



A clear view of Deer Lake and the opportunity to prevent development made the 70-acre Flagstad Farm a prime candidate for purchase.

A greater clarity

UNPRECEDENTED CITIZEN ACTIONS LED TO A CLEANER, CLEARER DEER LAKE.

Cheryl Clemens and Jim Miller / Photos by Deer Lake Conservancy

Deer Lake is a beautiful 812-acre lake in northwest Wisconsin about 4 miles east of St. Croix Falls. It faces many of the same impacts as other Wisconsin lakes, from agricultural production in its watershed to residential development along its shores. Like other lakes across the state, Deer Lake residents had witnessed declining water quality in the late 1980s.

What distinguishes Deer Lake is that lake residents have been able to see a water clarity improvement of 14 feet by installing a series of watershed protection projects over the last 25 years.

The story of lake improvement is a long one, but the time and investment have been worth the effort.

A conservancy is born

Volunteers began measuring water clarity in 1987 using a Secchi disk, an 8-inch black-and-white disk they lower below the surface of the lake. The point at which the disk is no longer visible is recorded as the Secchi depth. Greater Secchi depths are equivalent to greater water clarity. Secchi disk measurements in the late 1980s indicated that water clarity was decreasing and the lake was becoming more polluted.

In the early 1990s, the Deer Lake Improvement Association sponsored lake planning grant studies through the Department of Natural Resources to identify the reasons and specific sources of decreasing water clarity.

Study results suggested most of the pollution was coming from the watershed — the land that drains to the lake. The pollutant of greatest concern was identified as phosphorus, the main reason for algae growth in Deer Lake and many Wisconsin lakes.

A small group of people recognized that considerable resources and an efficient organizational structure would be needed to reduce watershed pollution. They formed the Deer Lake Conservancy, a tax-exempt, nonprofit organization, to take on the task.

Between 1992 and 2015, the Deer Lake Conservancy obtained DNR grants to fund land acquisition, conservation practices and ongoing lake and watershed monitoring and planning. Total project costs over that period were approximately \$1.3 million, about \$846,000 of which was funded through state grants.

The conservancy focused efforts on areas north and south of the lake. Initially they focused on reducing phosphorus entering the lake from agricultural watersheds to the north along Dry Creek. These projects helped to capture and infiltrate stormwater runoff where intermittent streams carry runoff to the lake. Latest efforts have shifted to the south, with acquisition and restoration of the Flagstad Farm Preserve.

DEER LAKE CONSERVANCY



A sediment basin north of Deer Lake captures and filters runoff from farmland before flowing into the lake.

Conservation practices at Dry Creek

Dry Creek drains one of the agricultural watersheds on the north side of the lake. A number of conservation practices were put in place to improve lake water quality.

Sediment basins – Earthen berms were constructed to capture runoff water from agricultural land. Ponds that form behind the berms allow dirty water to settle and release clean water slowly. By reducing the rate of flow, downstream erosion is also decreased. The pond created by the earthen berm near the trail reaches the base of the trees more than 100 feet north of the dam during periods of peak flow. A second pond with a permanent pool of over an acre is located on private property to the north.

Wetland restoration – Wetlands were restored by removing drainage tiles originally installed to increase the land available for farming. These wetlands now capture and filter runoff water, providing habitat for pond-dwelling creatures.

Prairie restoration – Ten acres of native prairie planted in 1999 provide habi-

tat for butterflies and grassland birds. Burning is used occasionally to reduce growth of weeds, shrubs and trees.

Tire cleanup – The conservancy removed over 20 truckloads of discarded tires from the Dry Creek streambed. A water diversion directs clean runoff away from a farmstead and down a rock waterway to the stream.

Conservation practices at Flagstad Farm

Land acquisition allows the Deer Lake Conservancy not only to install conservation practices, but to ensure they are maintained over the long term. The conservancy currently owns 167 acres of land and has installed conservation practices along nearly all of the intermittent streams that carry stormwater runoff to the lake. As a result of the work, the estimated annual watershed phosphorus loading to Deer Lake decreased by 53 percent from 1996 to 2009.

One of the most important acquisitions was the 70-acre Flagstad Farm

Preserve on the south side of Deer Lake which the conservancy purchased in August 2002. The goal of the land acquisition was to prevent development of the parcel and to allow water quality improvements.

Once the farm was acquired, a series of conservation practices were put in place.

Prairie restoration – Row-cropped farm fields used to drain directly to Deer Lake through three large culverts under U.S. Highway 8. In June 2003, the fields were planted with more than 100 species of native prairie grasses and flowers. Seeds were collected and grown within 50 miles of the prairie, creating one of the largest local-ecotype restored prairies in the state. This change from row crops to prairie significantly reduced pollutant loading to the lake.

Gravel pit reclamation – The conservancy hauled three truckloads (5 tons) of scrap metal and other garbage from the site and then had the area shaped and seeded to native prairie.

Wetland restoration – Plugging a drainage ditch along the southern property boundary resulted in additional water-holding capacity in a pond and decreased agricultural runoff to Deer Lake.

Waterfront owner conservation projects

Once most large agricultural areas were addressed, the conservancy turned its focus to waterfront properties beginning in 2006. Runoff water carries nutrients and sediments that lead to algae growth. Installing rain gardens, native plantings and rock infiltration trenches and pits helps to capture, infiltrate and purify runoff water and reduce erosion. With the great success the conservancy had in reducing phosphorus from the larger watersheds, these smaller waterfront projects increased in importance.

A quick tour of some of the projects follows. Many thanks are extended to property owners who took the initiative to improve their properties and protect Deer Lake!

Boathouse removal with native plantings

Owners Dorothy Goldie and Ralph Schwartz enjoy an improved view of the lake with the boathouse gone. They enjoy the native plants used to stabilize the bank and the critters the plants attract.

When asked why they completed the project, they said, “We have been on Deer Lake for many years. Our boathouse came with our 1920s-era cabin, and back

in the day a boathouse was an essential part of lake life. This is no longer the case. Our boathouse was derelict and scary, and we were interested in having a more natural shoreline that would provide runoff filtration. We felt that removing the boathouse would benefit the lake and help create the kind of shoreline that interested us."

When asked how well it works for them now, Goldie and Schwartz said, "It's great! Where the boathouse was is now a little cove that has pretty shoreline plants like flags that we enjoy. As the ice pulls away in the spring, migratory waterfowl can find open water there that makes for great bird-watching. We hear peepers there. In winter, we now have a gentle slope that makes getting on the lake to snowshoe really easy.

"We are lucky to have a strong lake conservancy that has done so much to improve our lake quality. The vision of the founding conservancy members was really extraordinary. We have had great support from our homeowners and the state of Wisconsin.

"Now that we are on the lake year-round we see the role it plays in providing a resting spot for huge numbers of migratory birds in the spring and fall. We enjoy seeing the interesting wildlife on the ice in the winter. We're glad our lake is healthy and that we were able to play a small role in that through our project."

Rain gardens and diversions

Rod and Terri Johnson installed a series of rain gardens on their property. Rain gardens are depressions that allow the water to soak into the ground. Runoff flowed from Pinewood Road right down their driveway to the lake, causing considerable erosion along the way. Along with the rain gardens, they installed trench diversions across the driveway.

"One of the primary reasons we purchased a home on Deer Lake was because of the outstanding efforts of the Deer Lake Conservancy to protect and improve the quality of the lake," the Johnsons explain. "During our first year on the lake, we observed a fair amount of surface water erosion through the lawn and landscaping. That, combined with the desire to do our part to prevent surface water runoff into the lake, led us to work with an environmental consultant and the conservancy to install rain gardens and plantings that stopped the erosion and held back the runoff."

Nancy Deschane and Dean Sather get a view of a rain garden as they enter their



Rod and Terri Johnson installed rain gardens and trench diversions across their driveway to slow and filter runoff that flowed down to the lake.

driveway. They explain that shortly after completion of their building project in 2008 on Deer Lake, it became evident runoff from and around the new buildings had to be addressed. The property is situated on the precipice of a steep ravine that flows directly into the lake. The area around the garage was especially prone to erosion due to the sandy soil composition and the heavy amount of runoff from the gutterless roof. A rock trench below the roofline of the garage now captures additional water that had been causing erosion to a stream that flows to the lake.

Through the professional guidance and financial assistance of the Deer Lake



Besides filtering pollutants, rain gardens add beauty to yards and neighborhoods and provide habitat for birds, butterflies and insects.



Dick and Susan Ward installed an underground infiltration device below their garage to infiltrate water from the downspout through buried plastic cells lined with filter fabric. This provides temporary storage for water until it can soak into the ground.



Nancy Deschane and Dean Sather's gutterless garage was causing erosion, so they installed a rock trench to catch and infiltrate water.



Areas filled with rock are another option for creating water storage to alleviate erosion by filtering water runoff from roads and driveways.



Mark and Patty Thayer's rain garden captures water flowing from the road on its way to the lake.

Conservancy, Deschane and Sather say they were able to address the areas of concern. Both rain gardens continue to capture and slow runoff into the ravine. The conservancy was instrumental in the coordination of their project and providing them with valuable knowledge to effectively manage the runoff.

Hard work leads to improved water quality

As a result of this citizen-led watershed work, water quality has improved significantly. While major projects were installed from 1997 to 2006, results became clear in the lake beginning around 2011 and clarity increased by 14 feet! Secchi depth measurements are recorded twice a month by Lake Improvement Association volunteers.

In recognition of this striking lake improvement, the Deer Lake Conservancy received the 2015 "Lake Management Success Story" award at the 2015 North American Lake Management Society (NALMS) Symposium in Saratoga Springs, New York.

Deer Lake's success story demonstrates the importance of effective lake organizations, partnerships with state and local government and dedicated engagement by volunteer lake leaders. 

Cheryl Clemens works at Harmony Environmental and Jim Miller is a member of the Deer Lake Conservancy Board.