Rollins Savanna contains two ponds: Rollins Savanna Pond 1 (RS1) at 7.62 acres and Rollins Savanna Pond 2 (RS2) at 52.65 acres. The area was historically farmed and the ponds were created through the breaking of field tiles and impoundment by a control structure in approximately 2003 by the Lake County Forest Preserve District. The Rollins Savanna Forest Preserve is actively managed and includes a prairie, savanna, oak woodlands, and wetlands. The ponds eventually drain into Mill Creek. Rollins Savanna has great habitat for birds, monarchs, and other wildlife.

In 2018, the Lake County Health Department - Ecological Services (LCHD-ES) monitored both of the ponds in Rollins Savanna as part of routine water quality sampling. Since both ponds are very shallow, samples were taken only from the surface of the lake. Both ponds have poor water quality and RS2 had frequent blue-green algae blooms throughout the summer months. RS2 was also carp dominated and is impaired for phosphorus, total suspended solids, and nitrogen.

Samples were analyzed for nutrients, solid concentrations and other chemical parameters. Additionally, LCHD-ES conducted an aquatic plant survey in August 2018 on both Rollins Savanna Pond 1 and Pond 2.
ROLLINS SAVANNA SUMMARY

Following is a summary of the water quality sampling from the 2018 monitoring season on Rollins Savanna Pond 1 and Rollins Savanna Pond 2. The complete data sets can be found in Appendix A & B of this report, and discussed in further detail in the following sections. Included in the Appendix is an “Understanding Your Lake Data” guide that will help with additional questions about water chemistry results.

Rollins Savanna Pond 1

- Average water clarity as measured by Secchi depth in 2018 was 1.38 ft for RS1. The 2018 Secchi is below the Lake County median Secchi depth of 3.00 ft; however it is a 42% increase since 2011 (Secchi depth= 0.97 ft.).
- Water clarity is influenced by the amount of particles in the water column; this is measured by total suspended solids (TSS) concentration. The average epilimnion TSS concentrations on RS1 was 22 mg/L in 2018, which is above the Lake County median of 8.2 mg/L. TSS have decreased by 42% since 2011 from 38 mg/L (2014) to 22 mg/L (2018).
- Nutrient availability indicated that RS1 was phosphorus limited with an average TN:TP ratio of 26:1.
- In 2018, the average total epilimnion phosphorus concentration was 0.112 mg/L. This is above the Illinois Environmental Protection Agency (IEPA) water quality standard of 0.050 mg/L. RS1 would be impaired for phosphorus, however IEPA no longer lists impairments for lakes <20 acres. TP concentrations have decreased by 63.5% since the 2011 sampling from 0.307 mg/L (2011) to 0.112 mg/L (2018).
- The aquatic macrophyte survey showed that 89% of all sampling sites had plant coverage on RS1. In 2018, a total of 5 plant species were present in RS1. This is the same amount of aquatic plants observed in 2011. The most dominant aquatic plants in RS1 was Elodea found at 89% of the sampling sites.

Rollins Savanna Pond 2

- Average water clarity as measured by Secchi depth in in 2018 was 0.66 ft for RS2. The 2018 Secchi is below the Lake County median Secchi depth of 3.00 ft; however it is a 30% decrease since 2011 (Secchi depth= 0.95 ft.).
- The average epilimnion TSS concentrations on RS2 was 45 mg/L in 2018, which is above the Lake County median of 8.2 mg/L. TSS have decreased by 37.5% since 2011 from 72 mg/L (2011) to 45 mg/L (2018). RS2 suffers from high carp populations as well as algae blooms and is impaired for total suspended solids.
- Nutrient availability indicated that RS1 was phosphorus limited with an average TN:TP ratio of 32:1.
- In 2018, the average total epilimnion phosphorus concentration was 0.176 mg/L. This is above the Illinois Environmental Protection Agency (IEPA) water quality standard of 0.050 mg/L and is impaired for total phosphorus.
- The aquatic macrophyte survey showed that 76% of all sampling sites had plant coverage on RS1. A total of 10 plant species were present in RS2. This is a slight increase since 2011 when 8 plant species were observed. The most dominant aquatic plants in RS2 was Sago Pondweed found at 67% of sampling sites.
Watershed & Landuse

Rollins Savanna Pond 1 & 2 are in the Mill Creek Watershed. They are located entirely in the Rollins Savanna Forest Preserve managed by the Lake County Forest Preserve District (LCFDPD). The watershed very small and the dominant landuse is public and private open space and water (Figure 1).

The size of the watershed feeding the lake relative to the lake size is also important factor in determining the amount of pollutants in a lake. The watershed to lake ratio is very small. There are no major roads or subdivision that influence water quality in the ponds. However, this area use to be farmed so there are high nutrients existing in the sediment. Small watersheds can be easier to manage for non-point source pollution.

Water Clarity

Water Clarity is typically measured with a Secchi disk and is primarily used as an indicator of algal abundance and general lake productivity. Although it is only indicator, Secchi disk depth is the simplest and one of the most effective tools for estimating a lakes’ productivity. It can also provide an indirect measurement of the amount of suspended materials in the water. A number of factors can interfere with light penetration and reduce water clarity. This includes: algae, water color, re-suspended bottom sediments, eroded soil, and invasive species.

The 2018 average water clarity for RS1 and RS2 are below the average lake county Secchi depth values. Average Secchi Depth for RS1 was 1.38 ft and average Secchi depth for RS2 was 0.66 ft. RS2 is the larger of the two ponds, and has increased carp activity. This increases turbidity and affects water clarity. Both ponds suffered from harmful algal blooms throughout the summer which affected water clarity, especially July—September. This is reflected in Figure 2 as water clarity declines after June.
TOTAL SUSPENDED SOLIDS

The Total Suspended Solids (TSS) parameter represents the concentration of all organic and inorganic materials suspended in the lakes water column, which includes both sediment and algal cells. Typical inorganic components of TSS are referred to as non-volatile suspended solids (NVSS) and originate from weathering and erosion of rocks and solids in the lakes watershed. The organic portion of TS are referred to as volatile suspended solids (TVS) and are mostly composed of algae and other organic matter such as decaying plants.

In 2018, TSS concentrations in RS1 averaged 22 mg/L and RS2 averaged 45 mg/L (Figure 3-4). While these are both decreases in TSS concentrations since the 2011 sampling, they are still well above the Lake County average TSS concentration of 8.0 mg/L. Secchi depth and TSS are inversely related. A lake can have a TSS impairment which is based on if the median surface NVSS is greater or equal to 12 mg/L for the monitoring season. In 2018, the median surface NVSS for RS2 was 28 mg/L, meaning it is impaired for total suspended solids. High carp activity and blue-green algae blooms contribute to these high TSS concentrations.

Figure 3: Total Suspended Solid Concentrations by Year, Rollins Savanna 1

Figure 3: Total Suspended Solid Concentrations by Year, Rollins Savanna 2
**Nutrients: Phosphorus & Trophic State Index**

In a lake, the primary nutrients needed for aquatic plant growth are phosphorus (P) and nitrogen (N). Sources of phosphorus can be external, internal, or both. External sources include: human and animal waste, soil erosion, detergents, sewage treatment plants, septic systems, and runoff from lawns. Internal sources of phosphorus originate with the lake and are typically linked to the lake sediment. When phosphorus is bound to sediments it is generally not available for use by algae, however, various chemical and biological processes can allow phosphorus to be released from the sediment, making it available in the water column.

Both ponds are very nutrient-rich, likely a result of their shallow nature and the underlying soil as the area was historically farmed. TP concentrations averaged 0.112 mg/L for RS1 and 0.175 mg/L for RS2. Concentrations increased as the season progressed due to lower water levels and increased biological activity (Figure 5 & 6). Since Rollins Savanna used to be a farmed system, it is likely a large source of nutrients is from sediments.

RS1 and RS2 also had frequent and intense algae blooms starting in July and lasting through the end of the sampling season. RS2 also had high density of carp, which resuspended bottom sediments. This can contribute to higher phosphorus concentrations.

Total phosphorus is also used to calculate the Trophic State Index (TSI) value. Trophic states describe the overall productivity of a lake and refers to the amount of nutrient enrichment. This has implications for the biological, chemical and physical conditions of the lake. Lakes are classified into four main categories: oligotrophic, mesotrophic, eutrophic, and hypereutrophic. These range from nutrient poor and least productive (oligotrophic) to most nutrient rich and most productive (eutrophic). In 2018, RS1 had a TSIp value of 72.1 and RS2 had a TSIp value of 78.6 both which classify Rollins Savanna 1 & 2 and hypereutrophic.

**Figure 5: Epilimnion Phosphorus Concentrations in Rollins Savanna 1**

**Figure 6: Epilimnion Phosphorus Concentrations in Rollins Savanna 2**

<table>
<thead>
<tr>
<th>Lake County Average TSIP</th>
<th>65.5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RS1</strong></td>
<td></td>
</tr>
<tr>
<td>TSIp = 72.1</td>
<td></td>
</tr>
<tr>
<td><strong>Trophic State:</strong></td>
<td></td>
</tr>
<tr>
<td>Hypereutrophic</td>
<td></td>
</tr>
<tr>
<td><strong>Rank:</strong></td>
<td></td>
</tr>
<tr>
<td>130/175</td>
<td></td>
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<tr>
<td><strong>RS2</strong></td>
<td></td>
</tr>
<tr>
<td>TSIp = 78.6</td>
<td></td>
</tr>
<tr>
<td><strong>Trophic State:</strong></td>
<td></td>
</tr>
<tr>
<td>Hypereutrophic</td>
<td></td>
</tr>
<tr>
<td><strong>Rank:</strong></td>
<td></td>
</tr>
<tr>
<td>152/175</td>
<td></td>
</tr>
</tbody>
</table>
**Nutrients: Nitrogen**

Nitrogen in the form of nitrate (NO$_3^-$), nitrite (NO$_2^-$), or ammonium (NH$_4^+$) is a nutrient needed for plant and algal growth. Sources of nitrogen include septic systems, animal feed lots, agricultural fertilizers, manure, industrial wastewaters, sanitary landfills and atmospheric deposition.

**Rollins Savanna 1**

Total Kjeldahl Nitrogen (TKN) is an organically associated form of nitrogen and averaged 2.96 mg/L in RS1. This is above the Lake County median TKN of 1.115 mg/L. This is a result of high organic matter in the RS1.

Typically lakes are either phosphorus or nitrogen limited. This means that one of the nutrients is in shorter supply and any addition of that nutrient to the lake will result in an increase of plant/or algal growth. Most lakes in Lake County are phosphorus limited. To compare the availability of nitrogen and phosphorus, a ratio of total nitrogen to total phosphorus (TN:TP) is used. RS1 had an average TN:TP of 26:1, and is a phosphorus limited system.

**Rollins Savanna 2:**

RS2 is impaired for nitrogen. When surface median total nitrogen (TKN + NO$_2$/NO$_3$-N) exceeds 3.6 mg/L a lake is impaired for nitrogen. The mean average TKN for RS2 is 4.7 mg/L, with August having the highest TKN value of 7.68 mg/L. These values are above the Lake County Median TKN of 1.115 mg/L and causes a nitrogen impairment. The high concentrations are an indicator of very high organic matter in the pond. Lakes with high TP surface waters where algae growth is high have also been shown to have elevated concentrations of TKN. RS2 had severe blue-green algae blooms in the summer and elevated concentrations of TP.

The TN:TP ratio for RS2 was 32:1, also making it phosphorus limited.

<table>
<thead>
<tr>
<th>TN:TP Ratio</th>
<th>Phosphorus Limited</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10:1</td>
<td>= nitrogen limited</td>
</tr>
<tr>
<td>&gt;20:1</td>
<td>= phosphorus limited</td>
</tr>
</tbody>
</table>

**RS 1 and RS 2 are Phosphorus Limited**

**Conductivity & Chlorides**

Conductivity and chlorides for RS1 and RS2 were very low. The average conductivities were 0.3225 mS/cm for RS1 and 0.3243 mS/cm for RS2 (Figure 7). This is well below the Lake County median conductivity of 0.7940 mS/cm. Chloride concentrations for both RS1 and RS2 were below detection limits (<2.5 mg/L) for the entire monitoring season. This reflects that the immediate small drainage area does not include any roads that may be maintained with road salts during the winter. It is also an indication that the ponds may be influenced by groundwater.

**Figure 7: 2018 Conductivity Concentrations in Rollins Savanna**

![Figure 7: 2018 Conductivity Concentrations in Rollins Savanna](image-url)
**Dissolved Oxygen**

A dissolved oxygen (DO) concentration of 5.0 mg/L is considered adequate to support a fishery since fish can suffer oxygen stress below this concentration. Dissolved oxygen (DO) concentrations in the water column of Rollins Pond 1 & 2 were adequate (>5.0 mg/L). Since the ponds in Rollins Savanna did not stratify, water chemistry remained fairly constant throughout the water column as seen in the dissolved oxygen depth profile. The August sampling date in Rollins 2 did have low oxygen levels of 2.71 mg/L near the surface.

Anoxic conditions, where DO concentrations are <1 mg/L did occur in certain months at the very bottom of Rollins 2. This is important because the absence of oxygen (anoxia) near the lake bottom can have adverse effects in eutrophic lakes resulting in the chemical release of phosphorus from lake sediment and the production of hydrogen sulfide (rotten egg smell) and other gases in the bottom waters (Figure 8). Low oxygen conditions in the upper water of a lake can also be problematic since all aquatic organisms need oxygen to live.

**Shoreline Erosion & Shoreline Buffer**

Rollins Savanna Pond 1 & Pond 2 had minimal erosion and good shoreline buffer. Minimal erosion is due to the emergent plants that line the shoreline for example: arrowhead and cattail. Since the Rollins Savanna Ponds are entirely within the Rollins Savanna Lake County Forest Preserve there is substantial buffer around both the lakes of native prairie grass and flowers.
AQUATIC PLANTS

Aquatic plants are a critical component of a lakes ecosystem as they compete against algae for nutrients, improve water quality and provide fish habitat. Their presence is natural and normal in lakes. An aquatic macrophyte survey was conducted on RS 1 and RS 2 in early August. Sampling sites were based on a grid system created by mapping software, with each site located 60 meters apart for a total of 72 sites between the two ponds. At each site, overall plant abundance was ranked and plant species were identified and ranked. Based on the aquatic plant rake survey, plants occurred at 8 out of the 9 sites for RS1 (89% total lake coverage) and at 48 out of 63 sites for RS2 (76% plant coverage). Figure 10 shows the plant rake density at sites observed with plants on RS1 and RS2.

For RS1, 5 plant species were observed which is the same amount as found in 2011. Elodea was the most common plant in RS1 found at 89% of the sampling sites.

In RS2, a total of 10 plant species were identified which is a slight increase since 2011 when 8 were identified. The most common species in RS2 were sago pondweed at 67% of the sampling sites and coontail at 22% of the sampling sites. Increase of aquatic plants in RS1 and RS2 may have contributed to reduced TP concentrations.

<table>
<thead>
<tr>
<th>Rollins Savanna Pond 1</th>
<th>Rollins Savanna Pond 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coontail</td>
<td>American Pondweed</td>
</tr>
<tr>
<td>Duckweed</td>
<td>Brittle Naiad</td>
</tr>
<tr>
<td>Elodea</td>
<td>Coontail</td>
</tr>
<tr>
<td>Giant Duckweed</td>
<td>Duckweed</td>
</tr>
<tr>
<td>White Water Lily</td>
<td>Giant Duckweed</td>
</tr>
<tr>
<td></td>
<td>Leafy Pondweed</td>
</tr>
<tr>
<td></td>
<td>Sago Pondweed</td>
</tr>
<tr>
<td></td>
<td>Southern Naiad</td>
</tr>
<tr>
<td></td>
<td>Spatterdock</td>
</tr>
<tr>
<td></td>
<td>White Water Lily</td>
</tr>
</tbody>
</table>
AQUATIC PLANTS – DOMINANT PLANTS

The most dominant plants found in RS1 were Elodea, and RS2 were Coontail and Sago Pondweed. The diversity and extent of plant populations can be influenced by a variety of factors. Water clarity and depth are the major limiting factors in determining the maximum depth at which aquatic plants will grow. When the light level in the water column falls below 1% of surface light level, plants can no longer grow. The 1% surface light level is roughly at 2 times the average Secchi depth or can be measured with a photosynthetically active radiation (PAR) sensor. For Rollins Savanna 1 & 2 this would be about 2 feet. Submerged portions of all aquatic plants provide habitats for many micro and macro invertebrates.

Common Plants in Rollins Pond 1 & Pond 2

**COONTAIL (Ceratophyllum demersum)**

This perennial plant is a submerged aquatic about 1-3’ long. There is more branching of the stems above than below, creating fan-like aggregations of leaves. The stems are up to 1.0 mm. across, light green to nearly white, terete to slightly compressed (flattened), and hairless; they are slender and flexible. The leaves are highly flexible and readily bend. The preference is full sun, shallow water up to 4’ deep, and a mucky bottom.

**ELODEA (Elodea canadensis)**

Elodea canadensis, commonly called Canadian pondweed, is a submerged aquatic perennial. It produces fragile, branching, tangled stems to 3.5’ long (10-12’ in the wild) densely clad with short, drooping, lance-shaped to ovate dark green leaves (to 5/8” long) in whorls of three. Plants may grow completely submersed and at some considerable depth, or in shallower water the growing tips of stems may float on the surface. It produces tiny greenish-white flowers appear from July to September.

**SAGO PONDWEED (Potamogeton pectinatus)**

Sago pondweed is an aquatic pant that can get up to 3 feet tall. It is generally completely submersed except the reproductive stalk that peaks above the water that flowers June-September. It can grow in nearly all bottom substrates and can tolerate high salinity pH and alkaline water.

**AQUATIC PLANTS: WHERE DO THEY GROW?**

**Littoral Zone** – the area that aquatic plants grow in a lake.

**Algae** – have no true roots, stems, or leaves and range in size from tiny, one-celled organisms to large, multicelled plant-like organisms.

**Submerged Plants** – have stems and leaves that grow entirely underwater, although some may also have floating leaves.

**Floating-Leaf Plants** – are often rooted in the lake bottom, but their leaves and flowers lay flat on the water surface.

**Emergent Plants** – are rooted in the lake bottom, but their leaves and stems extend out of the water.
**Carp**

Carp are considered to be one of the most damaging invasive fish species. Originally introduced to the Midwest waters in the 1800’s as a food fish, carp can now be found in 48 States. In the U.S., the common carp is more abundant in manmade impoundments, lakes, and turbid sluggish streams and less abundant in clear waters or streams with a high gradient. They are also tolerant of poor water quality. Participation in the Clean Waters Clean Boats program will help prevent other invasive species from entering the lake. Never release plants, fish or animals into a body of water unless they came out of that body of water.

The common carp has a dark copper-gold back with sides that are lighter, a yellowish belly and olive fins. They have 2 pairs of short barbells on their upper lip and their dorsal and anal fins have a leading spine that are serrated. They spawn from early spring to late summer in water ranging from 15 – 28 C and prefer freshly flooded vegetation as spawning substrate. They prefer to spawn in shallow weedy areas in groups consisting of one female and several males. A single female can produce up to 100,000-500,000 which hatch in 5-8 days. The spawning ritual involves a lot of thrashing in shallow water contributing to turbidity problems. Carp are omnivorous and feed over soft bottom substrate where they suck up silt and filter out crustaceans, insect larvae and other desirable food items. Carp are very active when feeding and can be observed around shallow areas where they uproot plants which increases turbidity and nutrient concentrations. Increase in nutrients causes algal blooms and reduction in light penetration that impacts aquatic plants.

There are several ways to control the carp population in a lake. Carp removal via electroshocking is a common method for reducing carp in lakes. Electroshocking typically needs to be done annually, sometimes multiple times a year, to reduce the population. The reduction of carp would certainly increase water clarity and possibly allow for the increase in aquatic plant diversity. This will help reduce TP and TSS concentrations and increase Secchi depth.

Rotenone (piscicide) may be used to eradicate carp from a lake. Rotenone is approved for use as a piscicide by the USEPA and has been used in the U.S. since the 1930’s. This piscicide can only be applied by an IDNR fisheries biologist. It is also biodegradable and there is no bioaccumulation. Warm-blooded mammals have low toxicity because they have natural enzymes that would break down the toxin. Treating the entire system would eradicate carp and allow aquatic plants to become established. Unfortunately, the concentration required to remove carp are high enough to kill native fish species.

**Pockets of increased turbidity caused by carp feeding activity observed at Rollins Savanna Ponds 1 & 2**

The spawning ritual involves a lot of thrashing in shallow water contributing to turbidity problems.
HARMFUL ALGAL BLOOMS

Algae are important to freshwater ecosystems and most species of algae are not harmful. Algae can grow quickly in water and is often associated with increased concentrations of nutrients such as nitrogen and phosphorus. Harmful algal blooms (HABs), also known as Blue-green algea or cyanobacteria, are a type of algae that can bloom and produce toxins. They are called harmful algal blooms because exposure to these blooms can result in adverse health effects to human and animals. Certain environmental conditions such as elevated levels of nutrients, warmer temperatures, still water, and plentiful sunlight can promote the growth of cyanobacteria to higher densities. However, their presence does not mean that toxins are present. It is still unclear what triggers HABs to produce the toxins. HABs tend to occur in late summer and early fall. Due to the potential presence of toxins, the IEPA and the LCHD have initiated a program to collect HABs from beaches and test for presence of microcystin, a common toxin produced by HABs.

In 2016, the US EPA has issued a draft of Human Health Recreational Ambient Water Quality Criteria (AWQC) and/or Swimming Advisories for Microcystins and Cylindrospermospin. This will be the first time the EPA is issuing recommendation concentrations of microcystins and cylindrospermopsin, two types of toxins associated with harmful algal blooms. Different cyanotoxins have different health effects associated with exposure. For example, microcystins are primarily associated with liver toxicity, while kidney toxicity is a key health effect for cylindrospermopsin. Other toxins have been shown to affect the skin, gastrointestinal, or nervous systems.

In 2018, there was a substantial blue green algae bloom noted on Rollins 2 during the July - September sampling dates. High nutrients in the sediments of Rollins Savanna Ponds is a source for these continued algal blooms. Fortunately, there is no recreational swimming or lake access on these lakes. However, the lakes are habitat for many birds (geese, ducks, egrets, herons, gulls) and other wildlife which can be impacted by blue-green algae blooms.

For more information or to report a blue-green algae bloom, contact the Lake County Health Department Environmental Services (847) 377-8030.
LAKE MANAGEMENT PLANS

It is recommended that long term Lake Management Plans be developed to effectively manage lake issues. All stakeholders should participate in the development of the plan and include homeowners, recreational users, lake management associations, park districts, townships or any other entity involved in managing the lake. Lake Management plans should educate the public about specific lake issues, provide a concise assessment of the problem, outline methods and techniques that will be employed to control the problems and clearly define the goals of the program. Mechanisms for monitoring and evaluation should be developed as well and information gathered during these efforts should be used to implement management efforts (Biology and Control of Aquatic Plants, Gettys et al., 2009). It is recommended that the Lake County Forest Preserve create a comprehensive Lake Management Plan for all lakes in their jurisdiction. The Lake County Health Department has created tools for homeowners to develop these plans. All materials can be found on the website at: https://www.lakecountyil.gov/4084/Lake-Management-Planning-Guide.

What are the steps in creating a Lake Management Plan?

1. **Getting Started**: Identify lake stakeholders and communication pathways
2. **Setting Goals**: Getting the effort organized, identifying problems to be addressed, and agreeing on the goals
3. **Problem Assessment & Analysis**: collecting baseline information to define the past and existing conditions. Synthesize the information, quantifying and comparing the current conditions to desired conditions, researching opportunities and constraints and setting direction to achieve goals.
4. **Alternatives**: List all possible management alternatives and evaluate their strengths, weakness, and general feasibility.
5. **Recommendations**: Prioritize management options, setting objectives and drafting the plan
6. **Project Management**: Management of assets, detailed records of expenses and time
7. **Implementation**: adopting the plan, lining up funding, and scheduling activities for taking action to achieve goals.
8. **Monitor & Modify**: Develop a mechanism for tracking activities and adjusting the plan as it evolves.

Follow these steps when getting started with writing Lake Management Plans. While each step is necessary, the level of effort and detail for each step will vary depending on the project’s goals, size of the lake, and number of stakeholders.
LAKE RECOMMENDATIONS

The Rollins Savanna Ponds water quality is poor as a result of high nutrients in the sediment from previous landuse, its shallow morphometry, and high carp density. While some parameters have improved since the previous sampling, controlling nutrients in the lake may be difficult due to the high legacy nutrients in the sediments. To improve and maintain overall quality of Rollins Savanna Pond 1 and Pond 2; the LCHD-

- Develop a Lake Management Plan for Rollins Savanna Pond 1 & 2 as well as other lakes that fall within the Lake County Forest Preserve District.
- Consider a carp removal program for Rollins Savanna 1 & 2 and create a barrier at the connection to minimize the ability to carp move from Mill Creek during times of flooding.
- Monitor intense blue-green algae blooms in case an impact on wildlife (fish or bird kills).

ECOLOGICAL SERVICES

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madam@lakecountyil.gov
Population Health Services
500 W. Winchester Road
Libertyville, Illinois 60048-1331
Phone: 847-377-8030
Fax: 847-984-5622

Protecting the quality of our lakes is an increasing concern of Lake County residents. Each lake is a valuable resource that must be properly managed if it is to be enjoyed by future generations. To assist with this endeavor, Population Health Environmental Services provides technical expertise essential to the management and protection of Lake County surface waters.

Environmental Service’s goal is to monitor the quality of the county’s surface water in order to:

- Maintain or improve water quality and alleviate nuisance conditions
- Promote healthy and safe lake conditions
- Protect and improve ecological diversity

Services provided are either of a technical or educational nature and are provided by a professional staff of scientists to government agencies (county, township and municipal), lake property owners’ associations and private individuals on all bodies of water within Lake County.

For more information visit us at:
https://www.lakecountyil.gov/2381/Lakes-Management-Unit