

THE GLQO WATERSHED JOURNAL



The Gull Lake Watershed includes Gull Lake, Little Long Lake, Grassy Lake, Little Gull Lake, Miller Lake, Bullhead Lake, Duck Lake, Backus Lake, Dake Lake, Elliston Lake, Mud Lake, Wintergreen Lake, and Prairieville Creek.

New State Guidelines Recommend Limiting Consumption of Smelt from Gull Lake

By Gary Mittelbach, Chairperson, Water Quality

Important news for Gull Lake anglers. Newly released guidelines from the Michigan Department of Health and Human Services (MDHHS) recommend limiting the consumption of smelt from Gull Lake to **2 serving per month**. The new smelt guidelines are based on elevated levels of perfluorooctane sulfonate (PFOS) found in rainbow smelt from Gull (and 5 other Michigan lakes). PFOS is in the family of chemicals known as per- and polyfluoroalkyl substances (PFAS). These long-lived chemicals can build up in fish and in the people who eat these fish.

The new Michigan Eat Safe Fish consumption guidelines for rainbow smelt are as follows:

- Lake Huron: **6 servings per year**.
- Lake Michigan: **1 serving per month**.
- Portage Lake in Houghton County: **1 serving per month**.
- **Gull Lake in Kalamazoo County: 2 servings per month.**
- Higgins Lake in Roscommon County: **4 servings per month**.

MDHHS also currently recommends that no one eat more than **1 serving per month** of rainbow smelt from Lake Superior.

Concerns about PFAS in fish have been much in the news lately (see, for example, <https://cnn.it/3k75fkv>) and consumption advisories for fish containing high levels of PFAS are becoming increasingly common. PFAS exposure has been linked to a number of adverse health effects including certain cancers, thyroid dysfunction, changes in cholesterol, and small reductions in birth weight. PFAS were commonly found in hundreds of items such as water and stain repellent clothing, cosmetics, fire-fighting foam, and nonstick cookware. Manufacturers agreed in the early 2000s to voluntarily stop using long-chain PFAS in US consumer products and the use of PFOS and PFOA in food packaging was [phased out in 2016](#) by the US Food and Drug Administration. But, since PFAS are

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The Gull Lake Quality Organization is an all-volunteer organization. Our mission is to address concerns and provide education regarding the use of natural resources of the Gull Lake Watershed.



long-lived chemicals, they remain in the environment and continue to circulate.

PFAS may leak into the environment where they are made, used, disposed of, or spilled. Moreover, their persistence means they can cycle through soils and water without breaking down, as well as build up in fish and other wildlife. Some PFAS can also biomagnify, becoming more concentrated as they move up the food chain. It is unknown why rainbow smelt in particular concentrate PFOS in their bodies, since smelt are relatively short-lived and feed on zooplankton and aquatic insects, not other fish (i.e., they feed in the middle of the food chain).

Should you take the fish consumption advisory for smelt from Gull Lake seriously? The simple answer is **YES**. There is good scientific evidence that consuming fish with raised levels of PFOS in their bodies will directly increase the levels of these chemicals in the people that eat them. (See https://bit.ly/PFOS_article).

It is natural to ask how Gull Lake smelt ended up on the MDHHS's fish consumption advisory? It may have more to do with smelt biology than with Gull Lake *per se*. As noted above, rainbow smelt seem especially prone to concentrate PFOS in their bodies, for reasons that aren't yet known (smelt consumption advisories have been issued for smelt in other Great Lakes states). Because smelt require deep, cold and well-oxygenated water to live, Gull Lake is one of the few local lakes where smelt are found. Folks familiar with local history may remember that PFAS were one of the multiple toxic chemicals released into the ground water by the former Production Plated Plastics factory located on N 34th St. in Richland. However, it is unlikely that this is the source of PFAS in Gull Lake smelt. Monitoring of private and test-well sites between the contaminated site in Richland and Gull Lake show that the PFAS have moved with groundwater towards the southeast and not towards Gull Lake (https://bit.ly/PFAS_Richland). Moreover, studies have found PFAS in very remote areas in the world leading to research on atmospheric deposition of PFAS. Lastly, PFAS have been used in many household products over the past 50 years, so it is possible that some may have come from septic systems prior to the sewer being installed around the lake.

Remembering the Four-Township Water Resource Council

Eric Reid, GLQO Online / Social Media Editor

The GLQO wishes to recognize the work of the Four-Township Water Resource Council (FTWRC), as its Board has decided to dissolve the organization after 30 years. The FTWRC was founded in 1993, with the purpose of preserving the Gull Lake and Augusta Creek watersheds. It did so through public outreach and education, and made a sizable collection of research and water quality guidance documents available on its website. Perhaps its most significant accomplishment was the creation of a Watershed Management Plan for the Four Township Area and programs which implemented its goals. The FTWRC also hosted a 'Kanoë the Kazoo' event each year on one of the water bodies within the two watersheds.



The GLQO often worked closely with the FTWRC on matters of shared interest to their respective constituencies; over the years, several local residents held Board of Director positions with both organizations at various times.

For more on the FTWRC's history, check out an article written by one of the founding members, Dr. Kenny Kornheiser at https://bit.ly/FTWRC_history.

Going forward, FTWRC online resources will still be available via the Kalamazoo Rivers Watershed Council website at the link above; in addition, FTWRC is distributing its remaining assets to area organizations.

A History of Ice Cover on Gull Lake

By Brook Wilke, Chairperson, Fisheries Committee

For over a century, Gull Lake area residents have been anxiously awaiting the onset of ice cover to enjoy the multitude of winter sports that can only be done on an ice-covered lake. Fishing, ice-sailing, skating, hockey and even an old-fashioned run and slide are a few of the more common activities. The winter of 2022/23 is turning out to be a dud when it comes to providing opportunities for these activities, with ice not covering the lake until January 31st, and most of the ice melted on February 15th. But how does this winter compare to winters for the past century?

Thanks to Gull Lake area residents and KBS scientists Drs. Alan Tessier and Steve Hamilton, ice cover data for Gull Lake have been compiled since 1924, which provides important insights into how this winter phenomenon has been changing over time. Decreasing duration of ice cover has been the trend over the past century, although there have been outliers that span the whole period, including 1930/31, 1931/32 (dust-bowl era) and 2001/02 when Gull Lake never froze over. The longest period of ice cover occurred during the winter of 1960, when ice covered the majority of the lake for a whopping 122 days; the second longest ice duration occurred in 2013 with 117 days. Assuming Gull Lake does not freeze over again, only six years in the past 100 will have had fewer days of ice cover than the 2022/23 winter.

If you are curious about year-by-year ice cover history, or trends over time, check out the graphs below graciously provided by Dr. Steve Hamilton who collects and summarizes these data annually. The dashed line is the fitted trend line showing a significant decline in the duration of ice cover since records were first collected. Perhaps you have some distinct memories from some of these years where winter lasted forever, or spring came early!

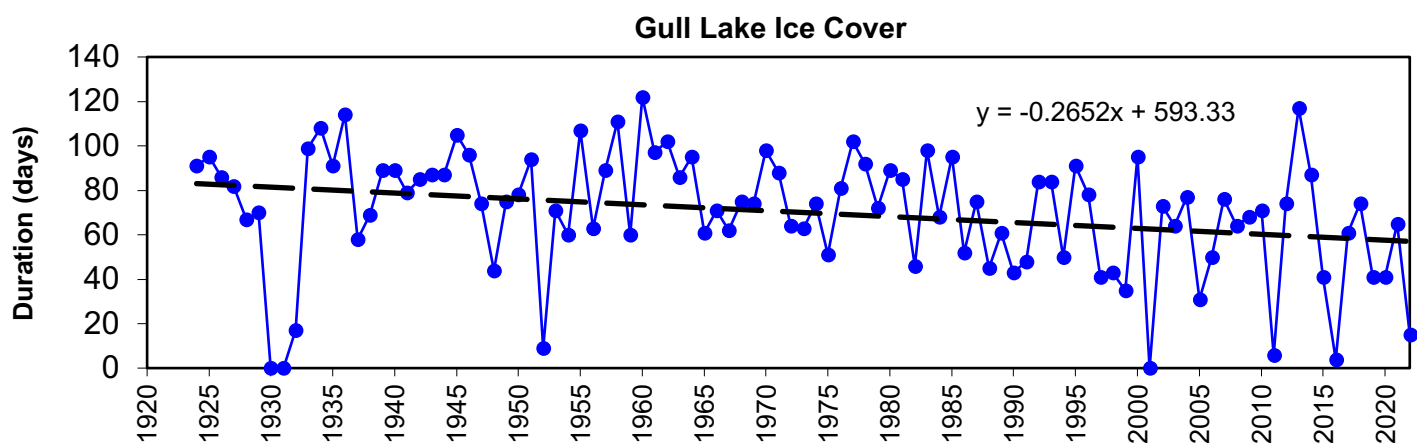


Figure 1. Gull Lake ice cover duration (days) from the time that most of the lake froze over to the day when open water existed on the majority of the lake. From these data, we can determine that the current duration of ice cover is about 19 days less per year than it was 72 years ago (Credit Dr. Steve Hamilton)

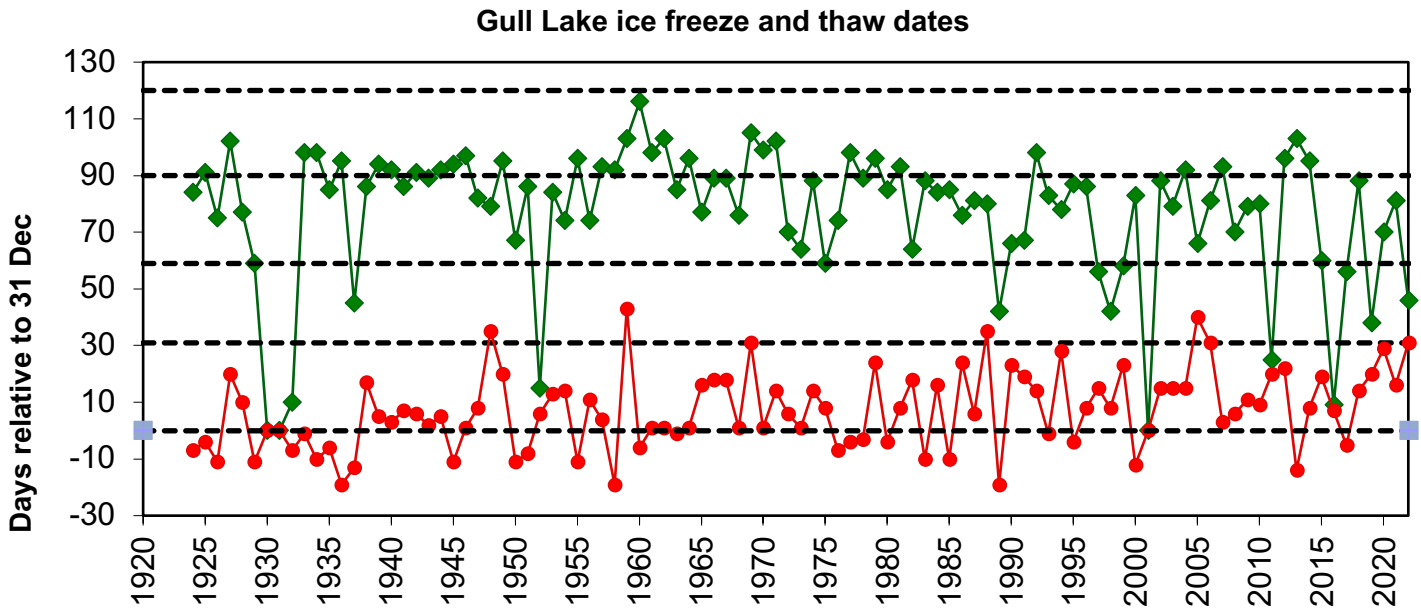
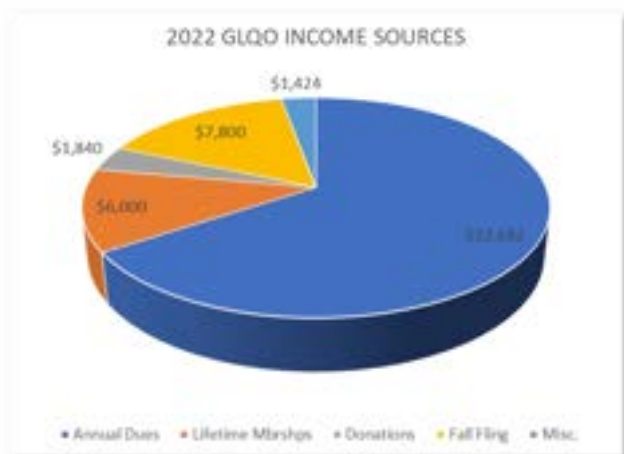


Figure 2. Freeze and thaw dates for Gull Lake ice cover. December 31st is day 0 in this graph, so negative values are days prior to Dec. 31st, and positive values are days after Dec. 31st. (Credit Dr. Steve Hamilton)

GLQO Income and Expenses for 2022

By Kay Gross, President and Andy Widner, Board Member

If you've ever wondered about the GLQO's annual budget, the pie charts below summarize our income and expenses for 2022. Annual member dues and four new lifetime memberships made up the vast majority of our total income of \$49,746. Expenses were primarily directed towards water quality activities in Gull Lake, including mapping and treating invasive plant species, and staffing and maintaining the boat wash. Total expenses in 2022 were \$38,072, leaving a budget surplus of about \$11,000 for 2022. This surplus is welcome as 2023 has us looking at some significant repairs to the boat wash, as well as an increase in education and outreach activities.



How did the GLQO Come to be?

By Kay Gross, President

Many, maybe most of you, might not know how and why the Gull Lake Quality Organization came to be. It's an interesting story that demonstrates the importance of community activism and collaboration. It all began with a group of women who grew concerned that the waters of Gull Lake were becoming green and murky and wanted to do something about it! It was also fortunate timing, for at the same time MSU decided to staff the biological station on Gull Lake with full time faculty, several of whom did research on Gull Lake.

The story begins in the late 1960's when three women who lived at the north end of Gull Lake (Marion Longman, Sue Parish, and Sally Murray) became concerned about the increasing 'cloudiness' of the lake. Marion Longman was a Girl Scout leader and her troop had received a \$500 grant from the Readers Digest Foundation that the girls wanted to use to 'help save the world'. This prompted Mrs. Longman to approach Dr. George Lauff, the newly appointed Director of Kellogg Biological Station, to see if the scouts could help save Gull Lake with their \$500. Dr. Lauff allegedly chuckled and said it would take the education of all the lake residents and the installation of a sewer system around Gull Lake to reclaim its water quality.

Lauff's assertion came because researchers at KBS had documented declines in Gull Lake water quality compared to the 1940's. Their data showed that the composition of algae in the lake had changed, likely causing it to appear cloudier. They also found that mid-summer oxygen levels in the deep water had declined to levels that were lethal for fish. Their research showed that these changes were likely due to increasing phosphorus in the lake. A KBS graduate student (David Tague) working with Dr. Lauff documented that a significant source of phosphorus to Gull Lake was leakage from septic systems. A second important source was phosphorus from lawn fertilizers. Installing a sewer system around the lake and encouraging home owners to use phosphorus free fertilizers would address both causes of the declining water quality and allow the lake to recover.

In 1977, a group of lake residents, including the "Ladies of the Lake", formed a non-profit corporation (Gull Lake Quality Organization, Inc). They organized the 'captains' of the 46 beaches around Gull Lake to get information to residents about the need for a sewer system and encouraged lake owners to use phosphorus free fertilizers on their lawns. Importantly, they also worked to raise funds to support the efforts of the four townships surrounding the lake to get the necessary state and federal approvals and funding to build the sewer system. The data from KBS researchers was important in convincing federal and state agencies of the causes – and solutions – to the problem.

Construction of the sewer system began in 1980 at a cost of ~\$12,000,000 and was completed in 1984. Subsequent monitoring of water quality in Gull Lake by KBS scientists and GLQO volunteers documented that by the early 1990's phosphorus levels had declined. Also, oxygen levels in the deep waters of the lake had increased, improving habitat for fish (see graphic below).

The combined effort of the GLQO, the four surrounding townships, KBS scientists, and Gull Lake residents was critical to the success of 'cleaning up Gull Lake' in the 1980s. Challenges remain, however. Today, the GLQO continues to monitor water quality in Gull Lake and adjacent Little Long Lake via participation in the Michigan Cooperative Lakes Monitoring Program. The GLQO is also involved in efforts to control the spread of aquatic invasive plants into Gull Lake. To do this, we map and treat areas where invasive species are detected (via contracts with firms Progressive AE and Progressive Lake Management), maintain and operate a boat wash at Prairieville Township Park, and provide information on our website (www.glqo.net) about current and

potential threats to Gull Lake. The cost of these efforts is substantial and your support – by joining the GLQO and providing donations to support our work – is critical to our being able to fulfill our goal to “Keep it Clean”!

Note: You can read a more detailed summary of the changes of water quality in Gull Lake from the 1960’s to 1990s in an article by Tessier and Lauff (1992) that was published in *The Michigan Riparian* that is posted on the Resources page of the GLQO website.

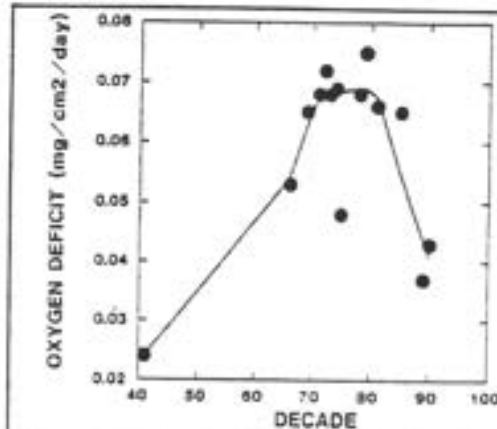


Figure: Oxygen levels in the bottom waters of Gull Lake quickly improved following completion of the sewer system in 1984. In this graph, high values of “oxygen deficit” indicate low oxygen availability in deep waters. The data point for 1975 is an outlier due to an unusually cold year.

2023 Lifetime Members

- | | |
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| <i>Gull Lake View Golf Course</i> | |
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| <i>Noteworthy by Design</i> | |

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- | | |
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The Gull Lake Quality Organization

P.O. Box 144 / Richland, Michigan / 49083

Website: glqo.net

Contact: info@glqo.net



Upcoming Events

Upcoming Board Meetings

Tuesday, March 14th 7:00PM

Tuesday, May 9th 7:00PM

Carriage House Classroom

GLQO Annual Meeting

Tuesday, June 13th, time TBD

Kellogg Manor House

All meetings held on the grounds of the

W.K. Kellogg Biological Station

3700 East Gull Lake Drive

Hickory Corners, MI

If there are ideas or issues that you think GLQO should address please contact any of the board members or communicate through our Facebook page or website.

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We welcome you to volunteer for committee work (of your choice) and to participate in our board meetings.

The Gull Lake Watershed includes Gull Lake, Little Long Lake, Grassy Lake, Little Gull Lake, Miller Lake, Bullhead Lake, Duck Lake, Backus Lake, Dake Lake, Elliston Lake, Mud Lake, Wintergreen Lake, and Prairieville Creek.