

Jefferson Quick, Timely Reads

Lake Erie Trawling: *Problems with Rainbow Smelt*

By David Frew
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Dr. David Frew, a prolific writer, author, and speaker, grew up on Erie's lower west side as a proud "Bay Rat," joining neighborhood kids playing and marauding along the west bayfront. He has written for years about his beloved Presque Isle and his adventures on the Great Lakes. In a new series of articles for the Jefferson, the retired professor takes note of life in and around the water.

"All the old turtlebacks rust in the rain, like they never will leave there again. But leave there they will in the hours before dawn, slip out in the darkness without word or song. For a few years more they will fish while they can, just to catch tiny fish for Japan."
(Stan Rogers, Tiny Fish for Japan)



The poetry of Canadian folksinger, Stan Rogers, helped to emphasize the 1980s-era plight of Lake Erie commercial fishermen as they added smelt trawling to their regular gill netting routines. The new smelt catch was profitable, but unsatisfying in the traditional sense of the "old-time fishing" culture. In a latter portion of the song, Rogers laments the loss of whitefish, complains that fishermen can no longer eat what they catch, and argues that fishing had become "a job" as opposed to a way of life. In a Toronto interview, Rogers asked if anyone could imagine a farmer that did not eat his crop as he explained that he was forever changed by visiting Port Dover and meeting commercial fishermen at the Norfolk Hotel ("Turtleback" is a descriptive local term for a fish tug).

The rainbow smelt is an ocean fish that swims up freshwater rivers and streams to spawn each spring. It found its way into the Upper Great Lakes (above Niagara Falls) when it was introduced to Lake Michigan as a food source for Atlantic salmon that were being stocked in the 1910s and 1920s for sport fishermen. After a few failed attempts, large numbers of smelt were finally observed in Lake Michigan in 1923. By 1932, they had made their way into Lake Erie. As of 2020, rainbow smelt have also managed to populate Lake Huron, Lake Superior, and Lake Ontario, having made their way to Ontario via the Erie Canal and the Finger Lakes. It should also be noted that Rainbow Smelt are genetically different from Lake Erie's smelt. Trawling for Lake Erie smelt was initiated in 1952 by the Ontario Ministry of Natural Resources (OMNR). The invasive species from Lake Michigan was finding Lake Erie such an ideal living environment that it was beginning to seem that smelt could entirely take over the lake, threatening commercial and sports fishing industries. The OMNR lobbied to fund a corrective program. After consulting with academic researchers, it was determined that a system of supervised commercial trawling seemed to be the best hope for controlling the rapidly exploding species. In Lake Michigan the state had already launched a commercial trawling program that seemed to be working to control the smelt.

Old timers, recalling the history of smelt on Lake Erie, tell stories of going to the mouths of Lake Erie creeks in the spring and gathering them by the hundreds in nets and baskets. At times, the creeks would turn silver from schools of the tiny fish as they gathered to lay and fertilize eggs. Fishermen who took advantage of smelting in the creeks decades ago fondly recall the excitement of catching and eating the tiny fish. Rainbow smelt are mild tasting, can be prepared in dozens of ways, and are often eaten raw. In fact, smelt became a staple of North American sushi bars after transiting a bizarre and circuitous supply chain from Lake Erie to Japan and back (thus the song, "Tiny Fish for Japan"). But those seemingly glorious smelting days were not a good sign for the overall health of Lake Erie, which had always been prized for the diversity of its fishery. As the smelt population increased, the valuable, traditional species declined or faced extinction.

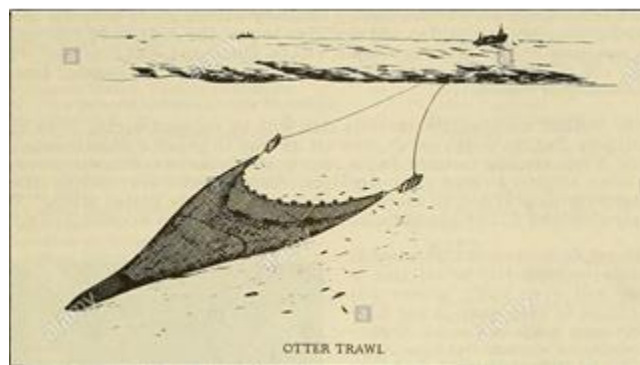
The Canadian government made a major investment in the Lake Erie fishery by providing grants for Ontario commercial fishermen to retrofit their tugs for trawling and hiring consultants to train the new trawlers. At about the same time, a few commercial fishermen from Erie were persuaded to add trawling equipment to their tugs by the Michigan Department of Fisheries. Louisiana shrimp trawlers were hired to work as consultants, training Ontario fishermen to use newly retrofitted fish tugs. Commercial fishermen added trawling licenses to their existing gill-net licenses and split time between the two techniques. The first adjustment required for trawling was the addition of a large boom or lifting structure for retrieving filled trawl nets and hauling them up onto the decks of fish tugs. In addition, two sliding weights (sleds or doors) were needed for running along the bottom as well as the trawl nets, themselves. The technique taught by the Louisiana consultants involved dragging the weighted doors along the floor of the lake while a trawl net was suspended like a giant parachute between the sleds sliding along the lake bottom, and the back of the fish

tug. The fact that the tugs were dragging weights along the lake bottom required that the depth of water for trawling had to be a minimum of 80 to 90 feet. This insured that the sliding doors would not damage delicate weed growth on the lake floor since at that depth there is not enough light to allow for such growth.



A fish tug rigged for trawling. Note the net lifting crane on the top and the sled on the rear

Most of Lake Erie's trawlers learned that the easiest way to gauge the net-filling process was to set the tug's engines at a steady RPM level (diesel efficiency) and then watch the speed through the water. Depending upon weather conditions and the engine size, it was possible to predict the extent to which the net was filled by the tug speed as it slowed. Given the optimum RPM level, when the tug slowed to a certain speed, the net was full and should be retrieved. By 1955, Canadian tugs reported catching 2.0 million pounds of rainbow smelt, annually. Sadly, results were not as positive in Erie. In about the same total trawling time, Erie's Captain Howard Wilson reported catching only 1,000 pounds and he had great difficulty bringing the catch to market unlike Canadian fishermen where the OMNR created a marketing and distribution system to accompany the new the catch. In addition to distribution issues, Wilson concluded that the bottom structure near Erie was not conducive to trawling and abandoned the practice.



Louisiana style trawl net, illustrated

Early objections to trawling revolved about concerns that fishermen would accidentally catch other, more valued species such as yellow perch, walleye, or whitefish. After meeting with fishermen, it was decided that the OMNR would trust them to avoid such

accidental harvests, especially when they knew that their catch would be inspected each day as tugs returned to the docks. Trawlers became quite adept at catching smelt without accidentally harvesting other species. The OMNR requires that trawlers return each day before 4:00 PM where they are inspected. Trawlers are permitted to keep “incidental” catch, providing that it is not a prized species. Allowable fish that are often netted incidentally during trawling include carp, drum, and burbot (ling-cod). Those species provided a “bonus” when harvested and commercial fishermen in Port Dover began to successfully market incidentally captured burbot as “fresh water cod.” The few whitefish, perch or walleye accidentally retrieved in trawl nets are cleaned and turned over to OMNR inspectors who donate them to nursing homes. A few skeptics complained that a trawler who had accidentally caught non-allowable fish might jettison them on return trips to the docks. Fishermen argued that it could not happen since fish that are suddenly brought up from depths of 80 to 100 feet in a trawl net would die when their swim bladders burst. A trail of jettisoned dead fish would provide evidence that could be used to take a fisherman’s license. Far too great a risk!



The burbot or ling cod is a deep-water fish common to the Great Lakes. It is ugly but delicious.

Fish in general, and smelt in particular, provide an illustrative example of fundamental economic system differences between the United States and Canada. While the American economy continues to be demand-driven, much of the Canadian economy is controlled via supply management. Commodities that are deemed essential to the success and balance of Canada’s economy are controlled at the level of supply, through quota systems. Hardwood lumber, dairy products, eggs, chicken, and other “critical” components of the economy are organized by supply managers (boards or panels) who use a variety of techniques to predict the need and then control the supply of a commodity rather than allowing producers (providers) to bring as much to market as they, the producers, wish. Agricultural products, including fish, use a quota system that begins with determining the largest possible annual output that could possibly be harvested. After determining the maximum quota size, an expert panel is established for each product, rainbow smelt for example. The expert panel or marketing board meets each year to determine the percentage of quota that producers will be allowed to harvest that year. The marketing board is charged with knowing, through extensive research the amount of the product that can be sustainably harvested. Fishermen’s

quotas for each species are an appended part of the commercial license that is renewed each year. For Lake Erie, the marketing board meets each year in late fall and announces the percentage of quota that fishermen will be allowed to harvest during the following season, a metric that is expressed as a percentage of the quota: 50% or 60% for example. Commercial fishermen wait anxiously each year to learn the next year's quota and often complain that they will not be able to make a living because the quota is too small. In fishing, quota is divided and distributed several times per year, beginning in early spring. Once a periodic quota has been reached (in early spring, for example), the fishermen are done until the next quota period begins. Canada first applied the quota system to Great Lakes fishing in 1984, after alarms were raised about overfishing and ongoing threats to the biomass of several species. Agricultural and or fishing quota-owners are permitted to sell or lease all or parts of a year's quota to other licensed producers if they wish.

Smelt trawling went very well in Ontario for several years, notwithstanding the objections raised in Stan Rogers' song. By the mid-1960s Ontario fishermen were catching 11 million tons per year, and sampling studies were concluding that the overall Lake Erie population was stabilizing rather than geometrically increasing. Happily, the increase in the smelt catch was accompanied by an increase in yellow perch. By the early 1980s, Ontario smelt trawlers were reporting astonishing annual catch totals of 25 million pounds.

The committee that regulates Lake Erie fishing, including setting the annual smelt quota, is comprised of academic researchers from Guelph University and Virginia Tech in the United States, commercial fishermen, OMNR officials, and others. Their decisions, with respect to establishing quotas for smelt and other Lake Erie fish, are based upon scientific sampling carried out year-round, as well as catch reports from commercial and sports fishermen, and data provided by American state agencies from the south shore of Lake Erie (Michigan, Ohio, Pennsylvania and New York). Of those data sources, the single largest and most reliable component is the annual commercial report generated from Ontario harvests. Ontario's recent Lake Erie data are included in Table 1 below, which contains rainbow smelt totals, both catch weight and wholesale value at the dock, from 2000 to 2018. The latest data (2019) were not available at this time. A recent news release from OMNR, however, noted that only 37 metric tons were harvested from Lake Erie in 2019. That would translate to 817,000 pounds, a significant reduction from the 2.47 million pounds harvested in 2018, which was reduced from the previous year. There have been reports of smelt populations crashing in all of the Great Lakes over the last two seasons amid a variety of speculation from biologists in both countries. The most persistent general hypothesis suggests that the problems with smelt are connected to global warming. Others are connecting the decline to the geometric increase in Lake Erie's walleye population. It has also been widely noted that since smelt are an invasive species, it may be impossible to predict how they will adapt (lessons learned from Lake Erie's zebra mussels) in the long term, even though they have been here for almost 100 years. There have been massive winter smelt kills washing up on Ontario beaches for the last two winters.

The data in Table 1 illustrate recent changes in Lake Erie’s smelt harvests. The year 2000 was the beginning of the modern period during which it was generally assumed that the OMNR had achieved its original objective of “controlling” the out-of-control species escalation. During the 1990s annual Ontario harvests had slipped from 18 million pounds at the beginning of the decade to 12 million pounds in 1995, but much of that change seemed connected to quotas. During that era the committee was not as concerned with setting quotas for smelt as they were for “flagship” species such as yellow perch, walleye, and whitefish. But as the 2000s continued, data in the table illustrate shifts in the smelt harvest (and population). From 2000 to 2003 annual totals were at about 7 million pounds. Then in 2004 they rose to 12.5 million. In 2006 the harvest fell to less than 2 million pounds but rebounded to 9.55 million in 2007. The harvest seemed steady until 2010 when it fell again, this time to 3.14 million pounds. But as before, it rebounded until 2018 when it fell to 2.47 million pounds.

Table 1

Lake Erie Rainbow Smelt Harvest 2000 to 2018: Ontario Commercial Fishermen

| YEAR | TOTAL CATCH | TOTAL VALUE | PRICE PER POUND* |
|------|----------------------|------------------------|------------------|
| 2000 | 7.17 Million Pounds | \$1,650 Million (Can) | \$.23 (Canadian) |
| 2001 | 9.35 Million Pounds | \$2,150 Million (Can) | |
| 2002 | 7.20 Million Pounds | \$1,655 Million (Can) | |
| 2003 | 7.15 Million Pounds | \$1,645 Million (Can) | |
| 2004 | 12.54 Million Pounds | \$2,884 Million (Can) | |
| 2005 | 6.65 Million Pounds | \$1,530 Million (Can) | |
| 2006 | 1.79 Million Pounds | \$0.411 Million (Can) | |
| 2007 | 9.55 Million Pounds | \$2,216 Million (Can) | |
| 2008 | 7.95 Million Pounds | \$1,827 Million (Can) | |
| 2009 | 7.80 Million Pounds | \$1,794 Million (Can) | |
| 2010 | 3.14 Million Pounds | \$0.722 Million (Can) | |
| 2011 | 5.71 Million Pounds | \$1,314 Million (Can) | |
| 2012 | 7.22 Million Pounds | \$1, 660 Million (Can) | |
| 2013 | 6.71 Million Pounds | \$1,542 Million (Can) | |
| 2014 | 5.85 Million Pounds | \$1,346 Million (Can) | |
| 2015 | 8.06 Million Pounds | \$1,853 Million (Can) | |
| 2016 | 10.38 Million Pounds | \$2,401 Million (Can) | |
| 2017 | 7.64 Million Pounds | \$1,775 Million (Can) | |
| 2018 | 2.47 Million Pounds | \$0.569 Million (Can) | |

**Since the Japanese market collapsed, the domestic dockside price of smelt has remained steady at \$.23 per pound (Canadian). Price stabilization and control are pillars of the Canadian supply management system.*

The most devastation change in the business of smelt occurred in the 1990s when the Japanese market disappeared. The primary reasons for the collapse of the Japanese “sushi market” was the systematic reduction in the size of the rainbow smelt that were harvested. During the early days, the fish averaged six and a half inches in length and processing involved sorting the largest, sushi quality smelt from the rest of the catch, using automatic, vibrating assembly machines (purchased in Pennsylvania). Machines

automatically removed the heads and tails, cut the fish open, and eliminated the innards. Resultant smelt were packaged and sent to Japan for use as a sushi delicacy and were often consumed almost as they were shipped. When the average smelt size decreased by two inches, however, over two decades it became difficult to use that automatic processing system. Instead the smelt were flash-frozen and shipped intact. Slowly but surely, the highly profitable international market collapsed and Ontario food wholesalers were limited to marketing domestically (North America).

These days, it is possible to buy Canadian smelt in Erie at Wegmans where the package proudly proclaims that the contents are fresh caught by trawlers in Lake Erie, frozen and sent directly to market. Smelt are marketed as an organic product.



Frozen Lake Erie smelt, breaded or plain, are locally available at Wegmans and popular during holidays

The future for Lake Erie smelt fishing is uncertain. While there is hope that the declining catch of recent years in both Lake Erie and Lake Michigan is temporary, there is great concern. Purdue University entered the research scrum a few years back because of the impact on the Indiana and Wisconsin fishing economies that were both dependent upon Lake Michigan. Purdue's Lake Michigan scientists are as puzzled by the decline as the Lake Erie researchers and point to the survival of hatchlings over the last few seasons as a positive sign. Their best guess, regarding recent declines on all of the lakes, is warming winter temperatures which have decreased ice cover on all of the Great Lakes. Smelt eggs need the cover of ice to thrive in the spring.

Photos:

Smelt: <https://www.glerl.noaa.gov/pubs/brochures/foodweb/LMfoodweb.pdf>

Trawling Boat: <https://www.alamy.com/stock-photo-fishing-boat-trawler-on-the-north-sea-dragging-fishing-nets-ostend-28120936.html>

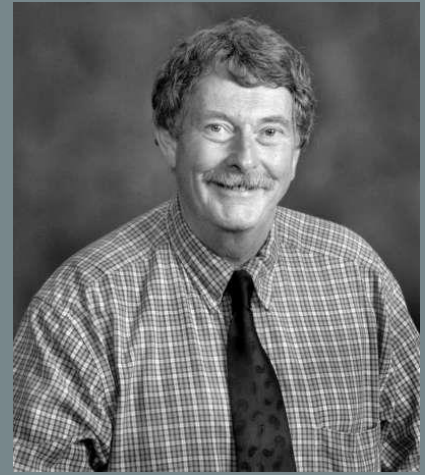
Louisiana Trawl Net: <https://www.alamy.com/stock-photo/otter-trawling.html>

Burbot: <https://www.cleveland.com/news/2019/01/lake-erie-burbot.html>

Frozen Smelt: <http://purepac.net/product-family/>

ABOUT THE AUTHOR

Historian and author David Frew, Ph.D., is an emeritus professor at Gannon University, where he held a variety of administrative positions during a 33-year career. He is also emeritus director of the Erie County Historical Society/Hagen History Center and is president of his own management consulting business. Frew has written or co-written 35 books and more than 100 articles, cases, and papers.



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