Walleye Recovery and Saginaw Bay

By Jim Johnson, retired Michigan DNR fish biologist

The main impediments to Walleye recovery were overfishing, water pollution, habitat loss, and billions of Alewives.

The crash

Fishing effort, mostly gill nets, peaked during the Second World War; harvest from the Bay reached a record 2 million pounds in 1942. But at about that time the Saginaw River became inhospitable to Walleye and other game fish as untreated industrial and municipal wastes, including massive amounts of sawdust and other sawmill wastes, poured into the river. The Saginaw River watershed had flipped from massive stands of white pine to to burned-over pine stands and agriculture, and the resulting erosion filled the river and bay with sediment, covering spawning sites. Spawning success almost ceased. By 1951 the Walleye were almost gone, opening the door for an Alewife explosion in Saginaw Bay.

The remedy

The Federal Clean Water Act of 1976 and other measures to improve water quality gradually restored Saginaw River and Saginaw Bay water quality to the point Walleye could again survive there. At about the same time, the DNR Fisheries Division converted most gill-net fisheries to trap nets and protected Walleye from commercial harvest.

Now restocking could begin. The DNR with its local partners began restocking Saginaw Bay with fingerling Walleye. The stocked Walleye survived remarkably well, and a recreational fishery emerged. But until 2004 reproduction was minimal. There were still too many Alewives.

While diets rich in Alewives cause thiamine deficiency and reproductive failure in Lake Trout and salmon (Thiamin the Alewives Revenge), the mechanism with Walleye is much simpler. In Lake Huron, Alewives simply eat almost all the recently hatched Walleye fry. Alewives spawn in warm, productive bays such as Saginaw Bay, which serve as nursery areas for young Walleye. With billions of adult Alewives converging on Lake Huron's most important Walleye nursery area, the young Walleye had little chance for survival. Then came an unexpected ecosystem change, wrought by yet another invasive species. During the 1990s, Lake Huron was invaded by Zebra and Quagga Mussels, which dramatically altered the food web and diverted resources away from Alewives. Simultaneously, Chinook Salmon reproduction sharply increased, outpacing the Alewives' capacity to support them. In 2004, the Alewife population collapsed, leading to renewed reproductive success among Walleye and Lake Trout. But the salmon, lacking their favorite prey, all but disappeared.

With Alewives almost gone. Walleye reproduction quickly rebounded, producing the largest year classes of young Walleye ever recorded. Stocking was no longer necessary, and Saginaw Bay Walleye have been on their own – no longer dependent on stocking - since 2006.

The Walleye recovery in Saginaw Bay was rapid and complete. Bay's recreational Walleye fishery is now second only to Lake Erie in size and is regarded among the best in the world. The stunning recovery of Saginaw Bay Walleye is regarded as one of the great recovery success stories of the Great Lakes and illustrates that when freed from the impediments of reproduction, Great Lakes ecosystems have enormous recuperative powers.