

Lake Erie Surprises

by Linda Steiner

Lake Erie is full of surprises—literally. The Great Lake is a great lake for meeting rare, strange, and unusual fish. It's like no other waterway in Pennsylvania.

photo-Linda Steiner



Roger Kenyon

Roger Kenyon's "beat," as a Pennsylvania Fish and Boat Commission fisheries biologist, is like no other fisheries biologist's in the state. For nearly 30 years, Kenyon has been involved in fisheries management in the Pennsylvania section of Lake Erie. Yet, those years could never be boring—Lake Erie is always something new and different.

"Lake Erie drives you nuts. When you're used to fishery stability in other waters, this lake is all over the map," says Kenyon. "Any freshwater ecologist or limnologist should come here for a real education. Pull one brick, one species out of the ecosystem link, and the whole thing changes."

In his career, Kenyon has seen a lot of "bricks" added and removed from the Lake Erie fish community. He's almost constantly had to revise his understanding of how that inland freshwater sea's web of aquatic life and energy responds. Guess you could say

that he's become shockproof at Lake Erie's unending changes, or at least has learned to adapt himself and roll with what the waves turn up.

No wonder tales and ballads have come out of the Great Lakes. They are all giants—even "little" Lake Erie, just 250 miles long and 50 miles wide. When seen for the first time by those to whom a lake is a sedate pond with all shores visible, the Great Lakes astonish and humble. Like the others, Lake Erie is a landscape of water, sky, and expectation. What's going to happen next?

Pennsylvania's Lake Erie frontage is mostly on what is known as the Central Basin. Biologists consider the lake to have three distinct sections, though from above it looks like just one huge pool. The Western Basin is the shallowest, with some extended shoals only 20 feet deep, which makes it the most prone to pollution problems. The Eastern Basin is the coldest and deepest,

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Lake sturgeon

photo-Rob Criswell

plunging in some spots more than 200 feet. Pennsylvania's Presque Isle peninsula and its counterpart across the lake in Canada, Long Point, seem to divide the Central from the Eastern Basin.

Lake Erie has shoreline in Michigan, Ohio, Pennsylvania, New York, and the province of Ontario. Management and monitoring involve five political entities. Their diverse views on what the lake's fisheries and their use echo the complexity of the lake's fisheries. Helping to coordinate it all is the Great Lakes Fishery Commission, established by treaty between the United States

and Canada in 1955. For more information on the commission, visit www.glfsc.org.

On average, Lake Erie is the shallowest of all the Great Lakes; off Erie County, Pennsylvania it averages only 70 feet deep. But that's enough depth to give it both coolwater and warmwater fishery types with unusual species variety, Kenyon says.

Why so many different fish? One reason is that the lake is the child of monumental ice movements across northwestern Pennsylvania terrain, tens of thousands of years ago. The glaciers

"dug" the lake, and changed the direction of rivers flowing into and out of the region. Fish and other aquatic species that already lived in those rivers were added to the new Great Lake; it was probably a strange mix from the start. Later, intentional and accidental alien introductions (still going on today) made it an even more chaotic assortment. Yet, the whole, in some way, works. As Kenyon says, there's just so much energy present in the lake. Which species are passing it around, as their populations rise and fall, appear and disappear, is always changing.

Spotted gar. Like sturgeons, gars are primitive, prehistoric relicts. As a leftover survival technique from the ancient days, they can use their swim bladder as a spare breathing apparatus, a sort of "lung" that can be put into action when oxygen levels are low in the water around them. Then they come to the surface and gulp air from above.



photo-Rob Criswell

Lake sturgeon

Some Lake Erie water life is insanely abundant; others are vanishingly rare. Take the lake's version of the Loch Ness Monster. At least, says Kenyon, that's what some observers report when they see the wave-wake of a huge body moving just below the surface. Actually, they've been close to a Pennsylvania endangered species, the lake sturgeon. In summer, when the lake is quiet, a small group of sturgeons may rise to the surface and feed on midges, tiny insects. Because these fish can grow 6 feet long, some people think they've seen a sea monster, says Kenyon.

Lake sturgeons, as a species, are 350 million years old, a prehistoric relict, which alone makes them an oddity. They were once quite numerous in Lake Erie, says Kenyon, and commercial fishermen used to throw the fish

Gar

Lake Erie even has its own version of an "alligator"—the gar. The spotted and longnose gar are not reptiles, but they are heavily scaled, predatory fish with a long "beak" full of big teeth. This gave them the nickname "gar pike," but they're not related to northerns or muskellunge, either. Surprised anglers sometimes catch gar, especially in weedy Presque Isle Bay. The fish also enter Lake Erie tributary streams to spawn, where basking 4-footers startle onlookers.

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"Some of these primitive fishes may also have been in other large lake systems, but died out," says Kenyon. "In something the size of the Great Lakes, they could find quiet backwaters where they were not subjected to the same stresses as their populations elsewhere."

Glacier

When the last glacier pulled back from Pennsylvania some 15,000 years ago, it left a legacy of new stream directions, some totally reversed from their former course. The Upper Allegheny, Tionesta and Beaver-Monongahela drainages had flowed north into what scientists call the "Erian River." After the glacier, these major watersheds fed the Ohio River. Today, the Pennsylvania tributary streams to Lake Erie are all short. The divide between the Lake Erie and Ohio River drainages is only about 20 miles from the big lake.



Sea lamprey

photo-Rob Criswell

away if they got caught in the nets. Sturgeons were also killed for their caviar and their air bladder, which was used to make isinglass, a semi-transparent gelatin that clarifies jellies and glue.

The lake sturgeon became imperiled primarily by degradation of its spawning sites, says Kenyon, when silt covered the gravel where the fish's eggs were laid. Right now there is renewed interest in restoring the sturgeon, he says. A large effort is being made to locate the sturgeon's preferred spawning grounds, find out where they live, and get an overall estimate on just how well or how poorly they are doing. For all their size, lake sturgeon feed on tiny invertebrates—human swimmers are safe.

Bowfin

The bowfin is another heavily "armored," primitive-looking fish. It has hard, bony head plates, a wavy back fin that stretches all the way to its tail, and lots of sharp teeth. Sometimes called "dogfish," the bowfin is a candidate species for special protection in Pennsylvania. Although bowfins are seldom encountered elsewhere in the state, they're fairly common in Erie's Presque Isle Bay, says Kenyon. Bowfins are a leftover from the Devonian period of prehistory and are one of a kind. The family *Amiidae* is represented by a single species.

Why are these prehistoric fish still living in Lake Erie, in the age of computers and space flight?

The glacier allowed some species to push south, while others went north, says Kenyon. The Iowa darter, another special protection candidate, is a relict of glacial times that is found in Presque Isle Bay. The salmonids (trout relatives) that are native to Lake Erie are also remnants from the Ice Age. Needing a coldwater habitat, "this is as far south as the whitefish and lake trout got," explains Kenyon.

The original lake trout were extirpated in (gone from) Lake Erie by the 1930s, the victims of a combination of commercial fishing, degradation of spawning reefs, and parasitism by the accidentally introduced sea lamprey. Lake trout are currently under a restoration program in Lake Erie, which is revised every few years to keep current

with lake conditions and prospects for bringing the fish back, says Kenyon.

Sea lamprey, whitefish

Sea lampreys still remain a limitation on populations of salmonids in Lake Erie, says Kenyon. They slipped into the Great Lakes via the Welland Canal that bypassed Niagara Falls, earlier in the century. The long, eel-like fish feed by attaching themselves by their raspy, "suction-cup" mouth to the flanks of smooth-sided fish. Then they ingest body fluids from the host. The most effective control for the salt-water invader has been spraying Great Lakes tributary streams that have lamprey larvae with TFM, a selective chemical lampricide. "We have met the goal in control," says Kenyon, of just five lamprey wounds for 100 fish surveyed.

Whitefish, another trout-relative native to Lake Erie, are a big commercial fishing item in the Western Basin, and some netting of the excellent-eating fish is still done in the Pennsylvania section. The silvery fish reached their peak numbers several years ago and are currently declining, "at least in our waters," he says. Whitefish populations tend to yo-yo, a phenomenon more easily watched than explained, he adds.

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Rainbow smelt, zebra mussel

Kenyon has seen boom and bust in many Lake Erie species, both originals and newcomers. The rainbow smelt, a slim, schooling fish that is an important food source to larger game fish, had been very abundant but is continuing a downward trend. "I expect it will hit a point and stay at a lower level," says Kenyon. This is "Ecology 101," he says, when an introduced species, like smelt, explodes in numbers shortly after it's added to a new environment, and then declines dramatically to reach a stable point. Rainbow smelt were a deliberate release into the Great Lakes; by 1935 the fish was recorded in Lake Erie.

Smelt depend heavily on plankton, microscopic plants and animals that fuel the engine of life in the Great Lakes. Declining nutrient levels in the lake and competition for plankton from zebra mussels may be contributing to the smelt decline, says Kenyon.

In the 1970s, Lake Erie was pronounced "dead," done in by

over-fertilization, mostly phosphate loading, and pollution. "The control of phosphate loading under the Great Lakes Water Quality Act," says Kenyon, "was one of the greatest success stories." But then in came the zebra mussel, a true stowaway, and a spoiler as far as fisheries are concerned. Zebra mussels feed by filtering algae and animal plankton from the water. They appear to have made Lake Erie almost too clean and clear, by locking up nutrients for themselves.

The zebra mussel hitchhiked from Europe, in ballast water of ocean-crossing ships. The ballast water was customarily dumped into the Great Lakes, as the ships adjusted their weight, along with whatever was still alive in the tanks after the voyage across the Atlantic. Today, says Kenyon, incoming ships are supposed to exchange their imported ballast water for local water, before getting into the Great Lakes. This should cut down on more alien species invading North America's inland freshwaters from the Caspian Sea, Scotland, and elsewhere in Europe.

Too small to be a candidate for marinara sauce and pasta, the zebra mussel grows to about two inches long. Zebra mussels attach themselves to just about anything—shoreline rocks, water pipe intakes and outflows, boats, and even other bivalves. Adult females

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photo-Rob Criswell



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Emerald shiner

can produce up to 40,000 eggs a year. Once they're in a waterway, they blanket it quickly. Their cousin, the quagga mussel, has colonized the deeper waters of Lake Erie. The quagga, too, was accidentally released in ballast water from Europe.

Spiny water flea, round goby

Ballast water from Europe also brought "B.C.," whose full name is *Bythotrephes cederstroemi*, otherwise called the spiny water flea. This "flea" is not an insect at all, but a tiny (less than a half-inch long) crustacean with a long, sharp, barbed tail spine. It appeared in Lake Huron in 1984, but soon exploded throughout the Great Lakes. B.C. would be a popular zooplankton food source for fish, except that its claw-like shape can choke smaller predators.

The round goby is the latest ballast water stowaway to emigrate to Lake Erie. The goby was first noticed in 1990, but now thrives throughout the Great Lakes. It is an aggressive, voracious feeder that can forage in total darkness. Gobies grow six to eight inches long and take baited hooks. The problem with this new arrival is that the goby takes over prime spawning areas that are traditionally used by native species and competes with native fish for habitat. They are already causing problems for other bottom-dwelling Great Lakes native fish like mottled sculpin, logperch, and darters. Gobies can also withstand degraded water conditions.

Gobies are extremely abundant in Pennsylvania's Lake Erie waters, says Kenyon. The only good news about

them is that they eat zebra mussels, though not enough to make a dent in the clam's overpopulation. Gobies are in turn eaten by game fish.

Alewife, gizzard shad

Lake Erie also has alewives. An alewife isn't someone's spouse who serves good beer, but a small herring that is important forage for game fish. Alewives are another introduced species to the Great Lakes, becoming abundant or scarce in cycles. Alewives do not tolerate cold water well, and seek out warmer temperatures. From time to time, schools get caught by frigid water and die, sometimes washing onto beaches by the thousands.

A herring like the alewife, the gizzard shad also experiences population booms and busts in Lake Erie. Kenyon says he's seen winterkills washed ashore, to the complaints of beach users and residents. The fish had to be hauled away by the truckload, like snowdrifts. Another pelagic (mid-water, free-swimming) foodfish, the gizzard shad is named for its muscular, gizzard-like stomach. With the reduction in lake productivity, post-zebra

mussel, gizzard shad numbers are declining, he says.

The emerald shiner, a slim, silvery minnow with a green side-stripe, rounds out the major food-base fishes of the lake. Emerald shiners are not as common as they used to be, in the 1950s and 1960s, says Kenyon, when tributary streams would turn black when the little baitfish made their spawning runs.

Once in a while, a few freshwater eels make it into the lake from the St. Lawrence River, and catchable flounder have appeared, brought in with that infamous ballast water from ocean-going vessels. Or the nibble might be from a sheephead, or freshwater drum, a white bass, white perch, or freshwater cod. Freshwater cod are also called burbot and ling. "The burbot is an ugly, deepwater carnivore," Kenyon says, and a Pennsylvania threatened species. The burbot is doing very well in Lake Erie, but not elsewhere in the state.

Salmon

One of the biggest predators in Lake Erie is unlikely to be seen nowadays, although it was the "star fish" several decades ago. Chinook salmon were brought in as part of a Pacific-salmon stocking program throughout the Great Lakes, along with their relatives, the coho, the pink salmon (rarely seen now), and others. Chinook aren't stocked into the lake from Pennsylvania hatcheries anymore, says Kenyon.



photo-Rob Criswell

The hook-and-line state record stands at nearly 30 pounds, which would seem to make it an attractive sport fish.

But chinook, or king, salmon “were never able to contend with the Lake Erie environment,” says Kenyon, and they are declining in all the Great Lakes. Like the chinook, the coho, or silver, salmon population had to be maintained by artificial hatchery production. Although these salmon teasingly return to tributary streams to spawn (seldom, if ever, successfully in the Great Lakes region), the adults die after they’ve finished their reproductive chores. Cohos gave anglers a better return than chinooks, but the decreasing availability of eggs and the steelhead’s increasing popularity with Lake Erie anglers will probably see the rainbow trout superceding the coho as the prime salmonid game fish in the lake.

Steelheads are rainbow trout that migrate to a large lake or the ocean, and enter inflowing rivers to spawn. Unlike cohos and chinooks, steelheads don’t necessarily die after releasing their eggs or milt. Instead, they may return to the big water and grow larger, so they’re even more attractive to anglers on their next spawning run. Originally Westerners, steelhead rainbow trout have long been hatchery propagated. Kenyon says steelheads are more flexible in habitat than cohos and have a wider diet, eating not only fish, but also invertebrates.

For a change, brown trout are a purposely introduced European species. “They do well in Lake Erie,” says Kenyon, “but not as well as we’d like.” The Fish and Boat Commission hasn’t made an effort with the anadromous (sea-running) form of the brown trout, he says, because the steelhead has responded so well. Brown trout have done better in cooler, deeper neighboring Lake Ontario. Brook trout, North American natives, were original to the Great Lakes drainages, but any caught in Lake Erie today are probably wanderers from stream stockings.

Blue pike

The blue pike was a homegrown species, too, unique to Lake Erie, but it seems to have disappeared entirely. Or has it? Kenyon says there has been renewed interest by the U.S. Fish and



photo-Linda Steiner

PA angler Mike Detore with a steelhead he caught in Elk Creek, Erie County. Steelheads are rainbow trout that migrate to the lake and enter inflowing rivers to spawn. Steelheads don’t necessarily die after spawning. Instead, they may return to the big water and grow larger, so they’re even more attractive to anglers on their next spawning run.

Wildlife Service (USFWS) in whether the blue pike (actually a blue walleye, but called “pike” because of its teeth) was a separate species or subspecies or color variation of the walleye. The USFWS is also looking into reports of blue pike caught in northern Canadian lakes, supposedly remnants from earlier transplants from Lake Erie. DNA testing on tissue samples (kept for decades and recently rediscovered) from actual blue pike helped determine recently that the blue pike was indeed a distinct species. Slightly smaller than the “yellow” walleye, looking almost transparent, or so Kenyon says observers have told him, the blue pike was a popular table fish. Blue pike were fished for heavily for sport and commercial sale, but Kenyon says their disappearance was caused more by the smelt “overwhelming” the blue pike, eating their fry and competing for spawning grounds.

As far as blue pike turning up again in Canada’s backcountry waters, Kenyon is skeptical. Many fish show color mutations and pigment variations. “I get shown blue this and blue that all the time,” he says. Kenyon says some of the interest in bringing back the native blue pike may just be fond wishful thinking for “that wonderful period of time.” But Lake Erie has changed so much in species makeup that introducing a blue pike from other waters, even if it’s genetically similar or identical to the originals, could bring unforeseen results. Behavior and other aspects of the fish’s life history may be unpredictable, plus blue pike were known to interbreed with walleyes, now arguably the lake’s most popular game fish. Kenyon says “this (talk of reintroduction) is coming too quickly and too fast, and people’s expectations are too high.”

Is there a crystal ball that can predict how Lake Erie will change next? Several alien species (blame ships’ ballast water again) aren’t quite into Pennsylvania’s Great Lake waters, but will probably get here eventually. The ruffe is a small, spiny perch that is capable of explosive population growth, which showed up first in Lake Superior. Since 1986, it’s gotten only as far east as Lake Huron, says Kenyon. Another alien spiny water flea, *Cercopagis pengoi*, is also ballooning in numbers elsewhere in the Great Lakes, but hasn’t been seen in Lake Erie yet.

How do fisheries biologists, like Kenyon, know what’s in the big lake?

“We use a set of sampling procedures and standardized stations we visit that are consistent from year to year,” he says. “Any change in abundance or catch rate for any species can be detected.” Changes in populations, good or poor “year classes” (fish born in the same reproductive season), and fish movements can be assessed by the trawling and gill netting samples, and also by looking at the sportfishing and commercial fishing harvests. Many sampling techniques are standardized among the state and provincial wildlife agencies bordering the lake, which aids in accuracy, says Kenyon. But no matter how scientific fisheries management gets, Lake Erie always surprises. □