

Yellow Perch & Climate Change

How will a changing climate affect Lake Erie yellow perch?

EXTENSION PRESENTATION

This presentation is based on research and information provided by Dr. Stuart Ludsin at Ohio State University. More background information is available from Dr. Ludsin's *Global Change, Local Impact* webinar (changingclimate.osu.edu/webinars/archives/2011-04-19) and from "Fishing for Change," Ohio Sea Grant *Twine Line* Winter/Spring 2013, pg. 10-11 (ohioseagrant.osu.edu/_documents/twineline/v35i1.pdf#page=10).

The presentation slides can be used on their own, or integrated into a larger presentation on Lake Erie fishing and fisheries.

Impact on Reproduction

Research has shown that very warm winters are often followed by failed year classes of yellow perch the next spring, while good year classes tend to follow long, cold winters. Year class is an index used by agencies like the Division of Wildlife to express how many juvenile fish are present in the ecosystem during late summer, essentially grading the reproductive success of that spawning season.

One potential explanation may be that short, warm winters do not give female yellow perch enough time to develop their ovaries, but experiments at Ohio State University's Aquatic Ecology Lab also suggest that a link exists between winter duration and the quality of yellow perch eggs that are produced the next spring.

Ecosystem Impacts

A warming Great Lakes climate could also lead to an increase in harmful algal blooms (HABs), already a common occurrence in Lake Erie's western basin, where warm, shallow waters and nutrient runoff from the surrounding agricultural lands provide prime environmental conditions for cyanobacteria, or blue-green algae.

The effects of these blooms on the fish community haven't been studied much yet, but preliminary research suggests that large algal blooms can impact how young fish forage for food. In addition, some blooms produce toxins that can severely impact egg and larval development.

Algal blooms are also problematic because they promote hypoxic events, or low-oxygen conditions. These "dead zones" have once again become common in Lake Erie's central basin, where decomposing algae and other forms of aquatic life use



up dissolved oxygen faster than it can be replenished from the surface. Dead zones also occur in Lake Erie's western basin in late summer during calm periods with little wind. Hypoxia displaces fish from bottom habitat where their food sources are located, causing them to not grow and put on lipids (energy reserves) as well as they could be during the summer.

Economic Impacts

Lake Erie recreational and commercial fishing are multi-million dollar industries, harvesting 13,482,090 pounds of yellow perch in 2012. Failed year classes of yellow perch reduce the number of adult fish available to the fishery, lowering recommended catch/harvest levels, reducing the number of fishing licenses sold, and reducing tourism income for charter captains and other businesses that rely on anglers for much of their income.