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“A lake is the landscape’s most beautiful and expressive feature. It is earth’s eye; looking into which the beholder measures the depth of his own nature.”

— Henry David Thoreau
Brandon C. Schroeder, Dan M. O'Keefe, and Shari L. Dann
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FOREWORD

Indigenous peoples of North America have been fishing the Great Lakes for 5000 years; European settlers from the days they arrived. The colonizers learned what the native people knew: the Great Lakes would provide, in the words of Michilimackinac commandant Antoine Cadillac, a “daily manna that never fails.”

But the daily manna did fail. Survey after survey, starting in the 1860s, showed species once seen as limitless were fished out. The first to go was Atlantic salmon, and many other kinds of fish, like sturgeon and whitefish, were also decimated by the time of the Great Depression. By the mid-twentieth century, because of commercial over-fishing and habitat loss, the fishery was a shell of what it once was.

The sea lamprey was the death blow. After sea lampreys invaded Lake Erie and above (around 1920), lake trout was extirpated from four of the five Great Lakes, whitefish fell to historic lows, and several species of ciscoes were gone for good. Sea lampreys changed a way of life in the region and the once-thriving fishing towns faced existential crises; some did not make it through intact.

Science, cooperative management, and sea lamprey control have saved the Great Lakes fishery. The 1954 Convention on Great Lakes Fisheries between Canada and the United States started a sea lamprey control program that continues to this day and saves 100 million pounds of fish each year. The convention also ended a parochial approach to management that contributed as much to fishery loss as the sea lamprey. The formation of “lake committees” in 1965 created a place for managers to exchange data and information, and the 1981 Joint Strategic Plan for Management of Great Lakes Fisheries committed the managers to actively work toward their shared goals. Thanks to these measures, the Great Lakes fishery has improved steadily—today generating at least $7 billion annually.

The Life of the Lakes, now in its fourth edition, chronicles our fishery’s rich history. Readers will gain an understanding of ecology and management, the fish—then and now—that make up various fisheries, and the future of the resource that so many of us depend upon for food, income, subsistence, and recreation. The story of our region plays on in the pages of The Life of the Lakes!

ROBERT LAMBE, EXECUTIVE SECRETARY

Great Lakes Fishery Commission
INTRODUCTION

From the earliest days, people have been drawn to the beauty, resources and way of life found in the Great Lakes—first native peoples, then European explorers and immigrant settlers and now, us, the current residents and students of the region. It is no secret why. The lakes are incredible in every sense of the word.

The people and these inland seas have been intricately intertwined, one influencing the other, throughout history. Perhaps the most dynamic relationship in that history has been with the Great Lakes fishery.

Through studying the Great Lakes fishery, we learn about the people and cultures that have depended on the productivity of the lakes. The story of the fishery also reflects the story of aquatic ecosystems, biodiversity, water quality, and environmental change, degradation, and rehabilitation. The Great Lakes fishery is the thread running through all these aspects, serving as the gauge of resource sustainability and quality of life for people in the region.

In this fourth edition of The Life of the Lakes, we have continued to focus on the Great Lakes fishery of the past; to outline the current status of the Great Lakes fishery today; and to discuss fisheries issues expected in the future. We have also provided a brief overview of ecology and management, as it applies to the Great Lakes and freshwater aquatic systems. The same comprehensive information found in earlier versions of this book is included here.

However, since the Great Lakes are dynamic and ever-changing, our approach to covering them should be too. More graphics and pictures have been added to help illustrate the colorful culture of the Great Lakes. For example, a new quick-reference section includes maps of each lake and its watershed along with an overview of the ecology, fisheries, and socioeconomics of the region. The main sections have been streamlined, sidebars and breakouts have been added, and this edition is in full color.

We hope you find The Life of the Lakes to be a valuable, educational and interesting source on the Great Lakes fishery—one that serves as your guide to exploring the vibrant Great Lakes that you return to through the years.

Great Lakes fisheries are defined as intricate webs of fish populations, their aquatic environments, and the people who use and enjoy them. These fisheries are important parts of the life of the lakes.

Terms used to describe the Great Lakes fishery are shown in bold throughout this publication and appear with definitions in the Glossary.
THE GREAT LAKES BASIN

The maps and descriptions in this section are new to the fourth edition of *The Life of the Lakes*. They serve as a quick reference for information about the ecology, fisheries, and species diversity of each lake, as well as the socioeconomic and physical attributes of the lakes and their connecting channels.

The maps show major cities and the extent of each lake’s watershed—or the area of land wherein all of the precipitation eventually flows into the lake.

It is important to remember that healthy watersheds reduce flood risk, support crops, filter pollutants, mitigate effects of climate change, and boost human well-being, and that actions upstream have impacts downstream.

Each lake has features that define its character, the region that surrounds it, and the fishery it supports. Look to this section to get an overview of the lakes and to see how features of a lake affect the communities in its watershed and how, in turn, those communities affect the lake.
ECOLOGY

Lake Michigan’s main basin contains cold, clear, nutrient-poor water. This provides good habitat for trout, salmon, whitefish, and other cold-water species, but the amount of food available in open water has dropped in recent years. Open-water prey fish such as alewife and bloater have declined dramatically since the 1980s.

Large rivers and associated inland lakes formed by drowned river mouths provide important habitat connections and nutrient inputs. In certain areas, excess nutrients create blooms of algae that die off and decompose, creating oxygen-deprived “dead zones.” Green Bay, considered the world’s largest freshwater estuary, is particularly vulnerable to these events. In shallow, rocky areas of the lake, excess nutrients can fuel the growth of bottom-dwelling algae that wash ashore and foul beaches. The rotting algal muck can also harbor bacteria implicated in die-offs of fish and waterfowl in northern Lake Michigan.

Spawning fish often move into rivers or use rocky reefs in Lake Michigan’s main basin. Dam removal and management efforts have improved conditions for spawning fish in many rivers. Many rivers in the northeastern part of the basin support naturally reproducing runs of introduced salmon.

FISHERIES

Though 136 fish species appear in the Lake Michigan watershed, only 68 are found in the lake itself. Five types of deepwater cisco disappeared from the lake due to overfishing and invasive species. Native strains of lake trout were also extirpated by the mid-1950s. Harvest limits, habitat restoration, water quality regulations, and stocking programs have aided in partial recovery of some species, including lake trout, cisco, lake sturgeon, and Great Lakes muskellunge.

Lake Michigan is the birthplace of the Great Lakes salmon fishery. Coho salmon were successfully stocked in the Platte River in 1966, and Chinook salmon followed in 1967. Recreational salmon and trout fisheries have fluctuated over the past 50 years, but Lake Michigan still supports a large charter-fishing fleet that primarily targets the “big five” salmonines: Chinook salmon, coho salmon, steelhead (rainbow trout), brown trout, and lake trout.

Some bays and drowned river mouth lakes offer excellent fishing for other species, including walleye and smallmouth bass. Lake whitefish continues to be the most popular and valuable commercial species on Lake Michigan, although catches have declined in recent years. State-licensed commercial fishers operate in Wisconsin and Michigan waters, and tribal commercial and subsistence fisheries operate in 1836 treaty waters of northern Lake Michigan. In Illinois and Indiana, commercial fisheries for yellow perch closed in 1997.

SOCIOECONOMICS

After Lake Erie, the Lake Michigan basin has the second highest population. Major urban centers include Chicago (Illinois), Milwaukee (Wisconsin), and Green Bay (Wisconsin), each relying on the lake for shipping, municipal, and industrial water use. Chicago also uses canals and water control structures to drain up to 2.1 billion gallons of Lake Michigan water per day into the Mississippi River. Originally designed for wastewater management, the canals also affect invasive species introductions, navigation, and flood control.

The basin is a mix of residential, agricultural, and forested land, with the majority of undeveloped land found in the northern part. Many popular vacation destinations attract tourists to the Lake Michigan shoreline. The rocky points, islands, and protected bays of northern Lake Michigan are a draw for communities along Wisconsin’s Door Peninsula and Michigan resort towns like Petoskey and Traverse City. Sandy beaches and dunes stretch along most of Lake Michigan’s eastern shore from Indiana Dunes National Lakeshore in the south to Sleeping Bear Dunes National Lakeshore in the north.