

Wasa Lake Citizen Questions

Primary Questions

1. Why such a strong focus on boating in the research findings - What is the actual impact of powerboats and wake boats on sediment disturbance and water quality?
 - Boating is a threat to water quality across the province. This issue is not unique to Wasa Lake. The study was focused on sediment and water quality; boating influences both and could not be ignored given the size, shape, and depth of Wasa Lake.
 - Report sections highlight the impact of powerboats and wake boats on the sediment and water quality. See pages: 21 and 28.
 - Below is additional information on boating and its impact on water quality
 - University of Waterloo:
<https://uwaterloo.ca/water-institute/news/boat-wakes-arent-just-nuisance-they-harm-freshwater>
 - Responsible Wakes for Vermont Lakes Page:
http://responsiblewakes.org/?page_id=25
 - Government of Connecticut:
<https://portal.ct.gov/-/media/deep/boating/wake-boat-and-wakesurf/draft-wake-boat--wakesurf-study-final.pdf?rev=1220fab8bb9a47d5b1d8aa60631b42d0&hash=949076AEF46FD9472408061529C1EEC>
 - Wisconsin's Greenfire:
https://wigreenfire.org/wp-content/uploads/2024/05/WakeBoatsLakeEcosystemHealth_WGF-May2024_Final.pdf
 - As studies provide mounting evidence of power boating's influence on water quality, the following changes are legislated in the US as of 2024:
 - **Oregon** banned wake surfing altogether along sections of the Willamette River.
 - **Vermont** adopted new rules restricting wake surfing to designated areas (zones are at least 500 feet from shore, 200 feet wide, and greater than 20 feet deep).
 - **South Carolina** passed a law requiring wake sports occur 200 feet from docks, swimmers, and other anchored craft.
 - **Minnesota** will, by 2025, require boaters engaging in wake sports to attend an education class and receive a boater education card. The state also now requires wake sports on Caribou Lake take place at least 500 feet from shore, and in water at least 20 feet deep.

2. What are the health and ecological risks associated with sediment disturbance and contaminants?
 - Report pages relevant to this question: 21, 28, 31
 - Sediments on the bottom of lakes accumulate over centuries and store large quantities of nutrients, metals and contaminants originating from the watershed and especially from on-water sources. This sediment storage is a beneficial service that all lakes provide. Sediment storage needs to stay undisturbed to preform its function.
 - The waves created by wake boats can produce up to 6 – 9 times more energy than other cruising vessels. These large, powerful wakes can strike shorelines. Below the waterline, larges wake boats force columns of turbulence downward, stirring up sediment. This disturbance causes impacts including damaging underwater plants, disrupting aquatic life including fish and benthic invertebrates, accelerating algae blooms from released nutrients, and reintroducing *E. coli* to the water column from the sediment (Francis et al. 2023).

 3. How serious is the invasive mussel threat? What can we do now to prevent this from happening to protect the lake for future generations?
 - Extremely serious. This threat is taken very seriously by the province and several water protection groups in BC. The province of BC views invasive mussels as an immediate emergency.
 - Invasive mussels are introduced most often by boats with reservoirs for engine cooling or ballast tanks. An infestation in Wasa Lake would damage lake values permanently (please refer to the Mussel Guide [OBWB 2024])
 - Once established the estimated cost to BC aquatic infrastructure is \$43-129 million/year
 - BC informational webpage:
<https://www2.gov.bc.ca/gov/content/invasive-mussels/zebra-and-quagga-mussel-facts>
 - Webpage with lots of information:
https://dontmoveamussel.ca/?utm_source=loknow&utm_medium=Search&utm_campaign=loknowDontMoveaMussel+&gclid=Cj0KCQjw39zSBhDhARIsANammDsm0qvzq6flbYem2j-guyQyB7c8XG4lBqAPZ4t1uJdJY4lAs7xFjQwaAmZAEALw_wcB
 - Provincial statement on prevention: <https://news.gov.bc.ca/releases/2024WLRS0021-000767>
 - Provincial page on invasive mussels: <https://www2.gov.bc.ca/gov/content/invasive-mussels>
 - Webpage with prevention tips: <https://dontmoveamussel.ca/prevention/>
 - Protect Wasa Lake by reducing the number of unregulated boat launches
 - Train volunteers to perform boat inspects and coordinate with the government of British Columbia
-

4. Can we afford the time to do long-term monitoring and management and more studies, or is the threat dire indicating that we should try to get some protection underway ASAP?
 - Long-term monitoring is useful to monitor changes to the lake over time. Monitoring will provide evidence once the change has been observed.
 - Protecting Wasa Lake sooner than later will preserve its health and recreational value
 - Wasa Lake is a safe lake that meets recreational guidelines. Preserving this will include thought-out recreation related to water depth, riparian protection, removal of unregulated boat launches, and restoration of natural habitats (promote native flora and fauna)
 - Reference Wasa Lake BC Lake Stewardship and Monitoring reports, and Wasa Lake Foreshore Inventory and Mapping Report for next steps alongside recommendations in the 2025-2026 LAC study. Consider redoing the Foreshore Inventory Mapping Report with Living Lakes Canada (report is 17 years old).

5. Is the current study sufficient to support management actions or boating restrictions to protect lake health and water quality? If not, what are next steps to protect Wasa for our families and the future?
 - Yes. Given Wasa Lake's depth, size, and available literature online, management actions can be supported.
 - Refer to the Water Sustainability Act of BC for regulatory agencies to engage with regarding lake and recreator health. Boating regulations are typically governed by Transport Canada but aspects fall under the Water Sustainability Act.
 - Refer to the recent Transport Canada regulation changes regarding wake-surf boats. This reflects community experiences across Canada. As wake-surf boats get more numerous and progressively more powerful, boaters can expect restrictions.

Secondary Questions

1. Were there levels of heavy metals and *E. coli* in the sediment traps?
 - Metals and *E. coli* were not analyzed in sediment traps
 - Details on sediment data can be found on pages 18-20
2. What are the potential consequences of sediment disturbances given likely increases in water temperatures due to global warming?
 - Rising water temperatures alongside sediment disturbances can increase algae blooms in Wasa Lake (following sediment disturbances nutrients are released from sediment to the water column and fuel algae blooms)
 - If blooms become chronic in Wasa Lake, oxygen dynamics in the lake can be influenced (cascade of events)
3. What are the maximum levels of contaminants that would be acceptable?
 - Please refer to provincial and federal guidelines
 - BC Recreational Water Quality Guidelines:
https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/water-quality-guidelines/approved-wqgs/drinking-water-and-recreation/recreational_water_quality_guidelines_bcenv.pdf
4. Are we at a point of no return w/ the health of the lake?
 - No. Wasa Lake is a healthy lake that meets recreational guidelines
 - Management improvements can protect the lake's health and prevent cumulative effects from degrading water quality
 - Example: protect the shoreline from developments, restore shoreline areas that have been disturbed, and preventing sediment disturbance
5. Why focus on boats?
 - Wasa Lake's shallow depth and small size makes it especially vulnerable to water degradation caused by boating. I was asked to review threats to water quality and describe the current water quality of Wasa Lake. Boating is identified as a threat to water quality within the scientific community.
 - With no large inflows/creeks/rivers into Wasa Lake, the largest threats to water quality come from within
6. Impact on fish, turtles, aquatic life and birds?
 - This study was only focused on water quality
 - For details these reports can provide some details:
 - <https://www.rdek.bc.ca/web/planningfiles/SHIM/WasaFIMReport.pdf>
 - https://www.rdek.bc.ca/web/pdf/planning%20files/ekilmp/wasa/wasashimfinaldec2010_a.pdf

7. I want to know more about *E. coli*: Where does it come from?
 - Canadian informational page on *E. coli*:
 - <https://www.canada.ca/en/public-health/services/diseases/e-coli/causes-e-coli.html>
 - *E. coli* is natural bacteria that is part of the digestive system of all warm-blooded animals (including humans)
8. Clarity regarding the rationale, methodology, and direction behind these recommendations.
 - Looking Forward on page 32 lists potential recommendations WLLID can use:
 - These are standard recommendations that were derived through local and international literature
 - Rationale, methodology, and direction regarding the study's structure can be found in the report (full read required).
9. Invasive plants and how they connect to the bigger picture - Show us what will happen if we don't restrict motorboats
 - Invasive plants such as Eurasian Milfoil can be spread by fragmentation caused by propellers. Plants surveys were not conducted in this study. To understand invasive plant dynamics a plant survey can be conducted. LAC recommends connecting with the local indigenous governments to discuss invasive species and mitigation.