Ripples

Lake Ripley Management District

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Lake District Office

Oakland Town Hall
N4450 County Rd. A
Cambridge, WI 53523
(608) 423-4537
Lake.manager@tn.oakland.jefferson.wi.gov.
www.lakeripley.org
@LRMDLS2020

Board of Directors

Jimmy DeGidio
Chair
(608) 921-1340

Debbie Kutz
Treasurer
(920) 650-9122

Georgia Gómez-Ibáñez
Secretary
(608) 628-7212

Steve Bieschke
Commissioner
(847) 420-5330

Doug Maurer
Commissioner
(608) 515-3976

Meg Turville-Heitz
Jefferson County Rep.
(608) 695-0313

Ted Vratny
Town of Oakland Rep.
(608) 556-1331

Lake Manager

Lianna Spencer
Lake.manager@tn.oakland.jefferson.wi.gov
(608) 423-4537

Weed Harvest Crew

Leo Allen
Ed Grunden
Jim Jermain
Richard Moen

From the Helm

Park Road Reconstruction

Jimmy DeGidio, checking out the materials that will be used for the Park Road reconstruction.

As I watch my neighbors around the lake installing their piers and boat lifts, it reminds me of the fast-approaching summer temperatures and severe thunderstorms that come with it. We saw a record number of 'ice-off' days this winter, and with several large rain events already this spring we are anticipating the weed growth on the lake to be more robust than years past.

Another thing that comes to mind this time of year is the start of construction season. As you have noticed, Park Road is being reconstructed this summer. The Town of Oakland received a 50% cost share grant for the rebuilding of the road; it is in rough shape and the drainage around the area needed to be looked at. After working on the Ripley Road project, we learned how important drainage around the lake is. Our ditches play a significant role in filtering the runoff and slowing the running water before it enters the lake. The District expressed concern in several areas of the project, such as the runoff that will enter the outlet which turns into Koshkonong Creek. Although we couldn't get all that we expressed interest in, we were able to help make meaningful changes to the original plans that will benefit the watershed for years to come. We are working with the contractors to make sure the carp gate at the culvert stays in place until the new culvert is installed. I would like to thank several people

Park Road Reconstruction continued

for assisting us in putting the best plan forward for Park Road and the lands surrounding the project: Lianna Spencer – Lake Manager, Dan Betka – DNR Water Resources Engineer, Nathan Lipinski – Senior Engineer for Jewell Associates Engineers, Tim McGuire – Subcontractor for the culvert, the Oakland Town Board, Jefferson County Zoning Department, Jefferson County Land and Water Conservation Department, and the Lake Ripley Management District Board.

I hope that everyone will make time to enjoy the lake this summer and take in all that it has to offer. It's a special resource in which we are all invested in!

-Jimmy DeGidio, Chairman

Construction materials lined Park Road.

One of the concrete pipes that lined Park Road before construction begins.

The Do's and Don'ts of Maintaining Your Ditch

Do you have a ditch on your property? Are you wondering what is the best way to maintain your ditch? We have some solutions for you! The District has created the "Swale Program" to help fill those ditches with native plants that will help slow rainwater and contribute to the healthy water quality of Lake Ripley! Win-win, right?! Visit our website (www.lakeripley.org/programs) or reach out to us to learn more about this program!

One thing not to do is to burn in your ditch. If you are piling up all of your yard waste into your ditch and burning it, then the next time it rains all of the nutrients that were released from your burned yard waste are washed directly into the lake! This is definitely not a good thing. You also don't want to fill in your ditch. These ditches were specifically created to help slow down runoff and infiltrate some of that water before it reaches our lake. If you filled in your ditch, the water would run straight off the manicured lawns and roads and right into the lake with no filtering! Lastly, don't fill up the ditch with trash. Trash of any kind can leach potentially hazardous chemicals into the ground which will travel to the lake whenever it rains.

Be sure to take care of your ditch this summer! And reach out to the District for any help you need to get started.

How's the Water?

Written by: Dwight Osmon, Water Quality Technician

"How's the water?" is the question most people ask when they stop and talk to me while I'm on a monitoring run in the inlet creek. I usually quip, "How long do you have to talk?". The reality is, the conditions in the inlet creek can change from month-to-month, week-to-week, day-to-day, or even hour-to-hour!

But first, let's talk about the monitoring we are doing on the lake and in the watershed. In the lake itself, the District participates in the DNR's Citizens Volunteer Lake Monitoring (CLMN) program. This ongoing monitoring has nutrient, water clarity and chlorophyll-A data for Lake Ripley that goes back decades! Within the watershed, we monitor the inlet creek at five locations. Listed upstream to downstream they are: Highway 18, the middle of the District's Preserve (Preserve Central), County Road A, Ripley Road, and the outlet at Park Road.

This strategy tells us what goes into and what comes out of the lake. This knowledge is what helps direct our current and future land management decisions.

Water quality measurements serve as indicators for different types of pollution that may be affecting a body of water. What do we monitor, and what are we finding so far?

Our Water Quality Technician, Dwight, collecting samples from

What Do We Monitor?

What (and when) do we measure?	What does it tell us?	What are we finding so far?
Phosphorus (bi-weekly or monthly)	Phosphorus is an essential nutrient needed by algae and plants. Too much can fuel nuisance algae growth, support toxic blue-green algae blooms, and turn the lake green. Phosphorus levels increase due to fertilizer usage, bank erosion and poor land practices.	The amount of phosphorus entering the lake via the inlet is high and will not sustain the desired ecological state of Lake Ripley. Phosphorus is the reason the lake looks green in the summer months because it stimulates algae growth. Phosphorus levels increase as flow increases.
Nitrogen (bi-weekly)	Nitrogen is a nutrient. It does not have a big impact on algae growth, but it is an indicator for groundwater pollution from overuse of fertilizers, animal waste, or leaky septic systems.	The type of nitrogen in the inlet (nitrates and nitrites) indicates either that the underlying groundwater is contaminated (which is not uncommon in Jefferson County) or there are local sources of nitrogen entering the lake from abandoned septic systems.

What Do We Monitor? (cont.)		
Temperature (bi-weekly or monthly)	Temperature tells us if the stream gets too warm to support aquatic life.	There are no indications that temperature is an issue in the inlet creek for aquatic life.
Dissolved Oxygen (bi-weekly or monthly)	Dissolved oxygen tells us if there is enough oxygen to support aquatic life and can indicate other types of pollution if there are large swings over the course of a day.	Most of the time, we find that oxygen levels are within the "healthy" range. At the monitoring site near Highway 18, oxygen levels can increase greatly indicating too many nutrients are present. The levels increase when algae photosynthesize at high rates and produce large amounts of oxygen. In this case, the likely culprit is filamentous algae which thrives at this location.
Conductivity (bi-weekly or monthly)	Conductivity tells us the amount of dissolved salts and minerals in the water. Groundwater contains minerals and is normal for a stream, while elevated levels indicate surface runoff from pavement or other impervious surfaces.	The conductivity measurements are within the expected range for our area and indicate groundwater is primarily feeding the inlet during regular flow conditions.

One of our monitoring sites.

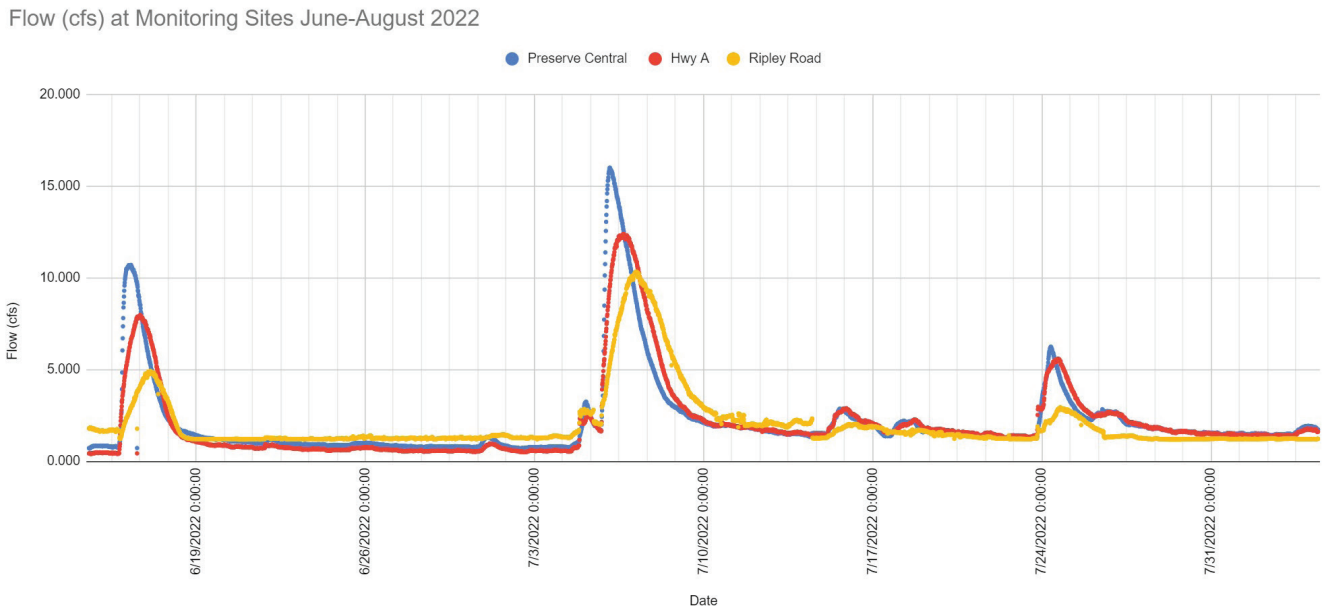
What Do We Monitor? (cont.)		
Turbidity (bi-weekly or monthly)	Turbidity is a measure of overall water clarity. Turbidity can increase from suspended or dissolved particles that reflect light. This means a stream could have a very low amount of suspended particles but still have high turbidity. Conversely, a stream might have very low dissolved particles and still have high turbidity if the amount of suspended particles is high.	The patterns for turbidity in the inlet are identical to the findings for suspended sediments. This means that most of the turbidity in the creek is due to sediments entering the water.
Flow (bi-weekly or monthly)	Flow tells us how much water is passing through a part of the stream at a given moment in time. This is measured in the field using a flow meter.	When the weather is dry, the flow in the creek can get really low, with only about a foot of water (or less). During periods of time where there is a "normal" amount of rainfall, flow increases, and the creek is about two feet deep at our monitoring sites. When large rainfall events happen, the creek can overflow its banks and exceed three feet in depth.
Water Depth (every 15 minutes)	Water depth is measured using remote data loggers. These are the steel pipes you might have noticed sticking out of the stream. The data is used to model stream flow using flow data collected in the field. When flow data is combined with nutrient and sediment measurements, we can model the amount of nutrients and sediments at each monitoring site.	Water depth is used to create a model for flow, allowing us to estimate the volume of water in the inlet every 15 minutes. During baseflow, the most downstream site located at Ripley Road has the highest volume of water which tells us the creek is gaining water as it gets closer to the lake. During high flow, the volume of water decreases as you get closer to the lake. This might seem counterintuitive, but it is an important part of what's happening in the watershed. I will explain this part of the story in more detail in the next part of the article…

What Do We Monitor? (cont.)

Biotic Index (spring and fall)	The Biotic Index is calculated by sampling the macroinvertebrate community in the spring and fall. Some organisms are intolerant to pollution while others are tolerant. The ratio of each organism found is used to determine the impacts of water quality over long time periods.	Water quality and the biological health of aquatic life living in a stream are directly connected. Water quality measurements tell us what is happening at a discrete moment in time. When we capture many of these moments during different environmental conditions, we can build a picture of what is happening most of the time. Measuring biological endpoints, such as the macroinvertebrate community, provides an integrated view of what is happening over the entire lifespan of the critters being sampled. What this means is that the macroinvertebrates are exposed to the stream continuously experiencing the best and worst conditions that water quality sampling might not capture. These small organisms function as the "canary in the coal mine" for water quality conditions in the creek. The macroinvertebrate community in the inlet creek rated the water quality as "fair," which is consistent with our data.

Let's dig a little bit deeper into the data to see how modeling works, and how it helps with planning and management decision making.

To model water volume or flow, you do some math to build a model of the cross section of the stream. The math looks like this: water depth X water velocity = flow or water volume expressed in cubic feet per



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How's the Water? continued

second (cfs). You measure this multiple times across the stream, calculate the volume at each spot and add them up to estimate all of the water in the stream at that moment in time.

The graph below shows a portion of the modeled flow data for the inlet creek from June to August 2022. The flat parts of the graph represent low flow conditions. The general pattern is that the smallest amount of water is found in the most upstream site in the Preserve (blue line) with the most water at the most downstream site at Ripley Road (yellow line). This pattern means that water is accumulating in the creek as it moves through the watershed or, in other words, the more land that is draining into the creek plus more groundwater entering the creek equals more water. This pattern reverses when it rains! During large storm events, represented by the spikes in the graph, the most water is in the Preserve and continues to decrease to Ripley Road.

How can this happen since we already know water accumulates as you move downstream? The answer lies in the landscape that surrounds the creek! Upstream of the Preserve the creek moves through an agricultural landscape that is designed to move water quickly from the land to the creek via ditches and drain tiles. This causes the large initial spike in water volume in the Preserve. Through most of the Preserve (east of Highway A) the creek is a straight agricultural channel that continues to move water quickly downstream, but this changes downstream (in the Preserve west of Highway A) as the creek starts meandering through wetlands. During high flows, the creek jumps its banks and overflows into the surrounding wetlands. These wetlands sequester flood waters and release them slowly back into the creek. The wetlands also capture the nutrients and sediments in the creek delivered by runoff, bank erosion and resuspended bottom sediments. Last year I sampled the day after a big storm and was shin deep in water…in the wetland!

Now I need to return to the concept of modeling to explain the next steps in our work. We used math to estimate flow, and we can use math again to estimate the amount of phosphorus and suspended solids in the creek. This is what the math looks like: flow X concentration = amount of phosphorus or suspended solids in pounds. When you put together all of the numbers, the majority of phosphorus and suspended sediments enter the Preserve from the upstream portion of the watershed with more increases, until the creek moves through the wetlands. In the wetlands, 85% of the suspended sediments and 28% of the phosphorus was removed before the water entered Lake Ripley. The 85% removal rate represents 9.8 tons of sediment that did not enter the lake! While this sounds great, unfortunately 1.7 tons of sediment were deposited in the portions of the creek downstream of Ripley Road and eventually will make their way to the lake. The story for phosphorus is not quite as bright. With only 28% of the phosphorus removed in the wetlands, nearly 80 pounds of phosphorus made its way into Lake Ripley over the two months that were modeled.

So finally, how does this information impact future planning and management of the inlet? First, it places a focus on the parts of the watershed that lie upstream of the creek crossing at County Road A. A total of 11.5 tons of sediment entered the creek upstream of the County Road A crossing in two months! For now, it seems our future might include new projects targeting this part of the watershed for instream management and/or watershed management to remove or prevent nutrients and sediment from entering the creek and making their way to Lake Ripley.

So, the next time I meet you at a water sampling site and you ask me "how's the water?", let's talk.

The inlet stream is the blue line in the photo.

Turtle Crossing!

Keep your eyes out for turtles crossing the road. Slow down, and if needed, help them cross the road in the direction they were traveling.

Did you see a turtle? You can submit any turtle sightings (alive or dead) to the Wisconsin Turtle Conservation Program! Here is the website to submit your sightings: *https://wiatri.net/inventory/witurtles/*

A big snapping turtle seen on Park Road.

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise." - Aldo Leopold

Be sure to visit, to LIKE and FOLLOW our Facebook page at: **www.facebook.com/LRMDLS2020**

Go check out our website *www.lakeripley.org* for more information on the Lake District!

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