

Benthic Biomonitoring on Hall's Lake to Determine Water Quality

Purpose

To understand the long-term change in lake health at Halls Lake by using benthic macroinvertebrates to assess water quality, as well as providing recommendations based on the results to property owners to help preserve and enhance the lake community.

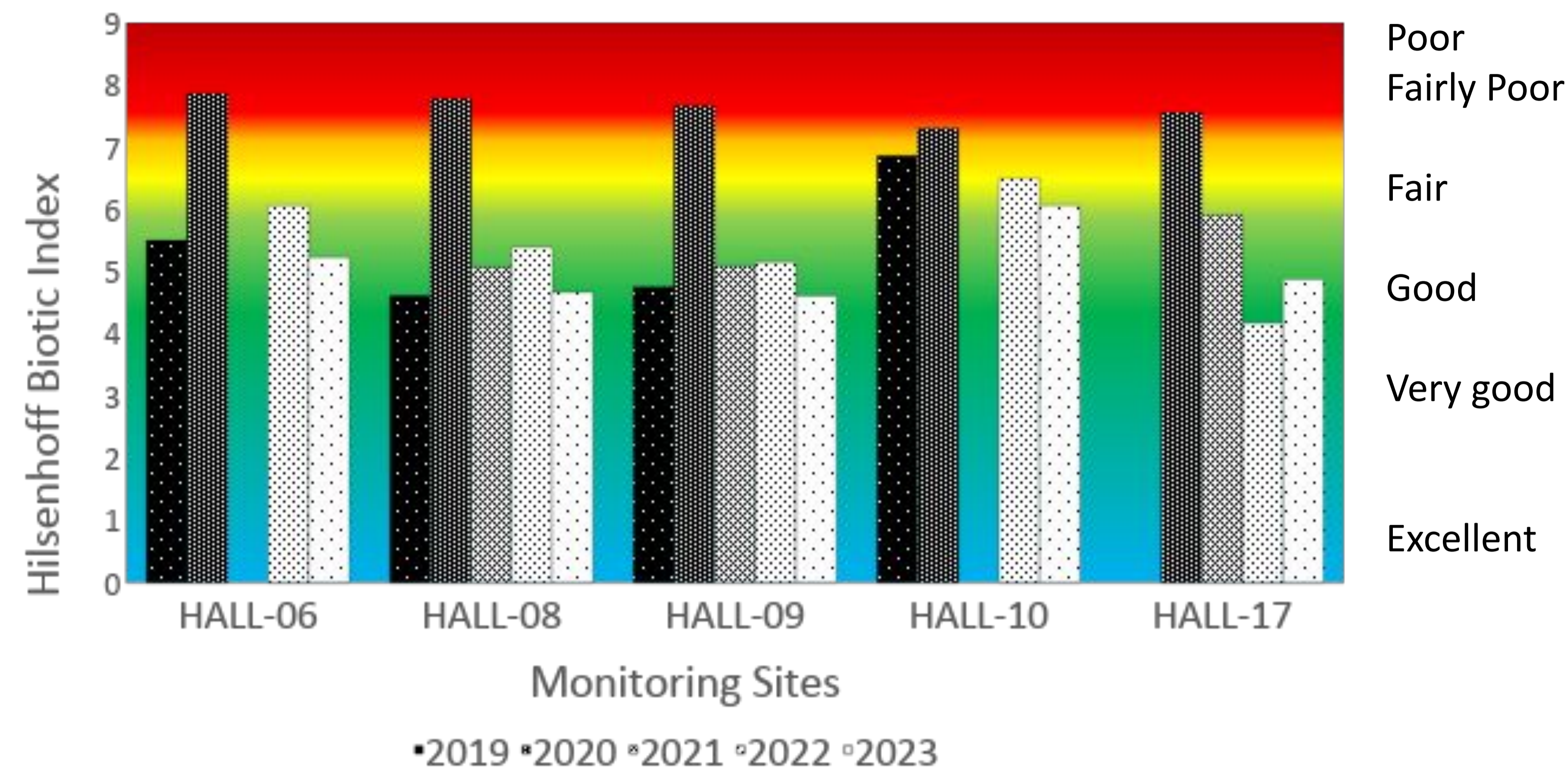
Research Question

What is the water quality on Halls Lake, and how has it changed over the last five years?

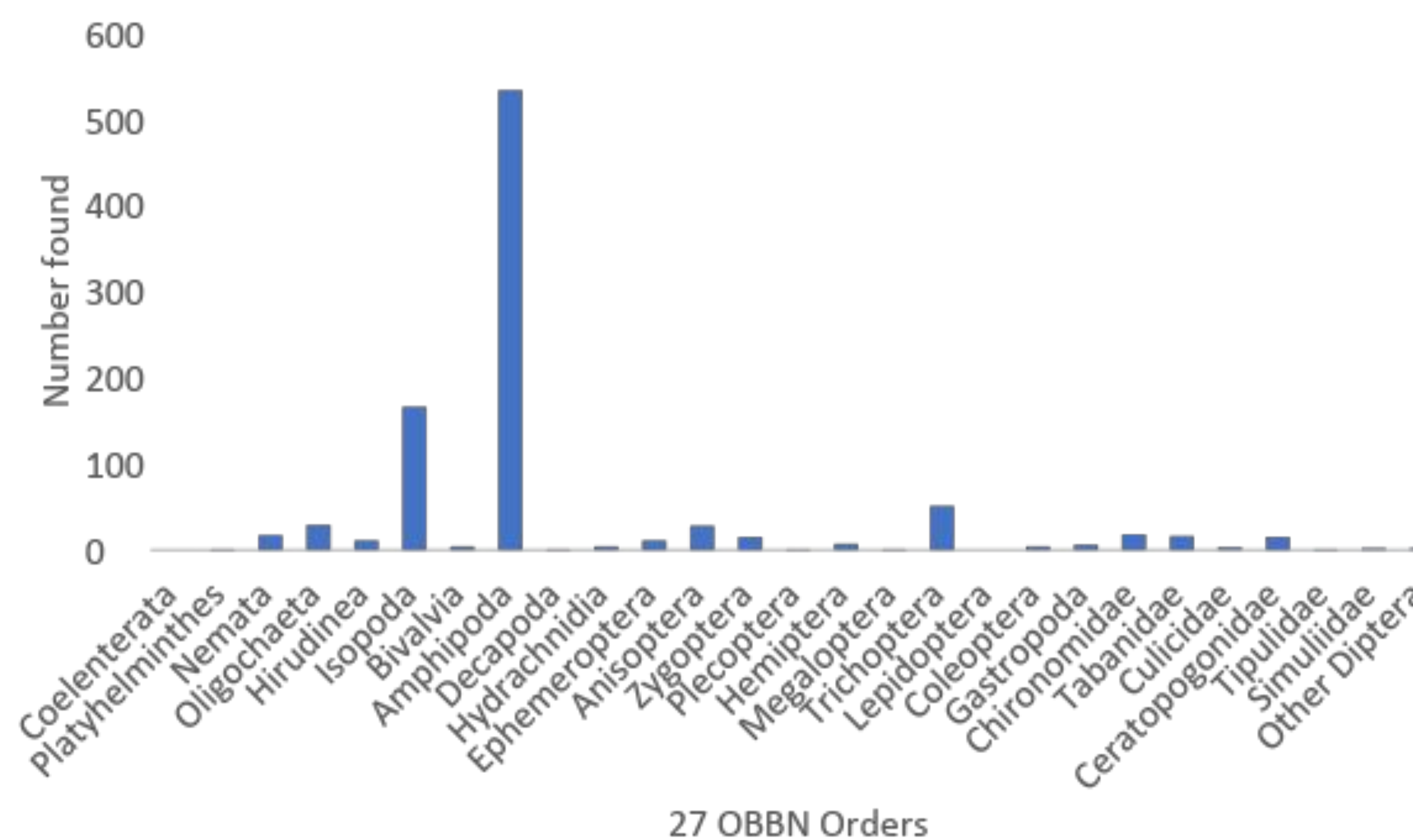
Methods

Modified OBBN method was used for collection and analysis of benthic invertebrates. It involved kicking and sweeping along a transect placed perpendicular to the shoreline for 3 minutes. For each site 2 replicates were used with each having 2-3 transects. The benthic samples were then preserved in ethanol and were then subsampled with the teaspoon method and identified in the lab with microscopes to the 27 group level.

Findings



Based on the Hilsenhoff biotic index, the water quality for all the sites ranged from fair to very good for the years 2019, 2021, 2022 and 2023. The water quality for all the sites was the worst in the year 2020, which were all fairly poor. After 2020, water quality has shown to steadily improve and has stayed within the 'good' range.



For the year 2023, the % of amphipods found was 56.28% compared to the % of insects which were found to be 18.48%. This would suggest that the health of Hall's lake is fair, as amphipods have a mid-range pollution tolerance. As well, the %EOT (Ephemeroptera, Odonata, Trichoptera) calculated was 11.09%, which also is in the range of fair health.

Recommendations

Steps that property owners can take to improve water quality include: a) Reducing harmful runoff by creating rain gardens, properly maintaining septic systems and not using phosphorus-based fertilizers; b) Creating a natural shoreline to filter runoff with a 3-meter 'no-mow zone', which can then be planted with suitable native plants to create wildlife habitat; c) Protecting against invasive species by cleaning, draining and drying watercraft.

For next steps, we recommend that students return to Halls Lake next year to sample sites HALL-06, HALL-10 and HALL-17 and obtain five years of data for those sites, so that trends can be better established.



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