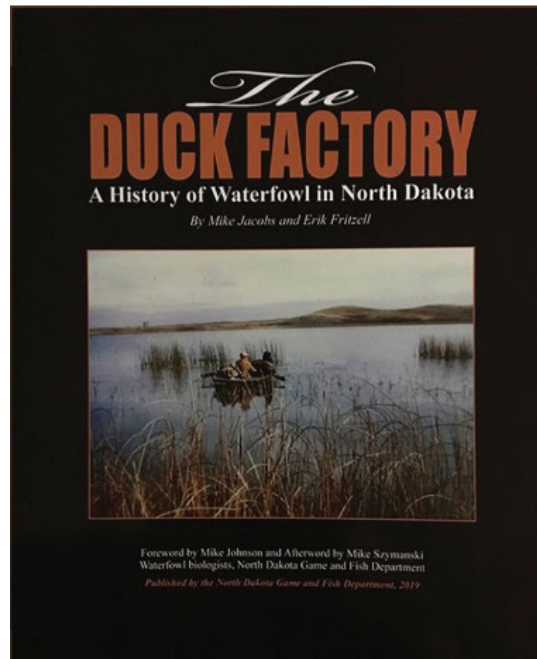


The Duck Factory: A History of Waterfowl in North Dakota, by Mike Jacobs and Erik Fritzell. 2019. North Dakota Game and Fish Department, Bismarck, North Dakota. 213 pages. \$24.99 (paperback). ISBN: 978-0-692-04233-5.

It was by geological accident that North Dakota became the heart of duck production in the continental United States. When the Wisconsin glaciation retreated some 11,000 years ago, it left an uneven layer of glacial till over much of North Dakota and nearby states and provinces, an area termed the Prairie Pothole Region. Large blocks of ice in the glacial till eventually melted and formed depressions that became wetlands, or prairie potholes. These were embedded in a matrix of soil that, with millennia of growth by deep-rooted prairie plants, became rich topsoil. The wetlands, surrounded by luxuriant grassland, were ideal places for waterfowl to breed. The rich soils of the uplands also offered attractive areas for agriculture. The interplay and conflicts between waterfowl and agriculture drove much of the history of waterfowl in North Dakota during the past century and a half. *The Duck Factory: A History of Waterfowl in North Dakota* tells the story well. Many photographs, usually historic, grace the pages of the book.



The book is adapted from a 500-page manuscript that Joseph Knue, of the North Dakota Game and Fish Department (NDGF), had researched and written but not published. Michael Johnson, the waterfowl supervisor for many years at NDGF, encouraged the authors of this book to complete Knue's project. Accordingly, the book has a NDGF flavor to it.

The "Duck Factory" actually refers to the Prairie Pothole Region (PPR), an area that is some 700,000 km², stretching from southeastern Alberta to north-central Iowa. Saskatchewan includes the largest expanse of the PPR, but North Dakota has the largest component in the United States. In most breeding seasons, the PPR hosts the majority of ducks in North America.

Wetlands of the PPR are surprisingly diverse. They range from shallow depressions that hold water for only a few weeks after spring thaw to deep lakes that rarely if ever go dry. The smaller and shallower wetlands thaw early in spring and provide abundant invertebrates, important foods for most duck species. But wetlands, which dotted the PPR before settlement by Europeans, posed inconveniences to the farmers as they used larger equipment that was difficult to maneuver around wetlands, so they drained the wetlands. Thus arose one major conflict between agriculture and waterfowl. There were others.

An earlier major conflict discussed in the book involved the uplands. Ducks once nested mostly in native grassland that surrounded the wetlands that they used for foraging and other activities. Most native prairie in North Dakota and elsewhere has been plowed to

facilitate cultivation of crops. Croplands are far less suited for duck nesting than is native prairie, in part due to reduced protective cover and in part due to disturbances by agricultural operations. The loss of native vegetation was detrimental to ducks and even more so to other grassland species.

This book nicely chronicles many of the conflicts between agriculture and ducks. For good measure, there were conflicts between governmental control and individual property rights as well as the natural dynamics of precipitation, causing the PPR to go from drought to deluge within a very short time.

Early chapters of the book, comprising *Part 1: the Duck Factory*, discuss the variety of wetlands in the state, describe the great diversity of waterfowl that use those wetlands, provide recollections of waterfowl noticed by early explorers, and chronicle how Native Americans and early explorers used waterfowl resources. To encourage development of the prairies and support their industry, railroads advertised the abundance of wild game that the prairies offered.

Settlement by Europeans heightened conflicts between humans and ducks. Crop depredations by waterfowl, spring hunting seasons, and nonresident hunters, along with plowing of the prairie and wetland drainage, were concerns at various times then and remain so today.

The Migratory Bird Treaty, ratified in 1916, granted the responsibility of waterfowl and most other migratory birds to the federal government, reducing the dizzying array of differing state laws and regulations. This perceived affront to states' rights was criticized widely, but the *Grand Forks Herald* of North Dakota welcomed the treaty as a hope to curb the declines of many bird species that were then occurring.

Many individuals of national and international note were involved in North Dakota's waterfowl history. By the end of his tenure as president, Theodore Roosevelt had established 52 national refuges, then termed "nature reservations." Three of these were in North Dakota: an island in Stump Lake, another in Chase Lake, and what eventually became Sullys Hill National Game Preserve and is now White Horse Hill National Game Preserve. Other prominent figures played key roles. One was Franklin Delano Roosevelt, who advocated for wildlife refuges, sought advice from Aldo Leopold, and appointed J.N. "Ding" Darling to lead the forerunner agency of the U.S. Fish and Wildlife Service. Darling in turn recruited J. Clark Salyer to develop the refuge system. Frederick Lincoln organized a nationwide program to band birds and proposed flyways as logical concepts for connecting breeding grounds and wintering grounds with the migration paths between them.

I was pleased to see more than a full page devoted to Merrill Hammond, a U.S. Fish and Wildlife Service employee who served as refuge biologist at J. Clark Salyer National Wildlife Refuge at a time when refuge biologists were scarce. He studied and learned much about waterfowl but published relatively little, so his contributions are generally underappreciated. He in fact recognized the bias of the apparent estimator of nest success and proposed essentially the Mayfield solution, several years before Harold Mayfield did. I had the honor of working with Hammond to analyze some of the data he had collected relating various aspects of waterfowl behavior to weather conditions. I only wish that I had spent more time with him before he passed away to gain a fuller appreciation of his insights.

The book's discussion of the controversy of the Garrison Diversion project was fascinating to this reviewer, who lived through it but did not realize the entirety of the issue at the time. The Diversion initially was intended to fulfill a long-term hope of many North Dakotans to move water from the Missouri River, where it was plentiful, to the eastern part of the state to protect against recurring droughts there. North Dakotans felt they were "owed" such a project because the state had given up much land to federal reservoirs to protect land in

more southern states. In reality, it was Native Americans who actually sacrificed their lands for those dams. The book tells of advocates (mainly agricultural) and opponents (mainly wildlifers) of the project and how they fought, leaving a sad legacy of bad feelings toward each other. Yet the project survived in a highly modified form because some disputants got together to think about changes in the plan that could yield benefits to both parties.

Minor blemishes in the book are frequent, but mostly editorial, errors. It is implied (page 21) that waterfowl species are distinguished primarily by body size, rather than by taxonomic or genetic differences. Preferred habitats of *Aix sponsa* Linnaeus (Wood Ducks) are described, albeit differently, twice within the same paragraph (page 23). The Department of the Interior is frequently referred to as Department of Interior; the authors mentioned the “Forward” and “Afterward” rather than the “Foreword” and “Afterword,” wrote “scare” where “scarce” likely was meant, “principle” for “principal,” misspelled Devils Lake, *inter alia*. The map on page 60, intended to demark the four flyways in North America, lacks indications of what the elements are.

Although I lived through many of the conflicts reported in this book, reading about them in a historical context was something of a revelation. Also, I personally knew many of the folks whose efforts were described. I respected them at the time, but seeing their accomplishments in perspective only makes me admire them more.

This book will appeal to any North Dakotan interested in the state’s history. And to the denizens of other prairie states and provinces, who have faced similar conflicts during their own history. It should be read by anyone interested in waterfowl science and management, or in conflicts between agriculture and wildlife. Wildlife practitioners will recognize, and wildlife students will learn, that waterfowl management is not solely, or even primarily, about biology. Valuable lessons indeed.

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