



2015 Loch Lomond Summary Report

Lake County Health Department, Ecological Services

LLPOA Lake Committee - 2023

Complete Report: <https://www.lakecountylvil.gov/DocumentCenter/View/14163/2015-Loch-Lomond-Lake-Report-PDF>

2015 Summary of Lake County Report on Loch Lomond

Loch Lomond is a privately owned, 75-acre impoundment located in central Lake County, within the Village of Mundelein. The lake was created in 1955 by damming Bull Creek, which enters the lake adjacent to the Loch Lomond Property Owners Association (LLPOA) North Beach.

- This is a “**flow through**” system, with the water entering the lake from Bull Creek and then exiting on the east side over a spillway that flows to St. Mary’s Lake and Butler Lake eventually reach the Des Plaines River.



- Residents use Loch Lomond Lake for swimming, fishing, non-motorized boating, and aesthetics.
- **The water quality in Loch Lomond is poor with low water clarity, high total suspended solids (TSS) concentrations and total phosphorus (TP) concentrations, and few aquatic plants.**
- **The lake is classified as “hypereutrophic” and ranked 150th out of 173 lakes in Lake County based on average Total TSI Phosphorus**

- TSI p measures eutrophication: 0-40 “good”, 40-60 “fair” 60-100 “poor”

Rank 1	Lake Carina	37.35
4	Independence Grove	41.14
36	Butler	54.33
67	St. Mary’s	63.41
150	Loch Lomond	80.23
164 & 172	Rollins Savanna	87 & 96
173	Almond Marsh	113.00

- These high concentrations have been causing nuisance algal blooms for many years. The LLPOA has algaecides applied annually to help control the algae.
- Aquatic plants consisted of several White Water Lily and Duckweed.
- Poor water clarity prohibited plant growth deeper than 2 – 3 feet.
- There were no submerged aquatic plants found during the 2015 survey.
- **23.4% of the shoreline areas show signs of erosion.**
- **One hundred percent of the shoreline was developed** with the major shoreline types being riprap, seawall, and lawn. A highly developed shoreline does not usually offer quality wildlife habitat. However, some of the lots around the lake have created Wetland Buffers offering good habitat for birds and small mammals.
- Most of the **birds** seen during the sampling season were those common to residential settings.
- **Total phosphorus** in Loch Lomond averaged 0.196 mg/L which is a 33.5% decrease from the 2005 concentration of 0.295 mg/L but higher than the Illinois Environmental Protection Agency impairment rate of 0.050 mg/L.
 - Sources of phosphorus include inputs from the watershed, local sources (i.e., lawn fertilizers and agricultural runoff) and internal loading from the sediment caused by wind and wave action and carp.
- **Nitrogen** is the other nutrient critical for algal growth. The average Total Kjeldahl nitrogen (TKN) concentration for Loch Lomond was 1.54 mg/L, which was higher than the county median of 1.20 mg/L.
- **A Total Nitrogen to Total Phosphorus (TN:TP) ratio of 8:1** indicates that nitrogen was the nutrient limiting aquatic plant and algae growth in Loch Lomond.
 - By using phosphorus as an indicator, the trophic state index (TSIp) ranked Loch Lomond as **hypereutrophic** with a TSIp value of 80.2. **This means that the lake has high nutrients which can result in excess plant and algae growth.**
- The 2015 average **Total Suspended Solids (TSS) concentration** for Loch Lomond was 11.0 mg/L, which was higher than the county median of 8.2 mg/L and a 16.7% decrease from the 2005 average of 13.1 mg/L.
- **Water clarity** was measured by Secchi depth, with the lowest reading in August (1.60 ft) and the deepest was in May (6.90 ft). The average Secchi depth for the season was 2.94 ft, which was near the county median (2.96 ft).
- The **average Conductivity** of Loch Lomond was 0.7736 mS/cm which is higher than the county median (0.7920 mS/cm). This was a 7.8% increase from the 2005 average (1.3298 mS/cm).
- The **average Chloride concentration** for Loch Lomond in 2015 was 134 mg/L which was slightly lower than the county median of 139 mg/L.
- **Although Loch Lomond is at the top of the watershed, it has lower water quality than the lakes it flows into. This is in part due to the lack of aquatic plants to stabilize sediments and take up excess nutrients.**

2015 Lake Recommendations

Loch Lomond's water quality had improved since 2005 with a decrease in total phosphorus (TP) and increase in water clarity. The chloride and total suspended solids (TSS) decreased by 53% and 17%, respectively. There were **no submergent aquatic plants** found and only a few White Water Lily. **The decrease in aquatic plant density leads to seasonal algae blooms due to higher amounts of available phosphorus.** Loch Lomond's management is administered by the Loch Lomond Property Owners Association (LLPOA).

To improve the overall quality of Loch Lomond, Lake County Ecological Services has the following recommendations:

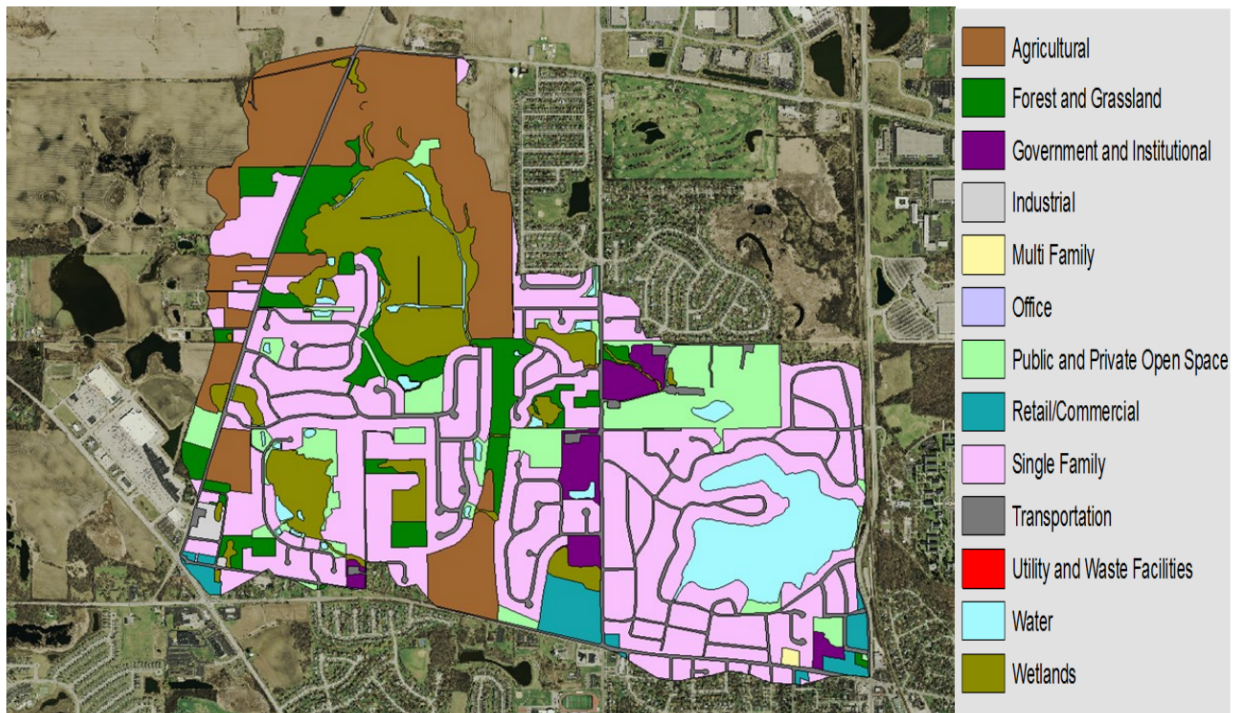
- Encourage homeowners to **incorporate native plants in their landscaping through rain gardens and shoreline buffers**
- **Monitor inlets for nutrients, sediment and erosion**
- Continued **participation in Volunteer Lake Monitoring Program** and in the Clean Waters Clean Boats Program
- Install a sign to **educate on ways to reduce the spread of Aquatic Invasive Species**
- Help **reduce Cl⁻ by supporting wise use of road salt** in the watershed
- **Assess current fish population and reduce or eradicate common carp**
- **Install a permanent staff gauge to monitor lake level** fluctuations
- **Become familiar with the appearance of harmful algal blooms** and report any blooms to the LCHD-ES by calling 847-837-8030
- **Develop an Aquatic Plant Management Plan (APMP) that targets the reduction of invasive species and promotes native plant diversity.** Aquatic plant management plans should consider type, timing of pesticide applications and quantity of pesticide used. Early season herbicide use is better for the native plant community. APMP can also include developing requests for proposals (RFPs) for herbicide application; which can better help associations properly manage their lakes.

Information & Other Resources

- <https://www.lakecountylil.gov/DocumentCenter/View/14163/2015-Loch-Lomond-Lake-Report-PDF>
- <https://lochlomondlake.com/our-lake/ecology/>
- https://lochlomondlake.com/wp-content/uploads/2019/07/LLPOA_Management_Plan_2018-09-24.pdf

[Additional Information from the Report](#)

LOCH LOMOND WATERSHED AND LAND USE



The lake has several inflow locations, including Bull Creek where it drains a pond from Keith Mione Community Park from the north, inlets from the southwest and west, and the residential areas surrounding the lake. Loch Lomond empties through a spillway on the east side of the lake. The water flows into Bull Creek, to St. Mary's Lake, Butler Lake and eventually into the Des Plaines River. **The retention time is 122 days** (the time it takes for water entering a lake to flow out again)

The major sources of runoff for Loch Lomond were Residential (48.3%), Transportation (25.6%) and Retail/Commercial (7.6%). The impervious surfaces (parking lots, roads, buildings, compacted soil) do not allow rain to infiltrate into the ground. **Land management practices of the large amount of residential area in the watershed impacts the lake. Controlling water that runs from the land's surface into the lake is important for drainage lakes.** Installing infiltration trenches to capture runoff from curbside gutters can reduce runoff into the lake.

Quality of Native Plants

Loch Lomond ranked 128 of 173 lakes in Lake County for its quality of native plants.

Lake County average Floristic Quality Index (FQI) ranking 2000-2015.

RANK	LAKE NAME	FQI (w/A)	FQI (native)
128	Loch Lomond	8.5	8.5

Aquatic Plants

Only 8% of Loch Lomond sites observed contain aquatic plants, and a healthy lake needs 20-40%. The types of aquatic plants found, White Lily and Duckweed, are not high quality. Aquatic plants provide oxygen, reduce harmful nutrients like phosphorus which prevents algae, and stabilize sediments.

- To Do:**

- increase Wetland Buffers along the shoreline,
- plant emergent vegetation, and
- decrease carp populations.

LOCH LOMOND AQUATIC PLANT MAP FOR JULY 2015



Rake Density (coverage)	# of Sites	% of Sites
No Plants	79	92
>0-10%	7	8
10-40%	0	0
40-60%	0	0
60-90%	0	0
>90%	0	0
Total Sites with Plants	7	8
Total # of Sites	86	100

- 91 - 100%
- 61 - 90%
- 41 - 60%
- 11 - 40%
- 1 - 10%

Aquatic Plants found at the 86 sampling sites on Loch Lomond Lake in July 2015. The maximum depth that plants were found was 4.7 feet.

Plant Density	Chara	Duckweed	White Water Lilly
Absent	91	94	94
Present	5	2	2
Common	0	0	0
Abundant	0	0	0
Dominant	0	0	0
% Plant Occurrence	5.8	2.3	2.3

Distribution of rake density across all sampling sites.

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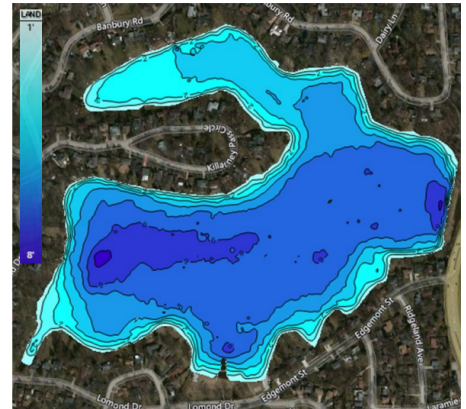
Common Carp

Common Carp are damaging and an invasive species (dark copper-gold back & light sides). **Decreasing Common Carp would increase aquatic plants, improve water clarity, increase dissolved oxygen, and reduce phosphorus and suspended solids.**



Bathymetric Map (Depth of Lake)

Bathymetric maps (depth contour maps) display the shape and depth of a lake. This information can then be used to determine the volume of the lake that goes anoxic, how much of the lake bottom can be inhabited by plants, and is essential in the application of whole-lake herbicide treatments, harvesting activities and alum treatments of your lake. Other common uses for the map include sedimentation control, fish stocking, and habitat management.



Shoreline Erosion & Plant Buffer Zones

A **shoreline erosion study** was assessed for Loch Lomond in 2015. The shoreline was divided into reaches, and the evaluated for none, slight, moderate and severe erosion based on exposed soil and tree/plant roots, failing infrastructure, undercut banks, and other signs of erosion. Based on the 2015 data, **23.4% of Loch Lomond's shoreline has some erosion which is up 67% since 2005. Approximately 19% of the eroding shoreline was classified as slightly eroding, with the remainder classified as moderately eroding (1.2%) and severely eroding (2.6%).** Continued neglect of these shorelines could lead to further erosion, resulting in a loss of property, and added soil inputs into the water that negatively affect water clarity.

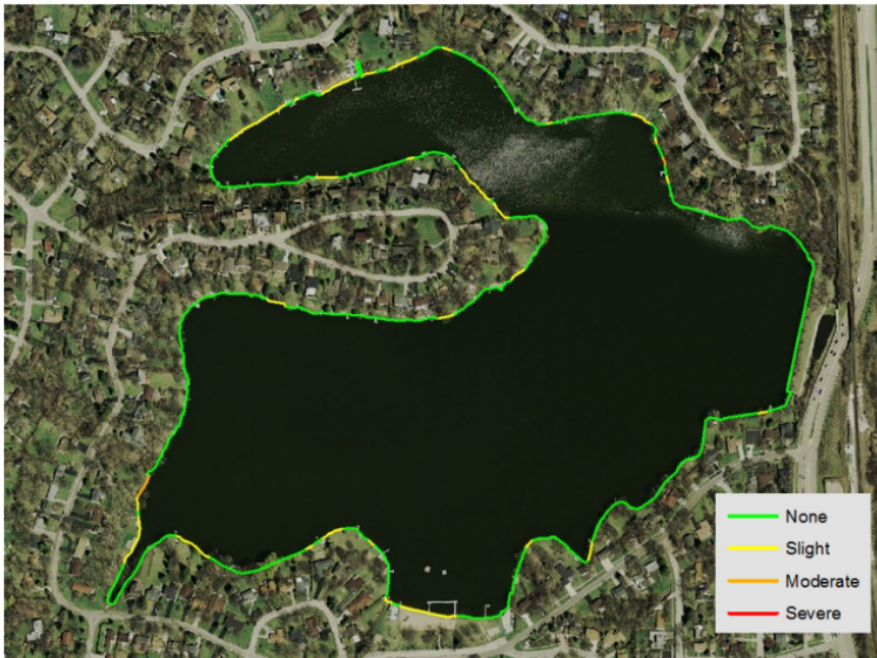
Erosion is a natural process primarily caused by water which results in the loss of material from the shoreline. Disturbed shorelines caused by human activity such as clearing of vegetation and beach rocks, and increasing runoff will accelerate erosion. Rain and melting snow and wave action are the main causes of erosion. Rain can loosen soil and wash it down gradient towards the lake. **Creating a native plant buffer helps prevent soil erosion as well as filter out pollutants and unwanted nutrients from entering the lake. Native plants can be planted along the shoreline** since plant roots hold the soil particles in place so they are not easily washed away during a rain event, melting snow or wave action. Loose rocks and gravel placed on top of a filter fabric prevents soil from washing away before newly planted seed and vegetation has a chance to grow. Eroded materials cause turbidity, sedimentation, nutrients, and pollutants to enter a lake. Shore line buffer zones planted with native vegetation not only reduces runoff by increasing water infiltration into the ground, it also offers food and habitat for wildlife. Less runoff means less nutrients, sediments and other pollutants entering the lakes and streams. Excess nutrients are the primary cause of algal blooms and increased aquatic plant growth. Once in the lake, sediments, nutrients and pollutants are harder and more expensive to remove.

Vertical seawalls reflect wave energy, which can cause scouring of the lakebed, increased turbidity and habitat loss for lake organisms. This can make it difficult for aquatic plants to grow near the seawall edge and may contribute to poor plant coverage near shore.

Stone refacing is adding layers of stone in front of an existing seawall to create a more natural shoreline. The stones help absorb wave energy that would otherwise reflect back and scour the bottom of the lake. This provides excellent habitat for fish, turtles and other aquatic animals. This minimizes the negative effects of an inflexible vertical seawall. Permits may be required with local or state government agencies prior to any alteration or repair of shoreline.

Erosion Maps

2015 Loch Lomond Summary Report



2018 Long Term Lake & Watershed Report



Detailed Soil Erosion Study by Lake Sections

Loch Lomond Shoreline Reaches 2015



Table 1: Loch Lomond Shoreline Erosion Condition 2015

Reach	None		Slight		Moderate		Severe		Total	Lateral Recession Rate
	Linear ft.	% Reach	Linear ft.	% Reach	Linear ft.	% Reach	Linear ft.	% Reach		
LL01	602.8	72.9	223.7	27.1	0.0	0.0	0.0	0.0	826.5	0.020
LL02	1294.4	71.2	155.1	8.5	49.7	2.7	318.0	0.0	1817.1	0.025
LL03	629.6	100.0	0.0	0.0	0.0	0.0	0.0	0.0	629.6	0.010
LL04	1593.8	91.1	155.4	8.9	0.0	0.0	0.0	0.0	1749.2	0.020
LL05	231.8	48.6	245.3	51.4	0.0	0.0	0.0	0.0	477.2	0.025
LL06	829.1	70.7	343.9	29.3	0.0	0.0	0.0	0.0	1173.0	0.020
LL07	571.8	75.5	186.0	24.5	0.0	0.0	0.0	0.0	757.8	0.010
LL08	2242.0	85.0	304.0	11.5	93.0	3.5	0.0	0.0	2639.0	0.020
LL09	1119.4	73.9	394.6	26.1	0.0	0.0	0.0	0.0	1514.0	0.010
LL10	266.9	47.7	292.3	52.3	0.0	0.0	0.0	0.0	559.2	0.025
LL11	104.1	42.3	142.0	57.7	0.0	0.0	0.0	0.0	246.0	0.010
Total	9485.6	76.6	2442.3	19.7	142.7	1.2	0.0	0.0	12388.7	

Shoreline Plant Buffer Zones

Table 2: Loch Lomond Lake Shoreline Buffer Condition 2015

Reach	Poor		Fair		Good		Shoreline Length Assessed
	Linear ft.	% Reach	Linear ft.	% Reach	Linear ft.	% Reach	
LL01	725	88	102	12	0	0	827
LL02	1499	100	0	0	0	0	1499
LL03	581	92	49	8	0	0	630
LL04	1749	100	0	0	0	0	1749
LL05	477	100	0	0	0	0	477
LL06	1173	100	0	0	0	0	1173
LL07	708	93	50	7	0	0	758
LL08	2383	90	256	10	0	0	2639
LL09	1514	100	0	0	0	0	1514
LL10	559	100	0	0	0	0	559
LL11	246	100	0	0	0	0	246
Total	11614	96	457	4	0	0	12071

Lake Management Plans

It is recommended that a long term Lake Management Plan be developed to effectively manage lake issues. All stakeholders should participate in the development of the plan and include homeowners, recreational users, lake management associations, park districts, townships or any other entity involved in managing Loch Lomond. Lake Management plans should educate the public about specific lake issues, provide a concise assessment of the problem, outline methods and techniques that will be employed to control the problems and clearly define the goals of the program. Mechanisms for monitoring and evaluation should be developed as well and information gathered during these efforts should be used to implement management efforts (Biology and Control of Aquatic Plants, Gettys et al., 2009)

What are the steps in creating a Lake Management Plan?

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

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Summary Report: https://docs.google.com/document/d/1unoyhlebr-WqHW-zpRUYBAT3_VykCSLdvqosA2qsatl/edit

Notes:

- **In 2018, LLPOA did develop a Long Term Lake & Watershed Management Plan**
- **The next Lake County study of Loch Lomond will be in 2024**