A Look Back...

In 1993, Lake Ripley was designated a "priority lake" by the Wisconsin DNR. This designation launched a 13-year effort (ending this year) to stabilize and improve water quality conditions that had been deteriorating for the last 150 years due to polluted runoff. Wisconsin Priority Watershed Program funding was used to pinpoint problem areas, and then to develop and carry out a long-term rehabilitation plan. Cost-sharing incentives and technical assistance were provided to eligible landowners to reduce soil erosion, control sources of contaminated runoff, and enhance habitat quality.

We are grateful for the 55 landowners who participated in the program. These landowners invested $378,000 on property improvements that protect the lake, of which $243,000 was reimbursed through state cost-sharing grants. (Figures do not include the value of projects funded through other funding sources.) An additional $563,600 in state grants went toward administering the program and conducting outreach. As a result, nearly one mile of eroding shoreline was protected or restored, and almost 3.5 miles of eroding drainage ditches were either repaired or plugged. In total, this work alone has prevented an estimated 2,100 tons of eroded sediment and associated phosphorus from reaching the lake each year. Thank you to all who contributed to this success!

Lake Leaders Institute Graduates

Pictured L-R with DNR Secretary Scott Hassett (center): Dennis McCarthy, John Molinaro (past graduate), Jane Jacobsen-Brown, Kent Brown and Paul Dearlove. Taken during Oct. 20th graduation ceremonies outside the Aldo Leopold Shack near Baraboo, WI. The Lake Leaders Institute is a statewide leadership program sponsored by the Wisconsin Lakes Partnership—DNR, U.W.-Extension and Wisconsin Association of Lakes. The training combines classroom and field experiences to help lake stewards gain an advanced understanding of lake ecology, lake-management techniques, water, and how to work with state and local governments to ensure that lakes get the attention they need.

Miss a meeting? Want to learn more about the lake? Give us a call, drop by our office, or visit us at **lakeripley.org**. Also, don't forget to send us your e-mail address to receive announcements through our **Lake Ripley E-Bulletin**.

Ripples
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FROM THE HELM

The seasons change and a forest of iron and wood appears on the Lake Ripley shoreline as piers slowly crawl out of the lake. I never tire of the first cool fall mornings when steam rises from the lake like a cup of hot coffee on a cold day. One season ends and another begins, bringing us closer to the end of another year.

This was a year of transition for the Lake Ripley Management District. In the past, we relied heavily on grants to fund our activities. We are grateful for your overwhelming support as our grant funding ends and we convert to a more realistic, tax-based operation.

As I travel around the state to meet with other lake groups, it becomes clear that some people see lake districts as only dealing with the lake and surrounding shoreline. However, to effectively protect and improve Lake Ripley, we must and have always dealt with the whole watershed (the land area draining water to the lake). In the past, we may not have talked enough about what we do away from the lake in our watershed. Wetland protection through conservation easements, miles of improved farm ditches, and rain gardens are examples of how we work with landowners off the lake.

In the future, we intend to work even more with property beyond the shore of Lake Ripley. So, as you plan for next spring and summer, think about what you might want to do to improve your property and help protect the lake. Whether its installing a rain barrel or rain garden, or maybe restoring a small wetland, I urge you to call us for assistance and to see if you're eligible for cost sharing.

Have a safe and healthy holiday season.

John Molinaro
Chair, Lake Ripley Management District

Making Sense of Lake-Monitoring Data

Every lake is unique, and each is a product of the lands that drain to it. Like an organism reacting to its environment, the look and behavior of a lake will reflect its physical, biological and chemical characteristics. Long-term monitoring is a way of evaluating these characteristics to better understand how they interact and contribute to observed lake conditions. On Lake Ripley, monitoring is used to track water quality, fish populations, aquatic plant communities, invasive species, lake levels, sources of watershed erosion and pollution… even boat traffic. And each is affected by how we use the lake and alter its surrounding landscape.

Regarding water quality, volunteers are trained to measure water clarity, oxygen levels, temperature profiles and other indicators of lake health. Samples also get sent to Madison's State Lab of Hygiene to screen for harmful E. coli bacteria, and to measure phosphorus and chlorophyll-a concentrations. Phosphorus is the nutrient that fertilizes our lakes and turns them green, while chlorophyll-a is used as an indicator of algae abundance. Because lakes exhibit natural variability and are influenced by many factors (like the weather), monitoring must occur over long time periods to identify trends. Monitoring is useful in comparing a lake's condition relative to other lakes, and acts as an early warning system by diagnosing emerging threats before they become larger problems. *(Continued on next page)*

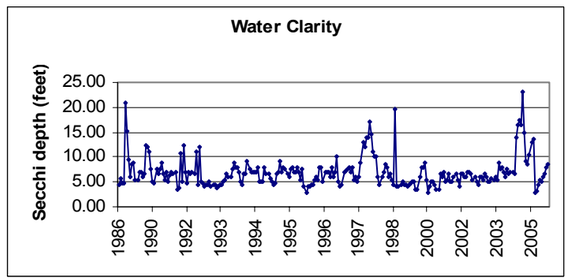
Lake Monitoring (cont.)

Lake Ripley is a 418-acre, 44-ft-deep, drainage lake. Drainage lakes are fed by inflowing streams, groundwater, precipitation and runoff, and are drained by an outlet stream. While most of Lake Ripley's water comes from runoff and through stream drainage at its inlet, as much as 30-45% comes from groundwater. Water primarily leaves as stream flow at the outlet or as evaporation. It takes just over one year for the lake to completely "flush" as water cycles through the system. Slow flushing rates and the in-lake recycling of phosphorus (i.e., that which is released from decaying organic matter, or from lake-bottom sediment in the absence of oxygen) can delay water quality improvements despite reductions in phosphorus delivery from the watershed.

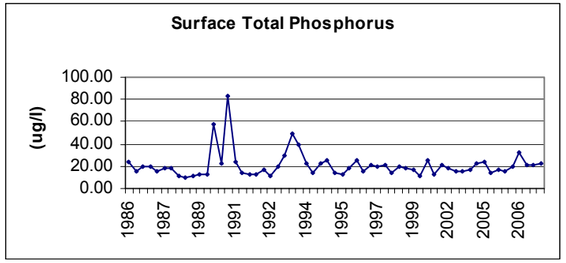
Over the summer, Lake Ripley forms water layers of different temperatures and densities. Lake-wide mixing is prevented as a "barrier" forms between the warmer, lighter layer near the surface, and the cooler, denser layer near the bottom. Water depths greater than 15-20 feet cannot mix and quickly become starved of oxygen. A lack of photosynthesis and the consumption of oxygen from bacterial decomposition make these depths inhospitable for most aquatic life.

Lake-wide mixing (called turnover) occurs in the spring and fall due to the rapid warming and cooling of the water column. Turnover aerates the lake but also transports phosphorus-rich water to the surface where it can stimulate new algae growth—an example of in-lake phosphorus recycling. During the winter, water continues to cool and slowly sink until it reaches a maximum density at 39°F. Further cooling then causes the coldest water to rise to the surface just prior to ice formation at 32°F. The resulting ice cover insulates the underlying water and keeps deeper lakes from freezing solid.

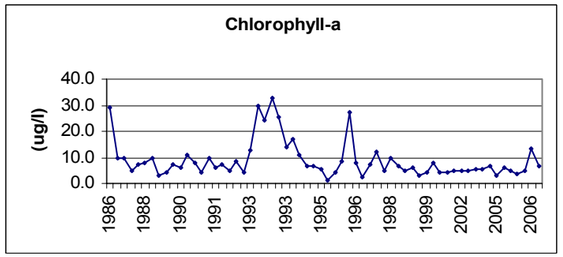
Understanding these and many other lake processes is important when collecting and interpreting lake data. Below are a few summary charts presenting basic water quality data from Lake Ripley. As you can see, many years of data are needed to see actual patterns and trends. These summary charts reveal fairly stable water quality conditions. Results can be plugged into a water quality index (see table) to determine how the lake compares to others in its region. The index suggests that Lake Ripley's water quality is generally "good."



Water clarity is measured using a Secchi disc. The Secchi depth marks the point at which the disc—when lowered from the side of a boat—can no longer be seen from the surface. Water color, free-floating algae and plankton, and suspended sediment (turbidity) can all affect clarity. Since 1986, clarity has averaged about 7 feet, but has ranged from 3-23 feet. The highest clarity readings are often associated with droughts that limit the amount of polluted runoff to the lake.



Runoff accounts for over 80% of the phosphorus entering Lake Ripley. Phosphorus is found in lawn and crop fertilizers, eroded topsoil, manure, pet waste, leaves and yard waste. It is responsible for stimulating aquatic plant and algae growth, especially when concentrations exceed 25 ug/l following spring turnover. Because rooted aquatic plants and algae compete for the same nutrients, excessive and indiscriminate plant removal has been shown to increase the frequency and intensity of algae blooms. Whereas plants offer habitat and can be managed with harvesting, nuisance algae has few redeeming values and is much more difficult to control.

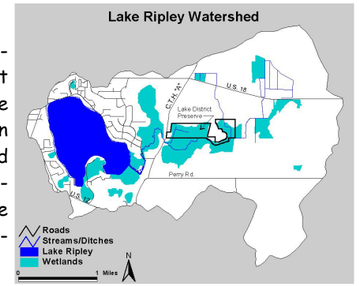


Algae is the free-floating, microscopic plant life that turns the water green and can create a thick scum on the surface. Chlorophyll-a is the green pigment found in all photosynthesizing organisms, and is used as an indicator of algae biomass.

Water Quality Index	Total Phosphorus (ug/l)	Chlorophyll-a (ug/l)	Secchi Clarity (ft)
Excellent	<1.0	<1	>20.0
Very good	1.0-10.0	1-5	10.0-20.0
Good	10.0-30.0	5-10	6.5-9.5
Fair	30.0-50.0	10-15	5.0-6.0
Poor	50.0-150.0	15-30	3.0-4.5
Very poor	>150.0	>30	<3.0

Adapted from Lillie and Mason, 1983

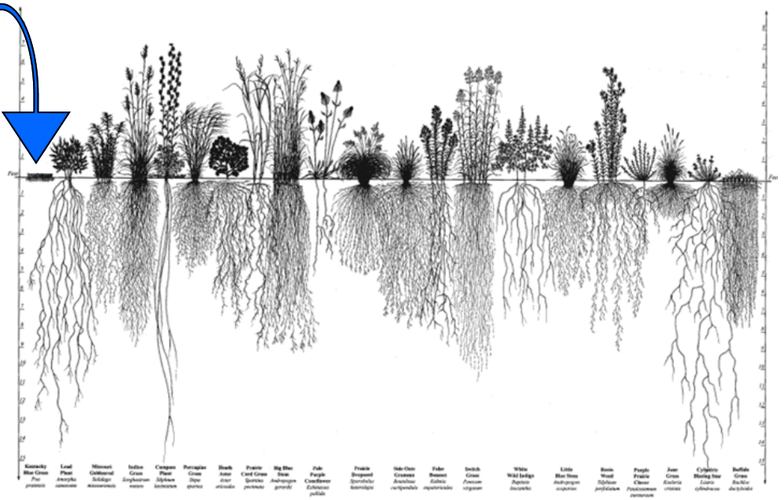
Exploring the Lake District Preserve



The primary goal of the Lake Ripley Management District is to safeguard the health and quality of Lake Ripley. We strive to achieve this goal by, in part, preserving and restoring wetlands around the lake. Wetlands absorb flood waters like giant sponges, filter and cleanse polluted runoff, protect groundwater, and provide valuable fish and wildlife habitat. They are also the most biologically productive ecosystems in the world. Three-quarters of Wisconsin's wildlife and 43% of all endangered and threatened species depend on them for part of their life cycles. Unfortunately, two-thirds (over 1,000 acres) of the local wetlands that once buffered Lake Ripley have been destroyed. Today, our remnant wetlands remain under siege, mostly due to encroaching development and disruptive land-use practices.

In 1997, the Lake District was able to acquire 100 acres of farmed wetlands strategically located at the inlet to Lake Ripley. A $120,000 DNR Lake Protection Grant and $47,000 in private donations were used to make the purchase. At the time, the wetlands were severely degraded from many years of filling, draining and plowing. Drainage ditches that helped dry the land for crop production also allowed runoff to bypass the wetland's natural filtration system.

Restoration was undertaken to improve water quality, as well as to offer opportunities for public education and outdoor recreation. To date, 1.7 miles of drainage ditches have been "plugged" so they no longer discharge directly into Lake Ripley's inlet tributary, but instead recharge thirsty wetland areas. Restored shallow- and deep-water marshes now provide sanctuaries for frogs, turtles, cranes, wood ducks, herons and other wetland-dependent species. In addition, upland portions of the property were planted to native, tall-grass prairie. A colorful diversity of deep-rooting prairie grasses and wildflowers provide important habitat, and help the soil absorb rainfall while protecting it from erosion. Prairie grasses can reach 10 feet tall, and have roots that penetrate 12 feet below the soil surface. These vast root systems help aerate the soil and increase its ability to infiltrate water. Compare them to the shallow root systems of lawn grasses:



Visitors are welcome to explore the Preserve and learn about its remarkable transformation daily from sunrise to sunset. A nature trail winds through the western half of the property where several interpretive signs describe the unique flora and fauna that commonly inhabit prairie and wetland ecosystems. The trail links to an elevated boardwalk that spans a shallow pond, and a hilltop observation deck featuring panoramic views of the marsh. Hunters, birdwatchers, hikers, school groups, nature enthusiasts and others are welcome to experience this beautifully restored wetland conservancy that benefits Lake Ripley.

Become a <u>Friend of the Preserve</u>! Volunteers are needed to help inspect and clean birdhouses, collect prairie seeds, update interpretive signs, participate in prescribed burns, monitor flora and fauna, and assist with educational tours. We are also looking for donors to sponsor recent public-access improvements. At the $100 sponsorship level, your name or business will be inscribed on a donor plaque attached to our new observation deck. Please send your tax-deductible donation payable to the Lake Ripley Management District (N4450 CTH A, Cambridge, WI 53523) by <u>January 31, 2007</u>, and write "Friend of the Preserve Fund" on the memo line of your check. In addition, we are still accepting donations to the F.K. Elson Fund which increases our capacity to conduct fishery-enhancement projects. **Your generosity and support are greatly appreciated!**