
Washed Up on the Shores of Lake Michigan

By CURT MEINE

Lake Michigan is our *not-Chicago*. At its edge, our seemingly solid lives turn liquid, our streets must bend and end, and our busyness is watered down. For Chicago, the lake is the source of the rising sun. Then it is daytime's spread-out sheen of blue or slate or green. And finally it is nighttime's void, *just out there*, beyond the reach of city lights. It is dark matter, off the grid, the great pool of mystery amid our familiar.

Lake Michigan is the *not-city* that is the city's alternate being, its reason for being, and its reason for being *here*. It is the city's counterpart and counterpoint.

Lake Michigan is where the city repairs. It has that effect.

Lake Michigan is where we leave our conversations behind, our presence recedes, and we stop.

Lake Michigan is where we go to look back at ourselves. It is where we reflect, and are reflected.

I first saw Lake Michigan from the Indiana Toll Road and the Chicago Skyway, through the industrial vapors of the Indiana shore, early one evening in the summer of 1967. I was eight years old and our family was on the move. My father had taken a new job in Chicago. My mother, father, three older brothers, and I packed ourselves into the family car and left Mary-

land behind. After two long days of driving, we arrived at the nation's crossroads. I, at least, was utterly disoriented, unsure what to expect in terms of either our new geography or our future.

The scene was suffused in orange: the wide smear of sunset in the west, the flare stacks of the steel mills to the east. We craned our necks to see what we could of the big lake through the ruddy haze. We were a fishing and camping family. My brothers and I had vague notions of fantastic fishing opportunities; I'd learned about the Great Lakes, and the Midwest's freshwater oceans loomed large in my imagination. And I'd heard of Chicago; I'd begun (alas!) to follow the Chicago Cubs the year before. But nothing prepared me for the dizzying entry into the city. It was all a blur of light, motion, traffic, smog, and skyscrapers.

For the first two weeks in our new environs, we camped out north of the city at Illinois Beach State Park. I'm not sure how that came about. Something about plans changing...a rental falling through...trouble finding another place. But we were veteran inhabitants of our big canvas tent and sidekick pup tent. We'd done this in the Pennsylvania forests, in the Appalachians, along the Carolina coast, in Florida scrublands. And so our family came to wash up on the shores of Lake Michigan.

We tried our hand at fishing there, but this was big water, and the gear and methods that worked on reservoirs and small streams back east were not very transferable. Besides, the beach was a rancid mess. There were dead fish everywhere, long drifted piles of them, stretching on and on and on along the shoreline.

Our campout ended and we moved temporarily

into an apartment suite at the Evanston Inn, a dowdy old place, long since demolished, on Main Street in Evanston, a few blocks in from the lake. On slow afternoons that summer, we would wander over to one of the nearby lakeshore parks. Sometimes, though, the reek of rotting fish was so strong that we had to turn around. *What is wrong with this lake? Why are there so many dead fish everywhere?* Even on days with a strong west wind, the aroma wafted inland.

The rest of the summer was devoted to finding more stable housing, while orienting ourselves to the sights and sounds and (other) smells of Chicago. We attended the unveiling downtown of “the Picasso”—

“[the public] are part of a longer and larger and deeper story, one that has fish in it.”

watched Mayor Daley pull the ripcord, dropping the draped pale blue veils and revealing...a monster baboon? A skulking Afghan hound? In various family combinations, we made the grand tour of the city’s cultural stations: the Field Museum, the

Museum of Science and Industry, the zoos and conservatories, the Adler Planetarium and the Art Institute. We visited the Shedd Aquarium, but I did not make any connection between the tanks inside and the lake outside, between the displays of exotic live fish and the myriad small dead ones afloat just outside in Monroe Harbor. In fact, I can hardly remember any of the fish I saw inside the aquarium. But I would never forget the opaque eyes of the fish, floating belly-sideways, outside.

After visiting all the major museums, we began to explore the less conspicuous ones. Toward the end of my mother’s list that summer was the old building of the Chicago Academy of Sciences. After the commotion of the Lincoln Park Zoo’s Farm-in-the-Zoo next door, it seemed a rather dusty and old-fashioned space. No live animals. No loud sounds. No knobs to turn or buttons to push. But the scale and all the *stuff* inside was just right, for me anyway. Immediately inside the entrance, straight ahead, was a small cave-like exhibit portraying the 300-some-million-year-old Carboniferous Period, with its tree ferns and giant horsetails and magnificent humongous dragonflies (that I’m sure a brother informed me could *eat your head!*).

On either side of the Carboniferous cave, two staircases led up to the natural history exhibits on the second floor. I loved the cave and reveled in the intricate exhibits upstairs, but two displays in the stairwells—

part of a rather busy “Exhibit of the Great Lakes”—made an even more lasting impression. On the left: the historic fish community (“Original Lake Ecology”) of an unsullied Lake Michigan. On the right: the contemporary fish community (“Disturbed Lake Ecology”) of an altered Lake Michigan.

Walk back and forth between them, and compare. See the different food chains. See which fish we’ve lost, which remain, and which are newly arrived. See the lake sturgeon and cisco gone. See the sea lamprey and smelt come on the scene. Wonder who figured that out, and how many fish they had to catch to do so!

Have your eight-year-old mind blown, in a way that you did not understand at all. Look at that great big lake out there, and somehow see beneath its placid surface for the first time. Think about all the churning life below. Imagine yourself a fish. Come to know that the world is very old, and very new... that things change... that life changes...that nature has a history... that people came...and that people made a difference. The Carboniferous was too long ago, too weird, the horsetails and dragonflies too enormous, the people absent. The fish and the lake were here and now. I’d run along the shore of that lake, and I’d just seen and smelled the fish myself.

I would pass those two cramped displays many more times over the years, while hurrying up to the second floor. They always stopped me.

I learned the word “alewife” that first summer in Chicago. But I had only the vaguest sense of what it might mean.

My family’s arrival in Chicago coincided with the high peak of the great alewife die-off of the mid-1960s. No one knows how many fish perished that spring and summer of 1967. Estimates ran into the hundreds of millions. On June 15 a federal official, conducting an aerial survey of sources of pollution in the lake, noticed incredible swaths of dead alewives on the water. One “great shimmering band,” as the U.S. Federal Water Pollution Control Administration described it, ran fifty feet wide and forty miles long, from Muskegon to South Haven, Michigan. By June 19, a silver ribbon of expired alewives stretched out along thirty miles of Chicago and suburban shoreline. Two days later a *Chicago Daily News* article pegged the total fish kill at 20 billion.

The July 7, 1967, edition of *Time* magazine told the tale to a national audience: “From the Chicago waterfront to the Mackinaw Bridge, the shores of Lake Michigan were taken over last month by dead alewives. The fish... washed ashore on every incoming wave, piling up on the beaches faster than bulldozers and tractors could clear them away. They filled the air with the odor of decay and drew swarms of mosquitoes and flies” (66). *Time*’s cover story that week was “The Hippies: Philosophy of a Subculture.” The Summer of Love had commenced in San Francisco. A summer of blight had come to Chicago and its lake.

Death followed the fine line where the communities of the land and the lake met. It came as a consequence of dramatic changes in both that were a century and a half in the making. The astonishing transformation of Chicago and the Midwest as a human community happened for all the world to see and to marvel at. The revolution in the lake’s biotic community happened mostly out of sight, beneath the waves—until it washed ashore in the form of putrid piles of dead alewives.

The alewife (as it exists in Lake Michigan) is six to seven inches long, with a brownish-bluish-green back, flashing silver sides and belly, a single dark spot behind its gills, and googly black eyes. It closely resembles its relative, the blueback herring of the Atlantic seaboard—hence its scientific name, *Alosa pseudoharengus* (a shad-like “false herring”). Its deep abdomen and large head are thought to account for its unbecoming common name, bestowed in tribute to plump female tavern keepers of Olde England.

Until the 1930s alewives occurred mainly along the Atlantic coast, from Newfoundland to South Carolina, coming inland to spawn in the freshwater streams. Their ability to survive in freshwater—to skip their time at sea if the opportunity arose—was the key to their destiny. The species may have been native as well to Lake Ontario, where it was first recorded in 1873. If the alewives did not exist there naturally, they were either intentionally introduced or followed their upstream yearnings through the Erie Canal and into the Great Lakes system. They made it above Niagara Falls to Lake Erie by 1931. Their great escape into the upper Great Lakes, though, came via the Welland Canal around the Falls between Lakes Ontario and Erie. The opening of the modern canal in 1932 hastened the alewife’s spread into Lake Erie, to Lake Huron by 1933, to Lake Michigan by 1949, and finally to Lake Superior by 1954. As the little silvery fish worked its way

upstream and inland, it bore global forces of environmental, cultural, and economic change into the Great Lakes basin, jolting and reconfiguring the food webs of the most extensive freshwater system on the face of the Earth.

It did not do so alone. Among the alewife’s fellow travelers was the sea lamprey, scourge of the larger native fish of the Great Lakes (and of the fishers who pursue them). The lamprey took the same water trail into the Great Lakes as the alewife—but it did so, significantly, slightly beforehand. By the 1930s sea lampreys were common in Lakes Huron and Michigan, and by the 1940s in eastern Lake Superior. Aggressive parasites and predators, they quickly devastated native fish populations in the lakes, including those of the large apex predators (especially lake trout and burbot), other key commercial and sport fish species (including lake whitefish, northern pike, and walleye), and smaller forage fish (such as the chub and lake herring).

Continuous overfishing of many species and unchecked industrial and agricultural pollution also contributed to the disruption of the native fish communities of the Great Lakes. The most profound ecological ripple effects were all but invisible. Three closely related endemic species of the lake’s cold-water depths—the longjaw cisco, the blackfin cisco, and the deepwater cisco—swam straight into the vortex of extinction; they would vanish by the early 1960s. More conspicuous was the collapse of the lake trout population. The commercial catch of lake trout in Lake Michigan fell from 5.5 million pounds in 1946 to just 402 pounds seven years later.

Into the complex eddies of environmental change in Lake Michigan came the alewives. With the relentless advance of the lamprey, the wiping out of the lake’s most important native large predator (the lake trout), and the suppression of populations of other predators and competitors, they entered an open ecological field. Although sensitive to colder water (which slowed its spread into Lake Superior), the alewife thrived prodigiously in its new landlocked environment.

Until it didn’t. The alewife population burgeoned—and then it crashed. In a 1968 technical report, fisheries biologist Edward Brown described more formally what my family and I had seen and smelled upon our arrival in Chicago: “The classic population explosion, which crested in the southern and central basins of the lake in 1966, was accompanied by progressively heavier spring and summer die-offs and was climaxed

by a massive mortality in June and early July 1967” (Becker, 268). In Lake Michigan, the alewife’s arc from arrival to abundance to mass mortality took just seventeen years.

Several factors contributed to the 1960s die-offs (and to those that have occurred periodically since). Although able to survive in the lake, the alewife is physiologically stressed by life in fresh water. A shortage of food in the winter can weaken them. When moving to nearshore waters to spawn, they can experience rapid temperature change—a phenomenon they are not subject to in their home waters in the Atlantic—adding to the normal strain of reproduction. The alewife proved to be a phenomenally successful aquatic invader, but still a limited one.

The alewife’s effect on life in the lake was and remains profound. Writing in 1983, Wisconsin biologist George Becker described the continuing consequences: “In Lake Michigan [the alewife] constitutes 70–90% of the fish weight...[A]ll zones of the lake are dominated by vast swarms of alewives competing with

“We are all part of a kaleidoscopic ecology.

and often eliminating the stocks of native fish” (265, 268). The alewife contributed to the loss of the native ciscoes, prey-

ing upon their eggs and larvae and outcompeting them as consumers of the lake’s plankton reserves. It had similar, if less final, effects on the lake herring, yellow perch, and chubs. Stanford Smith, a fisheries biologist from Michigan, wrote in the aftermath of the big die-off that the alewife had “reduced or replaced all of the previously very abundant species of the lake, and upset completely a very productive and stable multi-species balance that had existed since the glaciers retreated from the Great Lakes thousands of years ago” (12).

In 1966 the state of Michigan began to stock the lake with coho and chinook salmon imported from the Pacific in an effort to control the alewife hordes, creating in the process what has become a popular (if expensive and artificial) sport fishery. Wisconsin soon followed suit. Fisheries managers also stocked the lake with non-native steelhead, Atlantic salmon, and brown trout. But the sea lamprey preys upon these species as well, and so investments in lamprey control ratcheted up. Meanwhile, the beleaguered native lake trout struggled to regain its place in the food web.

That memorable summer of 1967, vacationers, resort operators, and landowners inundated the Chicago

office of the Federal Water Pollution Control Administration (the EPA would not exist for another two and a half years) with letters and phone calls. U.S. senators and representatives toured the sour beaches and drafted bills. Around the lake, people demanded that their local governments clean up the beaches. The fire department in Beverly Shores sprayed deodorant on the piles of dead alewives in an effort to squelch the stench.

Only slowly would the public and the policy makers come to see that they are part of a longer and larger and deeper story, one that has fish in it. It began 10,000 years ago, with a deluge: as the continent’s ramparts of ice melted, the land lifted, the waters pooled, and fish swam in the great basin of cold-water lakes. Soon people came into the story from the north and west, living in ever-changing communities through the millennia. Then a different wave of people came from the east. They carved out a passage around Niagara Falls in the 1800s. Among the cascading consequences of that act: an invasive species (the lamprey) came into the waters and overwhelmed a native fish (the lake trout); another invasive species (the alewife) arrived and filled the ecological void; another suite of exotic species (the Pacific salmonids) were brought in to control the invasive alewife. Now we humans are moving mountains—or at least securing the Mississippi River/Lake Michigan watershed divide—to prevent other invasive species (Asian carp) from entering the lake and potentially harming the fish now in the lake (including especially the introduced salmon).

And so it goes—out there, under the waves, all the time.

“The Exhibit of the Great Lakes” at the Chicago Academy of Sciences is long gone. The quirky displays of the changing fish fauna are now themselves extinct. All that remains are a few faded fiberglass models, in storage and out of sight, of a lake trout and lake herring, red-horse and flat-headed catfish, paddlefish and gar. I see the displays vividly, though, in my own memory. And their fundamental message—that ecosystems are always changing, and that we humans are powerful agents of that change—is now widely appreciated among ecologists and conservationists, and increasingly in the popular imagination.

A lake, like any community of life, is a dynamic reality. The 150 or so fish species native to the Great Lakes have not existed as specimens in a fish tank, nor

as mounted facsimiles in natural history museums. They have evolved together since the retreat of the ice. And people have been members of that community for a good part of that time. The “very productive and stable multi-species balance that had existed since the glaciers” will not return. Moreover, it is hard to gauge just how stable and balanced the Great Lakes community (or any other ecosystem on Earth) has ever been. In what ways? For how long? At what scale? The story is always more complicated than it seems on the surface.

A year before the big die-off, Stanford Smith had a remarkably clear view into the alewife moment in time and space. At a 1966 symposium on the over-exploited fisheries of the Great Lakes, he stated: “[A] succession of fish species would be expected during the natural aging process of the Great Lakes, but recent progressive changes in species composition have been rapid and obviously accelerated by influences of man, both from enrichment of the environment with wastes, and despoilment of the most abundant or preferred species of fish...leading to the state of biological instability in the mid-1960s that is almost unparalleled in fishery science” (quoted in U.S. FWPCA 1967, 17).

The Great Lakes now host some 180 invasive algae, plants, invertebrates, and fish. In recent years, another species has arrived about once every eight months. Some, like the zebra and quagga mussels, we know mainly because they cause noticeable economic damage. (Recent estimates of the annual economic impact of invasive species in the Great Lakes run into the hundreds of millions of dollars.) Most, like the European frog-bit and Oriental mystery snail, we rarely hear or think about.

We are all part of a kaleidoscopic ecology—an ever-shifting pattern of pieces and processes, its parts constantly coming into the field of view, rearranging themselves, fading and falling, reappearing and recirculating anew. But now we are turning the kaleidoscope around ever more quickly. The rate, scope, and types of changes we have known in the last two centuries are unprecedented—at least at any meaningful human time scale. The causes of change are now predominantly human. Moreover, the arrival of new and potentially disruptive species is only one of many stressors coming to the Great Lakes. Pollution, sedimentation, dams, coastal development, and other factors—including the Big One: climate change—ensure that the story will grow only more complex, and the mingling of human and natural realities more con-

spicuous.

In that way, the lake continues to reflect our lives on the land. We have arrived at a new place, and a new time, in our relations with one another and with the place we live. How do we respond? Do we accept, combat, or accommodate the invasive species that come to our waters? Do we continue to see only the surface of Lake Michigan and to regard that water *out there* as something inert and apart? Do we persist in seeing the lake as only a commodity, lacking a relevant history, ours to reconstruct according to political and economic demands? Or do we care for the lake as a living community to which we belong?

We don’t usually see it that way. In a city of neighborhoods, the neighborhood of the fish remains largely invisible. Would we regard the city or the lake differently if we could see them through the living eyes of the lake sturgeon and burbot, or the lamprey and goby? Through the absent eyes of the coaster brook trout and lake trout and deepwater cisco? Through the fading eyes of a stressed alewife, nearing death, floating flat on its side, one eye gazing down into Lake Michigan’s water, the other lifted toward the gleaming skyline of Chicago?

When I first saw alewives along the beaches of Lake Michigan, they were gross—and engrossing. They were not furry. They were furtive in life, obvious in death. They were mute animals, their species’ experience and wisdom voiced not through howls or snarls or chirps, but through their mere being, surfacing, and expiring.

Now I see the alewife, for better or worse, as a companion animal, stranded in its multitudes on the shores of Lake Michigan, at the raw borders of past and future, light and dark, sound and silence, life and death, natural and human, land and water, city and lake. Now I see that, as I held my young nose against their stink, the alewives and I had come to the same place, the same fluid edge of our existence.

Curt Meine is a conservation biologist, historian, and writer who serves as a senior fellow with both the Aldo Leopold Foundation and the Center for Humans and Nature, and as associate adjunct professor at the University of Wisconsin–Madison. He has written several books, including *Aldo Leopold: His Life and Work* (University of Wisconsin Press, 1988) and *Correction Lines: Essays on Land, Leopold, and Conservation* (Island Press, 2004).

Acknowledgments

Thank you to Brian Ickes of the U.S. Geological Survey for inspiring, informing, and reviewing this essay, and to Paul Heltne and Amber King for guiding me into the historic exhibits of the Chicago Academy of Sciences.

Recommended Resources

Books and Articles

- Becker, George C. *Fishes of Wisconsin*. Madison: University of Wisconsin Press, 1983.
- Bogue, Margaret B. *Fishing the Great Lakes: An Environmental History, 1783–1933*. Madison: University of Wisconsin Press, 2000.
- Brown, Edward H., Jr. “Population Biology of Alewives, *Alosa pseudoharengus*, in Lake Michigan, 1949–70.” *Journal of the Fisheries Research Board of Canada* 29, no. 5 (1972): 477–500.
- Eck, Gary W., and Larue Wells. “Recent Changes in Lake Michigan’s Fish Community and Their Probable Causes, with Emphasis on the Role of the Alewife (*Alosa pseudoharengus*).” *Canadian Journal of Fisheries and Aquatic Sciences* 44, no. S2 (1987): s53–s60.
- “Ecology: Alewife Explosion.” *Time* 90, no. 1 (July 7, 1967): 66.
- Greenberg, Joel. *A Natural History of the Chicago Region*. Chicago: University of Chicago Press, 2004.
- Koonce, Joseph K. “Aquatic Community Health of the Great Lakes.” EPA 905-R-95-012. Chicago, Illinois: Environment Canada and U.S. Environmental Protection Agency, 1995. Available at http://www.epa.gov/solec/archive/1994/1994_Aquatic_Community_Health_of_the_Great_Lakes.pdf.
- Rothlisberger, John D., David C. Finnoff, Roger M. Cooke, and David M. Lodge. “Ship-borne Nonindigenous Species Diminish Great Lakes Ecosystem Services.” *Ecosystems* 15, no. 3 (2012): 1–15.
- Smith, Stanford H. “The Alewife.” *Limnos* 1, no. 2 (1968): 12–20.
- U.S. Federal Water Pollution Control Administration (FWPCA), Great Lakes Region. “The Alewife Explosion: The 1967 Die-Off in Lake Michigan.” July 25, 1967. Available at <http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000UXWo.txt>.
- Woods, Loren P. “The Ale Wife.” *Chicago Natural History Museum Bulletin* 31, no. 11 (1960): 5–8.

Websites

- “Alewife” (species profile). United States National Agricultural Library, National Invasive Species Information Center (NISIC): www.invasivespeciesinfo.gov/aquatics/alewife.shtml
- “*Alosa pseudoharengus*.” United States Geological Survey, Nonindigenous Aquatic Species (NAS) website: <http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=490>
- Great Lakes Environmental Assessment and Mapping (GLEAM) Project: <http://great-lakesmapping.org/>
- Great Lakes Fishery Commission: <http://www.glfc.org/>
- “Invasive Species in the Great Lakes Region.” Great Lakes Information Network: <http://www.great-lakes.net/envt/flora-fauna/invasive/invasive.html>