WISCONSIN DEPARTMENT OF NATURAL RESOURCES

2022 Chironomid Assessment Report
Lake Winnebago and Upriver Lakes, Winnebago County

Introduction And Objectives

Chironomid larvae (redworms or lake fly larvae) are very common throughout the Winnebago System, sometimes representing nearly half of all macroinvertebrates in the deepest parts of the lakes. Adult Chironomids, or lake flies, lay their eggs on the surface of the water. The eggs sink to the bottom, where they hatch after about a week, emerging as larvae. The larvae burrow into the sediment, feed and undergo four stages, or instars, of development. The life cycle is completed when the larvae emerge as pupa, float to the surface of the water and are reborn as a lake fly.

Chironomids are a critical part of the aquatic food web. As benthic larvae, they serve as a widely available energy source for a variety of fish species. The 4th instar Chironomid larvae are particularly important to the diets of Lake Sturgeon. Due to their importance as forage in Lake Winnebago, as well as their abundance, their presence serves as an indicator for trophic health. For this reason, annual assessments of Chironomid populations remain a priority.

Assessments of Chironomid populations inhabiting Lake Winnebago have been conducted since 1961. While this provided a long-term data set, the assessments were done only periodically. In 2013, an annual, standardized DNR assessment of Chironomid abundance and distribution was initiated in Lake Winnebago. In 2017, the same was done for Upriver Lakes (Butte des Morts, Winneconne, and Poygan). Annual sampling in the Upriver Lakes and Lake Winnebago has occurred since.

Our objectives for assessing the Chironomid populations on the Winnebago System are to: 1) assess **relative abundance** and 2) **spatial distribution** of Chironomid larvae within Lake Winnebago and the Upriver Lakes.

Metric Descriptions

- **Relative abundance** is a metric that describes population size and is estimated by the **number of 4th instar Chironomid larvae per dredge drop**. The mean catch per dredge drop was used to calculate the relative abundance for each lake.

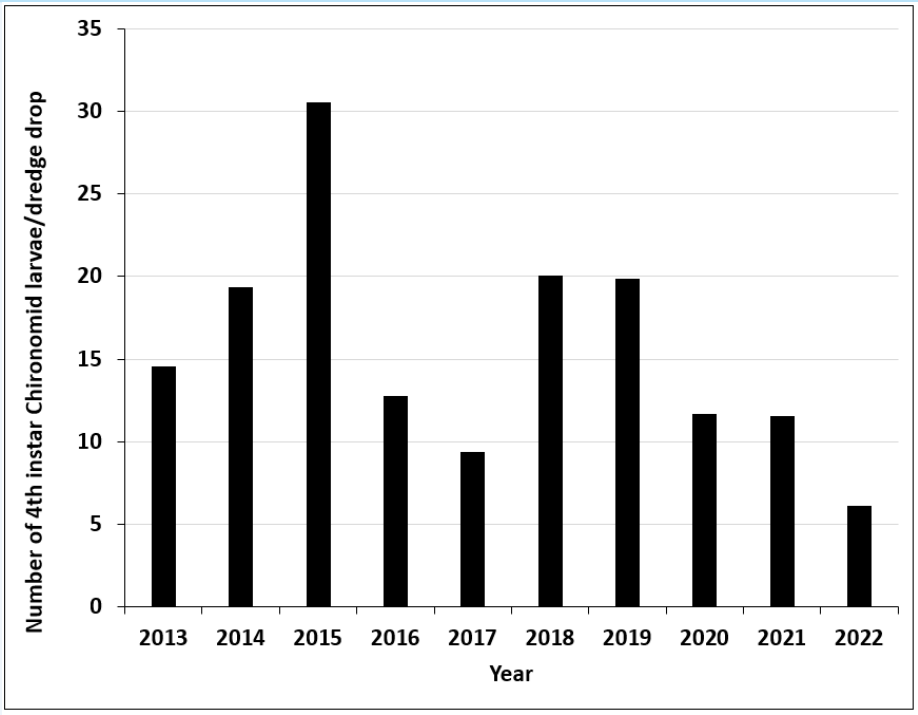

Figure 1. Relative abundance of 4th instar Chironomid larvae observed during August sampling conducted at sites 1-35 on Lake Winnebago (2013-2022).

DNR Contact

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Lake Information

Winnebago: 131,939 acres
Butte des Morts: 8,581 acres
Poygan: 14,024 acres
Winneconne: 4553 acres

Survey Method

- Substrate samples are collected in August by dropping two separate Eckman dredges to the lake bottom at each site.
- Lake Winnebago has 35 sites.
- The Upriver Lakes have 34 sites:
  - 12 on Butte des Morts
  - 8 on Winneconne
  - 14 on Poygan
- Substrate samples are sieved through a 541-µm sieve bucket and remaining material is preserved in 95% alcohol for analysis in the lab.
- Samples with high amounts of detritus were analyzed in the field rather than preserved.
- 4th instar Chironomid larvae are enumerated for each dredge to track relative abundance.

Eckman dredge (pictured above)

Family: Chironomidae

Species Summary

- In 2022, the relative abundance of Chironomid larvae (6.1 larvae per dredge drop) ranked the lowest for Lake Winnebago since 2013. It was also a 47% reduction from 2021 (Figure 1). The second lowest catch rate was observed in 2017 when samples averaged 9.4 larvae per dredge drop.
- For the first time since paired sampling data were available, the relative abundance in the Upriver Lakes appears higher than in Lake Winnebago. The average catch rate across all of the Upriver Lakes was 8.0 larvae per dredge drop compared to Lake Winnebago's 6.1 (Figures 1 and 2).
- Chironomids exhibit boom-bust recruitment on the Winnebago System, experiencing upward and downward trends that last for years. This is very clearly reflected in the data.
- These surveys are conducted at around the same time each year, but the timing of Chironomid maturation varies from year to year. 4th instar abundances were down in 2022, yet in many samples, we observed Chironomid larvae that were younger instars and were not counted. This could have partially contributed to the low numbers of instars counted in the 2022 survey.
- In years when Chironomid abundance is low, Lake Sturgeon, as opportunistic foragers, have the ability to feed on zebra mussels, crayfish and a variety of demersal species. One of the better alternative food sources for Lake Sturgeon is Gizzard Shad. Unfortunately, Gizzard Shad have not had a strong year-class since 2016. However there was a slight increase this year (Figure 3).
- Continued monitoring of the Chironomid populations within the Winnebago System will be important to see if any trends do develop.

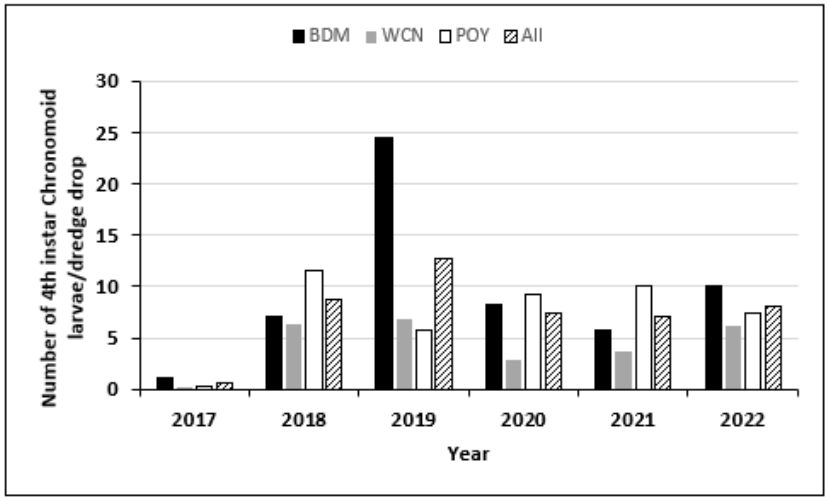

Figure 2: Relative abundance of 4th instar Chironomid larvae observed during August'ssampling conducted on Lake Butte Des Morts (BDM), Lake Winneconne (WCN), Lake Poygan (POY) and all three lakes combined (All) between 2017-2022.

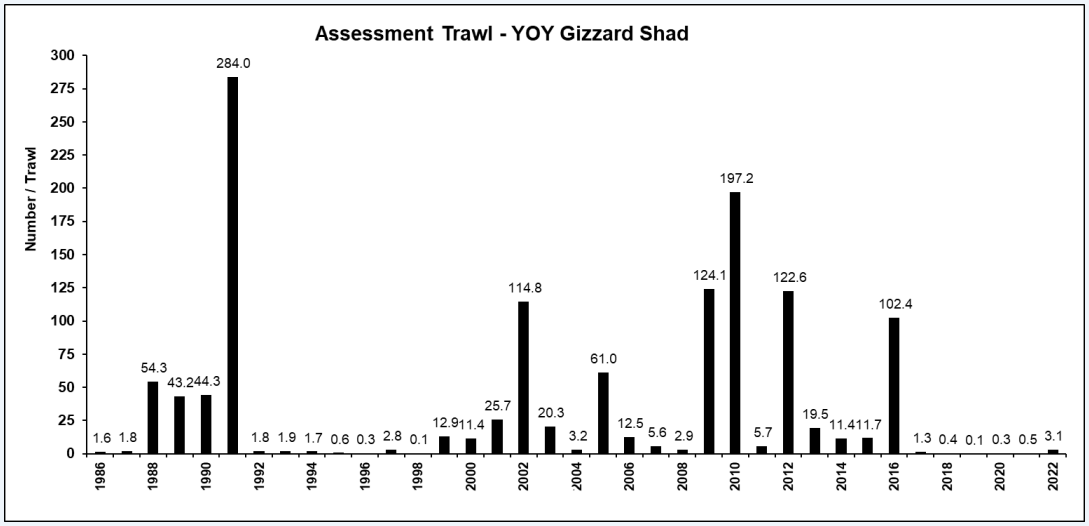

Figure 3: Average number of young-of-year Gizzard Shad per trawl in Lake Winnebago between September and October (1986-2022). This data was taken from the 2022 Trawl Report.

- Historically, the northern and central sites of Lake Winnebago often yield the highest average catch rates of Chironomid larvae while the southernmost locations tend to exhibit the lowest. The spatial distribution of larvae during the 2022 assessment followed this trend (Figure 4).
- In Lake Winnebago, the highest catch rates were from sites 20, 21 and 23 in the central region, followed by sites 4, 6 and 13 in the northern half.
- In 2022, the highest catch rates were in Lake Butte des Morts followed by Lake Poygan (Figure 2 and 5). In Lake Butte des Morts, the south end yielded the highest average catch rates. In Lake Poygan, the highest catch rates were at the western part of the lake. Generally, Lake Winneconne exhibits the lowest relative abundance of Chironomid larvae (Figure 2).

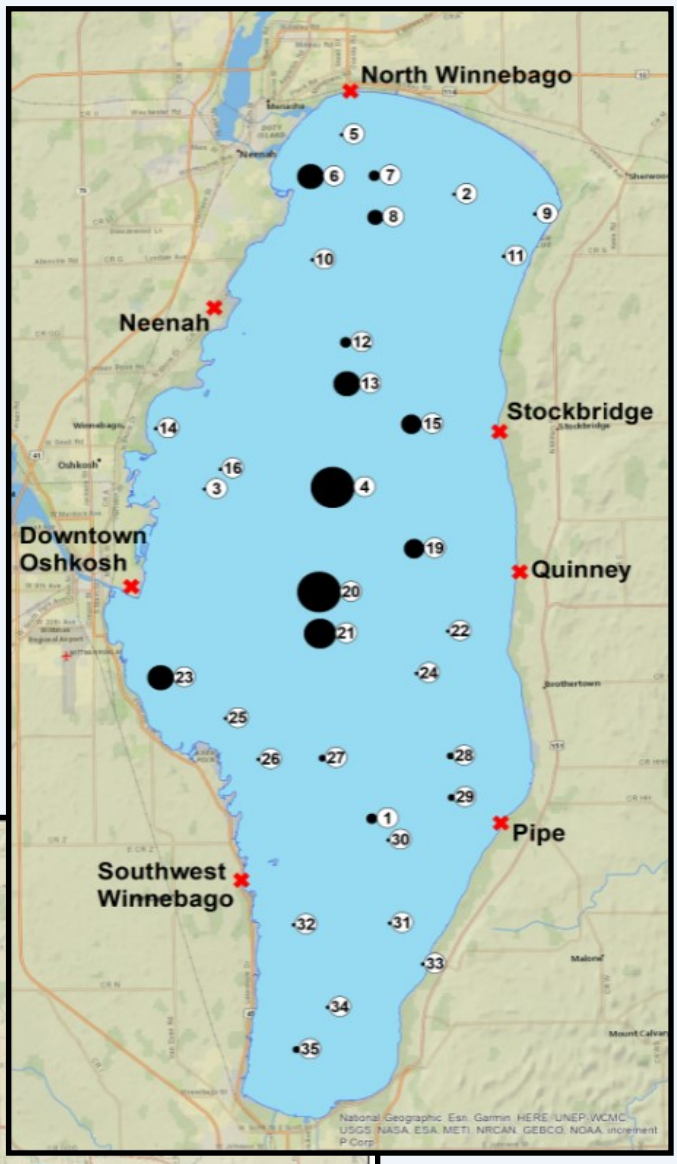

Figure 4: Average catch rates of 4th instar Chironomid larvae captured per dredge drop at each sampling location on Lake Winnebago in 2022. Highest catch rates are displayed in large bubbles while lowest catch rates are reflected in small bubbles. Site numbers are indicated.

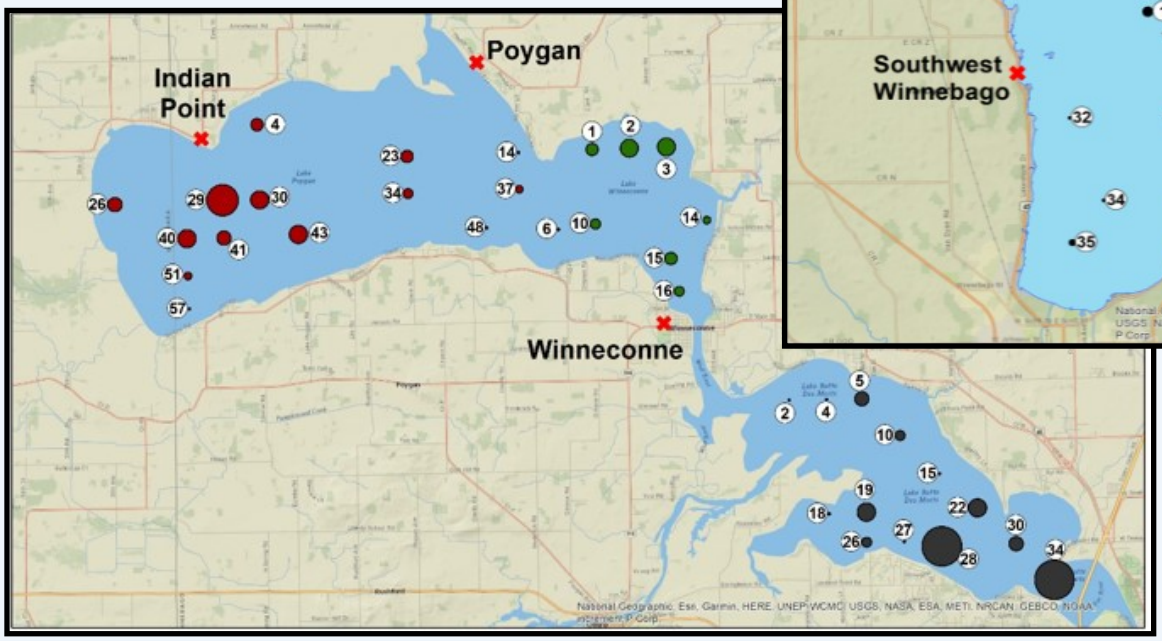

Figure 5: Catch rates of 4th instar Chironomid larvae in 2022 at each sampling location in Lakes Butte Des Morts, Winneconne and Poygan. Catch rates are relative to point size with larger points indicating higher catch rates. Site numbers are indicated.