservation program," said Neitzle.*

2019 Conservation Site Visits

- 3,723 Farmland preservation conservation site visits
- 88% Farmland preservation participants found to be meeting conservation requirements
- 2,062 Visits to determine compliance with state standards (in Wis. Admin. Code § NR 151)
- 74% Sites determined to be meeting state standards (in Wis. Admin. Code § NR 151)
- 377 Site inspections, including forestry site inspections
- 86% Sites determined to be meeting relevant standards

*Wisconsin's Farmland Preservation Program Participation**

- 11,574 Individuals participated in DATCP's Farmland Preservation Program and have a certificate of compliance with state conservation standards
- 2,240,417 Acres on which farmland preservation credits were claimed

**As reported by the Wisconsin Department of Revenue for tax credit claims paid in 2019.*

Building Resiliency: Designing Long-term Solutions to Control Soil Erosion

As weather patterns become more extreme and heavier rains become more frequent, farmers and landowners across Wisconsin are working with county conservation departments to improve land resiliency. As rains intensify, crop fields and shorelines are more susceptible to erosion. Erosion equals lost topsoil and nutrients, which is costly to farmers and affects crop production and property values. The erosion also negatively impacts the health of lakes, rivers, and streams.

Much of the agriculture community's focus on building resiliency has been around building soil health. Building soil health means building up active organic matter in the soil year after year. This can be done through a variety of farming methods, including reduced tillage and growing cover crops. Tillage is the agricultural preparation of soil by mechanical agitation of various types, such as digging, stirring, and overturning. A cover crop is a crop of a specific plant that is grown primarily for the benefit of the soil rather than the crop yield.

Preventing erosion also often involves large-scale hard practices or projects that actively reinforce landscapes and manage water. County conservation departments work directly with farmers and landowners across Wisconsin to decrease erosion and reinforce landscapes. Below are examples of two counties that demonstrate common ways county government works on erosion with farmers and landowners.

Dunn County: Reducing Soil Erosion Upstream of Dam

Dunn County Land and Water Conservation Division (LWCD) has been working with landowners and operators to address soil erosion in the Knights Creek Watershed. The focus area is upstream of an important flood control dam installed in 1970 through the Watershed Protection and Flood Prevention Act. After 50 years of controlling flood waters, the dam is filling up with sediment due to upstream soil erosion. As a result, Dunn County removes sediment on a regular basis to keep the low flow inlet from being buried.

To curb the soil erosion, Dunn County LWCD staff spent the last few years building relationships with landowners and cropland operators, working with them to implement reduced tillage, no-till, cover crops, grassed waterways, and grade stabilization structures in the watershed.

The project started with landowner Beverly

Corn planted into 14 inch standing cereal rye cover crop. Photo courtesy of Dunn County.

Fuhrman who Dunn County LWCD staff worked with to develop a plan to address soil erosion on her property with a grade stabilization structure and grassed waterways. Dunn County LWCD staff also worked with Ms. Fuhrman and her operator, Steve Lechler, to review possible changes to the rotation and tillage of fields that would reduce soil loss to tolerable soil loss or below. After multiple meetings, an agreement was reached and signed by Ms. Fuhrman, Mr. Lechler, and county conservation staff, implementing rotation and tillage on the operation.

Once construction began on the grade stabilization structure, neighbors began to take notice. Mr. Lechler contacted an upstream landowner and operator, Roger Kassera, to talk about putting a waterway on his land. Mr. Kassera and Dunn County LWCD staff worked together on a couple of waterways, adopted no till instead of vertical tillage, tried rye cover crops after soybean harvest, and closed an unused manure storage structure. Dunn County LWCD staff observed erosion upstream of Mr. Kassera's property line and contacted landowner Justen Walton. Mr.Walton operates his land using no-till and cover crops, but has found it difficult to establish waterways on this property. He agreed to work with county conservation staff by installing grassed waterways on his land to address soil erosion.

Dunn County LWCD staff assisted all of the landowners with partial funding from Wisconsin's Soil and Water Resource Management Grant (SWRM) and from USDA-NRCS's EQIP for implementing some of the conservation practices. Some practices have been installed while others are planning to be constructed in the coming years. Once all the planned practices are installed, an estimated 1,000 tons of soil per year will remain in place, instead of downstream in the Knights Creek Dam. Dunn County LWCD is hopeful these conservation efforts will continue to be discussed neighbor to neighbor in the Knights Creek Watershed and additional interest will develop in conservation.

Florence County: Helping Lake Homeowners Manage Soil Erosion

As water levels continue to rise across the Great Lakes region, homeowners along lakes will struggle with protecting their homes from flooding and their shorelines eroding from wave energy. Florence County Land Conservation Department (LCD) annually works with landowners to install erosion-reduction projects and shoreline stabilization measures.

In 2019, one of those projects focused on a private residence located along Sand Lake, near a public boat landing and park. With the property being elevated, runoff was eroding the slope resulting in an increase of water at the park and

Geotextile wall in Florence County. Photo courtesy of Florence County.

Grassed waterway adjacent to Sand Lake. Photo courtesy of Florence County.

boat landing. This also flooded low-lying private property on the north side of the park.

"Although this was a gradually declining situation, the trigger for the LCD's involvement was a series of rain events in 2017 that resulted in the property to the north of the park flooding," said Scott Goodwin, Florence County conservation technician. "We were contacted by the Town of Homestead to assess the park/boat landing to reduce the flooding and erosion. The landowner was aware of the situation and had been installing a timber retaining wall in an effort to stop the erosion. We worked with the owner to replace the wall with vegetated geotextile bags."

Vegetated geotextile bags are naturally resilient and environmentally friendly in their design. They are built by weaving rows of soil-filled bag into a cohesive barrier, then securing them in place with spikes. Once seeded, the bags grow native plants and develop extensive root systems that lock in soil and absorb water. Stacy Dehne, DATCP engineer, worked with Goodwin on designing the five-foot tall geotextile barrier to stabilize the slope. The top of the slope was excavated, seeded with native grass seed, and covered with a coconut erosion control netting.

Additionally, a grassed waterway was installed to manage high volumes of water, while filtering and absorbing runoff before entering the lake. Florence County used grant funds from the Soil and Water Resources Management grant program to pay for 50% of the project.

"We think the project turned out very well," said Goodwin. "The landowner seemed very happy with the final product. With routine maintenance from the landowner, the project should keep the slope in place, reduce water flow on the boat landing, and sediment discharge into the lake, as well as provide a bit of wildlife habitat, for years to come."

Protecting Streambanks and Shoreline for Water Quality and Wildlife

Wisconsin has over 15,000 lakes, and 84,000 miles of rivers. These resources provide countless opportunities for recreation and relaxation. They also support critical habitat for plants and animals. Protecting these resources and preserving their value requires stewardship of streambanks and shorelines.

County conservation departments are critical partners in protecting the shoreline of Wisconsin's lakes and its streambanks. These protection efforts not only help reduce sediment from affecting water quality and lake habitat, but they can also provide habitat for wildlife and protection of property.

Examples from Clark and Menominee counties demonstrate how county conservation departments work to protect these natural resources.

Clark County: County, State, and Federal Conservation Groups Address Sinkhole Challenge

In April 2019, Sheri Denowski, Clark County Land Conservation Department conservation engineer, fielded a call from a landowner in the Town of Dewhurst about a large hole that had formed through an apparent seep in the bank of

Large hole in the bank of Arnold Creek near Lake Arbutus. Photo courtesy of Clark County.

Completed shoreline project on Arnold Creek. Photo courtesy of Clark County.

Arnold Creek near Lake Arbutus. The hole formed between two cabins along the creek and was large: 4 feet deep and 15-feet long by 8-feet wide on the surface. The sand that eroded from this hole deposited under one landowner's dock on the creek. The hole presented a safety issue while the sediment in the stream posed a water quality concern for the creek and the nearby lake.

Initially, the erosion was thought to be the result of surface runoff due to upstream deforestation and damage to culverts. With further investigation and input from Pat Schultz, DATCP conservation engineer it was determined that the upstream drainage area was too small to be the primary cause of the bank erosion.

"We needed to look further to determine why the water was constantly seeping through the bank where the sand had been deposited," said Denowski. "We saw clear evidence for flow beneath the surface of the bank."

To determine the extent of the problem that lay below the surface, Schultz and Denowski contacted Tim Weisbrod with USDA-NRCS to help with the subsurface investigation. Analysis of data from subsurface sounding equipment allowed Weisbrod to determine that there was wet sand for several feet under the area with the hole. In addition, the site likely has fractured sandstone which allowed the sand to flow through horizontally along with the water.

With an understanding of the challenge at the site, Denowski and Schultz got to work to design a solution to address the problem for the landowners on both sides of the hole. The solution included digging out the sinkhole area to get a solid foundation and laying drain tile to create a pathway that subsurface water could flow through to get to the stream. Then the hole was filled with the native soil (sand) that had discharged into a pile in the stream, and a filter to hold the sand in place was constructed where the bank meets the stream. The first layer of the filter (farthest from the stream) was .075 inches rock, then there was a 3-inch layer of riprap, then the 6-inch riprap at the stream.

Funding for the project included state Soil and Water Resource Management grant funds.

Although the project did cost more than the landowners originally thought, they felt that it was done right and provides the long-term solution needed to solve the problem. The final result is a stable bank, a nice yard, and the sand deposit removed from the stream.

Menominee County: Protecting Legend Lake's Water Quality

Parts of the shoreline on Legend Lake in Menominee County looks different in 2020 after the completion of several projects to address shore erosion. In

Beach club erosion before project.
Photo courtesy of WI DATCP

Beach club shoreline following project.
Photo courtesy of WI DATCP.

2019, Jeremy Johnson, Menominee County Conservation, Forestry, and Zoning Department director, completed six projects on the lake, the most in any recent year. Johnson worked with landowners on three sites to convert eroding shoreline or lawn areas to natural, riparian buffers. These projects will have a positive effect on lake water quality as well as provide essential wildlife habitat along the highly developed lake shorelines.

Three additional projects are designed to prevent shoreline erosion through the installation of rock riprap. Johnson completed the initial site visits and met with landowners to discuss the projects and available funding through the state's Soil and Water Resource Management grant program. One of the sites of the project is a popular beach club for Legend Lake property owners association members that own property offshore nearby. The wave action from the lake undercut the bank extensively and the site is steep and sandy, additional factors that contribute to the site's highly erodible nature.

To complete the projects, Johnson reached out to Travis Buckley, DATCP conservation engineer for further assistance. Together, the pair surveyed the sites, designed the project, and managed the construction. With the completion of these six projects, the natural buffers and rock riprap at the shore will keep the soil in place – and protect the shoreline and lake water quality.

Outreach and Education Activities

Conservation solutions to natural resource challenges are often technical – but before efforts to implement solutions can take place, awareness and information are required to ensure understanding and buy-in. Conservation partners recognize the importance of educating Wisconsin citizens on the principles and practices of environmental science and conservation. The techniques for education and outreach vary depending on the audience and the resources. The following stories provide examples of conservation professionals around the state who spent time in 2019 to build the knowledge and understanding necessary to make progress toward conservation goals.

Lincoln County: Pollinator Partnership

The Lincoln County Land Services Department, in partnership with the Lincoln County Maintenance Department, UW-Madison Division of Extension, North Central Wisconsin Pollinator Partnership (NCWPP), and The Bee and Butterfly Habitat Fund, converted two acres of turf grass into pollinator habitat. During the conversion process, over 200

School children helping to hand seed a site with plants to support pollinators. Photo courtesy of Lincoln County.

students from area schools visited the site to learn about pollinators and pollinator habitat. The students then helped hand seed portions of the site so that they could watch their efforts grow. It is projected that after five years the county will save about $13,000 in scheduled grounds maintenance by converting the turf grass into pollinator habitat. And the students were able to have a hand in creating habitat critical to the pollinators.

Racine County: Producer-Led Watershed Field Day

The Racine County Producer-Led Watershed Protection Committee and Land Conservation Division hosted a field day on September 11, 2019 at Beck Grain Farms in Waterford, WI. The field day had over 70 attendees, 50 of whom were farmers who learned about the importance of soil health and erosion mitigation. Those present were able to view a soil pit, take a walk on a field with cover crops and a field where no-till corn was planted into cereal rye.

Trempealeau County: Great Outdoors Camp

Elementary students in Trempealeau County got to explore the Trempealeau County Department of Land Management's second annual Great Outdoors Camp. The camp is put on with the support of the Trempealeau County Environment and Land Use Committee and cooperation from the following partners: UW-Madison Division of Extension; DNR, USDA-NRCS, Elk Rod and Gun Club; and the Whitehall Future Farmers of America (FFA)/ Ag program; The camp is for children in 3rd-8th grade who are interested in natural resources and enjoy being outdoors. Participation has grown in popularity with an enrollment of 14 students in 2018 to nearly 60 students in 2019. Environmental science professionals led students to explore topics including water quality, wetland ecology, fish

Racine County farmers getting a first-hand look at conservation practices at a 2019 field day. Photo courtesy of Racine County.

Trempealeau County students at the "Great Outdoors Camp." Photo courtesy of Trempealeau County.

anatomy and dissection, outdoor survival techniques, hydroponics, and soil health. Through the camp, students developed their land ethic and walked away with an understanding of how to steward the soil and water resources of Trempealeau County.

Juneau County: Producers of Lake Redstone

Locally-led conservation efforts, such as those on Lake Redstone, provide an opportunity to see how small-scale efforts can lead to larger benefits. The Producers of Lake Redstone, a producer-led group, held their first field day on July 30, 2019 at Brian Daugs' beef and cash crop farm. More than 30 farmers, lake protection district members, and conservation staff attended. During the event, Daugs and Tom Schlough shared the conservation practices they have installed to improve soil health and the relationship of these activities to the Lake Redstone community. The UW-Madison Division of Extension Discovery Farms edge of field monitoring equipment was showcased and a rainfall simulator demonstrated how cropping practices can impact runoff and infiltration. After lunch attendees took pontoon tours on the lake, led by members of the Lake Redstone protection district who provided the history of the lake. During the tour, a dredging crew actively removed sediment from the lake. The field day gave producers and members of the Lake Redstone protection district a unique opportunity to interact and share ideas about soil loss and water quality improvements in the fields and on the shoreline.

Piloting CREP Signs in Southwest Wisconsin

CREP practices often blend into the scenery as they are designed to be an integral part of the agricultural landscape. In an effort to increase visibility and public awareness of CREP conservation practices, program partners created signs to place in CREP sites starting in 2019. Brian Loeffelholz, DATCP CREP Manager, presented the idea to Southwest Wisconsin Grasslands Network partners, who agreed that the signs would help with visibility. The sign costs were covered by the U.S. Fish and Wildlife Service and The Nature Conservancy, while state funds are available for reimbursing counties for posts and hardware. The signs identify the land as a CREP site, state a brief program purpose, and notify the reader that the land is private. Southwest Wisconsin counties began placing the signs in CREP sites during 2019, with the hope to offer the signs statewide in the future. Bringing more visibility to the practices on the ground not only helps show the extent of program participation in a county, but also highlights our agricultural community's commitment to conservation and protecting Wisconsin's valuable soil and water resources.

Learning about edge of field monitoring at the 2019 Field Day in the Lake Redstone watershed. Photo courtesy of Juneau County.

CREP sign installed in 2019. Photo by WI DATCP.

Education and Outreach Tools Used by Wisconsin's 72 Counties

There are 72 counties in Wisconsin and more than two-thirds used the following tools for outreach in 2019:

Number of Counties	Outreach Tool
62	Presentations
57	School-age programs
56	News release/story
54	Workshops
53	Field days
50	Social media posts
35	Newsletters
33	Tours
33	Volunteer monitoring efforts
31	Private well testing programs
22	Local conservation awards
21	Radio
11	Local conservation camp

Rainfall simulation in Juneau County. Photo courtesy of Juneau County.

2019 Conservation Observance Day

The Peirick family and T & R Dairy was recognized for their community leadership and outstanding land stewardship at the 2019 Conservation Observance Day, held at T & R Dairy. The public event showcased the Peirick's family dairy farm and their conservation practices on 1,000 acres of corn and soybeans, as well as Tony Peirick's impact on the community and watershed by founding the Dodge County Farmers for Healthy Soil and Healthy Water farmer-led group.

T&R Dairy Farm. Photo courtesy of Tony Peirick

Wisconsin Conservation Activities in 2019

Each year, county conservation departments work closely with county officials, residents, farmers, state, and federal governments as well as other conservation partners to protect and improve local natural resources. Conservation challenges across the state are reflective of the diversity of Wisconsin's natural resources and locally identified priorities. The figures below identify the range of conservation issues handled by county conservation departments in 2019, and the top issues, based upon time spent. Determining conservation priorities is completed at the local level through annual work planning and the development and of the county land and water resource management plan.

Figure 3: Range of Conservation Issues Handled by County Conservation Departments in 2019

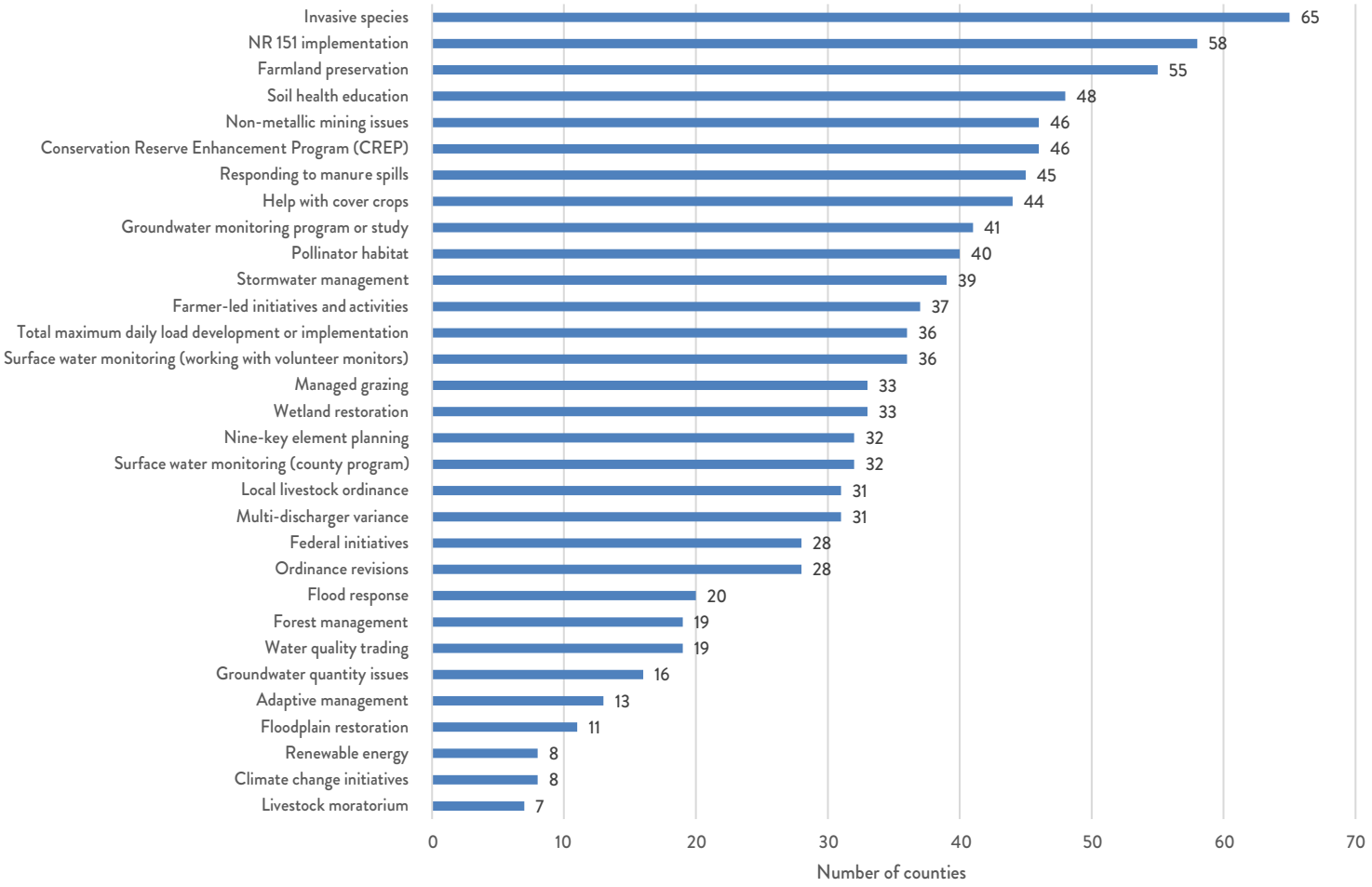
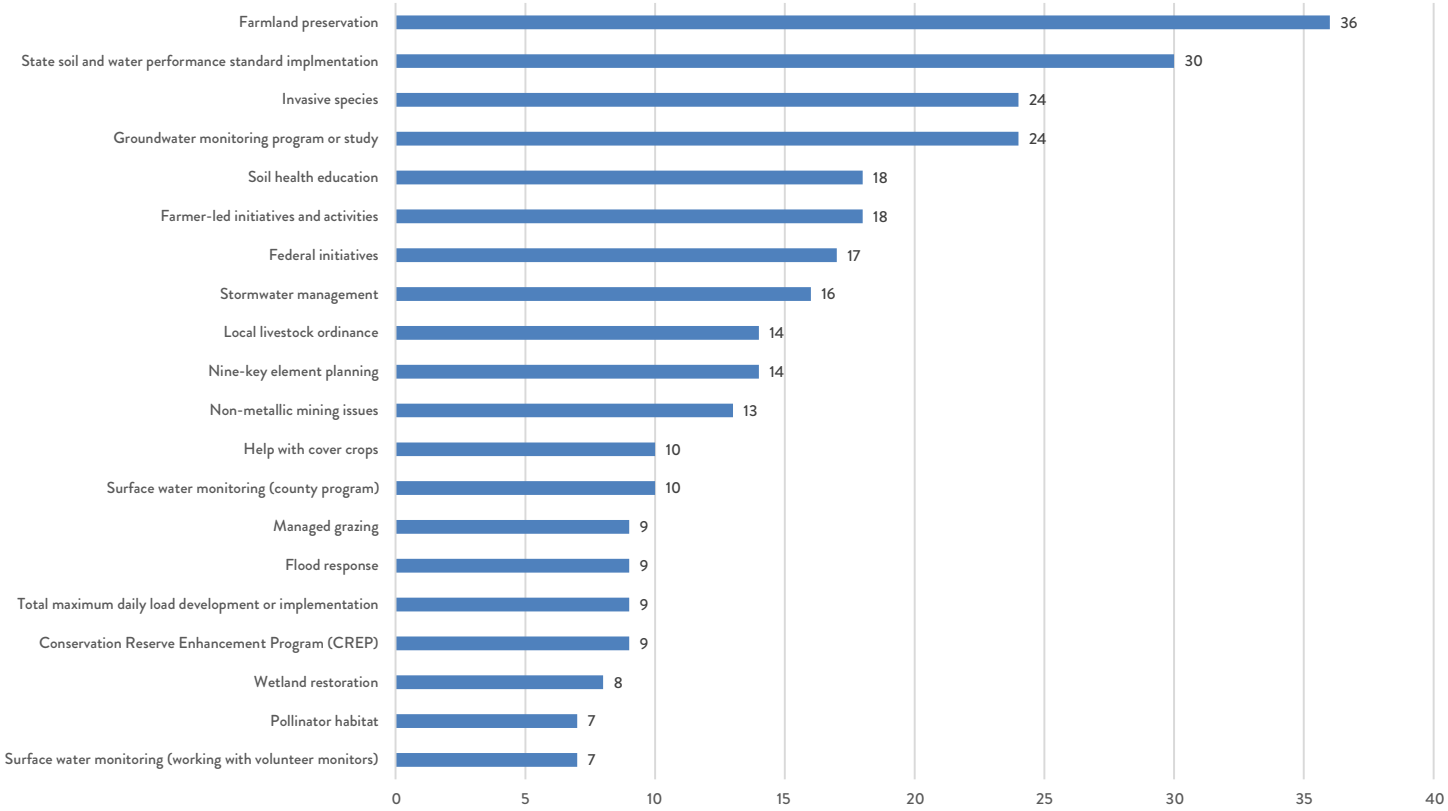


Figure 4: Top Conservation Topics (in Time Spent) Handled by County Conservation Departments in 2019



Number of counties that identified the topic as in their "top five" with respect to time spent. Only those topics with 7 or greater are shown.

Native planting and streambank stabilization. Photos courtesy of Douglas County.

Conservation Practices Installed in 2019 Compared to Estimates from County Work Plans

Each year, county conservation departments develop a plan of work for the coming year. The work plan is developed based upon priorities identified in the county land and water resource management plan, with consideration for critical conservation challenges and anticipated available resources to complete the conservation work. The following figures show the conservation work completed in 2019 compared to estimates in the work plans for the year.

Figure 5: Cropland Management Practices Other Than Nutrient Management, in Acres

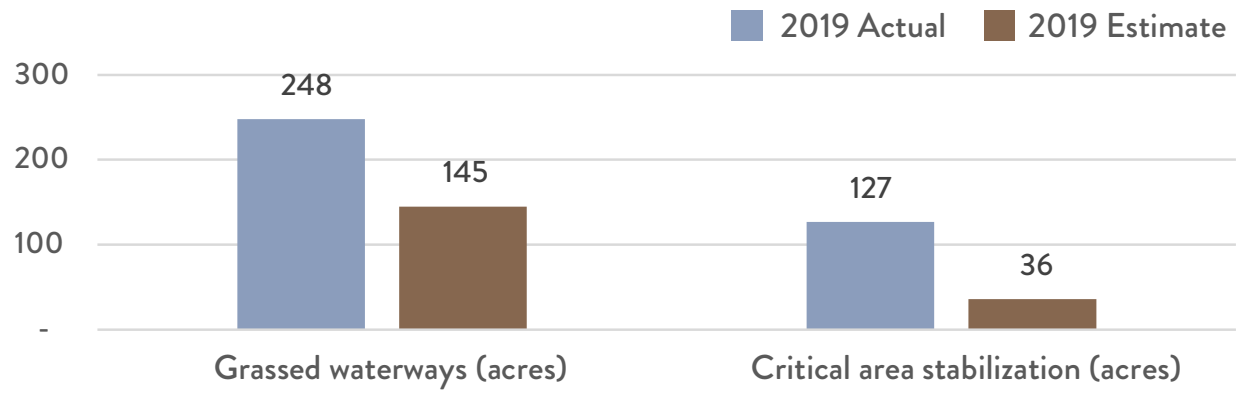


Figure 6: Cropland Management Practices Other Than Nutrient Management, in Thousand Acres

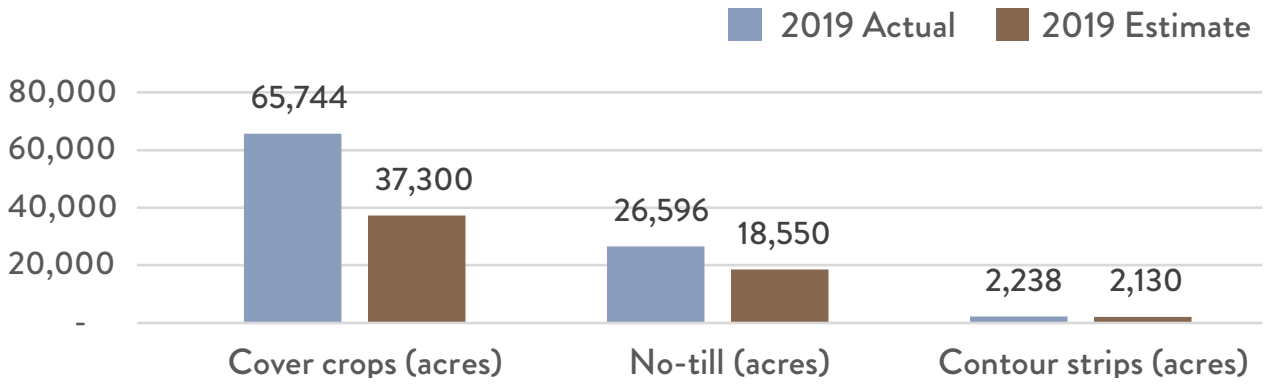
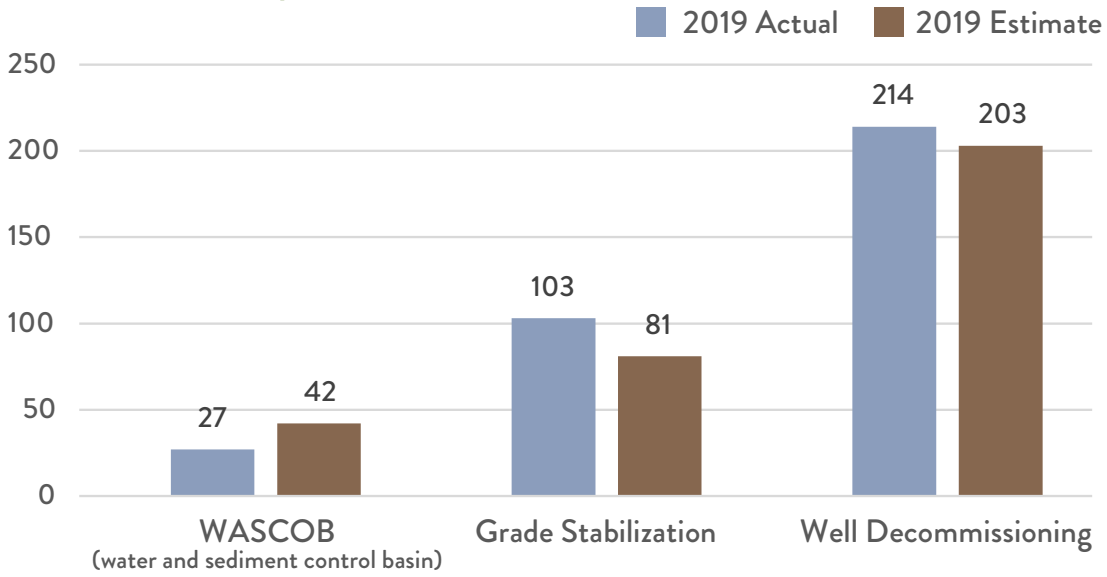
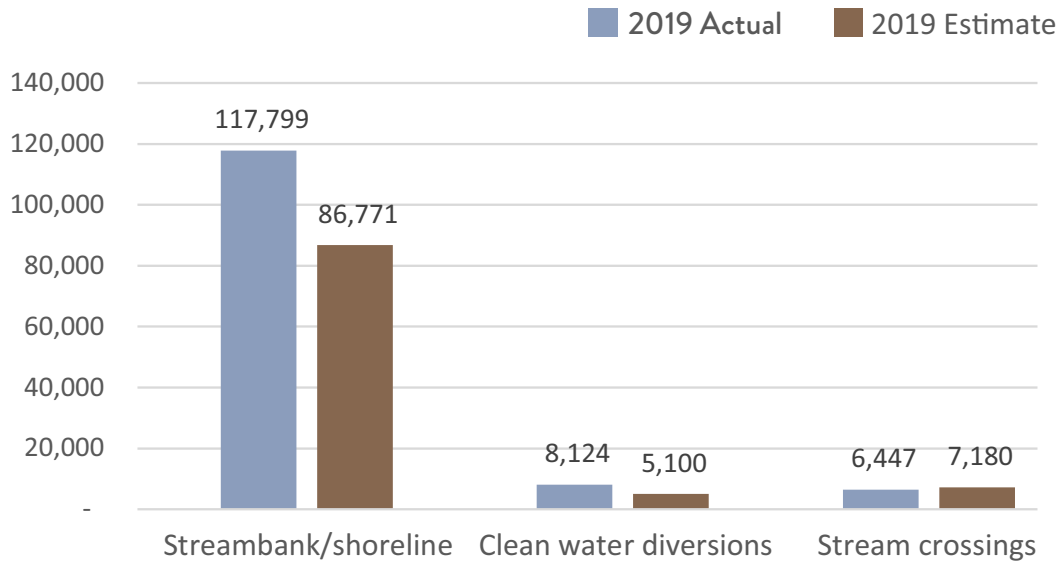


Figure 7: Practices Installed, by Number



Grade stabilization structure site the spring following construction. Photos courtesy of Dunn County.

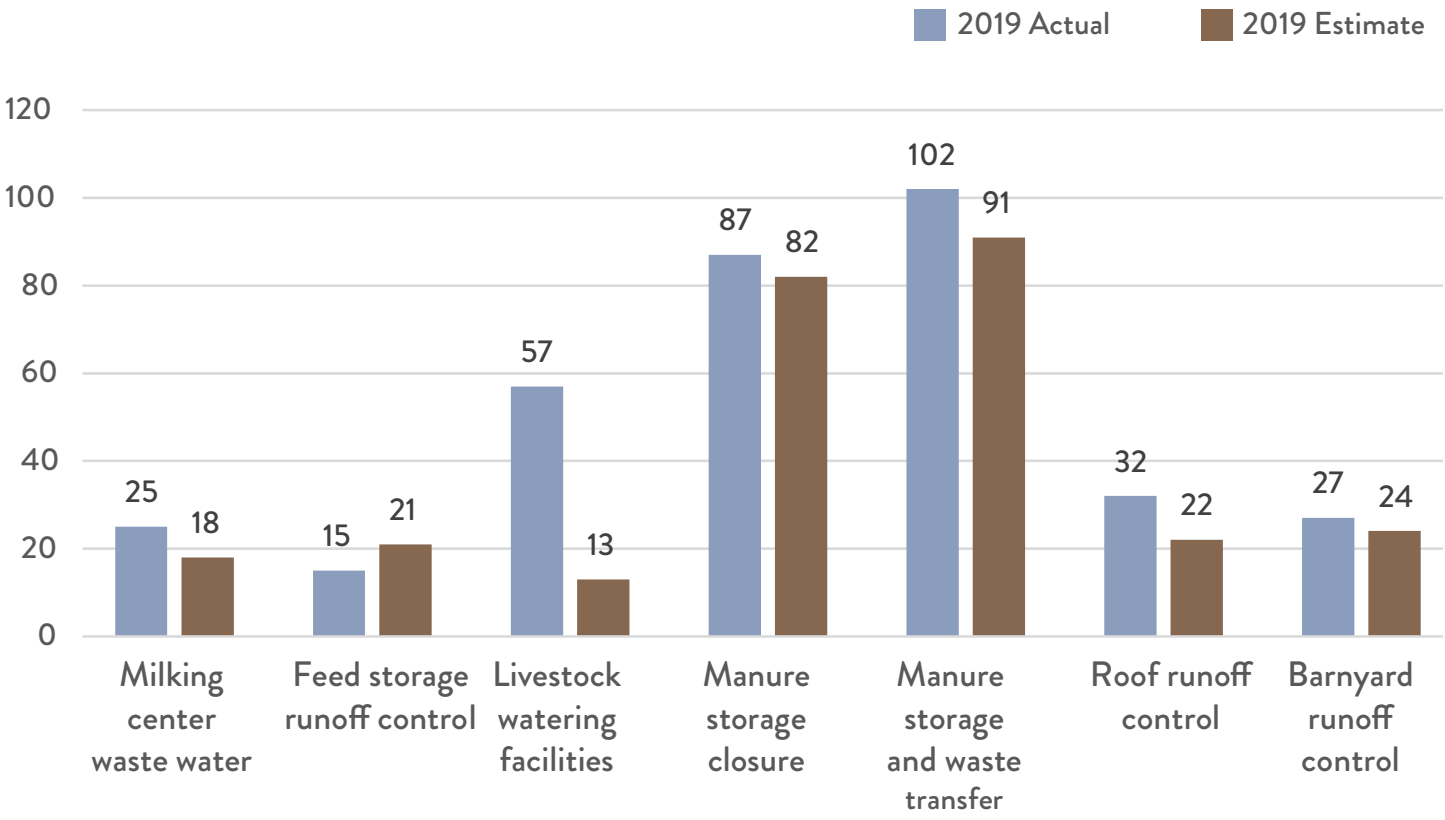
Figure 8: Practices Installed, by Feet



BEFORE - Installing roof gutters at the Laeser property. Photo courtesy of Iowa County

AFTER - Installing roof gutters at the Laeser property. Photo courtesy of Iowa County

Figure 9: Runoff Control Practices Installed, by Number



A manure storage abandonment. Photo courtesy of Polk County.

*Local Permit and Enforcement Actions in 2019**

Many counties in the state have adopted ordinances to regulate activities that impact state soil and water resources. These ordinances often require permits for select activities and the regulation is adopted and enforced locally.

Permits Issued by County Conservation Departments in 2019:

- 105 Permits for manure storage construction and transfer systems
- 93 Permits for manure storage closure
- 38 Permits for Livestock Facility Siting
- 189 Permits for winter spreading
- 505 Permits for nonmetallic and/or frac sand mining
- 1,993 Permits for stormwater and construction site erosion control
- 1,795 Permits for shoreland zoning

Ordinance Enforcement Actions Reported by County Conservation Departments in 2019:

- 4,782 Permitted facilities inspected for compliance
- 92 Permitted facilities issued notices of violation or similar determinations
- 24 Stop work orders issued
- 34 Permitted facilities issued citations or fined for violation
- 16 Permitted facilities referred to corporation counsel for commencement of legal proceedings

**As reported by County Conservation Departments in March 2020.*

Wildlife, Wetland, and Habitat

Managing the threat from aquatic and terrestrial invasive species and protecting wildlife and habitat are critical conservation priorities in counties throughout the state. In 2019, 51 counties worked on issues related to aquatic invasive species and 56 counties worked on terrestrial invasive issues. Counties also incorporate activities related to wildlife, wetland and habitat into their annual work plans and land and water resource management plans.

Wildlife, Wetlands, and Habitat Activities in 2019:

- 62 Counties process wildlife damage claims
- 30 Counties worked on a wetland restoration project
- 47 counties held tree and plant sales

Many other counties are involved in pollinator habitat plantings, native plant restoration projects, and fish passage and habitat work.

Winners of the Douglas County poster contest. Photo courtesy of Douglas County.

Tour of newly constructed stream crossing in Forest County. Photo courtesy of Forest County.

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