2016-17 Highlights
Great Lakes Restoration Initiative in Wisconsin
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The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) is committed to helping private landowners care for the land, use it productively, and excel as stewards for the future. America’s working lands produce food and fiber, clear air and water, wildlife, and healthy soil. Farming can be one of the most environmentally compatible uses of land there is.

NRCS is the leader in helping people make sound choices, to ensure healthy land and water. Through voluntary incentive-based programs, NRCS works directly with farmers and landowners to provide technical expertise and financial assistance to make conservation work on private lands.

The agency promotes conservation practices, everything from practices that manage excess nutrients and waste on farms, to practices that promote soil health, among a host of others, all of which are helping to protect our natural resources for the long term, while at the same time improving Wisconsin farms. Taking care of the landscape in concert with agricultural productivity is our goal.

NRCS celebrates over 80 years of working with farmers and landowners, local and state governments, and other federal agencies to maintain healthy and productive working lands.

NRCS BACKGROUND

NRCS Mission

The U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) is committed to helping private landowners care for the land, use it productively, and excel as stewards for the future. America’s working lands produce food and fiber, clear air and water, wildlife, and healthy soil. Farming can be one of the most environmentally compatible uses of land there is.

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State Resource Priorities

- Water quality degradation
- Soil erosion
- Soil quality degradation
- Inadequate habitat for fish and wildlife
- Degraded plant conditions
- Livestock production limitation
- Excess water and insufficient water
- Air quality impacts
- Insufficient energy use
Over 30 million Americans get their drinking water from the Great Lakes. Seventy-five million acres in eight states flow to the Great Lakes. Nearly one-third of the drainage area is agricultural land. There are over 126,000 farms comprising nearly 24 million acres in the Great Lakes Basin. That includes over 16.7 million crop acres and 6.7 million hay and pasture acres. The average farm size is under 200 acres, with less than ten percent of the farms greater than 500 acres. Major crops include corn and soybeans; major livestock types include dairy and hogs. The waters of the Great Lakes are highly sensitive to biological and chemical stresses and many of the coastal areas have become impaired by sediment and nutrients. Wildlife has also been impacted by habitat fragmentation and competition from invasive species.

The Great Lakes are a key part of Wisconsin’s identity. Wisconsin enjoys nearly 800 miles of Lake Michigan and Lake Superior coastline. Nearly one-third of the land and one-half of the population of Wisconsin reside within the Great Lakes basin.

Wisconsin has a wide range of land covers and uses including forest, agriculture ranging from cash crops to orchard and specialty crops, developing and developed lands. There has been a loss of agricultural lands to other uses. Climatic conditions limit the window for establishing cover crops after harvest. Colder, wet soils hinder adaption of no-till planting. Educating on the timing and method/placement of nutrients are critical for farmers to succeed. There are also opportunities for better management of agricultural drainage water. Many opportunities exist in Wisconsin for NRCS to assist farmers and landowners in putting conservation on the ground in the Great Lakes basin area.
Conservation Beyond Boundaries

Clean water, abundant wildlife, and productive agriculture are all interconnected. Conservation doesn’t have man-made boundaries. That’s why NRCS is addressing natural resource priorities on a landscape scale. Our conservation solutions are to benefit both landowners and the environment, provide wildlife habitat and improve agricultural production.

NRCS, along with 11 other federal agencies, support and participate in the Great Lakes Restoration Initiative (GLRI). This initiative addresses urgent issues such as cleaning up Great Lakes areas of concern, preventing and controlling invasive species, reducing nutrient runoff that contributes to harmful or nuisance algal blooms, and restoring habitat to protect native species. NRCS is helping farmers and landowners to plan and implement activities to improve and protect the natural resources in locally identified watersheds within the eight GLRI states - Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania and Wisconsin.

GLRI Action Plan

The GLRI Action Plan calls for aggressive efforts to address five urgent priorities:
1) Clean up the most-polluted areas in the lakes,
2) combat invasive species,
3) protect watersheds and shoreline from run-off,
4) restore wetlands and other habitats and
5) work with strategic partners on education, evaluation and outreach.
NRCS-Wisconsin is working with several partners to accomplish GLRI goals to accelerate conservation practice implementation and leverage federal funding. The following partners help make this effort possible:

- Wisconsin County Land Conservation Departments (Brown, Calumet, Dodge, Fond du Lac, Kewaunee, Manitowoc, Milwaukee, Outagamie, Ozaukee, Sheboygan, Washington, Waukesha, Winnebago),
- Great Lakes Commission,
- Glacierland RC&D,
- Wisconsin Department of Agriculture, Trade & Consumer Protection,
- Wisconsin Department of Natural Resources,
- U.S. Geological Survey and
- Sand County Foundation.
The NRCS focus for GLRI in Wisconsin is to implement core conservation practices in a systems approach in targeted watersheds to address surface water quality resource concerns associated with livestock operations.

Wisconsin NRCS has developed three key areas of focus to meet GLRI goals.

**Focus Area One**

*Establish and Maintain a Lower Fox Demonstration Farms Network*

**Focus Area Two**

*Establish and Complete a Fox Phosphorus Trading Program*

**Focus Area Three**

*Provide Financial and Technical Assistance to Key Watersheds*
  - Lower Fox Watershed
  - Manitowoc-Sheboygan Watershed
  - Milwaukee Watershed
  - Door-Kewaunee Watershed
The Lower Fox River Watershed, just south of Green Bay, is home to a network of farms that demonstrate the best, leading-edge conservation practices to reduce phosphorus entering Green Bay and Lake Michigan to improve Great Lakes water quality. The NRCS and the Great Lakes Commission (GLC) partnered to establish a Lower Fox Demonstration Farm Network, the first of its kind, in Wisconsin. Other partners include the Brown County Land & Water Conservation Department and Outagamie County Land Conservation Department.

The Great Lakes basin has diverse geology, climate, topography, and soils that provide challenges to controlling erosion and non-point source pollution. The diversity of the region creates challenges for managers to develop conservation practice systems that function in a predictable manner while addressing the region’s conservation priorities.

The Network is working to provide better information on the effectiveness of conservation systems used to improve water quality. The participating farms demonstrate effectiveness and adaptability of conservation practice systems to reduce erosion and sedimentation, control phosphorus runoff, and address other non-point source pollution issues. The Network also provides educational technology transfer opportunities for the public, farmers, land managers, agribusiness, environmental, and natural resource agencies, and research entities and their partners.

Objectives

The Demonstration Farm Network objectives are to:

• Establish demonstration farms within the Lower Fox Watershed to test new and standard conservation systems in reducing phosphorus and sediment.

• Establish an efficient mechanism to share this technology and information with farmers, agribusiness, conservation agencies and the public.

• Create opportunities for others to test their research, technical and program ideas at the demonstration farms.

• Share information and lessons learned from the Lower Fox Watershed throughout the Great Lakes basin.
Participating Demonstration Farms

The six farms participating in the Network are (1) Brickstead Dairy, operated by Dan Brick; (2) Nettekoven Farms, operated by Greg and Karon Nettekoven; (3) Tinedale Cropping, operated by Scott Theunis and family; (4) Van Wychen Farms, operated by George Van Wychen and his son Nick; and two new farm additions; (5) Vande Wettering Farms, LLP, operated by Bill and Tom Vande Wettering; and (6) New Horizons Dairy, LLC, operated by David, Derek, and Matthew Van De Hey. Each of these farms have played an intricate role in trying, demonstrating, and information sharing of leading-edge practices and technologies applied on their farms. Farmers and landowners, partners, government officials, Universities, and many other groups have toured these innovative farms, and participated in demonstration field days. The next pages are introductions to participating farms in the Lower Fox Demonstration Farms Network.
Brickstead Dairy

- Utilization of cover crops (radish, red clover, barley, and other mixes) and timing of application.
- Committed a 35 acre field to cover crop and no-till for long term trials with five species of cover crop utilized.
- Addition of a concrete manure storage structure and grassed waterways.
- Addition of a water quality monitoring system measuring sediment and nutrient loss from a test field in surface water runoff, as well as nutrients coming off the field through a tile drainage system.
- Implementation of cover crop, reduced tillage, and reduced disturbance manure applications on the entire dairy operation.
- Experimentation and use of an interseeder prototype model; an innovative piece of equipment developed by Penn State that straddles corn rows to plant cover crops.
Demonstration Farms

Nettekoven Farms

- Frost seeding of red clover into winter wheat has been very successful.
- Experimenting with planting in late summer after winter wheat harvest of summer no-till triticale, berseem clover, and radish has also been very successful and very favorable yields have been recorded in the first year. No-till of soybeans into winter cover crop mixture has also been successful with favorable yields.
- Gypsum and urea applications with cover crops are currently being tried as soil amendments.
- Actively working with an agronomist to ensure proper selection of herbicides in working with cover crops.
- Drift reduction strategies are being implemented for pesticides.
- Development and experimentation of co-op seed formulas to determine which cover crop seed mixtures work best on the operation.
- Experimentation and use of the Penn State interseeder prototype model to plant different cover crop mixes.

Data Source: ProTracts 10/1/2016
Demonstration Farm Highlights

Left: NRCS Soil Conservationist Julia Hager (left) and Scott Theunis (right), of Tinedale Cropping, on his farm. Middle: Established radish cover crop. Right: Scott Theunis shows radish cover crop on his farm.

Tinedale Cropping

• Implementation of cover crop and reduced tillage.
• No-till with radish cover crop has been successful.
• Experimentation and use of the Penn State interseeder prototype model to plant different cover crop mixes.
• Actively working with an agronomist to ensure proper selection of herbicides in working with cover crops.
• Committed to planting 400 acres of cover crops on the farm in fall 2015.
• Addition of a concrete manure storage structure and grassed waterways.
• Integrated pest management working with a crop advisor.
• Collaborating on cover crops and dairy rotation.
Van Wychen Farms

- Experimenting with many different cover crop mixes; very proactive in trying different multi-species mixes.

- Experimentation and use of the Penn State interseeder prototype model to plant different cover crop mixes.

- Working to develop manure application strategies while maintaining cover crop with local dairy producers.

- Working to develop and design innovative equipment for interseeding cover crop.

- Experimenting with half fields of no-till or conventional tilled, with cover crop or no cover crop. Yield data for no till with cover crop has shown no adverse yield reduction with clover interseeding.

- Installation of stream crossings.
Addition of Two New Demonstration Farms

In 2016, two more demonstration farms were added to the original four to expand the ability to showcase and demonstrate conservation to more producers in the Lower Fox River Watershed area. The following is an introduction to the newly participating farms.

Vande Wettering Farms, LLP

• Located in Greenleaf, Wisconsin, a dairy farm with 350 cows.
• Operated by brothers Bill and Tom Vande Wettering. Tom's son Luke also works on the farm.
• Over the past few years, the brothers have constructed a manure storage, done leachate control measures, installed a waterway and erosion control practices, and have utilized low disturbance manure applications along with various cover crops and no-till planting to improve soil health on their farm, along with protecting water quality in the Upper East and Plum Creek Watersheds.

New Horizons Dairy, LLC

• Located in De Pere, Wisconsin, a dairy farm with 850 cows.
• Operated by David, Derek, and Matthew Van De Hey.
• The farm utilizes cover crops and no-till planting to improve soil health and protect water quality. The Van De Heys constructed a storage to address leachate concerns from their feed storage area to protect water quality in the Apple Creek Watershed. They currently have paired edge-of-field monitoring stations on a field, in cooperation with the U.S. Geological Survey, to quantify water quality benefits of cover crops in a dairy rotation.
DEMONSTRATION FARMS

Edge-of-field monitoring is an effort to help farmers improve and verify the effectiveness of agricultural conservation practices and systems installed on their farm. Monitoring equipment is installed at the edge of a farm field to evaluate the quality of water draining from the field. Collaboration with producers in edge-of-field monitoring demonstrates the effectiveness of system-wide conservation approaches and their effect on overall water quality.

Three of the demo farms house four edge-of-field monitoring stations: Brickstead Dairy, Vande Wettering Farms and New Horizons Dairy. There is also one monitoring station at Mark Wall’s Farm, a satellite demo farm location.

Monitoring began in spring 2015 and will continue for three years to evaluate the effect of cover crops on water quality results. Sites are monitored year-round with autosamplers used to characterize individual storm runoff events and data is combined to produce annual loads. Field data is collected by conservation staff partners to help identify field activities and explain water quality results.
Demonstration Farms Future

Through this agreement with the Great Lakes Commission and the Brown County Land Conservation Department, a staff person, Brent Petersen, with Brown County, is dedicated to carrying out the goals of the partnership. NRCS is currently working on a new agreement to expand the Network project out through 2020 and potentially add one additional farm in the watershed.

Based on the success of the Lower Fox Demonstration Farms Network in the Lower Fox River Watershed, and as a result of a request for this type of assistance from the Kewaunee and Door River Watersheds, Wisconsin-NRCS is finalizing an agreement to establish four Demonstration Farms in Door and Kewaunee Counties. These watersheds have formally been accepted and added into the GLRI Nearshore Program, allowing for funding to be utilized through the NRCS Environmental Quality Incentives Program (EQIP) (projected in 2018) to address resource concerns with producers to improve and protect Great Lakes water quality.
NRCS and the Great Lakes Commission worked to develop a program to capture and apply water quality trading in the Lower Fox River Watershed. This 42-month project started in 2013 and was recently completed. This project analyzed supply and demand for phosphorus credits, and evaluated the best approach for the establishment of a nutrient credit trading program for the Lower Fox Watershed.

Water quality trading is an innovative market-based approach to reducing pollution. Agricultural producers can be non-point sources of phosphorus into the Lower Fox and Green Bay, both of which suffer from multiple pollution problems, including excessive sediment as well as nutrients that cause harmful algal blooms. Reducing phosphorus use and associated runoff is largely a voluntary action for farmers. Phosphorus also enters the watershed from industrial facilities and municipal wastewater treatment plants; however, most already have permits that limit how much pollution can be discharged into the water. When these permit holders face high costs to meet their permit limits, water quality trading can provide an opportunity for them to invest in potentially less expensive ways to reduce pollution entering the watershed.

- Year 1: Develop work plan, convene stakeholders, feasibility (supply, demand, market survey)
- Year 2 & 3: Convene stakeholders, develop trade scenarios, design program (articulate goals, quantification methods, manage risks, administration, guidance)
- Year 4: Convene stakeholders, finalize design, pilot design, lessons learned.

As a result of the project, on October 13, 2016, the first official modern water quality trade between a crop farmer (Bob Van De Loo) and a waste-water treatment facility (Bill Hafs, New Water) on the U.S. side of the Great Lakes basin took place. A complete trading guidebook was also completed.
Wisconsin NRCS focuses GLRI efforts in the following key watersheds: Lower Fox River, Manitowoc-Sheboygan, and Milwaukee River. We call these our Nearshore HUC Watersheds. For FY17, Door-Kewaunee Watershed has also been added to our key watershed list and work will commence in this area soon.

NRCS-WI GLRI Nearshore HUC 8 Watersheds
High volumes of phosphorus and sediment deposition into Green Bay is a major concern in the Lower Fox River Watershed. NRCS is conducting a multi-year project to help farmers reduce phosphorus entering surface water from agricultural land by funding specific conservation practices. Phosphorus reduction priority watersheds include targeting HUC 12 watersheds from the Lower Fox TMDL with the highest agricultural phosphorus and TSS outputs. This multi-year effort started in 2010.

In FY2016, Wisconsin obligated $777,057 in 10 contracts covering 1,637 acres to reduce sediment and nutrient runoff in the Lower Fox Watershed through a special GLRI EQIP phosphorus reduction program sign-up.

A conservation systems approach was used to provide the greatest phosphorus reduction with multiple conservation practices. Local questions within ranking tools were used to prioritize applications that would make the most impact. Questions covered cropland systems, managed grazing systems, and more, with an emphasis on conservation planning at the landscape scale.

<table>
<thead>
<tr>
<th>Code</th>
<th>Practice Name</th>
<th>Planned Amount</th>
<th>Units</th>
<th>Obligation ($)</th>
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<tbody>
<tr>
<td>329</td>
<td>Residue Mgmt - No-Till</td>
<td>6,679 acre</td>
<td>acre</td>
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<td>340</td>
<td>Cover Crop</td>
<td>50,351 acre</td>
<td>acre</td>
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<td>412</td>
<td>Grassed Waterway</td>
<td>255 acre</td>
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<td>528</td>
<td>Prescribed Grazing</td>
<td>3,604 acre</td>
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<td>150,198</td>
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Left: Cover crops and managed grazing are eligible practices that act as targeted conservation efforts to reduce nutrient runoff.
Meet Paul and Ken Hoelzel

Brothers, Paul and Ken, operate a 360 milking cow dairy and farm 800 acres (half owned, half rented). For over 10 years, the Hoelzels have been doing nutrient management planning.

The brothers farm is not far from the Fox River and heavy rains in 2013 showed the need for improved manure storage. Through GLRI, the Hoelzels were able to begin a new manure management regimen to significantly reduce runoff and phosphorus going into the Fox River.

Their previous manure storage system was an old, small concrete pit and an earthen pit, allowing for only six months of storage. The new concrete pit provides a full year of storage, 3.5 million gallons worth. This allows for manure to be spread only when conditions are right for minimum risk of runoff. The new system also includes a vegetated treatment area, with underground tank and pump for transporting manure from barn to pit.

The brothers worked with an NRCS certified Technical Service Provider to develop a comprehensive nutrient management plant to incorporate new manure storage facilities, improved nutrient management and erosion control practices.

The Hoelzels also invested in energy reduction practices identified through an Energy Management Plan through NRCS EQIP. They also enrolled in the NRCS Conservation Stewardship Program (CSP), with enhancements for wildlife, water and soil quality.

Paul explains the benefits, "We have seen great improvements on the farm, more conservation and more awareness for conservation practices and needs, like timing of manure applications; through GLRI, we accomplished our goal, a full year of storage, so we can apply when conditions are right, where we need the nutrients, and reduce the risk of runoff."
Wisconsin obligated $2.1 million in 30 contracts covering 6,139 acres to improve water quality in Lake Michigan through a special GLRI-EQIP nearshore health program sign-up. Funding for installation of core conservation practices that reduce sediment and nutrient runoff were focused in targeted sub-watersheds in the Manitowoc-Sheboygan and Milwaukee Watersheds in eastern Wisconsin.

Funding was provided for installation of core conservation practices that reduce sediment and nutrient runoff in these watersheds. Manitowoc-Sheboygan Watershed partnership started in 2010 and Milwaukee Watershed partnership started in 2011.

Meet Dave and Heather Lettow

Dave and Heather have been farming since 2007. Being good stewards of their land, they are always looking for ways to address the natural resource concerns on their farm and make improvements. Through EQIP, NRCS helped them develop a prescribed grazing system for their dairy operation.

Keeping water clean on the farm was one of their priorities. Conservation practices include a roof runoff system with gutters on the barn to divert clean water from barnyard runoff. They plant cover crops to protect the soil from erosion over winter and subsequently, are a source of high quality forage for the cows in spring.

They also enrolled in CSP and now recycle 100% of their farm lubricants and added structures to their watering troughs to allow wildlife to escape. They installed a manure storage structure through EQIP and installed a milk-house waste collection system to keep contaminated water out of nearby surface water. "We have made a lot of improvements to this farm and we never would have been able to do it without the assistance of NRCS," said Dave.
NRCS will continue to focus on GLRI in the future. Plans include the following.

- Continue to build and leverage partnerships and agreements with farmers, and state, local and government agencies.
- Continue to monitor and share results from edge-of-field monitoring sites at participating Lower Fox Demonstration Farms.
- Use a systems approach to establish and meet all GLRI goals.
- Promote the use of cover crops and no-till, pushing soil health to the next level.
- Continue to utilize and expand the Lower Fox Demonstration Farms technologies and information transfer.
- Work to establish a new Demonstration Farms Network in the Kewaunee-Door Watershed.

NRCS is proud to be involved in GLRI and working with landowners and communities to improve and protect natural resources. Landowners and farmers are receiving incentive payments to implement conservation practices that help them farm the land more efficiently and effectively. In addition to the financial assistance, they see the land become more productive and sustainable for the future. Communities are benefiting from cleaner water, safer beaches, and healthy habitat for wildlife and aquatic communities that provide diversity in our ecosystem.

For more information on GLRI in Wisconsin, contact your local USDA-NRCS Service Center. See the map on page 24 for Service Centers in Wisconsin. Visit our website www.wi.nrcs.usda.gov.
The total FY16 NRCS GLRI estimated phosphorus reduction reported was 139,808 pounds. Wisconsin has made a direct impact in Great Lakes water quality with accountability for approximately 36% of the total reduced phosphorus estimates in FY2016. Please see the chart below.

<table>
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<tr>
<th>Watersheds</th>
<th>Total P CEAP Method (lbs)</th>
<th>WSF P Reduction Calculations (lbs)</th>
<th>Gypsum (lbs)</th>
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