ILM

TRUSTED CARE OF LAND & WATER

2021 ROUND LAKE MANAGEMENT PLAN

Acknowledgements

We would like to thank the members of the Round Lake Management Commission and the residents and stakeholders living in the watershed for their commitment to protecting and improving the quality of the Round Lake.
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INTRODUCTION

Mission

The mission of the Round Lake Management Commission is to provide a safe, clean, and pleasant lake for the enjoyment of all area residents.

Lake Overview and History

Round Lake is a 230-Acre glacial lake in Lake County, Illinois, with a shoreline length of 4.5 miles (Figure 1). The lake has a maximum depth of 30.4 feet and average depth of 8.4 feet (Table 1, Figure 3). There are three channels in the lake – to the southwest is Dave's channel, and along the north is Clarendon Channel to the northeast and Cedar Lake Channel which flows west and connects to the outflow. Round Lake is listed as an ADID (advanced identification) wetland by the US EPA. An ADID designation indicates the lake and surrounding natural areas have the potential to have high quality aquatic resources.

The lake has been used for recreation for over a century and was used to harvest ice in the early 1900's (Figure 2). Currently, the lake is used by area residents for recreational activities such as boating (motorized and non-motorized), swimming, fishing, and wildlife viewing.

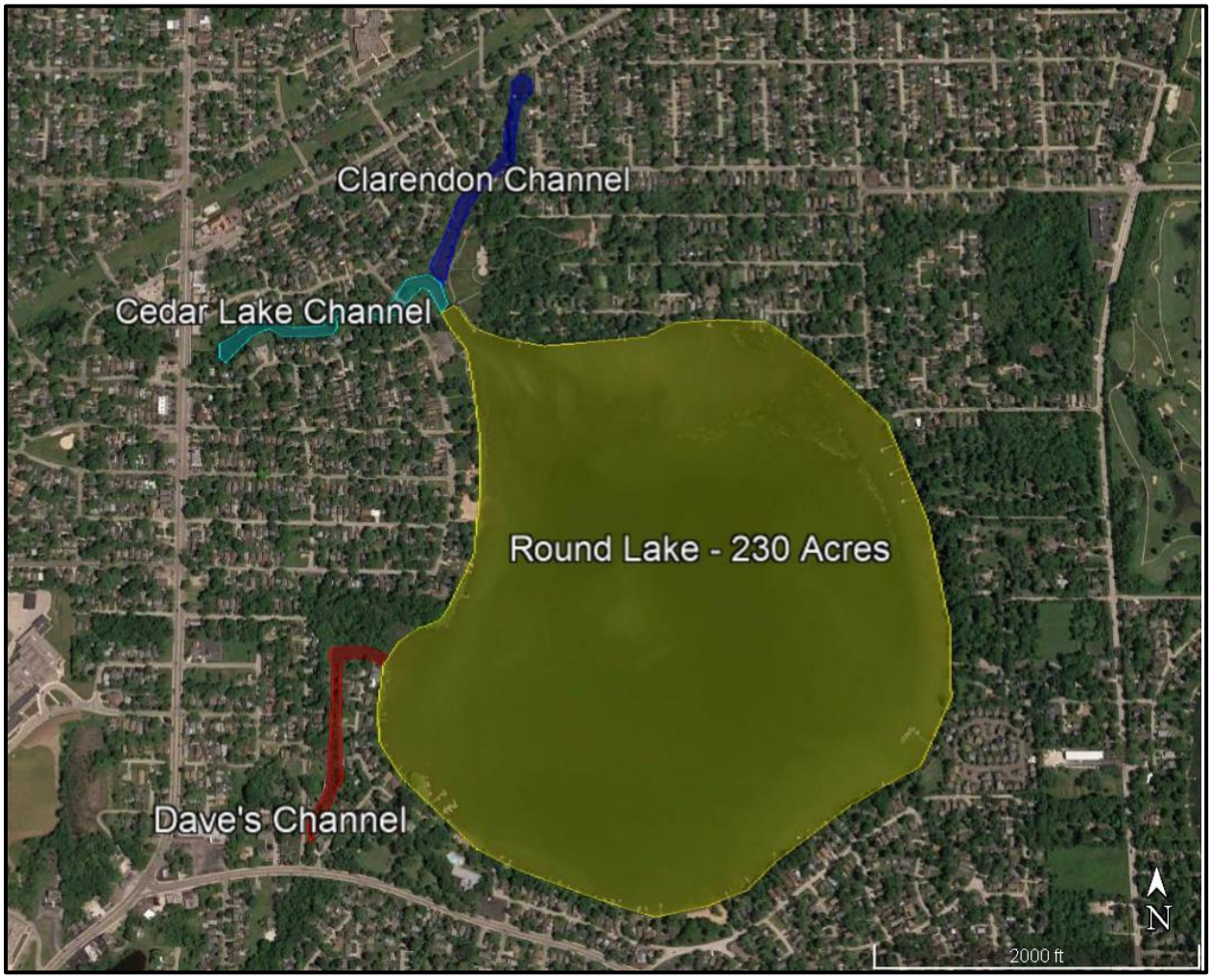

Figure 1. 2018 Satellite image of Round Lake and channels*. Google Earth*.

Parameter	Value
Surface Area	230.0 Acres
Maximum Depth	30.4 feet
Average Depth	8.4 Feet
Volume (Estimated)	1986.6 Acre-Feet
Shoreline Length	4.5 Miles
Lake Elevation	761.72 feet, MSL
Watershed Area	2428 Acres
Watershed to Lake Ratio	11:1
Average Water Residence Time	0.58 Years (213.4 Days)

Table 1. Round Lake morphometric information. **Adapted from** ***2019 Round Lake Summary Report, Lake County Health Department (LCHD)***

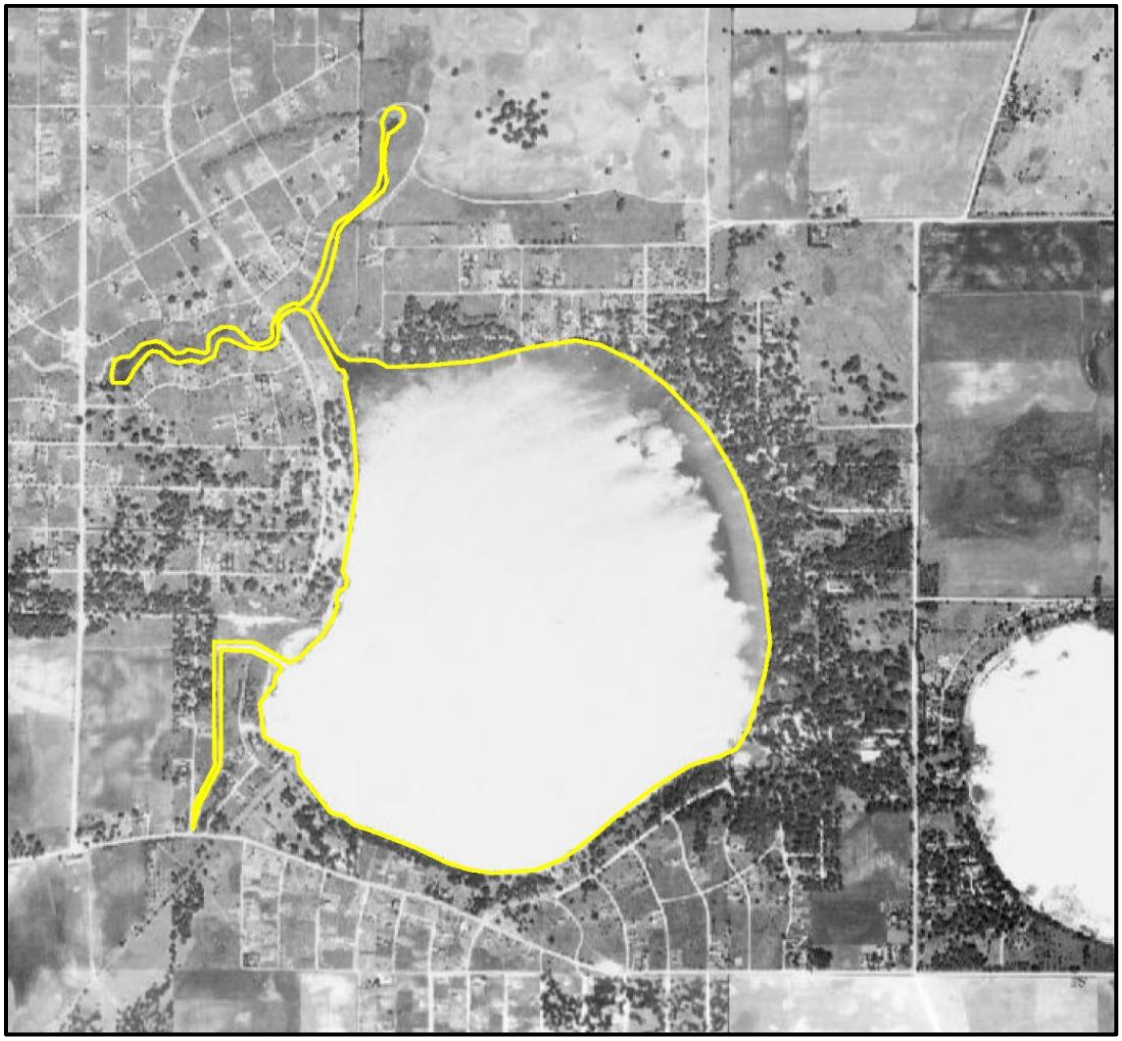

Figure 2. 1939 aerial image of Round Lake and channels, shoreline outlined. Lake County Maps Online.

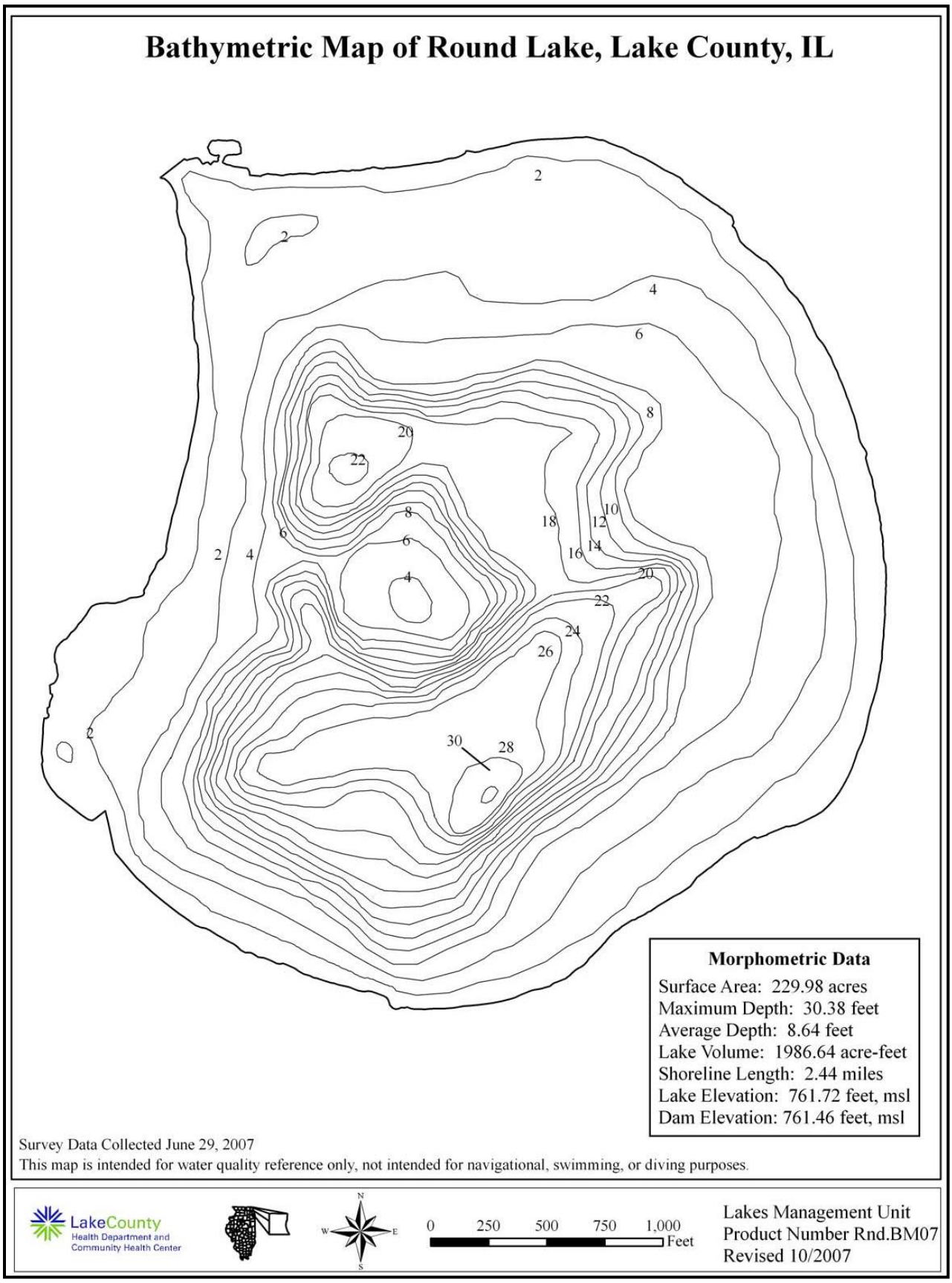

Figure 3. Bathymetric map of Round Lake. LCHD.

WATERSHED CONDITIONS

The Round Lake watershed is 2,428 acres in size (Figure 4). Hook Lake, Cranberry Lake, and Highland Lake are contributing waterbodies. The outflow for Round Lake is via a spillway, located at the end of Cedar Lake channel on the northwest corner of the lake. From the spillway, the water flows through the Round Lake Drain and into Long Lake, where it then enters Squaw Creek and flows into Fox Lake and the Fox River.

Single family homes (36.8%), water (17.0%, including Round Lake) and transportation (15.9%) comprise the majority of the Round Lake watershed. Open space, forests, grasslands, and wetlands make up 18.8% of the watershed.

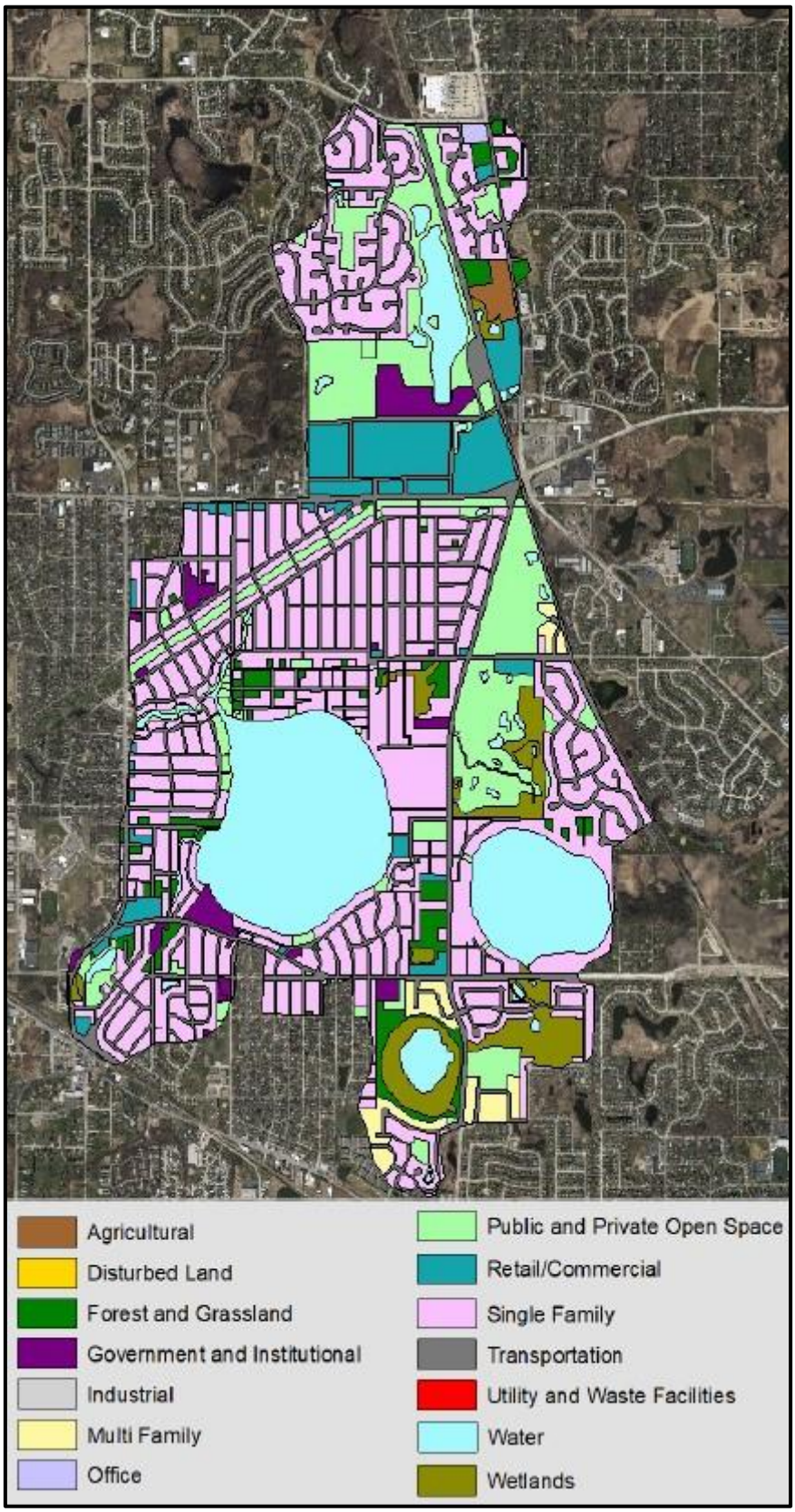

Figure 4. Round Lake watershed boundary and land use, 2019. **LCHD.**

CURRENT LAKE CONDITIONS

Round Lake is one of 173 lakes and wetlands assessed periodically by the Lake County Health Department for various water quality parameters. The last three assessments occurred in 2003, 2009, and 2019. This report includes relevant findings from those assessments. Other resource materials referenced in the plan include a Storm Water Management Plan prepared for the Village of Round Lake Beach in 2017, A Natural Area Management Plan for Round Lake Channel published in 2019, and a Lake Management Plan from 2013. More detailed explanations of sampling methods and additional results can be found in those reports (Table of reports referenced in this document are listed in Appendix A).

Round Lake is part of the Squaw Creek watershed. The Squaw Creek Watershed Plan was implemented in 2004. The plan outlines management issues for different lakes in the watershed. For Round Lake, invasive species management, high conductivity and total dissolved solids were identified as management issues of "high" concern. Low dissolved oxygen, wildlife habitat, Canada geese, and lack of wetlands were identified as "medium" concern. Elevated phosphorous concentrations, elevated ammonia-nitrogen concentrations, elevated heavy metal concentrations, and shoreline erosion were identified as "low" concern.

During creation of this plan, Integrated Lakes Management staff surveyed the lake in June 2021 to evaluate lake conditions and correlate current conditions with past lake surveys.

Nutrients

Phosphorous is a vital nutrient for regulating plant growth. When excessive concentrations build up in a watershed, however, phosphorous can lead to nuisance aquatic plant and algae growth and degrade the ecological health of the system. Increases in toxic cyanobacteria blooms have been linked to nutrient pollution, and excess plant growth caused by high nutrient concentrations can lead to a hazardous depletion in dissolved oxygen levels when plants die off and decompose.
LCHD surveys from 2003-2019 found average phosphorous concentrations to be below the desired maximum concentration of 0.05 mg/l in all years (Table 2). Elevated phosphorous levels were considered a "low concern" in the *Squaw Creek Watershed Plan* (2004).

Year	Average Total Phosphorous (mg/l)
2003	0.025
2009	0.023
2019	0.019

Table 2. Average total phosphorous concentrations.

The Trophic State Index (TSI) is a measurement of the productivity of a lake. In general, lower productivity in lakes is desirable for aesthetics, as there is less nuisance aquatic plant and algae growth. The TSI is calculated by accounting for phosphorous concentrations, chlorophyll concentrations and transparency of the water. A lake with low phosphorous and chlorophyll levels and high water clarity is considered oligotrophic and has a TSI of less than 40. Such lakes tend to have little aquatic plant or algae growth. Lakes with high levels of nutrients and a TSI greater than 50 are considered eutrophic and have high productivity. Round Lake had a calculated TSI of 46.6 in the 2019 LCHD report. This is considered mesotrophic, which is an intermediate state between oligotrophic and eutrophic (Figure 5).

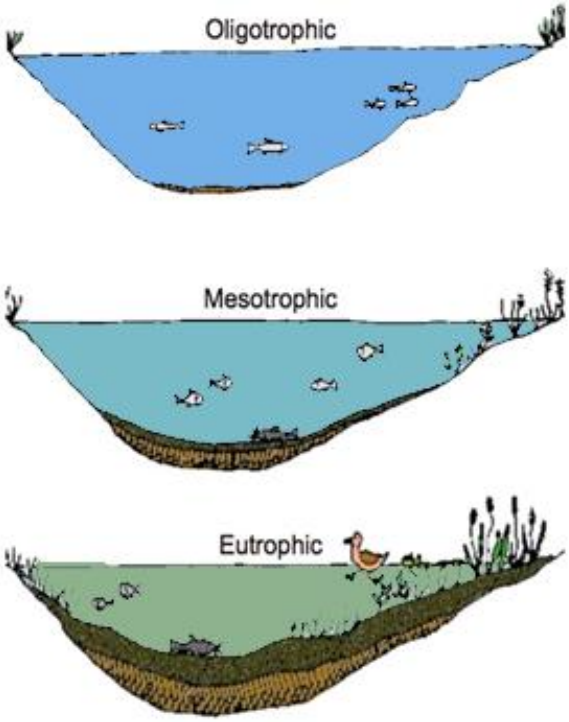

Figure 5. Varying states of lake productivity.

Total Suspended Solids

Water clarity is an indicator of water quality in a lake. Lakes with low water clarity are considered turbid. Planktonic algae growth can lead to low water clarity. Turbid water can be caused by sediment that has recently washed into the lake or eroded from the shore. Sediment can also be resuspended in shallow lakes by winds and waves or bottom-feeding fish such as carp can turn up sediment while they forage on the bottom on the lake.

Secchi disk readings are a measure of water clarity. A painted disk is lowered in the water until is it no longer visible, and that depth is recorded as the secchi reading. Secchi readings in Round Lake have consistently been above the average of Lake County (Figure 6), meaning Round Lake has higher water clarity than most other lakes in the county.

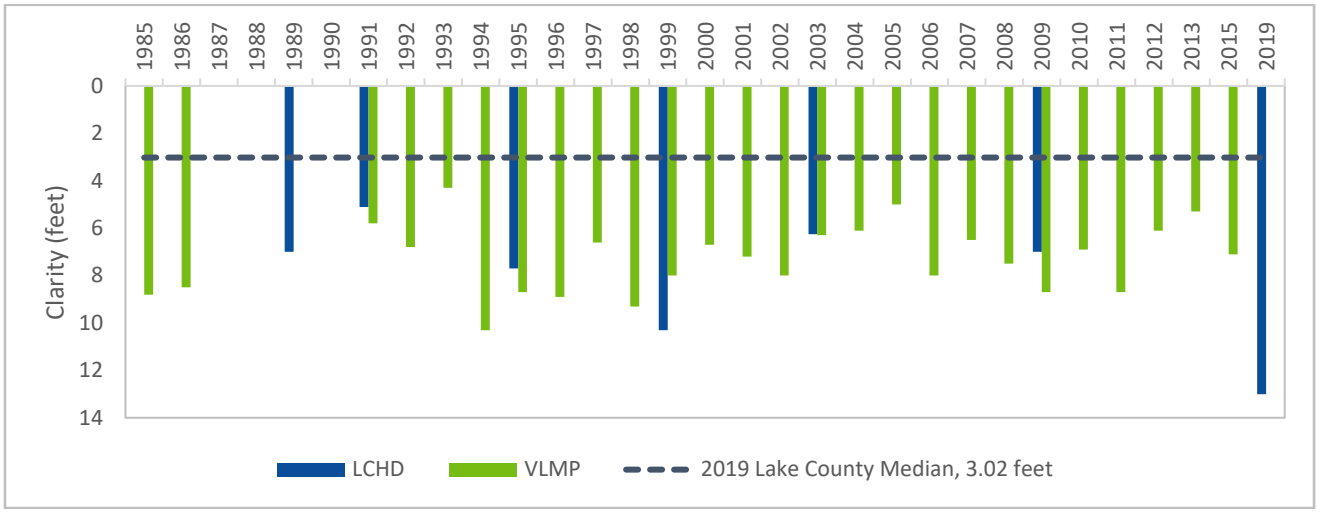

Figure 6. Secchi disk averages from VLMP and LCHD records for Round Lake, 1985 - 2019. Adapted from LCHD.

Another measure of water quality in relation to clarity is the concentration of suspended solids in the water. Total suspended solids (TSS) include the amount of nonorganic clay or sediment materials and algae and other organic material suspended in the water.

In general, lakes with higher levels of aquatic plant growth tend to have lower levels of TSS, as plant roots stabilize sediment and plant-dominated lakes usually have less algae growth. As seen in Figure 7, Round Lake has had lower TSS concentrations than the average of Lake County, which was 7.6 mg/l in 2019.

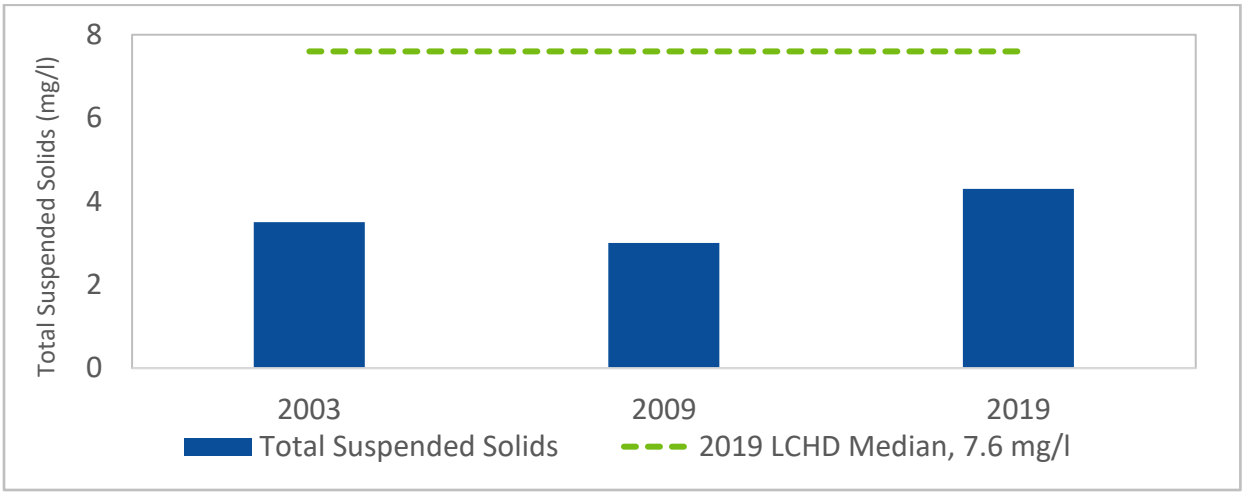

Figure 7. Total suspended solids concentration (mg/l) for Round Lake, 2003 - 2019. Adapted from LCHD.

Chlorides

When road salt is applied to roads, sidewalks, driveways, and parking lots in the winter, the snow melt in the spring washes the dissolved salt into surrounding lakes and streams. A concentration of 230 mg/l, or the equivalent of 1 tsp of salt per 5 gallons of water, has the potential to impair aquatic systems. Round Lake had a chloride concentration of 206 mg/l when sampled by LCHD in 2019. The average chloride concentration for lakes in Lake County is 170 mg/l. The snow and ice removal procedures for Round Lake Beach and Round Lake Park, as reported in the "Des Plaines River Watershed-Based Plan" (2018), can be found in Table 3. The Village of Round Lake was not included in the report.

Jurisdiction	Winter Maintenance Policy/Manual (Y/N)	Attended a Lake Co. De-icing Workshop (Y/N)	Calibrate Trucks? (Y/N)	Annual road salt purchased (tons)	Amount of road salt reduced? (Y/N)	Road Salt Alternatives & Practices
Round Lake Beach	No/Yes (still as draft)	Yes	Yes- Annually Standard rate: 300 lbs/ lane mile	1,000-2,000	Yes- 20-30% reduction	Anti-icing used before winter storm Pre-wetting operations BEET HEET
Round Lake Park	No/No	Yes	N/A	N/A	N/A	N/A

N/A = Not answered

Table 3. Snow and ice removal policies. Adapted from Des Plaines River Watershed-Based Plan, 2018.

Vegetation

Aquatic Plants and Algae

During the most recent LCHD Survey in 2019, 21 different aquatic plant species were observed. Eurasian watermilfoil, curlyleaf pondweed, and brittle naiad are aquatic invasive plant species present in Round Lake and were found at 63%, 3%, and 9% of sampling sites respectively.

During June 2021, ILM visited the lake to assess site conditions and provide updated vegetation information for the management plan. Many species observed in 2019 were also present in 2021 (Photos 1 – 6), with Eurasian watermilfoil being dominant in most regions of the lake where aquatic vegetation was visible. A map of Eurasian watermilfoil density in Round Lake was created by LCHD (Figure 8), showing the plant is present in approximately 130 acres of the lake.

Photo 1. Coontail, Ceratophyllum demersum.

Photo 2. White water lily, Nymphaea odorata.

Photo 3. Curlyleaf pondweed, Potamogeton crispus.

Photo 4. Eurasian watermilfoil, Myriophyllum spicatum.

Photo 5. Heavy subsurface Eurasian watermilfoil growth.

Photo 6. Aquatic vegetation in northwest channel.

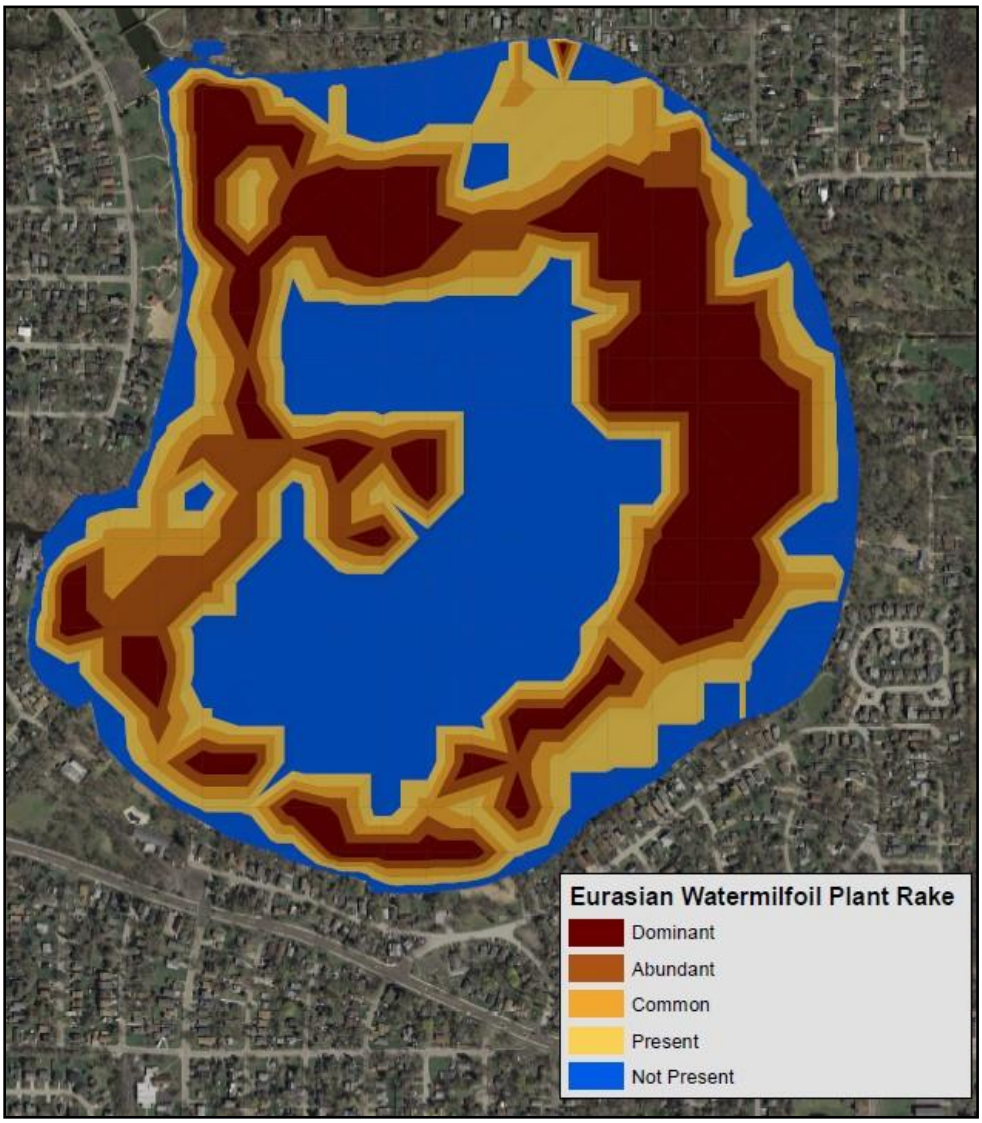

Figure 8. Eurasian watermilfoil distribution and density in Round Lake, 2019. LCHD.

Emergent and Terrestrial Plants

Much of the Round Lake shoreline is highly developed, with either rip rap or seawall armoring. There are dozens of man-made beaches with imported sand around the lake. Turf grass is the dominant vegetation along the shoreline.

Buckthorn (*Rhamnus spp.*) was growing along portions of the shore. This invasive shrub can lead to increases in erosion, as their leaves decompose more quickly than many native species, leading to bare earth being exposed for much of the winter, while native leaves tend to protect the soil throughout the winter. There are a few small patches of cattails along the shore, but they are not significantly encroaching into the lake. Desirable native emergent vegetation such as pickerelweed, arrowhead, or rushes were not present in substantial numbers.

Shoreline

During 2019, the lakeshore was assessed by LCHD. In the assessment, 14% of the shoreline was experiencing moderate erosion, with 64% of the shoreline experiencing some form of erosion (Figure 9). The north channel had a relatively high proportion of moderate to severe erosion.

Figure 9. Round Lake shoreline condition, 2019. **Letters correspond with photos on following page.** ***LCHD.***

Photos of the shoreline were taken during the 2021 visit to document different examples of shoreline conditions occurring in the lake (Photos 7-12). The photos lettering corresponds with the letters on the map in Figure 9.

In areas experiencing moderate or severe erosion, the shoreline typically had mowed turfgrass or shallow-rooted vegetation planted up to the edge. Often, erosion can occur during periods of flooding, when high water combined with wind and waves washes away soil. When waters recede, a steep, often incised bank remains (Photo 7).

In addition to shoreline erosion, the shoreland buffer condition was assessed by LCHD in 2019. A good shoreline buffer consists of at least 25 feet of native plants between developed areas and the lake. In 2019, Only 8.8% of the buffer was deemed to be in “good” condition, with 3.2% falling into the “fair” category, and 88.0% being classified as “poor” condition. Without buffer strips, shorelines tend to be more prone to erosion and nutrients and other pollutants can easily wash from surrounding yards into the lake during rain events.

Photo 7. Channel erosion.

Photo 8. Fishing access point.

Photo 9. Undeveloped shoreline with snags.

Photo 10. Steep naturalized shoreline.

Photo 11. Mowed turfgrass to water.

Photo 12. Undercut bank with exposed roots.

Fisheries

In 2019, an Illinois Department of Natural Resources (IDNR) fish survey was conducted in Round Lake. Bluegill and largemouth bass made up almost 70% of the species observed. Their management recommendations included:

- Establish a “catch and release” ordinance for largemouth bass during May
- Establish a 15” minimum length and 3 per day catch limit on largemouth bass
- Establish a 24” minimum and 1 per day catch limit on northern pike
- Promote the removal of common carp and yellow bass
- Stock predators instead of forage fish

Annual fish stocking occurs in the lake, funded in part through the Huebner Fishery Management Foundation (HFMF) and other partners. Typical stocking numbers are around 500-1000 fish. The most frequent species being stocked have been walleye and northern pike, with yellow perch, black crappie, smallmouth bass, and muskellunge also being stocked less frequently and in smaller numbers.

The downed trees along portions of the shore and aquatic vegetation in the lake provide shelter and forage for fish in the lake (Photo 13). In the southwest channel, carp were observed and the channel water was turbid with sediment. This was likely due in part to the carp stirring up sediment while foraging. High carp populations can lead to increases in algae growth, as they resuspend nutrients in sediment.

Wildlife

During the 2021 visit, birds including great blue herons, mallard ducks, coots, wood ducks, and a kingfisher were seen (Photo 14). Canada geese were listed as a nuisance species of concern in the *Natural Area Management Plan for Round Lake Channel* (2019) and implementing strategies to reduce goose presence was recommended. This is because geese leave large numbers of droppings that are unaesthetically pleasing and can lead to increased nutrient pollution and *E. coli* outbreaks.

Muskrats were seen swimming in the north channel. In the *Natural Area Management Plan for Round Lake Channel* (2019), reducing muskrat presence through trapping was recommended. This is because muskrats can lead to shoreline failure and uncontrolled erosion by burrowing into the shore and leading to bank collapse.

Photo 13. Downed trees in the water.

Photo 14. Great blue heron.

Recreation

The lake is used for both motorized and non-motorized boating. Many residents and stakeholders enjoy fishing. There are also public and private beaches around the lake. A canoe and kayak launch is in the Clarendon Channel for residents (Photo 15). Lakefront Park has many amenities, including a public boat launch, a shoreline restoration demonstration area with fishing access points (Photo 16), a beach (Photo 17), and paths with a bridge connecting the eastern and western sides of the lake (Photo 18). Other locations of public access include Bengson Park, John Huebner Jr. Park, and Huebner Shores.

There are four registered swimming beaches on Round Lake: Round Lake Beach, Alpine Country Club, Bengson Park, and Ukrainian Camp. The LCHD monitors tests the beaches for *Esherichia coli (E. coli)* every two weeks from May until the end of August. *E. coli* can make humans sick when present in high quantities. Therefore, closing beaches when samples have over 235 *E. coli* colonies/ 100 ml is recommended to reduce exposure risk. In 2019, there were 6 days of beach closures due to high *E. coli* levels.

Photo 15. Canoe and kayak launch.

Photo 16. Fishing access point.

Photo 17. Public beach, Village of Round Lake Beach.

Photo 18. Fishing access point.

Boating Regulations

The current Round Lake Boat Safety Rules are listed at the Lakefront Park Boat launch (Photo 19):

1. No alcohol or drug impaired boat operators.
2. All boat occupants must have a personal floatation device and children under 13 must wear them at all times.
3. No wake near the shoreline, piers, channels, or swimming areas.
4. Your boat must be a safe distance when under power from other boats at all times.
5. Non-motorized boats always have the right-of-way.
6. If skiing, you must have two people in the boat, one operator and observing the skier.
7. Motorized boats should travel counter-clockwise around the circumference of the lake.
8. Not littering or polluting of the lake. Please help keep your lake clean by picking up any trash.
9. Respect your fellow boater. Provide help if needed.
10. No reckless or careless operation, use common sense and follow all State boating laws.

Photo 19. Round Lake Boat Safety Rules sign.

Community Organization

Three municipalities border Round Lake - the Village of Round Lake, the Village of Round Lake Beach, and the Village of Round Lake Park. The Round Lake Management Commission (RLMC) is an intergovernmental agreement between the three villages and the Round Lake Area Park District. The commission is volunteer-run, with the stated purpose to “Provide a safe, clean, and pleasant lake for the enjoyment of all residents. The RLMC has partnerships with other stakeholder groups in the area to help with management decisions, including the Huebner Fishery Management Foundation (HFMF), the Alpine County Club, the Lake County Health Department Environmental Services Team, the Illinois Lakes Management Association (ILMA), and volunteer residents.

The RLMC manages several activities throughout the year, including an annual shoreline clean up, a fishing line recycling program, encouraging volunteer water clarity lake monitoring, promoting education around the impact of invasive species, and coordinating fish stocking.

Management funds are raised through membership dues, partnerships, grants, and donations for various management activities, including invasive aquatic vegetation management, shoreline stabilization, and fish stocking.

The three villages and Park District contribute around $3,000 annually towards management, but there is no guaranteed source of funding for management activities in Round Lake, such as though permit fees or taxes.

Ownership of the lakebed and surrounding shoreline is broken up into several groups, including public property managed by the Park District and surrounding municipalities, private homeowners, homeowners associations, and Alpine County Club, a private county club located at the southwest end of the lake (Figure 10).

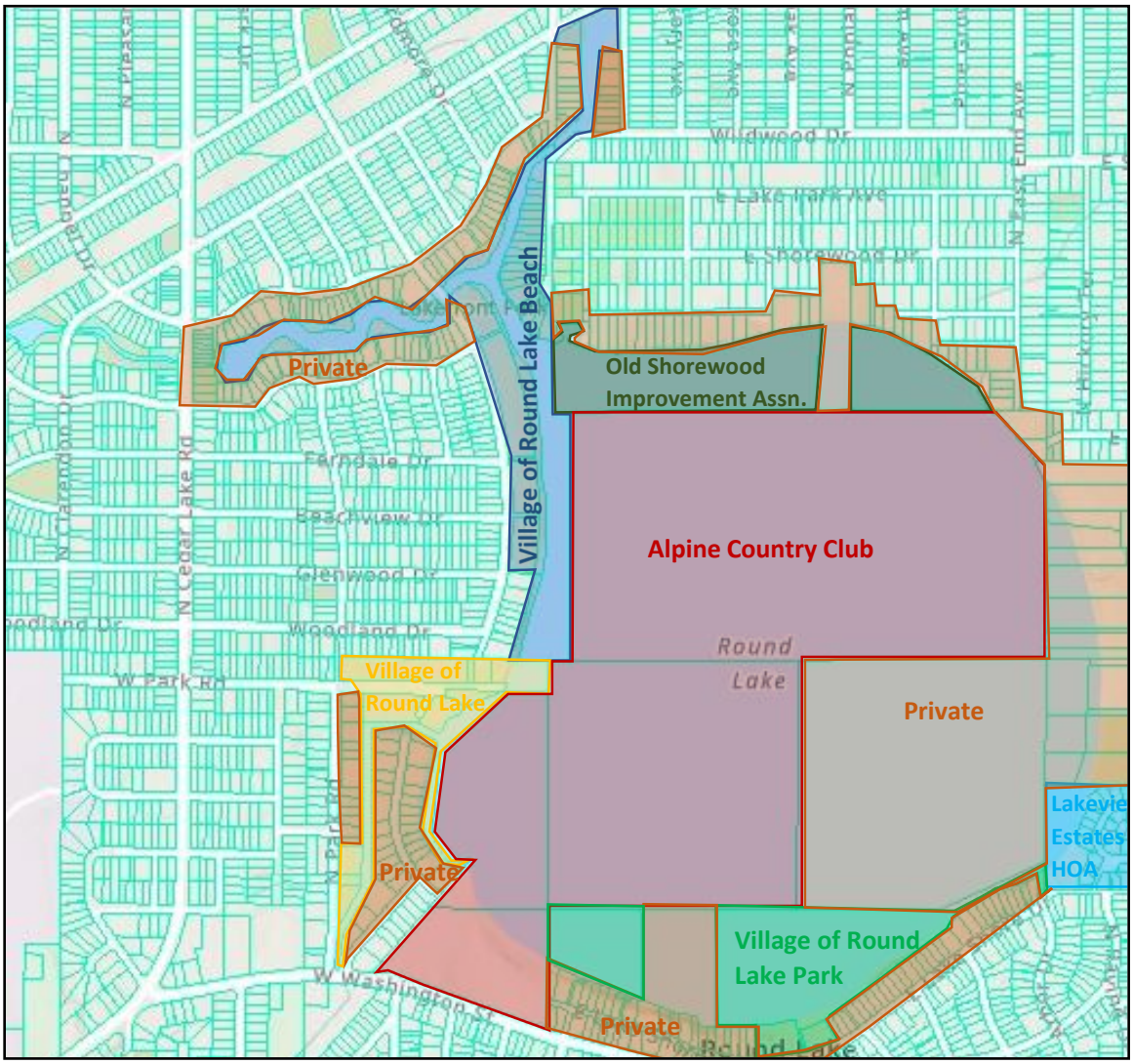

Figure 10. Approximate boundaries of Round Lake Lakebed and shoreline ownership. Adapted from Lake County Maps Online.

Community Survey Results

In the spring of 2021, the Round Lake Management Commission issued a community survey to better understand the needs of stakeholders and help set management goals for the lake.

Of the 119 respondents, approximately 50% lived on the lake or in the surrounding communities, with the remainder being stakeholders that use the lake. Almost 60% of survey respondents had lived in the area for over 20 years.
The survey respondents reported using the lake for a wide variety of recreational activities (Figure 11), with 70% of respondents using the lake for swimming and 65% using the lake for fishing. The results represent the wide range of uses in the lake and the highlight the importance of considering and balancing different stakeholder interests when constructing a management plan. For example, anglers may prefer more aquatic vegetation for fish habitat than those using the lake for swimming or waterskiing, as weeds can be a hazard for swimmers.

The survey also asked residents to choose what they considered the highest priority for management in the lake based on a selection of options as well as what they considered the second highest management priority following their first choice (Figure 12). Over 50% of respondents said invasive aquatic plants was their highest-priority issue for management. The second-highest priority was also invasive aquatic plants.

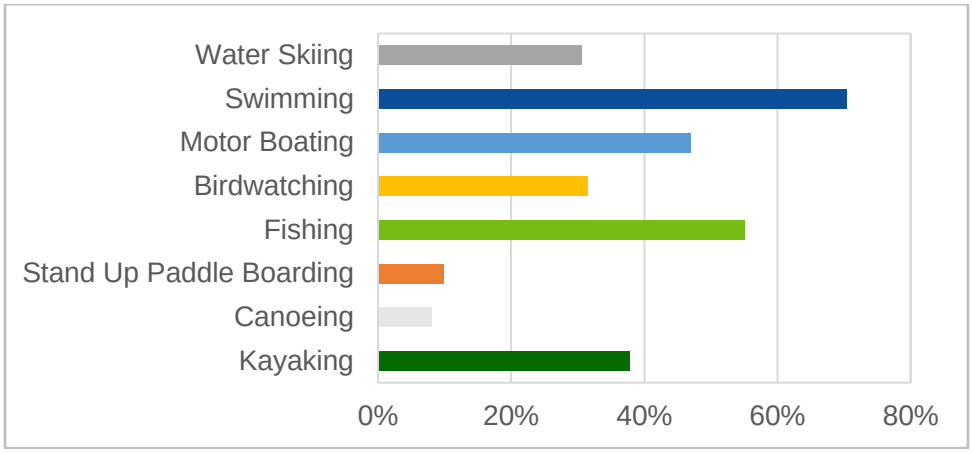

Figure 11. Stakeholder responses regarding recreational use of Round Lake. 2021 Round Lake stakeholder survey.

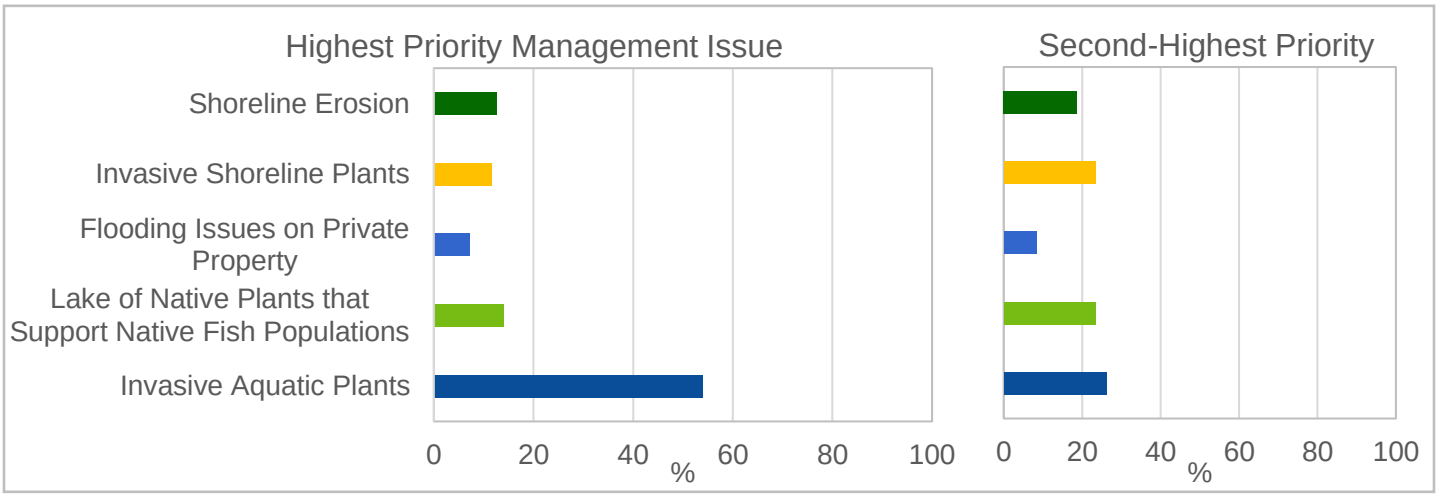

Figure 12. Priority management issues identified by stakeholders. 2021 Round Lake Stakeholder Survey.

When asked whether respondents were aware that there was not a specific revenue stream to improve the lake, 67% said they were not. When asked if they would consider an annual donation to improve the lake, 52% of respondents said they would.

These survey results show the wide variety of beneficial uses stakeholders gain from the lake. The results also suggest that there are many stakeholders who understand the need for funding lake management and would consider donating to improve the health of the lake. By taking these results, of the 119 respondents, 52% or 61 people said they would consider a donation. Based on the monetary breakdown in Figure 13, this sum would equate to between $2,000-$3,000, just from the 119 people who took the survey.

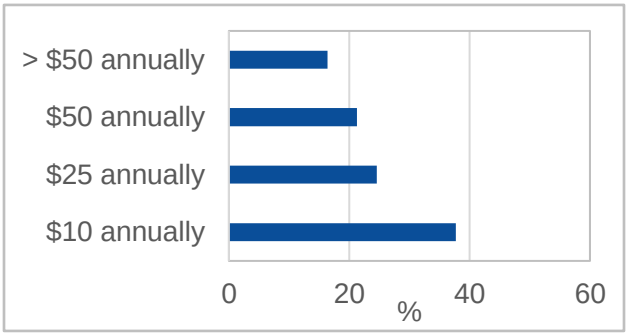

Figure 13. Among those who would consider an annual donation, what amount would the respondent consider donating. 2021 Round Lake Stakeholder Survey.

CONCERNS & POTENTIAL SOLUTIONS

Various water quality concerns and management strategies have been identified for Round Lake:

In the *Squaw Creek Watershed Plan* (2004), the following were listed as issues of "high concern" for Round Lake:

- Invasive species management
- High conductivity
- Total dissolved solids

The Round Lake Stormwater Management Program Plan (2017) and *Round Lake Beach Stormwater Management Plan* (2017) outlined strategies to reduce stormwater runoff through implementing best management practices (BMPs). Some techniques include installing "green infrastructure" such as green roofs, rain gardens, rain barrels, bioswales, and permeable pavement, while other strategies focus on reducing pollutant additions, such as picking up pet waste and not dumping hazardous materials downs storm drains.

The results of the 2021 community survey overwhelmingly found invasive aquatic plant management to be the issue stakeholders thought was most important to address, followed by encouraging native plant populations and invasive shoreline plants.

The 2019 Lake County Health Department report had four main recommendations to continue management in Round Lake:

- Develop a Lake Management Plan (which this plan seeks to address)
- Manage Eurasian watermilfoil growth to address boater and safety concerns
- Encourage homeowners to incorporate native plants into their landscaping
- Continue to participate in citizen science in the lake

In 2018, the RLMC outlined four main management strategies they wanted to follow to reach their long term vision:

- Build and maintain partnerships, including between the villages, park district, HFMF, Alpine County Club, ILMA, and other resident groups
- Encourage activities and volunteer activities such as lake safety monitoring, shoreline cleanup events, environmental education, having historical lake tours, paddling events, and fish stocking
- Develop a strategic plan based on the 2013 Round Lake Management Plan
- Continue volunteer water clarity monitoring

Accounting for these different suggestions and priorities led to the creation of three main management goals for this lake management plan:

Goal 1: Reduce the dominance of invasive vegetation in and around the lake to encourage healthy native plant communities
Goal 2: Improve recreational and educational opportunities to foster community investment in lake management
Goal 3: Reduce the amount of shoreline experiencing erosion around the lake and channels and reduce stormwater and pollution runoff

Management strategies to achieve these goals were identified as:

- Strengthen partnerships and revenue streams
- Aquatic invasive vegetation control
- Terrestrial invasive vegetation control

- Fishery management
- Shoreline stabilization
- Pollution reduction

The main goals addressed by each management strategy are indicated in Table 4. Potential management activities that can be used to implement a specific management strategy are listed as well. It is understood that not all presented management actions can be implemented in Round Lake, due to various environmental or practical constraints. Considering as many management actions as possible, however, allows for the best combination of strategies to be chosen to meet the long-term needs of residents and improve the health of the lake. This allows provides options to readjust management strategies as needed. The remainder of this section outlines the different possible management actions and considerations related to their implementation.

Main Goal Addressed				
Plant Community	Education & Investment	Erosion & Runoff	Management Strategy	Possible Management Action
	●		Strengthen Partnerships and Revenue Streams	Grow public and private partnerships
	●			Regular website and newsletter updates
	●			Create donation opportunities
	●			Encourage citizen science
●			Invasive Aquatic Vegetation Control	Herbicide application
●				Physical removal
●	●			Aquatic invasive species education
●			Invasive Emergent and Terrestrial Vegetation Control	Herbicide application
●	●			Community plant removal events
●	●	●		Establish desired species
	●		Fishery Management	Follow IDNR recommendations
●	●			Control carp
●		●	Shoreline Stabilization	Native buffer installation
●	●	●		Demonstration area maintenance
		●		Rip rap and seawall repair
		●		Muskrat control
	●	●		Boating regulations
	●	●	Pollution Reduction	Community BMP outreach
	●	●		Public green infrastructure installations
	●	●		Salt application reduction
	●	●		Goose control
	●			Reduce *E. coli* sources

Table 4. Management strategies and potential management activities for Round Lake.

Strengthen Partnerships and Revenue Streams

While there are many potential management strategies to improve the ecological health of Round Lake, it can be difficult to make lasting changes without a stable funding source and a shared vision between the community and the managing body. This management plan seeks to create a framework to guide a shared vision but requires continued leadership to ensure recommendations are implemented. Strengthening partnerships and revenue streams, while not a direct lake management activity, will help ensure the coordinated and long-lasting success of implemented management activities. The Round Lake Management Commission was awarded the Frank Loftus Lake Stewardship Award in 2008 and the Round Lake Area Park District (RLAPD) has been awarded the Community Service Award on three occasions, highlighting area resident's commitment to improving Round Lake. Continuing to grow and foster community engagement is vital to obtaining stakeholder buy-in and to recruit passionate individuals to join leadership efforts. Before attempting any large management projects, the RLMC should ensure strong partnerships with stakeholders and residents exist to maintain momentum and achieve long-term goals.

Grow Public and Private Partnerships

The Round Lake Management Commission consists of board members from the three surrounding villages and the Round Lake Area Park District. The majority of the shoreline and lakebed, however, is privately owned. Therefore, strong relationships between private and public sectors are critical to ensuring implementation of a cohesive management plan. Some options for improving partnerships could include coordination with municipalities to advertise the monthly meeting to increase stakeholder attendance and participation, or adding additional positions within the commission for private landowners. If municipalities are unable to consider increasing funds they contribute to management activities, the RLMC may be able to partner with the villages or RLAPD to see if they could share some of the effort for updating the website or sending out the newsletter, as the RLAPD already sends an e-newsletter every other month. Municipalities and the RLAPD could also consider providing a link to the RLMC website on their pages to increase visibility of the RLMC.

Regular Website and Newsletter Updates

The Round Lake Management Commission website and Facebook page is periodically updated with information related to monthly meeting dates and reports are added as well. There are also some pages on village municipal websites where residents can look up information relating to the lake and management. These sources, however, did not seem to be consistently updated at the time of this report and there is little engagement on the Facebook group, indicating residents do not use it for a frequent source of community interaction. If possible, someone showing initiative to help with managing such accounts should be encouraged to do so.

The drone footage gathered for this management report can be posted to social media accounts to showcase the lake and possible management areas. This management plan and other educational materials can also be uploaded to the website to provide information to the community.

Create Donation Opportunities

As seen from the community survey results, there are many area residents and stakeholders who would be willing to consider an annual donation to improve lake management activities. If a simple donation account were created, this could be linked to on the website or mentioned in newsletters. Raising funds is vital to the successful implementation of more extensive management objectives. Even when grants are awarded, there are often requirements to match the given funds, which the RLMC is not able to do at this time, due to the relatively low amount of available management funds.

Encourage Citizen Science and Volunteerism

The Round Lake Management Commission relies on passionate community members to donate their time for events such as the lake cleanup and to perform volunteer water clarity monitoring. Spending a year focusing on growing these community events can help increase community involvement. Any stakeholders showing interest in lake management activities should be encouraged to apply their strengths to help in whatever way they can. This could be by organizing a community event, managing the website or Facebook page, monitoring water clarity, or many other important activities.

Shoreline Trash Cleanup Events

The annual shoreline cleanup is beneficial by removing garbage that is accumulating along shore. This can improve the stability of the shoreline, as trash, especially larger materials, can degrade the soil beneath them and lead to erosion. This event also allows residents to make an immediate, visible difference in the community, potentially spurring further interest in management activities.

Volunteer Water Clarity and Lake Level Monitoring

The Volunteer Lake Monitoring Program (VLMP) was managed by the Illinois Environmental Protection Agency (IEPA) but was suspended in 2019. One of the main aspects of this program involved trained volunteers submitting secchi disk readings. Volunteers can still submit data through the North American Lake Management Society (NALMS) "Secchi Dip-In" website. Additionally, a lake level gauge was installed in Lakefront Park in 2019 as part of the Lake Observations by Citizen Scientists and Satellites (LOCSS) project (Photo 20). There are instructions on the gauge for lake users to read and submit measurements to the website (www.locss.org). These citizen science programs should be encouraged. Other opportunities for lake users to provide data include creel surveys periodically conducted by the IDNR, where anglers are surveyed regarding details of the fish they are catching. All collected data can help the agencies make informed management recommendations.

Photo 20. LOCSS lake level guage, LCHD.

Invasive Aquatic Vegetation Control

In 2019, LCHD found three aquatic invasive species in Round Lake: Eurasian watermilfoil (EWM), curlyleaf pondweed, and brittle naiad. EWM was present at 63% of locations, whereas curlyleaf pondweed and brittle naiad were only found at 3% and 9% of sites, respectively. Additionally, EWM typically reaches nuisance conditions more frequently than the other two species, as it grows in dense stands, excluding other vegetation and topping out in the water column. Therefore, the main focus over the next ten years should be on reducing EWM densities. Controlling all aquatic vegetation is not desirable, as lakes tend to become algae dominated if aquatic vegetation is not present to sequester nutrients and provide wildlife habitat.

The two most practical methods for invasive aquatic vegetation control are aquatic herbicide applications and physical (mechanical, manual, DASH) removal. These methods are discussed below.

Herbicide Application

Aquatic herbicides are frequently used to control invasive aquatic vegetation. Table 5 lists common aquatic herbicides and considerations in their use. Experienced applicators are needed to get the best results, as the environmental conditions can significantly impact effectiveness. As of 2019, most small private beaches on Round Lake were individually managed. Coordinating between different landowners is recommended for herbicide applications. This can reduce costs by only needing to pay one company to do the applications and also by reducing the different chemicals applied to a waterbody. In swimming areas, the minimum area should be treated to ensure safe swimming, and native vegetation should be allowed to grow where it is not interfering with safe recreation.

Annual management of non-native species can reduce the seed bank over time and decrease their pervasiveness in the lake, allowing for management to shift to physical removal of small populations. Application rates and products used will shift over time to best fit the species present and their density.

Hebicide		Considerations
Trade Names	**Active Ingredient**	
ProcellaCOR	Florpyrauxifen-benzyl	Manufacture guarantee on Eurasian watermilfoil control for 3 years, dependent on treatment area Does not control curlyleaf pondweed Can be costly in large applications
Sonar	Fluridone	Controls plants as they sprout, reducing visibility Helps reduce algae blooms following die-off, as nutrients remain in sediment Contains irrigation restrictions Requires long contact time in water Can be applied at a rate that leaves native plants less affected
Reward	Diquat	Generally less expensive alternative Algae blooms may occur following die-back, as decaying plants release nutrients Will impact non-target native species Less effective in cloudy water Contains irrigation restrictions
Aquathol K	Dipotassium salt of Endothall	Algae blooms may occur following die-back, as decaying plants release nutrients Will impact non-target native species
Aqua-Kleen, Navigate, Weedar 64	2,4-D	Widely used and inexpensive Can be relatively slow to be taken up by plants and can migrate out of the treatment area Dicot-specific herbicide

Table 5. Common herbicides used in aquatic vegetation management.

Florpyrauxifen-benzyl is a relatively new aquatic herbicide that is specifically formulated to control Eurasian watermilfoil. It does not control curlyleaf pondweed. The product is formulated to be quickly taken up by plants, meaning it does not remain in the environment for a long period of time following application. This makes it a good alternative to use in ecologically-sensitive areas. The manufacture has a 3-year guarantee for applications covering 10 acres or more in size. Treating a sample area, such as along the northern channel by the boat launch, could be a way to gauge community reaction and increase buy-in.
Flouridone can be applied in early spring. It prevents photosynthesis in plants as they emerge and keeps their populations low. It can control Eurasian watermilfoil and curlyleaf pondweed and can be applied at lower rates that will not impact native species like sago pondweed to the same degree.
Diquat is a contact herbicide that provides broad-spectrum aquatic plant control, which can make it difficult to only control non-native species. Reward loses effectiveness in cloudy water as it will bind with sediment and may need to be combined with another product to improve results. This product can be more cost-effective than other options presented.
Endothall is another common broad-spectrum aquatic herbicide and would control all aquatic vegetation in the lake. This product does not have irrigation restrictions, like Reward or Sonar.
2-4 D is a common, inexpensive herbicide that can be applied at rates to control dicots like EWM but it has minimal effect on monocots like curlyleaf. This can be helpful as the product will not cause all aquatic vegetation to die back.

Physical Removal

Physical removal of aquatic vegetation provides immediate improvement to aesthetics, as the plants are physically removed from the lake. This method has the added benefit of removing the nutrients stored within the plants. The

strategy of growing and harvesting plants to remove nutrients or contaminants from a site is known as bioremediation. In a lake the size of Round Lake, however, removing vegetation is not likely to lead to a substantial decrease in nutrient concentrations.

Hand-Raking or Weed Harvesting

Manual removal is desired over chemical management when there are concerns about impacts to native aquatic plant populations. While hand raking can work as a management strategy, it can be difficult for long-term control of these species. This is because Eurasian watermilfoil can spread by fragments that break off, and curlyleaf pondweed can re-sprout from small buds on the stems, called turions. Therefore, caution should be taken during removal to ensure complete removal of plants.

The same principle applies for weed harvesters, where a machine cuts and collects plants (Photo 21). Plant pieces can break off and regrow in other parts of the lake, so care needs to be taken to remove as much material as possible.

Photo 21. Mechanical removal of coontail.

Diver-Assisted Suction Harvesting

Diver-assisted suction harvesting (DASH) involves a person in the water removing plants through a suction hose, where they are collected in bags. This harvesting technique is potentially more effective than raking or cutting, as the goal is to remove the roots as well. This method is desirable when targeted removal of only invasive plants is desired, as the divers can maneuver through native plants and selectively harvest non-native species. Removing the vast beds of Eurasian watermilfoil currently in Round Lake would likely be cost-prohibitive. Once the density of Eurasian watermilfoil is significantly reduced, however, DASH harvesting small populations as they appear can be effective for removing only invasive species, while keeping native aquatic vegetation in place.

Desirable Species Establishment

Round Lake had 18 native aquatic plants and 1 macroalgae species present during the 2019 vegetation survey conducted by LCHD. This represents a healthy diversity of plants, which provide different habitat types and foraging opportunities for aquatic organisms. In some lakes, introducing native species may be recommended to promote diversity, but at this time, Round Lake does not appear to need the introduction of more native species to improve the health of the lake.

Aquatic Invasive Species Education

Zebra mussels were first observed in Round Lake in 2012. The “Transport Zero” campaign has been run through the Illinois DNR, Illinois-Indiana Sea Grant and Prairie Research Institute to help educate recreation water users on how to prevent the spread of invasive species. While these mussels have been spread through many of the lakes in the surrounding area, it is important to continue encouraging boaters to thoroughly clean their boats when moving between waterbodies. There are other potential invasive species that have been found in the Midwest, such as hydrilla and starry stonewort, and cleaning boats is one of the simplest and most important steps in preventing their spread.

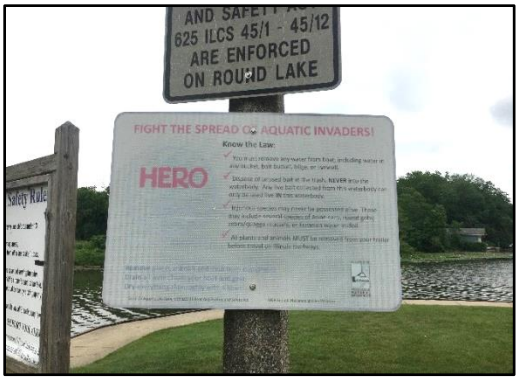

Photo 22. Invasive species education at the Lakefront Park boat launch.

The current sign at the boat launch (Photo 22), is faded to the point of illegibility. The IDNR and Illinois-Indiana Sea Grant would likely be able to replace the sign and install them in other public access points.

Invasive Emergent and Terrestrial Vegetation Control

Managing non-native, invasive vegetation is an ongoing process, as seeds can stay viable for years and new seeds are constantly being re-introduced through bird droppings or blowing in with the wind. Managing these species is important though, for many reasons. They can mar aesthetics or lead to safety hazards as is the case with wildfire hazards from uncontrolled burning of excess dead vegetation, or can lead to increased erosion, as caused by buckthorn. Invasive species also tend to outcompete native plants, reducing the quality of habitat for wildlife. Once an initial year of control is performed on invasive plants, management effort typically decreases in the following years, leading to an easily managed population over time.

Herbicide Application

Buckthorn Herbicide

Buckthorn species are most effectively controlled by cutting back plants and applying a treatment of herbicide to the cut stump. Large plants are typically targeted first, as these produce the most berries. If the lake freezes over, restoration technicians can access plants from the lake side, making it easy to see and remove plants. Sometimes, volunteer days are planned where community members can cut the plants, followed with stump treatment by licensed applicators. This allows for a reduction in costs and promotes community investment.

Cattail, Phragmites or Reed Canary Grass Herbicide

Cattails (*Typha spp*), *Phragmites*, and reed canary grass, are all common, aggressive species found in wetlands around most lakes. Round Lake does not have these species in high densities, likely due to the high level of shoreline development. If these species do establish in high densities, however, control is recommended.

Cattails are most effectively controlled by an herbicide application before seed-set in late summer. There are several herbicides approved for application around water. Cattails did not appear to be abundant to the point of nuisance on the lake. They also provide shoreline stabilization, so some presence can be beneficial, but they also encroach on shallow areas of lakes over time. Therefore, cattail stands should be monitored and controlled if they are taking over areas of the lake where open water is desired. *Phragmites* and reed canary grass are both considered invasive species. Educational materials for homeowners can help them identify and remove these plants.

Community Plant Removal Events

As stated in the previous section regarding buckthorn herbicide, community volunteer days to cut and remove buckthorn shrubs is a common activity. While usually more prevalent in woodlands, garlic mustard is an invasive plant that is relatively easy to remove. In surrounding parks, community cleanup events can be paired with garlic mustard pulls or buckthorn removal to promote interest in public spaces.

Desirable Species Establishment

Of critical importance after achieving control is restoration through seeding desirable native species. Promoting native species will reduce the available space for cattails or *Phagmites* to establish and expand into the lake. For larger areas, seeds are typically used, but small plants can be planted in high-traffic locations to quickly establish plants for the community to enjoy. Desirable species tend to be lower growing, allowing for views of the lake (Photo 23). They also aren't as aggressive, so one species is not likely to dominate the landscape.

There is a vast array of aesthetically attractive native species that can be planted along shorelines and in frequently inundated wetland areas. The general types of vegetation that are planted include:

Photo 23. Bluff Spring Fen Nature Preserve, Elgin, IL

- Emergent species for water depths greater than 1 foot, such as American lotus (*Nelumbo lutea,* Photo 24), white water lily (*Nymphaea odorata*), or pickerelweed (*Pontederia cordata,* Photo 25). These species have the added benefit of absorbing wave energy and reducing their impact on the shoreline.
- Shoreline species for less than 1 foot of water depth, including bur-reed species (*Sparganium spp.*), blue flag iris (*Iris versicolor*, Photo 26), or arrowhead (*Sagittaria spp.*)
- Upland species with deep roots to stabilize the shoreline, which typically consist of native grasses and forbs (Figure 14).

Any species planted in the water will need to be protected from carp and geese during establishment. Plantings are often surrounded by staked snow fencing to prevent these nuisance animals from uprooting plants before they establish. These native species occupy space where cattails or *Phragmites* would otherwise establish. They tend to be lower-growing so surrounding households can see the lake. Native species also provide better habitat for wildlife.

Photo 24. American lotus, white water lily.

Photo 25. Pickerelweed.

Photo 26. Blue Flag iris.

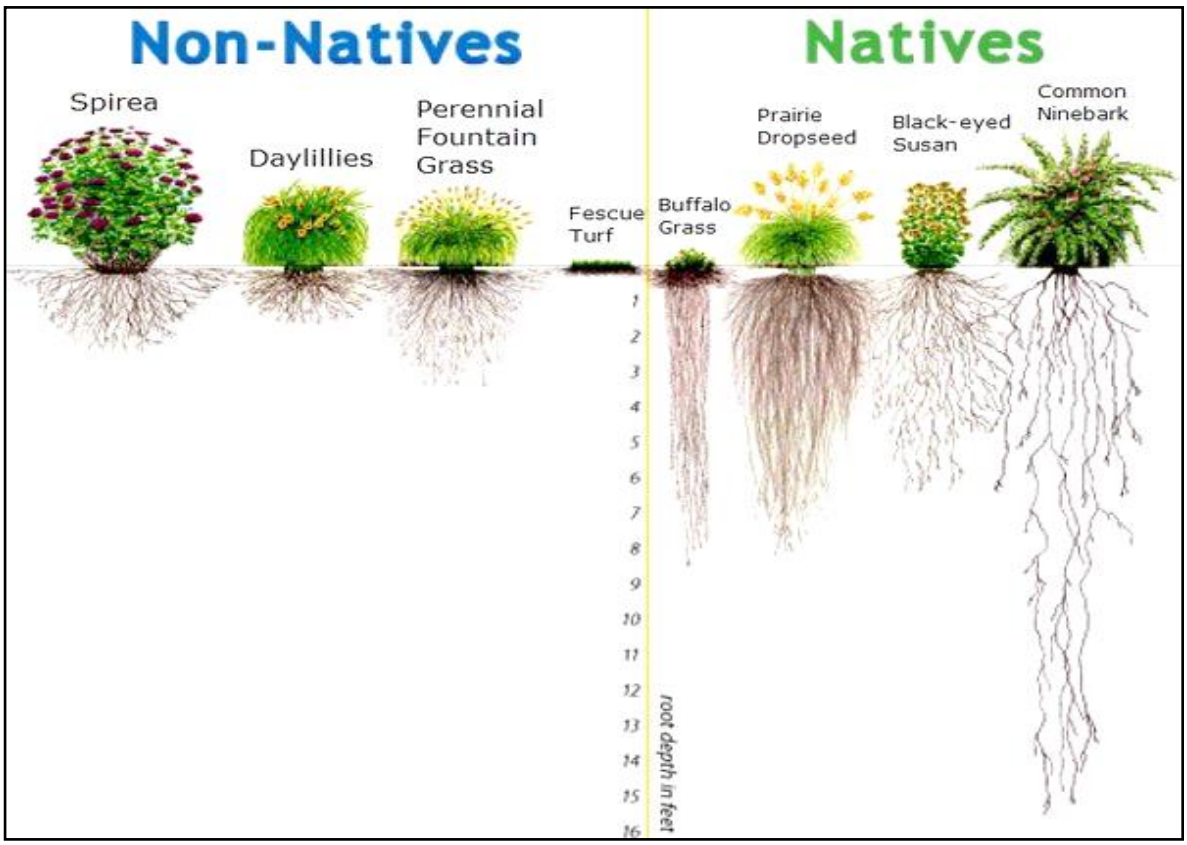

Figure 14. Non-native vs. native species root depths.

Fishery Management

Follow IDNR Stocking Recommendations

Improving fishing opportunities on Round Lake is a goal of lake management. The partnership with the Huebner Fishery Management Foundation has been beneficial for providing a reliable source of funding for stocking. The Illinois DNR recommendations to only stock predator fish species should be followed, as well as the recommendation to stock different species following a “4 year on, 4 year off” pattern. For example, this could mean stocking walleye each year for 4 years, and then northern pike each year for 4 years. Any time the DNR does a survey, the fishing guidelines should be updated to reflect their recommendations.

Additionally, the daily take limits should be set to follow IDNR recommendations. The current fishing regulations posted at Round Lake (Photo 27) do not match the I-DNR recommendations from 2019. This includes setting a 15” minimum length and 3 per day catch limit on largemouth bass, establishing a “catch and release” ordinance for largemouth bass during May, placing a 24” minimum and 1 per day catch limit on northern pike, and promoting the removal of common carp and yellow bass. Also posting signs in Spanish when possible is recommended to help include all members of the community.

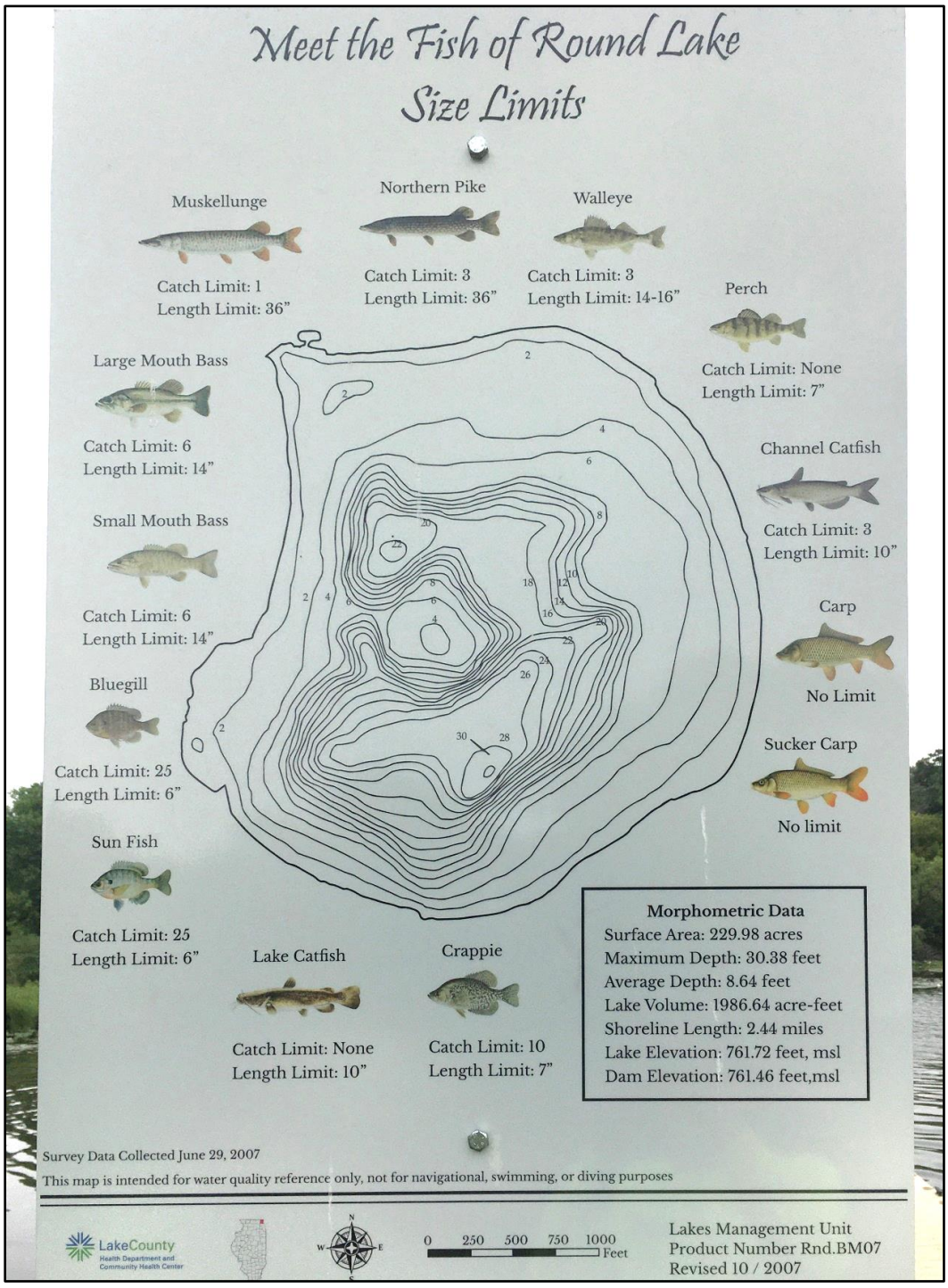

Photo 27. Fishing guidelines posted at Public Boat Launch as of July 2021.

Carp Control

Carp were observed in abundance in “Dave’s Channel” on the southwest end of the lake. Therefore, control could be considered if funding becomes available. These fish tend to uproot vegetation and stir up sediment while foraging, leading to higher water turbidity. The resuspended sediment can lead to more nutrient availability and an increase in nuisance algae blooms. Therefore, management to reduce the population of these fish is recommended to improve water quality.

Rotenone

The most common strategy for removing unwanted fish species is to use rotenone. This product will kill all fish in a waterbody. Treating all of Round Lake is not recommended, especially since Round Lake is considered an ADID waterbody. Since most carp were observed in Dave's channel, a physical barrier could be set up at the mouth of the channel prior to application. Only the channel would be treated, leaving the main body of the lake unaffected. Coordination with the Illinois DNR would be needed to apply rotenone.

Seining or Electroshocking

While more time consuming, seining or electrofishing can be done to target only carp. These methods are unlikely to remove all fish but can keep biomasses below the level where fish become damaging to the lake ecosystem. Typically, bait is left in a certain area of the lake during the winter. Fish congregate by the bait and then a seine net is used to gather the fish and remove them. This could be done in Dave's Channel if rotenone is not used.

Carp Roundup & Encouraging Removal

A potential community engagement event that some lake associations partake in is a carp roundup. Anglers are given an allotted time to catch the most carp they can for a prize. If enough people partake, this strategy can be effective enough to keep carp biomass below damaging levels. Carp roundups can also act as educational opportunities for the community to learn how different fish species impact lake health. In addition to a carp-removal event, removing carp any time they are caught should be encouraged. The lake already has no limit on common carp and sucker carp catches, which should be continued.

Shoreline Stabilization

Native Buffer Installation

Installing native vegetative buffers have the benefits of reducing shoreline erosion, as well as nutrient runoff during rain events. As discussed above in the "Desirable Species Establishment" subsection of "Invasive Emergent and Terrestrial Vegetation Control", native shoreline plants can be chosen for different aesthetic desires. Native buffer installation typically involves applying herbicide to the restoration area to remove turfgrass and weeds. Then, small plants, called plugs, can be planted into the dead grass. If bare soil is present, the ground should be protected with erosion control blanket to prevent erosion while plants establish. Native buffers typically take 2-3 years to fully establish, during which time the restored area should be monitored, and weeds should be promptly removed.

Buffer Demonstration Area Maintenance

Approximately 465 feet of shoreline was stabilized in Lakefront Park in Round Lake Beach during 2016 and 2017 (Photo 28). The demonstration area utilized three different stabilization techniques to provide area residents with an example of possible shoreline stabilization options.

Natural Area Management Plan: Round Lake Channel (2018) described the three different methods and pros and cons to each:

Option 1: Vegetation Geogrid

- Natural or synthetic geotextile material wrapped around each soil lift between the layers of live branch cuttings.
- Advantages: provides environment enhancement and permanent solution for bank stabilization.
- Disadvantages: Slow to establish and more expensive to install.

Photo 28. Buffer demonstration area in Lakefront Park.

Option 2: Coir Logs

- Biodegradable material packed in netting and shaped into a log. This is placed at the base of the shoreline to reduce water velocity on the shoreline.
- Advantages: Biodegradable protection and easy installation
- Disadvantages: Not effective in high water velocity areas, moderately expensive, and less effective by itself.

Option 3: Rip-Rap

- Loose stone placed strategically on the shoreline to reduce erosion due to water.
- Advantages: Easy-to-use method for decreasing water velocity and protecting slopes from erosion. Additionally easy to install and maintain.
- Disadvantages: More expensive then vegetated slopes, does not provide habitat enhancement, and possibility of increased erosion at the outsides of the riprap

The demonstration area appeared to be fully stabilized, but vegetative maintenance should occur approximately three times a year throughout the growing season to prevent the establishment of invasive species.

Installing signage to explain the different stabilization methods, native plant species used, potential costs, and other information could provide context to residents walking along the lake. Additional shoreline stabilization resources should be linked to on the RLMC website.

Rip Rap and Seawall Repair

Much of the Round Lake shoreline is already stabilized with rip rap and seawalls, and homeowners should continue maintenance of these structures in the future. Installation of new seawalls should be discouraged if not necessary to prevent erosion, as they do not provide any habitat between the upland-lake transition. When rip rap is installed, combining the rocks with native plantings can increase soil stability more than only rock. New seawall installation and shoreline stabilization projects need approval through the US Army Corps of Engineers and Lake County may require monitoring of the project following completion to ensure the stabilization measures are effective.

Muskrat Control

Muskrats are a common rodent found on lakes and ponds throughout Illinois. Unfortunately, they can burrow into banks, creating dens that eventually collapse (Figure 15). These collapsed dens can lead to severe bank erosion over time. Steep banks, such as seen in Photo 7, tend to encourage burrowing the most, so bank stabilization in those areas should consider regrading to a slope greater than 3:1. Round Lake does not appear to be experiencing much shoreline loss from muskrats, but if den collapse becomes a concern, trapping and removing muskrats that are causing erosion in certain areas of the lake can be done to prevent uncontrolled bank loss. A licensed trapper can be hired to remove them.

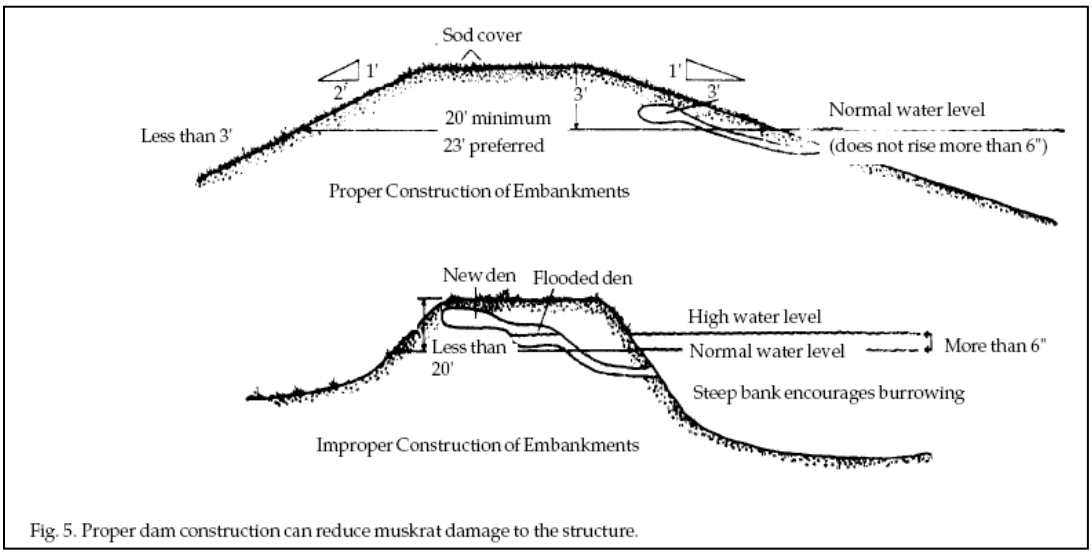

Figure 15. How embankment construction can discourage or encourage muskrat damage.

Boating Regulations

The boat safety regulations on Round Lake are listed at the public boat launch in Lakefront Park. Rule 3 states: no wake near the shoreline, piers, channels, or swimming areas. In many lakes, this distance is greater than 150 feet from shore. Section 5-12 of The Boat Registration and Safety Act (625 ILCS 45/) states: "No Wake" areas shall be clearly posted with buoys or appropriate signs except as provided in Section 5-7 of this Act. Therefore, the RLMC should work with the community to define where the no wake areas are on the lake and place buoys or other markers to denote those areas. No Wake Zones help reduce wave action near shorelines and protect human safety by reducing the chance a boat will encounter a swimmer near the shore.

In many lakes, there are also rules to limit the times where wake is permitted. A common example is between 1 hour after sunrise to 1 hour before sunset. This allows the lake to be shared between non-motorized boaters, anglers, and motorized boaters alike. If such regulations are to be considered, involving the community is important to ensure stakeholders concerns are being addressed.

Pollution Reduction

Pollutant inputs from terrestrial sources should be reduced to the greatest extent possible. Pollutants of greatest concern for Round Lake include phosphorous and nitrogen, chlorides, and bacteria from fecal waste. Best management practices (BMPs) are techniques that can help citizens and municipalities protect lakes and streams from polluted runoff. BMPs include practices such as ensuring new developments are not impacting waterways and leading to erosion, preventing pollution though practices such as reducing the use of or banning harmful pollutants, retrofitting existing developments to better reduce pollutant runoff, performing inspections on septic systems, and conducting maintenance on existing BMPs to maintain functionality.

Community Nutrient and BMP Education

A major contributor of watershed nutrient pollution in developed communities is lawn fertilizer and grass clipping runoff. Single family housing covers 37% of the Round Lake watershed. Reducing these sources of pollution to the greatest extent possible is vital to the long-term success of water quality improvement actions. There are many watershed groups in Lake County with experience promoting successful pollution reduction strategies through community outreach and education. Such practices include:

- Implement phosphorous-free fertilizer practices
- Educate homeowners regarding lawncare (Photo 29)
- Reduce grass runoff through buffers and lawncare best management practices

Photo 29. Example of educational material mailed to residents in a watershed.

Public Green Infrastructure Installations

Green infrastructure installations showcase the possibilities for reducing stormwater pollution. These installations are site-specific, and should be accompanied with educational signs to help community members understand their benefit. Common examples of green infrastructure include installing permeable pavement, creating a rain garden, installing a bioswale where water flows during rain events, or encouraging residents to install rain barrels to store rainwater and reduce flooding. Grant funding is available for green infrastructure projects through Lake County Stormwater Management Commission and the Illinois EPA.

Salt Application Reduction

Road salt application during the winter - whether by municipalities on roads or private property owners on sidewalks, driveways, and parking lots - is quickly becoming one of the emerging pollutant issues in Illinois watersheds. Salt dissolves in water and washes into lakes and streams during the spring melt. The Lake County Health Department – Environmental Services works with the "Salt Smart" Collaborative (www.saltsmart.org) to educate residents, road agencies, and private contractors to ensure salt is being applied in the more effective manner, to reduce pollution into lakes.

The RLMC can also work with municipalities in the Round Lake watershed to ensure they are working towards improving their salt application procedures, with the ultimate goal of a unified application strategy. Such a strategy could include ensuring salt trucks are regularly calibrated, applying brine prior to storms, knowing the conditions where salt will not reduce ice (mainly temperatures below 10º F), etc.

Goose Control

Canada geese present a nuisance on many lakes, as they are aggressive when nesting, and their feces can pollute waterways with both bacteria and excess nutrients. While some presence is natural, large flocks of geese should be discouraged from remaining on and around the lake for long periods of time. The main ways to discourage goose presence include reducing habitat, harassing geese, removing them through hunting, and reducing preferred food sources.

Shoreline Barriers or Buffers

Geese prefer entering waterbodies when the transition between upland and water consists of short vegetation. Turf grass encourages this behavior, as geese eat grass as well. Planting taller vegetation along the shoreline discourages them from using that portion of shoreline to access the water. See the "Desirable Species Establishment" subsection of "Invasive Emergent and Terrestrial Vegetation Control" section for further details on planting native vegetation along the shore.

Many shoreline owners will place physical barriers along the shoreline to deter geese from accessing water at that point. Common methods include installing a low fence or stringing a line a foot or less from the ground, which the geese cannot step over or go under.

Goose Harassment and/or Removal

Goose harassment or removal can take different forms:

- Installing objects that make geese uneasy, such as shiny objects or false predators. These objects need to be regularly moved, however, or geese will become desensitized to them.
- Hiring a company to bring a dog to chase geese off properties on a very regular basis
- Regularly spraying grass with a product that makes the grass taste bitter to geese so they won't graze on lawns
- Hiring a certified professional to "addle" goose eggs. This can involve oiling or shaking the eggs so they are no longer viable. This can reduce the population of geese in an area over time.
- Setting up hunting availability on the lake. This can be difficult to do on a lake that is as developed as Round Lake, as there may be gun ordinances and there is an increased safety risk.

Anti-feeding Campaign

Feeding waterfowl is generally detrimental to their health, as birds are not adapted to eat large quantities of human food, especially items like bread or rice. Therefore, feeding geese and other birds should be discouraged around Round Lake. Commonly, signs are posted to discourage feeding in areas that are known to have a large Canada goose presence.

Reduce *E. coli* Sources

E.coli is a bacteria tested for to indicate fecal contamination in water. There are many bacteria carried in feces that can cause disease in humans and animals. Therefore, reducing the sources of contamination - mainly from pet and Canada geese waste washing into the lake - can reduce the frequency of high bacteria levels in the lake.

E. coli Education

Reducing Canada goose presence and encouraging everyone living in the watershed to promptly pick up pet waste can help reduce the amount of bacteria washing into the lake. Installing signs and dog waste bag dispensers can encourage adoption. Dock owners should also be made aware that goose droppings should be shoveled off docks and disposed of in the trash – not washed into the lake.

E. coli Monitoring

The Lake County Health department monitors the four registered swimming beaches - Round Lake Beach, Alpine Country Club, Bengson Park, and Ukranian Camp – every other week from mid-May to the end of August. This monitoring should be encouraged to continue to ensure the health and safety of swimmers in the lake.

GOALS, OBJECTIVES, & ACTIONS

Establishing clear goals and objectives is necessary for developing appropriate management strategies. Goals must align with the agreed upon vision for the lake as well as the needs of stakeholders in the community. Achievable goals consider the feasibility of reaching the desired outcome when considering budgetary, environmental, legal, and time constraints.

As outlined in the previous section, the management goals for Round Lake are:

Goal 1: Reduce the dominance of invasive vegetation in and around the lake to encourage healthy native plant communities

Goal 2: Improve recreational and educational opportunities to foster community investment in lake management

Goal 3: Reduce the amount of shoreline experiencing erosion around the lake and channels and reduce stormwater and pollution runoff.

Each goal is followed by measurable objectives and actions to achieve each objective. A management timeline follows. This management plan is structured to provide recommendations at three budgetary levels – the current annual operating budget of approximately $4,000, an increased budget of $20,000, and additional projects that would likely require outside funding through grants or partnerships. This management plan is designed as a dynamic document and the timeline and objectives can and should be altered as funding sources develop or community focus changes.

Goal 1: Reduce the dominance of invasive vegetation in and around the lake to encourage healthy native plant communities

Objective: Reduce Eurasian watermilfoil to less than 25% of the aquatic vegetation community within 10 years

Action: Coordinate a vegetation management schedule with regular herbicide applications to control Eurasian watermilfoil. If funding allows, treating areas of milfoil with ProcellaCOR, to reduce impacts to native plant species is, recommended.

Action: Reduce herbicide applications when invasive species populations are low, and use manual harvesting methods, such as DASH to allow native species to flourish

Objectives: Maintain cattails, Phragmites, and reed canary grass at their current density

Action: Treat cattail, *Phragmites,* or reed canary grass stands as needed when they are encroaching into the lake and impeding boating activities

Objective: Reduce European buckthorn presence along the lakeshore to 25% of current density in 10 years

Action: Perform survey around lake to calculate areas with highest buckthorn density

Action: Coordinate annual invasive species removal events in the community

Goal 2: Improve recreational and educational opportunities to foster community investment in lake management

Objective: Increase annual revenue to manage Round Lake by 200% within 5 years and 500% in 10 years

Action: Create donations option for stakeholders

Action: Meet with stakeholders in the area to strengthen partnerships

Action: Update social media accounts and website regularly to encourage community involvement

Action: Create and distribute a periodic newsletter

Action: Survey residents after 5 years of management plan implementation to see how perceptions and use change. Use results to update management focus.

Objective: Update fishing regulations to follow IDNR recommendations

Action: Update public boat launch signs and upload regulations so they are accessible online

Objective: Reduce carp to 10% of current levels by next IDNR survey

Action: Encourage anglers to remove carp whenever possible

Action: Hold a carp removal tournament

Action: Compare 2019 IDNR survey results to next fishery survey and change actions if recommended

Objective: Increase community activities and maintain citizen science opportunities

Action: Continue existing community events (shoreline cleanup) and create new events to encourage engagement (buckthorn removal days, carp roundups)

Action: Focus education on a different management issue on a 5-year rotation, making educational materials available to the community, placing signs in public spaces, and holding educational events. The 5 areas of focus are: invasive species, carp, road salt, *E. coli*, and nutrients. Educational materials should be in Spanish and English if possible

Objective: Update Lake Rules by Year 7 of management plan implementation

Action: Facilitate community discussion to set wake time limits and areas of no-wake on the lake

Action: Install buoys to designate no-wake zones

Goal 3: Reduce the amount of shoreline experiencing erosion around the lake and channels and reduce stormwater and pollution runoff.

Objective: Reduce the percentage of shoreline experiencing moderate or severe erosion by 50% in 10 years

Action: Apply for grants to install native vegetative buffers

Action: Encourage homeowners experiencing erosion to repair erosion, following methods outlined in shoreline stabilization demonstration area. Approach homeowners experiencing particularly extreme erosion to see if they require assistance with stabilization efforts

Action: Remove invasive buckthorn from shorelines

Objective: Install three green infrastructure BMPs in public locations around the lake within 10 years

Action: Apply for grants to install BMPs, including rain gardens, bioswales, permeable pavement, etc.

Objective: Reduce "poor" buffer from 88% to 50% within 10 years.

Action: Install signs in shoreline demonstration area to educate lakefront owners about different stabilization methods

Action: Schedule routine maintenance within the restored natural areas and buffers in Lakefront Park

Action: Remove invasive shoreline species and restore the buffer with native species where possible

Action: Encourage and showcase lakefront owners who improve their buffer conditions.

Objective: Reduce chloride levels in the lake by 10% in 10 years

Action: Facilitate the creation of coordinated watershed road salt guidelines for municipalities

Action: Periodically promote salt application education to homeowners and businesses

Action: Perform chloride testing in the lake or coordinate with LCHD for testing

Objective: Reduce beach closures due to high bacteria concentrations by 50% in 10 years

Action: Continue *E. coli* testing on registered beaches

Action: Implement Canada goose reduction strategies, including shoreline buffer and barrier installations, anti-feeding campaigns etc.

MANAGEMENT TIMELINE

The proposed management timeline presented in Table 6 is designed to help meet goals by the dates set in the objectives (assuming year 1 is 2022). While many of these actions will be done on an as-needed basis, this timeline sets general expectations for what events might occur in a given year. Five educational opportunities were chosen to be focused on a rotating basis every five years. This would allow the RLMC to focus education and management efforts on one particular objective in a year, reducing the potential for stakeholders to feel overwhelmed with information overload. Following the table is a more detailed summary of the proposed management activities for each year, with estimated costs. The activities are sorted by management strategy and funding availability.

Main Goal Addressed			Management Strategy	Recommended Management Action	Year									
Plant Community	Education & Investment	Erosion & Runoff			1	2	3	4	5	6	7	8	9	10
	●		Strengthen Partnerships and Revenue Streams	Grow public and private partnerships										
	●			Regular website and newsletter updates										
	●			Create donation opportunities										
	●			Encourage citizen science/volunteerism										
●			Invasive Aquatic Vegetation Control	Herbicide application										
●				DASH or hand removal										
●	●			Invasive species education										
●			Invasive Emergent and Terrestrial Vegetation Control	Herbicide application										
●	●			Community plant removal events										
●	●	●		Establish desired species										
	●		Fishery Management	Follow IDNR stocking recommendations										
●	●			Encourage Carp Removal										
●		●	Shoreline Stabilization	Native buffer installation										
●	●	●		Demonstration area maintenance										
		●		Rip rap and seawall repair										
	●	●		Implement boating regulations										
	●	●	Pollution Reduction	Nutrient and BMP education										
	●	●		Public green infrastructure installations										
		●		Coordinated salt application strategy										
	●	●		Salt reduction education										
	●	●		Goose harassment										
	●			*E. coli* education										
	●			*E. coli* testing										

Table 6. Proposed management timeline. Dark blue cells can be pursued with existing budget ($4,000/year), Medium blue cells are recommended with increased revenue ($20,000+/year) and light blue cells would likely require outside funding sources, such as grants and partnerships.

Year 1

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Coordinate with municipalities, park district, and private associations to advertise RLMC meetings. Continue to coordinate and promote events in future years. *Approximate cost: In-kind*
- If deemed appropriate, consider adding additional committee member seats or creating sub-committees to encourage private landowner and stakeholder input on management activities. *Approximate cost: In-kind*

Regular website and newsletter updates

- Encourage passionate individuals to join commission and assign someone to maintain social media accounts, update website, and send out periodic (preferably at least quarterly) e-newsletter. Continue into future years. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Create donation opportunities

- Create a donation account for lake management activities. Add a link to donate on the website and include the option to donate in e-newsletters. *Approximate cost: In-kind*
- Research legacy donations to RLMC as part of estate planning. *Approximate cost: In-kind*

Encourage citizen science and volunteerism

- Share educational materials on website, including lake drone video, lake management plan, and phosphorus educational pamphlet. Continue sharing educational materials as they become available in future years. *Approximate cost: In-kind*
- Promote citizen science opportunities, including water clarity monitoring. *Approximate cost: In-kind*
- Continue annual shoreline cleanup events. *Approximate cost: $100 for trash bags and other materials*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Update fishing regulations sign at boat launches and public access points to match IDNR limit recommendations. Consider signage an opportunity to educate and improve messaging by adding questions such as “do you care about good fishing experiences?” to give context to regulations. *Approximate cost: $100-$500, depending on sign design*
- Continue stocking fish per IDNR recommendations with a 4-year on 4-year off rotation on stocking desired predator fish. *Approximate cost: $1,000 per year*

Pollution Reduction

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

Year 2

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Aquatic Species Management

Invasive species education

- Reach out to IDNR, Illinois-Indiana SeaGrant, and Prairie Research Institute for educational materials for website, for updated sign. See if there are options for signs in Spanish as well. Repeat outreach in 5 years. *Approximate cost: $100-$500, depending on custom sign design, size and number installed*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Coordinate with educational opportunities to host manual invasive species removal events along shores. Common species to pull include garlic mustard, using loppers to remove buckthorn (herbicide stump after removal). *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Pollution Reduction

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Species Management

Herbicide application

- Through coordination with different lakebed owners and raising funds, an herbicide application to control Eurasian watermilfoil growth in Round Lake is recommended. If possible, ProcellaCOR is recommended as it specifically targets Eurasian watermilfoil and does not impact native aquatic vegetation to the same degree. The company producing ProcellaCOR has a 3-year milfoil management guarantee for areas over 10 acres, so larger treatment areas will likely see longer-lasting results. Complete as funds become available, annually or every 3 years, as needed. Other herbicides can be utilized, which can be more cost effective but can impact non-target vegetation. *Approximate cost: $6,000 to over $30,000, depending on product used, size of treatment area, milfoil density, average depth etc.*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Year 3

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue websitem, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Encourage Carp Removal

- Share materials to help identify carp and explain their negative impacts on lake health. Repeat in 5 years. *Approximate cost: In-kind*
- Post signs at boat launches and public fishing points to encourage carp removal if caught. Repeat in 5 years. *Approximate cost: $100*
- Host a community carp roundup to draw attention to the damage carp cause and the Repeat in 5 years. *Approximate cost: $100: $1,000 for supplies, prizes etc*

Pollution Reduction

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Vegetation Control

DASH or Hand Removal

- Following herbicide applications, diver assisted suction harvesting (DASH) can be used to target small populations of invasive aquatic plants on an annual or as-needed basis. Hand removal can occur near shore by homeowners or with mechanical equipment. *Approximate cost: $2,500 per day for 5,000-6,000 square feet of DASH harvesting*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Shoreline Stabilization

Native buffer installation

- Offer materials to help homeowners learn about the benefits of native buffer installations. *Approximate cost: In-kind*
- Native buffer installations should occur as funds become available. Many on private properties will need to be paid for by the homeowner, but grants could be applied to for bank stabilization and native buffer installation project on public property. Homeowners should apply for grants as a group and will have a higher chance of success receiving a grant of one of the properties is public. *Approximate cost: $50 per linear foot for coir log installation and regrading (excludes plantings, access issues).*

Rip rap and seawall repair

- Round Lake Beach applied for and received approval for a blanket shoreline stabilization permit from the US Army Corps of Engineers in 2017, effective for a span of 5-10 years. This permit covers shoreline restoration that needs to occur along Clarendon Channel and Cedar Lake Channel (Natural Area Management Plan: Round Lake Channel). These repairs should occur as-needed. *Approximate cost: $65 per linear foot for rip rap (excludes plantings, access issues).*

Pollution Reduction

Public green infrastructure installations

- When grant and partnership funding permits, install green infrastructure BMPs to reduce stormwater and pollution runoff into the lake. Common examples include installing permeable pavement in public parking lots, installing storm drain markers designating “Dump no waste, drains to waterways”, installing rain gardens and bioswales in public spaces that receive runoff. Grants should be applied to annually, as they become available. *Approximate cost: $1,000 +, depending on scope of project, grant funding etc.*

Year 4

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Pollution Reduction

Coordinated salt application strategy

- Work with all municipalities in the Round Lake watershed to ensure road salt is being applied efficiently. This could include salt truck calibrations, applying brine before storms, ensuring proper salt storage. Consider sending municipal workers to a training session on road salt application, through the Lake County Health Department. Repeat every 5 years. *Approximate cost: In-kind*

Salt reduction education

- Obtain educational materials from the Lake County Health Department to distribute electronically or through the mail to residents in the watershed. Repeat effort every 5 years. Approximate cost: $0 to $2,000, depending on how materials are distributed

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Vegetation Control

DASH or Hand Removal

- Following herbicide applications, diver assisted suction harvesting (DASH) can be used to target small populations of invasive aquatic plants on an annual or as-needed basis. Hand removal can occur near shore by homeowners or with mechanical equipment. *Approximate cost: $2,500 per day for 5,000-6,000 square feet of DASH harvesting*

Invasive Emergent and Terrestrial Vegetation Control

Herbicide application

- If funding allows, target larger populations of terrestrial invasive species, particularly European buckthorn, *Phragmites,* and reed canary grass. Hiring commercial applicators for larger areas ensures more success with herbicide applications. *Approximate cost: $3,000-$4,000 per day for a 4-person crew and haul-off of buckthorn. $3,000-$4,000 per day for forestry mow, $2,500 per day for ~ 4 acres of Phragmites or reed canary grass control*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Shoreline Stabilization

Native buffer installation

- Offer materials to help homeowners learn about the benefits of native buffer installations. *Approximate cost: In-kind*
- Native buffer installations should occur as funds become available. Many on private properties will need to be paid for by the homeowner, but grants could be applied to for bank stabilization and native buffer installation project on public property. *Approximate cost: $50 per linear foot for coir log installation and regrading (excludes plantings, access issues).*

Rip rap and seawall repair

- Round Lake Beach applied for and received approval for a blanket shoreline stabilization permit from the US Army Corps of Engineers in 2017, effective for a span of 5-10 years. This permit covers shoreline restoration that needs to occur along Clarendon Channel and Cedar Lake Channel (Natural Area Management Plan: Round Lake Channel). These repairs should occur as-needed. Approximate cost: *$65 per linear foot for rip rap (excludes plantings, access issues).*

Pollution Reduction

Public green infrastructure installations

- When grant and partnership funding permits, install green infrastructure BMPs to reduce stormwater and pollution runoff into the lake. Common examples include installing permeable pavement in public parking lots, installing storm drain markers designating “Dump no waste, drains to waterways”, installing rain gardens and bioswales in public spaces that receive runoff. Grants should be applied to annually, as they become available. *Approximate cost: $1,000 +, depending on scope of project, grant funding etc.*

Year 5

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Pollution Reduction

E. coli education

- Obtain and distribute educational materials about the potential hazards associated with pet waste entering a waterway. Obtain signs in public walkways to encourage residents to pick up pet waste. Repeat outreach every 5 years. *Approximate cost: $100 to over $1,000 for signs and materials*

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Species Management

Herbicide application

- Through coordination with different lakebed owners and raising funds, an herbicide application to control Eurasian watermilfoil growth in Round Lake is recommended. If possible, ProcellaCOR is recommended as it specifically targets Eurasian watermilfoil and does not impact native aquatic vegetation to the same degree. The company producing ProcellaCOR has a 3-year milfoil management guarantee for areas over 10 acres, so larger treatment areas will likely see longer-lasting results. Complete as funds become available, annually or every 3 years, as needed. *Approximate cost: $6,000 to over $30,000, depending on size of treatment area, milfoil density, average depth etc.*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Invasive Emergent and Terrestrial Vegetation Control

Desirable species establishment

- Following control of invasive terrestrial and emergent species, plant areas with desirable wetland and shoreline species to restore the landscape. *Approximate cost: $100 - $1,000 per 100 square feet, depending on seeds or plugs, species used, volunteer vs hired labor*

Shoreline Stabilization

Native buffer installation

- Offer materials to help homeowners learn about the benefits of native buffer installations. *Approximate cost: In-kind*
- Native buffer installations should occur as funds become available. Many on private properties will need to be paid for by the homeowner, but grants could be applied to for bank stabilization and native buffer installation project on public property. *Approximate cost: $50 per linear foot for coir log installation and regrading (excludes plantings, access issues).*

Rip rap and seawall repair

- Round Lake Beach applied for and received approval for a blanket shoreline stabilization permit from the US Army Corps of Engineers in 2017, effective for a span of 5-10 years. This permit covers shoreline restoration that needs to occur along Clarendon Channel and Cedar Lake Channel (Natural Area Management Plan: Round Lake Channel). These repairs should occur as-needed. Approximate cost: *$65 per linear foot for rip rap (excludes plantings, access issues).*

Pollution Reduction

Public green infrastructure installations

- When grant and partnership funding permits, install green infrastructure BMPs to reduce stormwater and pollution runoff into the lake. Common examples include installing permeable pavement in public parking lots, installing storm drain markers designating “Dump no waste, drains to waterways”, installing rain gardens and bioswales in public spaces that receive runoff. Grants should be applied to annually, as they become available. *Approximate cost: $1,000 +, depending on scope of project, grant funding etc.*

Year 6

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*
- Follow-up survey of residents following 5 years of active management to determine if the management plan should be adjusted to follow changing community focus. Surveys should be done every 5 to 10 years to ensure management is meeting the community's needs. *Approximate cost: In-kind*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Pollution Reduction

Nutrient reduction BMP outreach

- Focus on obtaining and distributing educational materials to watershed residents to reduce stormwater and pollution runoff. Examples of best management practices (BMPs) include, rain garden installations, installing native shoreline buffers, rain barrel installations, permeable pavement, reducing fertilizer applications. Repeat this educational outreach every 5 years. *Approximate cost: $0 to over $1,000. Often, watershed groups can obtain rain barrels to raffle off to residents.*

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Vegetation Control

DASH or Hand Removal

- Following herbicide applications, diver assisted suction harvesting (DASH) can be used to target small populations of invasive aquatic plants on an annual or as-needed basis. Hand removal can occur near shore by homeowners or with mechanical equipment. *Approximate cost: $2,500 per day for 5,000-6,000 square feet of DASH harvesting*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Implement boating regulations

- Community surveys and meetings should be conducted to determine if there are areas of the lake where boat wakes should be prohibited, as well as times of the day. Installation of signs and buoys will denote regulations. If possible, hiring enforcement officers to have a presence on the lake during busy weekends can help ensure compliance. *Approximate cost: $100-$200 per buoy, $0 - $1,000 to conduct a community survey, $30+ per hour for enforcement officer presence on the lake*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Shoreline Stabilization

Native buffer installation

- Offer materials to help homeowners learn about the benefits of native buffer installations. *Approximate cost: In-kind*
- Native buffer installations should occur as funds become available. Many on private properties will need to be paid for by the homeowner, but grants could be applied to for bank stabilization and native buffer installation project on public property. *Approximate cost: $50 per linear foot for coir log installation and regrading (excludes plantings, access issues).*

Rip rap and seawall repair

- Round Lake Beach applied for and received approval for a blanket shoreline stabilization permit from the US Army Corps of Engineers in 2017, effective for a span of 5-10 years. This permit covers shoreline restoration that needs to occur along Clarendon Channel and Cedar Lake Channel (Natural Area Management Plan: Round Lake Channel). These repairs should occur as-needed. *Approximate cost: $65 per linear foot for rip rap (excludes plantings, access issues).*

Pollution Reduction

Public green infrastructure installations

- When grant and partnership funding permits, install green infrastructure BMPs to reduce stormwater and pollution runoff into the lake. Common examples include installing permeable pavement in public parking lots, installing storm drain markers designating “Dump no waste, drains to waterways”, installing rain gardens and bioswales in public spaces that receive runoff. Grants should be applied to annually, as they become available. *Approximate cost: $1,000 +, depending on scope of project, grant funding etc.*

Year 7

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Aquatic Species Management

Invasive species education

- Reach out to IDNR, Illinois-Indiana SeaGrant, and Prairie Research Institute for educational materials for website, for updated sign. See if there are options for Spanish signs as well. Repeat outreach in 5 years. *Approximate cost: $100-$500, depending on custom sign design, size and number installed*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Pollution Reduction

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Vegetation Control

DASH or Hand Removal

- Following herbicide applications, diver assisted suction harvesting (DASH) can be used to target small populations of invasive aquatic plants on an annual or as-needed basis. Hand removal can occur near shore by homeowners or with mechanical equipment. *Approximate cost: $2,500 per day for 5,000-6,000 square feet of DASH harvesting*

Invasive Emergent and Terrestrial Vegetation Control

Herbicide application

- If funding allows, target larger populations of terrestrial invasive species, particularly European buckthorn, *Phragmites,* and reed canary grass. Hiring commercial applicators for larger areas ensures more success with herbicide applications. *Approximate cost: $3,000-$4,000 per day for a 4-person crew and haul-off of buckthorn. $3,000-$4,000 per day for forestry mow, $2,500 per day for ~ 4 acres of Phragmites or reed canary grass control*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs

to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Shoreline Stabilization

Native buffer installation

- Offer materials to help homeowners learn about the benefits of native buffer installations. *Approximate cost: In-kind*
- Native buffer installations should occur as funds become available. Many on private properties will need to be paid for by the homeowner, but grants could be applied to for bank stabilization and native buffer installation project on public property. *Approximate cost: $50 per linear foot for coir log installation and regrading (excludes plantings, access issues).*

Rip rap and seawall repair

- Round Lake Beach applied for and received approval for a blanket shoreline stabilization permit from the US Army Corps of Engineers in 2017, effective for a span of 5-10 years. This permit covers shoreline restoration that needs to occur along Clarendon Channel and Cedar Lake Channel (Natural Area Management Plan: Round Lake Channel). These repairs should occur as-needed. Approximate cost: *$65 per linear foot for rip rap (excludes plantings, access issues).*

Pollution Reduction

Public green infrastructure installations

- When grant and partnership funding permits, install green infrastructure BMPs to reduce stormwater and pollution runoff into the lake. Common examples include installing permeable pavement in public parking lots, installing storm drain markers designating “Dump no waste, drains to waterways”, installing rain gardens and bioswales in public spaces that receive runoff. Grants should be applied to annually, as they become available. *Approximate cost: $1,000 +, depending on scope of project, grant funding etc.*

Year 8

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Encourage Carp Removal

- Share materials to help identify carp and explain their negative impacts on lake health. Repeat in 5 years. *Approximate cost: In-kind*
- Post signs at boat launches and public fishing points to encourage carp removal if caught. Repeat in 5 years. *Approximate cost: $100*
- Host a community carp roundup to draw attention to the damage carp cause and the Repeat in 5 years. *Approximate cost: $100: $1,000 for supplies, prizes etc*

Pollution Reduction

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Species Management

Herbicide application

- Through coordination with different lakebed owners and raising funds, an herbicide application to control Eurasian watermilfoil growth in Round Lake is recommended. If possible, ProcellaCOR is recommended as it specifically targets Eurasian watermilfoil and does not impact native aquatic vegetation to the same degree. The company producing ProcellaCOR has a 3-year milfoil management guarantee for areas over 10 acres, so larger treatment areas will likely see longer-lasting results. Complete as funds become available, annually or every 3 years, as needed. *Approximate cost: $6,000 to over $30,000, depending on size of treatment area, milfoil density, average depth etc.*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Invasive Emergent and Terrestrial Vegetation Control

Desirable species establishment

- Following control of invasive terrestrial and emergent species, plant areas with desirable wetland and shoreline species to restore the landscape. *Approximate cost: $100 - $1,000 per 100 square feet, depending on seeds or plugs, species used, volunteer vs hired labor*

Shoreline Stabilization

Native buffer installation

- Offer materials to help homeowners learn about the benefits of native buffer installations. *Approximate cost: In-kind*
- Native buffer installations should occur as funds become available. Many on private properties will need to be paid for by the homeowner, but grants could be applied to for bank stabilization and native buffer installation project on public property. *Approximate cost: $50 per linear foot for coir log installation and regrading (excludes plantings, access issues).*

Rip rap and seawall repair

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Pollution Reduction

Public green infrastructure installations

- When grant and partnership funding permits, install green infrastructure BMPs to reduce stormwater and pollution runoff into the lake. Common examples include installing permeable pavement in public parking lots, installing storm drain markers designating “Dump no waste, drains to waterways”, installing rain gardens and bioswales in public spaces that receive runoff. Grants should be applied to annually, as they become available. *Approximate cost: $1,000 +, depending on scope of project, grant funding etc.*

Year 9

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Pollution Reduction

Coordinated salt application strategy

- Work with all municipalities in the Round Lake watershed to ensure road salt is being applied efficiently. This could include salt truck calibrations, applying brine before storms, ensuring proper salt storage. Consider sending municipal workers to a training session on road salt application, through the Lake County Health Department. Repeat every 5 years. *Approximate cost: In-kind*

Salt reduction education

- Obtain educational materials from the Lake County Health Department to distribute electronically or through the mail to residents in the watershed. Repeat effort every 5 years. Approximate cost: $0 to $2,000, depending on how materials are distributed

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Vegetation Control

DASH or Hand Removal

- Following herbicide applications, diver assisted suction harvesting (DASH) can be used to target small populations of invasive aquatic plants on an annual or as-needed basis. Hand removal can occur near shore by homeowners or with mechanical equipment. *Approximate cost: $2,500 per day for 5,000-6,000 square feet of DASH harvesting*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Shoreline Stabilization

Native buffer installation

- Offer materials to help homeowners learn about the benefits of native buffer installations. *Approximate cost: In-kind*
- Native buffer installations should occur as funds become available. Many on private properties will need to be paid for by the homeowner, but grants could be applied to for bank stabilization and native buffer installation project on public property. *Approximate cost: $50 per linear foot for coir log installation and regrading (excludes plantings, access issues).*

Rip rap and seawall repair

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Pollution Reduction

Public green infrastructure installations

- When grant and partnership funding permits, install green infrastructure BMPs to reduce stormwater and pollution runoff into the lake. Common examples include installing permeable pavement in public parking lots, installing storm drain markers designating “Dump no waste, drains to waterways”, installing rain gardens and bioswales in public spaces that receive runoff. Grants should be applied to annually, as they become available. *Approximate cost: $1,000 +, depending on scope of project, grant funding etc.*

Year 10

Within Existing Budget

Strengthen Partnerships and Revenue Streams

Grow public and private partnerships

- Continue to seek out partnerships, as outlined in year 1. *Approximate cost: In-kind*

Regular website and newsletter updates

- Continue website, newsletter, and social media updates is outlined in year 1. *Approximate cost: In-kind or ~ $20/hr for a student intern to manage accounts*

Encourage citizen science and volunteerism

- Continue hosting events and promoting citizen science opportunities, as outlined in year 1. *Approximate cost: $100 for trash bags and other materials*

Invasive Emergent and Terrestrial Vegetation Control

Community invasive terrestrial plant removal events

- Continue hosting annual educational opportunities such as invasive species removal events along shorelines. *Approximate cost: $0 to > $1,000, depending on methods used*

Fishery Management

Follow IDNR Stocking and Limits Recommendations

- Continue stocking fish per IDNR recommendations. *Approximate cost: $1,000 per year*

Pollution Reduction

E. coli education

- Obtain and distribute educational materials about the potential hazards associated with pet waste entering a waterway. Obtain signs in public walkways to encourage residents to pick up pet waste. Repeat outreach every 5 years. *Approximate cost: $100 to over $1,000 for signs and materials*

E.coli testing

- Continue coordinating with LCHD to test for *E. coli* on registered beaches and following closing recommendations on an annual basis. *Approximate cost: In-kind*

With Increased Revenue

Invasive Aquatic Vegetation Control

DASH or Hand Removal

- Following an herbicide application, diver assisted suction harvesting (DASH) can be used to target small populations of invasive aquatic plants on an annual or as-needed basis. Hand removal can occur near shore by homeowners or with mechanical equipment. *Approximate cost: $2,500 per day for 5,000-6,000 square feet of DASH harvesting*

Invasive Emergent and Terrestrial Vegetation Control

Herbicide application

- If funding allows, target larger populations of terrestrial invasive species, particularly European buckthorn, *Phragmites,* and reed canary grass. Hiring commercial applicators for larger areas ensures more success with herbicide applications. *Approximate cost: $3,000-$4,000 per day for a 4-person crew and haul-off of buckthorn. $3,000-$4,000 per day for forestry mow, $2,500 per day for ~ 4 acres of Phragmites or reed canary grass control*

Shoreline Stabilization

Demonstration area maintenance

- Maintenance to control invasive species should occur 3 – 4 times throughout the growing season. *Approximate cost: $1,000 per year*
- Signage to explain the different shoreline stabilization strategies. *Approximate cost: $100 + depending on sign size etc.*

Pollution Reduction

Goose harassment

- Identify areas with the highest goose presence. Plant taller native vegetation along shorelines to discourage them. Consider applications of products, such as Flight Control, to grass, as geese do not like the bitter flavor. Place signs to discourage feeding waterfowl in public spaces. *Approximate cost: $30+ per sign, $450 per acre per treatment for grass applications. $1 + per square feet of native buffer installations*

Grants and Partnerships

Shoreline Stabilization

Native buffer installation

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EVALUATION & MOVING FORWARD

The Round Lake Management Plan was designed as a dynamic document, which can be adjusted as management priorities change.

Potential Grant Opportunities

Grants are an important way fund management activity for larger projects. Most grantors encourage partnerships and lean towards funding projects that benefit multiple stakeholders. Working with the local watershed group can be one way to take a partnership approach to a project. The grants that are most applicable Round Lake and therefore the most likely to be successfully applied to are listed in Table 7. While these grants are best suited for directly improving water quality for Round Lake, there are many other grant opportunities available, which may indirectly improve water quality. Contacting local management groups can help identify additional opportunities that may fit with a desired project.

Source	Grant	Due	Project Amount	Match	Purpose	Eligibility	Other Considerations
Illinois Environmental Protection Agency (IEPA)	319 (h) Nonpoint Source Pollution Control	August 1st	$50,000-$450,000	60%/40%	Improved Water Quality by addressing non-point source pollution	Local units of government, non-profits	Can partner with Lake County SMC and have them write and submit grant as part of a watershed-wide focus to improve water quality. (pay 60% with 10% of project cost going to SMC for project oversight)
Illinois Environmental Protection Agency (IEPA)	Green Infrastructure Grant Opportunity (GIGO)	21-Aug	$75,000 - $2.5 million	Minimum match 25% (15% for underserved communities)	Install stormwater management technique or practice employed with the primary goal to preserve, restore, mimic or enhance natural hydrology	Watershed groups, land conservancies, private institutions, nonprofits organizations, units of government (County, municipal, township or state), universities or colleges.	Must be GATA registered 24 months to complete https://www2.illinois.gov/epa/topics/grants-loans/water-financial-assistance/Pages/gigo.aspx
Lake County Stormwater Management Commission	WMB (Watershed Management Board) Cost Share Projects	October 1st	$20,000-$50,000	50%/50% Includes in-kind services	projects that reduce flood damage, improve water quality and/or protect natural resources.	HOA's, nonprofits, local units of government	

Table 7. Potential funding opportunities for management activities.

Lake County Stormwater Management Commission's Watershed Management Board (WMB) grants are geared towards HOA's for projects that improve water quality, reduced flooding and improve the natural environment. While most funded projects fall with the $20,000-$50,000 range, they have funded projects into the six figures. The cost share is 50%, but HOA's may use volunteer time at prevailing wage as in-kind contributions. These grants are relatively easy to write as the funder is targeting volunteer groups like HOA's who may not have grant-writing experience.

The Illinois Environmental Protection Agency offers two grants appropriate for lake communities. The Green Infrastructure Grant Opportunity (IGOG) funds projects that deal with stormwater and flooding. The 319 (h) funds projects that improve water quality by addressing sources of non-point source pollution. It should be noted that both require pre-registration through the Grant Accountability and Transparency Act (GATA) and these requirements are significant. Some of the GATA pre-registration requirements include the DUNS #, FEIN, and SAMS Cage Code. Because of the complexity of applying for these grants, partnering with LCSMC is recommended if considering a 319 grant. LCSMC will manage all aspects of grant writing and project management for a 10% fee. LCSMC does not manage IGOG grants. There are also programmatic and fiscal and administrative risk assessments, and any requirements that they generate, including development of a 'fraud awareness program''. There are also in-progress and post project reporting requirements. Groups that aren't already GATA-ready can partner with an organization that is already GATA-ready. Local soil and water conservation districts, counties, municipalities, etc. are good possibilities. Depending on their staffing levels, Lake County SMC will sometimes manage IEPA grant writing and reporting for an HOA for a 10% administration fee.

Increasing Revenue Streams for Management

Focusing on raising funds in order to be able to implement projects can be beyond the scope of an all-volunteer organization like RLMC. If internal resources do not allow for the opportunity for financial growth, the RLMC could consider implementing a campaign directed toward potential major donors to hire a consultant to oversee fundraising. ILM has expertise in this area and would charge approximately $1,000 per 10 hours of support. Once fundraising mechanisms are in place, the RLMC could assume this role.

APPENDIX A – Referenced Reports

Date	Report Type	Author	Summary
2003	Summary Report	LCHD	“2003 Summary Report of Round Lake”
2004	Management Plan	LC-SMC	“Squaw Creek Watershed Management Plan”
2009	Summary Report	LCHD	“2009 Summary Report of Round Lake”
2013	Management Plan	ILM	“Round Lake Management Plan 2013”
2017	Management Plan	Manhard	“Village of Round Lake Beach Storm Water Management Plan”
2017	Management Plan	SMC, Bleck, Baxter and Woodman	“Village of Round Lake Stormwater Management Program Plan”
2018	Management Plan	LC-SMC	“Des Plaines River Watershed-Based Plan – 2018”
2018	Management Plan	Dezirae Gonzalez	“Natural Area Management Plan: Round Lake Channel”
2019	Summary Report	LCHD	“2019 Round Lake Summary Report”

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