LCIA Environmental Report

The LCIA Environmental Committee is responsible for informing the membership of the status, issues and concerns associated with the Les Cheneaux Islands recreational water quality as well as the diversity and resilience of the coastal wetland environment of the Les Cheneaux Islands.

Since 2001 members of both LCIA and Les Cheneaux Watershed Council have been taking water samples annually. Currently, five testing sites located across the islands provide the samples from which data are collected and analyzed. At each site water clarity, temperature and wind speed are measured along with three samples of water taken for analysis.

The sampling is done in mid-July, a time which data history shows to be the peak of the summer season. Fluctuations in sampling differences are minimized by sampling each testing site close to the same time and date each year. Our team took samples that were very close to the time and date (between 9:00 AM and 11:00 AM of July 11, 2024) of the previous year. On July 10th, at each collection site, Dave Letts measured wind speed and determined water clarity. Meanwhile, Shane Coykendall and Emily Periloux, students at Lake Superior State University's School of Chemistry, Environmental, & Geosciences, took water samples and noted the water temperature at five sites ranging from Hessel Bay in the west to McKay's Bay in the east. Listed below are the testing sites and reasons for their selection.

- Hessel Bay (off the public marina): near public beach and high public usage area
- Musky Bay: high public usage area
- Cedarville Bay: near sewer-system discharge and high public usage
- Government Bay: near public beach and high public usage
- McKay's Bay/Strong's Island: near quarry docks and commercial shipping usage

Any matter or substance found in these water samples comes from one of two sources: natural sources (erosion of rocks and soils; decomposition of organic matter; animal waste) and human-induced sources, which include the following:

- Agricultural runoff: Fertilizers and animal waste from farms can be washed into waterways.
- Wastewater discharge: Sewage and industrial wastewater can contain phosphorus.

- Urban runoff: Stormwater runoff from streets and parking lots can carry phosphorus.
- Septic systems: Improperly maintained or failing septic systems can release phosphorus into groundwater and surface water.

What did these water samples yield and what do they tell us about the status of the waters of the Les Cheneaux Islands?

In this current newsletter the LCIA reports on the levels of phosphorus and chlorophyll in our waters; while the Watershed Council reports on the levels of PFAS/PFOS in the LCI fish which many residents and visitors catch and eat. PFAS (Poly Fluoroalkyl Substances) is a family of synthetic substances commonly referred to as “forever chemicals”. Also, PFAS can be used in products that eventually become “micro plastics”(tiny plastic particles less than 5 millimeters in size that result from the breakdown of larger plastic items).

PFOS (Perfluorooctane sulfonate or Perfluorooctane sulfonic acid) and PFOA (Perfluorooctanoate or Perfluorooctanoic acid) are the most common PFAS species found in the environment. These substances are found in a number of products that we often use every day, e.g., non-stick cookware, outdoor and rain gear, cosmetics, fast food wrappers, shampoos, dental floss, electronic components, et.al.

As mentioned above, the LCI environmental report focuses solely on the levels of phosphorus and chlorophyll in our waters of Les Cheneaux. So, what are phosphorus and chlorophyll and what do their levels tell us about the health of our waters?

Phosphorus is an essential nutrient in aquatic ecosystems. While vital for plant and animal life, excessive amounts can lead to harmful algae blooms and other water quality issues. Its presence in water bodies can be influenced by natural sources like decaying organic matter and human activity such as agricultural runoff and wastewater discharge.

Chlorophyll is a pigment found in algae and plants that absorbs light energy for photosynthesis. In water, it's a key indicator of algal biomass and primary productivity, i.e., the rate at which organisms like phytoplankton, algae, and aquatic plants convert light energy into chemical energy through photosynthesis, forming the base of the aquatic food web. Measuring chlorophyll levels helps assess water quality, nutrient levels, and the overall health of aquatic ecosystems. Excessive algal growth, indicated by high chlorophyll levels, can be a sign of a “eutrophic” state, where excess nutrients in the water lead to algal blooms.

The balance between phosphorus and chlorophyll in water is crucial for aquatic ecosystems, as phosphorus is a key nutrient for algae (whose abundance is measured by chlorophyll). Excessive phosphorus causes algae blooms, leading to decreased water quality, while a lack of phosphorus can limit growth.

Reported below is the average value of phosphorus and chlorophyll of the three samples taken at each site. The value is conveyed in micrograms per liter (ug/L). One microgram is equal to one millionth of a gram. A liter of water is equal to one billion micrograms (ppb). Another way to comprehend a microgram is to imagine one drop into ten gallons.

- Hessel Bay (off the public marina): near public beach and high public usage area
  Phosphorus: 3.0 ug/L Chlorophyll: .85 ug/L

- Musky Bay: high public usage area
  Phosphorus: 6.43 ug/L Chlorophyll: 1.64 ug/L

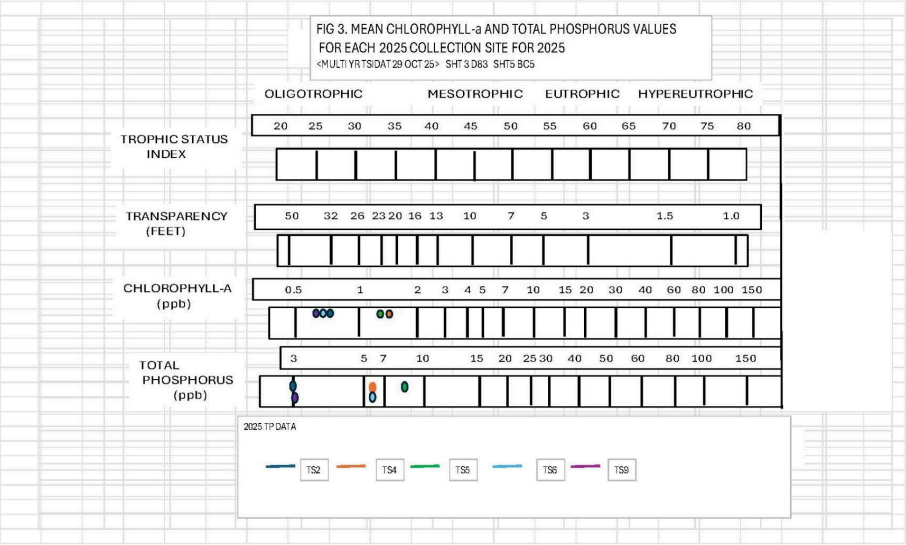
- Cedarville Bay: near sewer-system discharge and high public usage
  Phosphorus: 8.03 ug/L Chlorophyll: 1.5 ug/L

- Government Bay: near public beach and high public usage
  Phosphorus: 5.03 ug/L Chlorophyll: .72 ug/L

- McKay's Bay/Strong's Island: near quarry docks and commercial shipping usage
  Phosphorus: 3.26 ug/L Chlorophyll: .64 ug/L

As the chart below indicates, our water falls into an oligotrophic state: a low level of nutrients (phosphorus), deep and cold water, highly dissolved oxygen, and low bacteria. This is good and historically our waters have shown little change. Of course, due to high boat traffic, shallow waters, higher water temperature, and proximity to sewer system discharge (nutrients), Cedarville Bay falls into the area closer to a mesotrophic

state (warmer water, higher nutrients, increased bacteria), whereas McKay's Bay and Hessel Bay are more solidly in the oligotrophic state.



Finally, as lake levels continue their downward trend the channels will warm more quickly. Sunlight will penetrate more deeply than in recent years when the waters were deeper. Consequently, there will be more weed growth of both native and non-native species. So, expect more Eurasian watermilfoil growth. Excessive weed growth will deplete dissolved oxygen which impacts the fish population, change water quality (moving away from the oligotrophic state), and increase bacteria and sedimentation.

None of us want to relive the dense milfoil of the 2010-2012 years. As a preventative, please be vigilant about grooming your riparian waterfront area by removing non-native weeds, especially milfoil, along your beach, docks, and boathouses. Neighboring properties can effectively decrease the severity of excessive weed growth.