Prologue

When I was eight I climbed into an aluminum rowboat with the elderly director of a summer camp north of Toronto. He rowed a quarter mile out into the shallow bay, and we spent the next two hours fishing. It was a calm summer evening and the water was like glass. It was my first time in a small boat, and floating on this vast, faintly undulating expanse of dark water was exhilarating. I wondered what creatures lurked below, and this stoked my excitement whenever the sudden jerk of my primitive fishing pole—a stripped sapling with a line and hook—signaled that a fish had struck the bait.

I caught sixteen fish that day. Some we released. Several others, larger bass and perch, we kept for breakfast the next morning. Mr. Nelson did all the dirty work, baiting the barbed hooks with writhing earthworms, twisting the wire out of the fish's lips, plunging his knife into their skulls to kill them. His face contorted strangely as he performed these tasks, and I wondered if he was feeling revulsion or if he was merely lost in concentration.

I have some fond memories of that experience. But, as a sensitive boy with a soft spot for animals, I was disturbed by a lot of what went on in that rowboat. I worried privately about the worms. I fretted that the fish felt pain as the stubborn hook was extracted from their bony, staring faces. Maybe one of the "keepers" survived the knife and was dying slowly in the wire basket dangling over the side. But the kind man sitting at the bow didn't

seem to think there was anything wrong, so I rationalized that it must be okay. And the taste of fresh fish at breakfast the next morning left only vague remnants of misgivings from the previous evening.

That was not my only childhood encounter with fish that raised conflicting emotions about our cold-blooded cousins' place in our moral calculus. In fourth grade, I was one of a few kids recruited to move some supplies from our classroom to a neighboring room at my elementary school in Toronto. Among the items was a glass fishbowl containing a lone goldfish. The vessel was three-quarters full of water, and quite heavy. Concerned that the fish not be placed in the hands of someone who might care less than I did, I volunteered to transport the bowl to its destination, a counter next to the sink in the adjoining room.

How ironic.

I firmly held the bowl in my child's hands and methodically walked out the door, down the hall, and into the new room. As I gingerly approached the counter, the bowl slipped from my grasp and smashed on the hard floor. It was a moment of horror that played out in slow motion. Shards of glass splintered and water sloshed across the floor. I stood there stunned. Someone with more wits than I grabbed a mop and moved the glass and water to one side, then four of us began to scour the floor for the fish. A minute went by with no sign of the creature. It was like a bad dream. It seemed as if she had experienced goldfish rapture and risen up to the fishy heavens. Finally, someone found her. She had bounced behind a radiator and ended up on the inside lip, two inches above the floor and completely out of view. She was still alive, gawping meekly. She was quickly plopped into a beaker of tap water. I believe that fish survived.

Though the goldfish incident left a deep impression on me, as evidenced by my vivid recollection of it four decades later, I was not moved to a new empathy for fish. Admittedly, I never took a shine to fishing; what little enthusiasm remained after the outing with Mr. Nelson soon faded when it came time to bait and extract my own hooks. But I made no connection between the perch and bass I unceremoniously hauled up from Sturgeon Bay, or the hapless little goldfish I dropped at Edithvale Elementary School, and the anonymous fish who ended up in the Filet-O-Fish sandwiches I enjoyed on family trips to the local McDonald's. That was the late sixties, and already McDonald's was boasting "over one billion served." They

could as soon have been referring to fish or chickens as to customers. But like other members of my culture, I was blissfully removed from the once living, breathing creatures who ended up in my lunch.

It was not until I took an ichthyology course in the final year of my undergraduate biology degree twelve years later that I began to seriously question my relationship to animals, including fish. I was as captivated by fishes' diverse anatomy and adaptations as I was disturbed by the parade of inert, once-living bodies we were given to classify using dissecting microscopes and taxonomic keys. The class made a midterm visit to the Royal Ontario Museum, where we met one of Canada's foremost ichthyologists for a private tour of the museum's fish collection. At one point he unlocked and raised the lid of a large wooden case to reveal an enormous lake trout floating in an oily preservative. The fish, weighing a record 103 pounds, had been caught on Lake Athabasca in 1962. Her size and plumpness were attributed to a hormone imbalance that had rendered her sterile; energy that would normally have been spent on the profligate task of egg production was instead assigned to body mass.

I felt for that fish. Like most we encounter, she had no name and her life was a mystery. I felt like she deserved a more dignified existence than entombment in a wooden case. To me it would have been better had she been eaten, her tissues recycling back into the food chain, than to float for decades in darkness, polluted by chemicals.

Legions of books have been written about fish—their diversity, their ecology, their fecundity, their survival strategies. And several bookshelves can be filled with books and magazines about how to catch fish. To date, however, no book has been written *on behalf of* fish. I'm not referring to the conservationist message that decries the plight of endangered species or the overexploitation of fish stocks (have you ever noticed that the word "overexploitation" legitimizes exploitation, and that "stocks" reduces an animal to a commodity like wheat whose sole purpose is to supply humans?). My book aims to give voice to fish in a way that hasn't been possible in the past. Thanks to breakthroughs in ethology, sociobiology, neurobiology, and ecology, we can now better understand what the world looks like to fish, how they perceive, feel, and experience the world.

In researching this book I have sought to sprinkle the science with stories of people's encounters with fishes, and I will be sharing some of

these as we go along. Anecdotes carry little credibility with scientists, but they provide insight into what animals may be capable of that science has yet to explore, and they can inspire deeper reflection on the human-animal relationship.

What this book explores is a simple possibility with a profound implication. The simple possibility is that fishes* are individual beings whose lives have intrinsic value—that is, value to themselves quite apart from any utilitarian value they might have to us, for example as a source of profit, or of entertainment. The profound implication is that this would qualify them for inclusion in our circle of moral concern.

Why bother? There are two main reasons. First, fishes are, collectively, the most exploited (and overexploited) category of vertebrate animals on Earth. Second, the science of fish sentience and cognition has advanced to a point that it may be time for a paradigm shift in how we think about and treat fishes.

Just how exploited are they? One author, Alison Mood, has estimated, based on analysis of Food and Agriculture Organization fisheries capture statistics for the period 1999–2007, that the number of fishes killed each year by humans is between 1 and 2.7 trillion.* To get a handle on the magnitude of a trillion fishes, if the average length of each caught fish is that of a dollar bill (six inches) and we lined them up end to end, they would stretch to the sun and back—a round-trip of 186 million miles—with a couple hundred billion fishes to spare.

Mood's estimate is exceptional because the human toll on fishes is rarely presented as a number of individuals. To wit, the Food and Agriculture Organization itself estimated the 2011 commercial fisheries catch to be 100 million tons. Fish biologists Steven Cooke and Ian Cowx, among the few to enumerate individual deaths, estimated in 2004 that some 47 billion fishes were being landed *recreationally* worldwide every year, of which some 36 percent (about 17 billion) were killed and the remainder returned to the water. If we apply their estimated average weight per fish (0.635 kilograms = 1.4 pounds) to a commercial catch of 100 million tons, we arrive at an estimate of 157 billion individual fishes.

One study reports that official (FAO) statistics on global fish catches have been underestimated by more than half over the last sixty years, due to

often-neglected small-scale fisheries, illegal and other problematic fisheries, and discarded bycatch.

However you slice it, it's a lot of fishes, and they do not die nicely. The leading causes of death for commercially caught fishes are asphyxiation by removal from the water, decompression from the pressure change of being brought to the surface, crushing beneath the weight of thousands of others hoisted aboard in massive nets, and evisceration once landed.

Regardless of which estimate you take, dizzying numbers like these tend to mask the fact that each fish is a unique individual, not just with a biology, but with a biography. Just as each sunfish, whale shark, manta ray, and leopard grouper has a distinctive pattern from which you can recognize individuals on the outside, each has a one-of-a-kind life on the inside, too. And therein lies the locus of change in human-fish relations. It is a fact of biology that every fish, like the proverbial grain of sand, is one of a kind. But unlike grains of sand, fishes are living beings. This is no trivial distinction. When we come to understand fishes as conscious individuals, we may cultivate a new relationship to them. In the immortal words of an unknown poet: "Nothing has changed except my attitude—so everything has changed."