



BLUE PAPER

Cisco – Clear Lake’s “Canary in a Coal Mine”

March 2024
Blue Paper No. 14_a

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Perhaps you have heard the expression “canary in a coal mine.” It comes from the idea that miners would often take caged canaries down into the mine to help them detect the presence of carbon monoxide and other gases. If the canaries would keep singing, everything was fine. But if they were overcome and died, it was time to get the miners out quickly.



The canaries were used as biological indicators that something was awry. In a similar way, the presence of cisco fish in a lake is a signal of high water quality. Ciscos (*Coregonus artedii*) are whitefish and the only native fish from the salmon family found in Indiana waters outside of Lake Michigan. They are sometimes referred to incorrectly as lake herring.

Cisco require a very narrow layer of clear, clean, and cold water. Cisco lakes generally are quite cold and deep with narrow shoreline regions, steep drop-offs and well-oxygenated waters. Thus, the presence of these fish is a sentinel of high water quality and their extirpation is a biological indicator of habitat degradation.

In “Living Inside the Cisco Layer – Fish Habitat Section of the American Fisheries Society,” Crystal Nichols shares that they live in a “cisco layer”, which is a portion of the lake with temperatures of 20° C (68° F) or colder and oxygen levels are equal to or higher than 3 parts per million. She explains that this cold, oxygen-rich layer is created when sunlight can penetrate deep into the lake and increase phytoplankton photosynthesis rates, ultimately increasing oxygen production. In short, lakes with high water clarity are the most likely to contain the cisco layer.

A chart published by the Indiana Department of Natural Resources in 2016 shows cisco were common in Clear Lake in the 1950s. That designation was reduced to rare from the 1970s to 2000s and then probably extirpated in 2016. That still leaves room for the existence of these fish in Clear Lake waters today. As of 2016, only two of the 101-some lakes in Steuben County had substantiated confirmation of cisco in their waters: Lake Gage and Failing Lake, part of the Seven Sisters chain of lakes protected by Trine State Recreation Area and ACRES Land Trust’s Wing Haven Nature Preserve.

Dr. Jerry Sweeten of Ecosystems Connections Institute, a research partner in CLTLC’s Watershed Diagnostic Study, said there is a relatively high probability cisco are indeed present in Clear Lake waters. Sweeten suggests they could be reintroduced if aquatic conditions can be brought to



a sustainability level. Our Watershed Diagnostic Study aims to better understand the nutrient and sediment loads in our lake. So far, we have learned that the conditions for a cisco layer are present in the early summer months but degrade by the later summer season. The study will continue to monitor these changes and identify pathways to restore and protect our precious lake environment.

Seeing the cisco as the “cold-water canary” and the overall *Clear Thinking* that is at the heart of the Clear Lake Township Land Conservancy's mission may be a vital “brass ring” for us to grab onto as we endeavor to preserve, protect, and manage the natural environment within the watershed and township for future generations.

What will this take?

To start with, each resident of Clear Lake Township must identify themselves as a vital part of a “community of stewards” willing to give time and effort to enhance the protection of the environment of both land and water. Remember, ten of the most important two-letter words are: “*If it is to be, it is up to me!*”

Here are some ways everybody can get involved:

- [Reduce wave action.](#) Waves stir up sediment that blocks sunlight from entering the water. Lake water needs sunlight to stimulate photosynthesis that puts oxygen into the water so cisco can survive there.
- [Install glacial stone seawall or restore natural lakeshore.](#) These help minimize wave action and their harmful effects by absorbing their energy rather than bouncing it back into the lake like a concrete seawall does.
- [Monitor and reduce infiltration of harmful nutrients.](#) This starts at home by assessing fertilizer and other chemical use around the lake and identifying areas of potential erosion. On a larger scale, efforts can be made to manage surface and ground water so it penetrates the soil in wetlands and related areas before entering the lakes and streams.
- [Learn from our Watershed Diagnostic Study.](#) We continue to gather more data on nutrients and sediments entering and leaving our lake.



Indiana Department of Natural Resources Division of Fish and Wildlife fisheries aid Aaron Voirol holds a cisco captured at Crooked Lake in Noble and Whitley counties during a 2019 fish community survey.



For more information visit the links below:

[Indiana Department of Natural Resources - Cisco](#)

[The Habitat Section of the American Fisheries Society - Living](#)

[Inside the Cisco Layer](#)