CHANGES TO THE GREAT LAKES FISH COMMUNITY

The first settlers on the shores of the Great Lakes were astounded by the bounty of fish. *The Jesuit Relations*, a journal published annually describing the experiences of Jesuit missionaries, reported that, "A single fisherman will catch in one night twenty large sturgeon, or a hundred and fifty whitefish, or eight hundred herring in one net" on the south shore of Lake Superior. It was reported that, at Sault Ste. Marie, whitefish in the St. Marys River ran so thick that, standing in the water, a person could reach out and easily grab a thousand. By the early 19th century, commercial fisheries had been established on the lakes, initially supplying mining and lumbering companies and, later, the booming cities of the U.S. midwest.

As early as 1879, more than a million pounds of lake trout and nearly two million pounds of whitefish were being harvested annually from Lake Ontario. By the beginning of the 20th century, commercial fishing was big business in the Great Lakes, involving 10,000 people — twice as many as 20 years earlier. "But as fishing intensity increased, and human-initiated changes to environment accelerated", the delicate web within which the fish community existed began to unravel.

Fish stocks declined, and some species disappeared forever, primarily as the result of overfishing. For example, the black-finned and short-nosed ciscoes were much sought after but, by 1900, these deep-water herring-like fish were commercially extinct. Other species were deliberately destroyed: the long-lived sturgeon (some live as much as 150 years) was hunted and destroyed because its external body armour easily tore nets set for smaller fish. Once they caught the sturgeon, fishers "piled them like cordwood, on the beaches, dousing them with oil and burning them."

Still other species were lost or declined as the result of a combination of factors. For example, overfishing, compounded by decreasing habitat, led to the demise of Lake Ontario Atlantic salmon. As settlers cleared the land, water flow in the summer decreased and siltation increased. Without trees to shade the rivers, temperatures rose, denying salmon the cool clear waters necessary for reproduction. Furthermore, saw mills blocked spawning routes and released saw dust that blanketed the river bottoms and marshes, suffocating fish eggs and larvae. The last Lake Ontario Atlantic salmon was seen in Wilmot Creek in 1896.

The final major blow to the Great Lakes fisheries came when, deliberately and accidentally, foreign fish species were introduced. Already vulnerable fish stocks could not compete with the new arrivals, changing forever the Great Lakes' ecosystem. Rainbow smelt, added to the Great Lakes as a food source for an unsuccessfully introduced salmonid, thrived and probably fed on the prey of whitefish and herring, thus bringing about the decline of these species. Carp, introduced as a food source for humans, destroyed aquatic vegetation, thereby affecting many fish species dependent on wetlands.

There are two fish species — lamprey and alewife — that have played a major role in degrading the Great Lakes fisheries; they are thought to have gained access via the

canals that were constructed to link the fresh-water seas with the Atlantic Ocean. Lampreys, parasites that suck fish dry of their vital juices, have decimated whitefish and lake trout populations. Alewives do damage by virtue of their sheer numbers: they consume prey species used by lake herring, chub, and whitefish.

We are left with a Great Lakes fishery that has been drastically altered. The foreign species have become the most abundant; now, our sport fisheries rely almost exclusively on coho and chinook salmon raised in hatcheries, because these types do not reproduce very successfully in the lakes.

Because of diminished stocks, and also because of the relatively new threat of toxic contamination, commercial fishery operations cannot be sustained in the Great Lakes. The chemical soup produced by the agricultural and urban communities that rim them makes many fish unfit for consumption by either humans or wildlife. Today, the blue pike and lake trout are gone from Lake Erie, while Lake Ontario has lost the lake herring. Furthermore, six of seven species of chub are now extinct in the Great Lakes. It took 10,000 years for the fish community to evolve in the Great Lakes, and only a few decades to change it forever.

Sources: Ashworthy, W. 1986. *The late, Great Lakes: an environmental history.* Toronto: Collins; Weller, P. 1990. *Fresh water seas: saving the Great Lakes.* Toronto: Between the Lines.

Basin: water quality (especially as it affects the health of humans and wildlife), wetlands and river systems, and water quantity.

WATER QUALITY

The degraded water quality in the Great Lakes Basin is not just a recent concern. In Toronto, for example, pollution of the harbour and Ashbridge's Bay was a civic preoccupation as early as the 1880s. Prior to that time, the waters of the harbour had been viewed, in the main, as a convenient (and inexhaustible) dumping ground for human and animal wastes, and any other unwanted garbage. But as the stench along the waterfront became unbearable and understanding of waterborne disease grew, attitudes began to change. In order to protect public health, by 1910 the City of Toronto had built its first plant to treat sewage.

Toronto, of course, was not alone and its problems were being duplicated around the lakes, in Buffalo, Chicago, Cleveland, and other rapidly growing urban centres. To remedy the situation, in 1912 the Canadian and American governments asked the fledgling International Joint Commission to study the matter — the first bilateral environmental initiative undertaken in the Great Lakes.

In retrospect, building sewage treatment facilities and implementing measures to control nutrient loadings in the lakes have been the highlights of pollution control in the Great Lakes Basin. Until quite recently, sewage treatment initiatives there were a patchwork but, by the late 1960s, it was becoming apparent to scientists, policy makers, and the general public that the lower lakes were suffering badly from nutrient pollution. High levels of nutrients such

Massey Creek, Toronto

as phosphorus and nitrogen were causing eutrophication of the lakes — uncontrolled growth of aquatic plants, lowered levels of oxygen, and an environment in which many fish could not survive. Lake Erie, in particular, was in severe trouble and, as the "dying lake", became a powerful symbol of what was wrong in the basin.

Of course, excess levels of nutrients were by no means the only pollution problem at the time: waterways were receiving huge amounts of what are called "conventional pollutants" — oils and greases, oxygen-depleting organic matter, and suspended solids — in addition to barely treated industrial effluents and spills. The conditions in the 1960s were captured graphically by Phil Weller (1990) in his book, *Fresh Water Seas: Saving the Great Lakes*:

> The severity of the problems produced a catalogue of bizarre phenomena. The weeds in Rondeau Bay on the north shore of Lake Erie became so dense that they looked like a "field of wheat" and an aquatic weed cutter was purchased to fight back the growth. The Cuyahoga River running through Cleveland was so clogged with oils and greases that it caught fire in 1969. The city had to build a fire wall and declare the river a fire hazard. . . . In March 1967 a deadly combination of cold weather and industrial pollution killed five thousand ducks along the Detroit River. Wood fibres, chips, pulp-paper mats, and oil slicks clogged the St. Marys River. Oil slicks and discoloured water were common on the Niagara River. . . . In January 1967 a worker's acetylene torch accidentally ignited the oils on the Buffalo River, a tributary of the Niagara. Flames leaped high into the air, burning