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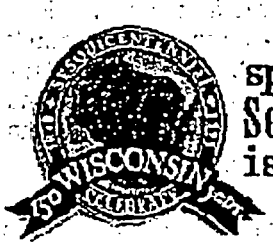
Sea lamprey – predator of Great Lakes fish. © DNR Photo

Into Lake Michigan's waters

Exotic fish took hold by many routes

Paul Peeters



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From the surface, Lake Michigan seems timeless and unchanging, but the waterscape, like the landscape, has been altered dramatically since statehood. Events in the watery world set the stage for changes that would allow exotic species into the Great Lakes and spell the demise of many native species.

In 1848, Lake Michigan was an important trade route, and a source of food and income. Lake trout, lake whitefish, lake herring, and seven species of lake chub dominated the native fish community. Yellow perch, lake sturgeon, emerald shiner, spottail shiner, white sucker, longnose sucker, burbot, round whitefish, and four species of sculpin were also part of the mix. These fish had evolved together since the retreat of the Ice Age glaciers in a diverse, yet balanced fish community, isolated from the rest of the aquatic world. The 200-foot vertical drop of the Niagara River plunging over Niagara Falls was an insurmountable barrier to fish from the outside world.

But Niagara Falls wasn't a barrier from people, and people brought dramatic changes to the native fish community. In the late 1800s, sawdust and wood scrap from sawmills were dumped in rivers destroying fish spawning areas in many streams. Lake sturgeon were considered a nuisance by commercial gill netters and were caught and stacked like cordwood on the Great Lakes beaches. Dam construction on tributary streams also prevented sturgeon from reaching their spawning grounds, which all but eliminated these relics from Lake Michigan. Unregulated commercial fishing further depleted various stocks of fish. However, none of these factors caused a bigger or more permanent change in Great Lakes fish populations than the unintended introduction of exotic species. These new species upset the

delicate balance of fish communities that had developed in Lake Michigan.

Exotic species entered the upper Great Lakes by many routes. The Welland Canal (click for a map), completed in 1829, bypassed Niagara Falls and connected Lake Erie to Lake Ontario and the St. Lawrence Seaway. The canal system was designed to give ships a navigable route from the Atlantic all the way to the Great Lakes ports in the Midwest. Naturally, fish used the new passages as well. Sea lamprey, alewife, and white perch migrated through the canal system and invaded the upper Great Lakes. Other species like river ruffe, zebra mussels, and spiny water flea "booked passage" as stowaways in the ballast water of large vessels. Many fish like rainbow and brown trout, chinook and coho salmon, and carp were intentionally introduced by people.

More than 140 exotic species of animals and plants have taken hold in the Great Lakes since the early 1800s. A partial list includes Atlantic and pink salmon, goldfish, smelt and round-nose goby. As in any ecological system, these exotic species settled in at the expense of something that was there before.

The sea lamprey was first observed in Lake Michigan in 1936. This eel-like predator with rasp-like teeth victimized lake trout, lake sturgeon, lake whitefish, and burbot. These fish had no natural defenses against the sea lamprey. By the mid 1950s, lamprey had all but eliminated the native population of lake trout in Lake Michigan, and significantly reduced populations of other species.

Like the sea lamprey, the alewife also entered the upper Great Lakes through the Welland Canal and was first documented in Lake Michigan in 1949. When the lake trout population collapsed in the 1950s, there were no predators to control alewife and their population grew rapidly. By 1967, alewife comprised an estimated 85 percent of the mass of the Lake Michigan fishery.

The alewife population explosion affected many other fish species in Lake Michigan. Six of seven chub species were eliminated and the commercial chub season was closed. Lake herring, yellow perch, and emerald shiner populations crashed. From the mid 1950s through the mid 1960s, neither commercial netters nor sport anglers found the Lake Michigan fishery desirable.

During the mid 1960s the U. S. Fish and Wildlife Service and its Canadian counterpart developed techniques to limit sea lamprey reproduction. Selective chemicals and physical barriers were used throughout the Great Lakes and lamprey populations were reduced, but not eliminated. Unfortunately, lamprey control came too late to save Lake Michigan lake trout.

Predatory fish were desperately needed to control the burgeoning alewife population. Fish managers selected strains of Pacific salmon to do the job. In 1966 coho salmon were stocked in Lake Michigan followed by chinook salmon in 1967. Salmon did well and grew quickly. Twenty-pound coho and 30-pound chinook were not uncommon. Rainbow, brown, brook, and lake trout were also stocked in Lake Michigan.

Sport anglers quickly learned how to catch the trout and salmon, and an exciting new sport fishery was born. Alewife are now considered an important part of the Lake Michigan food base that supports trout and

salmon. As alewife numbers dropped, other Lake Michigan fish species have recovered. The one species of chub that survived the exotic invasion has come back strong and is currently fished commercially. Also, Wisconsin commercial fishers currently harvest more lake whitefish than at any time in history.

The Wisconsin Department of Natural Resources , other state and federal agencies and sporting groups are attempting to restore some of the native Lake Michigan fish species. The effort has had little success, and lake trout and lake herring still don't reproduce naturally in the lake.

Some people favor managing Lake Michigan exclusively for native species, but many species that were part of the original fish community are now extinct or have been extirpated from Lake Michigan. Also, many of the exotic species are so firmly established, that complete elimination is not feasible. Like it or not, many of these are now a naturalized part of the Lake Michigan fishery community.

If properly managed, Lake Michigan can provide both a world-class sport fishery and a healthy, viable commercial fishery. Effective management includes ongoing surveys to understand the changing nature of the fishery, a sustained commitment to limit pollution sources, controls on development and attention to other changes people can bring to resources as vast as Lake Michigan.

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