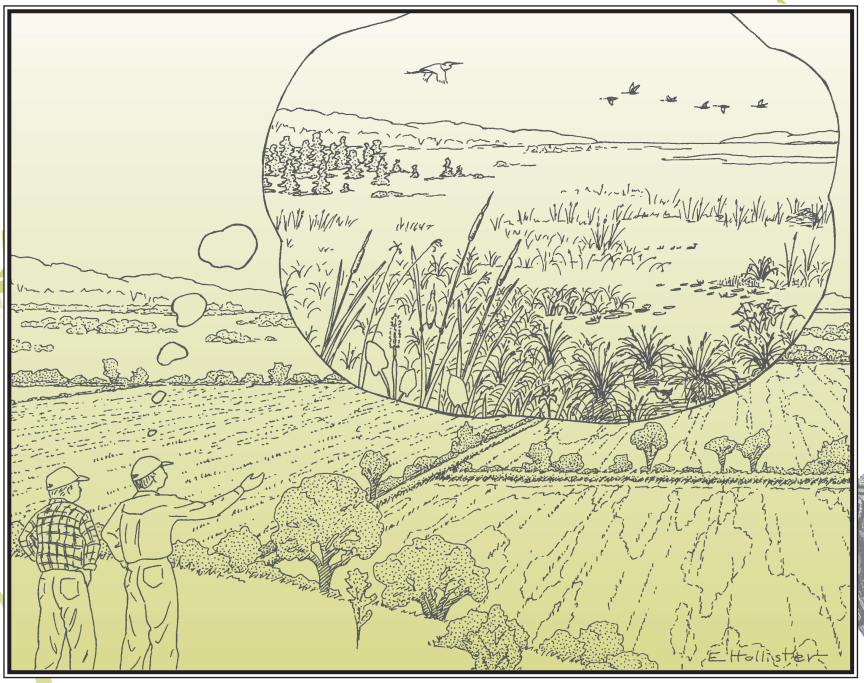
WETLAND RESTORATION HANDBOOK

for Wisconsin Landowners

2nd Edition



Alice L. Thompson and Charles S. Luthin

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The **Wisconsin Coastal Management Program**, part of the Wisconsin Department of Administration, and overseen by the **Wisconsin Coastal Management Council**, was established in 1978 to preserve, protect and manage the resources of the Lake Michigan and Lake Superior coastline for this and future generations.

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The first edition of the *Wetland Restoration Handbook for Wisconsin Landowners* was awarded the "Wisconsin's Distinguished Document Award" by the Wisconsin Library Association's Government Documents Roundtable in 2000.

Comments about the first edition of the *Wetland Restoration Handbook*:

"Stewardship of our natural resources by private landowners is essential to the health of Wisconsin's environment. This handbook provides an excellent tool to help landowners achieve their conservation goals."
Jim Ruwaldt, Private Lands Coordinator • United States Fish and Wildlife Service

"The *Wetland Restoration Handbook* is a valuable resource for citizens in protecting and restoring wetlands. The book has already become a well-used resource in Wisconsin and across the Great Lakes Basin. Citizens in our network have found the document to be thorough, informative and beautifully written and illustrated."
Jill Ryan, Director • Great Lakes Aquatic Habitat Network and Fund

"The *Handbook* has been a great resource for our landowner education programs. It provides workshop participants an easy to use reference and helps to reinforce the concepts that they've seen and discussed in class."
Rob Nelson, Education Coordinator • Aldo Leopold Foundation

"As wetland and natural resources consultants, Cedarburg Science uses the *Wetland Restoration Handbook* frequently as a reference guide and as a tool to provide background for educating landowners. It has a logical layout, and it provides technical information in a very readable format, which is important in our outreach efforts with developers and landowners."
Ginny Plumeau, President • Cedarburg Science

"For landowners and land managers who want to mend our damaged wetlands, the *Wetland Restoration Handbook* is simply indispensable. This is a practical and user-friendly guide, chock full of essential information, attractively presented. It is a book meant to be put to work; use it, and help bring health, diversity and beauty back to our landscapes."
Curt Meine, Director of Conservation Programs • Wisconsin Academy of Sciences, Arts and Letters

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2nd Edition

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Wisconsin Wetlands Association

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Preface

Wisconsin's wetlands serve many important functions. They provide economic and aesthetic benefits to their owners and to society in general. They create habitat for a diversity of wildlife, help alleviate flooding, reduce soil erosion, cleanse dirty and polluted waters, and contribute to regular water flow in streams and rivers throughout the year. It follows then, that healthy wetlands translate into a healthy environment. This handbook was produced based on the assumption that healthy wetlands benefit our communities.

This handbook contains general guidance for landowners interested in improving the health of their wetlands. It discusses conservation, management, and restoration techniques that will improve drained, ditched, or otherwise degraded wetlands, and provides a range of activities that can greatly improve the values and functions of our wetland resources.

A landowner does not need to manage or restore his or her wetland alone. This handbook provides an extensive list of federal and state agencies, conservation organizations, and private entities that can offer financial or technical assistance with private restoration projects. Various published references are also mentioned, and landowners are encouraged to turn to them for assistance.

Purpose

The objective of this handbook is to encourage the responsible and effective restoration of wetland habitats. Each wetland has its own unique characteristics, and restoration efforts should attempt to recreate, to the degree possible, the original structure, hydrology (how water interacts with the land and circulates) and plant communities that existed at the site prior to its destruction or degradation. To accomplish this requires an initial working knowledge of the history, hydrology, and ecology of the site. Moreover, attempting to recreate historic conditions ensures that the wetland is a good "fit" into the landscape, and increases the chance of restoring a site that will be self-sustaining into the future. Simply stated, historic restoration requires reversing the impacts to a wetland that initially caused its degradation.

We do not advocate the creation of wetlands where they did not exist before, nor do we encourage establishing a wetland type different from the original. For example, creating a pond or shallow pool of extensive open water by impounding water, such as with a dam, in an area that was once sedge meadow does not constitute a true restoration. Indeed, many of the original wetland functions of the sedge meadow would be lost.

Restoration ecology is a science in its infancy. Wetlands are very complex systems that have interdependent water, soils, and vegetation. No simple recipe or prescription exists for restoring what took nature the 12,000 years since the retreat of the last glacier in Wisconsin to create. The recommendations in this handbook, however, represent the "state of the science" in wetland restoration that should provide guidance for restoring private wetlands.

In December 2000, the Wisconsin DNR released an important planning document called *Reversing the Loss: A Strategy for Protecting and Restoring Wetlands in Wisconsin*. The goal of this document is to guide wetland conservation and restoration throughout the state. The vision statement from this document reads,

U. of Florida, Center for Aquatic Plants (Gainesville)

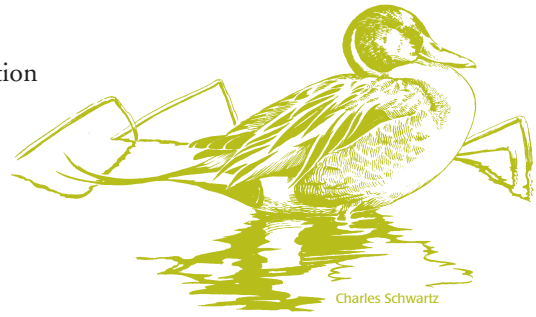
"We promote, restore, enhance, and preserve the quantity, quality, and diversity of Wisconsin's wetlands as a critical component of ecosystems essential to the health and quality of life of our state's diverse citizenry, plants, animals, and landscapes." The strategy is available at the Wisconsin DNR's web site at: **www.dnr.wi.gov/org/water/fhp/wetlands/.**

In the *Reversing the Loss* strategy, the Wisconsin DNR gives high priority to wetland restoration. Cooperation between private landowners and public agencies to restore degraded and destroyed wetlands could help reverse the trend of wetland losses over the past century. It is possible to envision thousands of acres of Wisconsin's degraded wetlands restored over the next decade, restoring the lost functions these wet landscapes offer to humans and wildlife alike. This would serve as a lasting legacy for future generations.

This revised edition of the *Wetland Restoration Handbook* provides considerably more information to landowners interested in wetland restoration than the first edition. We have expanded the chapters that explain restoration techniques, describe control strategies for invasive plants in-depth, and have included a new chapter on post-restoration site management. Where available, we have incorporated new ideas and techniques that have surfaced since the first edition was written. Several chapters have been rearranged to provide information in a more logical sequence. Furthermore, we have updated the lists of agency contacts for regulatory needs and restoration assistance and added new web sites with pertinent wetland information. Since the first edition of the handbook was published, Wisconsin Wetlands Association has produced the *Wetland Resource Directory*, an extensive list of scientists, agency personnel, private consultants, nurseries, and other individuals involved in wetland conservation, science, restoration, or management. This directory is available at the Wisconsin Wetlands Association web site (**www.wiscwetlands.org**). We encourage you to visit this directory if you are in need of any contacts on wetland-related issues.

The opportunities for wetland restoration in Wisconsin and throughout the country are better than ever before in the history of our nation. In the 2002 Farm Bill, the United States Congress allocated significant funding to support various farm conservation programs. This includes the very popular and successful Wetland Reserve Program (WRP) described in Chapter 8 of this handbook. The funds available to the Natural Resources Conservation Service for wetland restoration in Wisconsin under the WRP are four to five times more than in previous years. With any luck, this popular program will be continued for many years. The WRP, in combination with other state and federal conservation programs, will help increase the number of wetland acres restored in Wisconsin. We encourage landowners to take advantage of the very favorable financial terms of these conservation programs while the opportunity exists.

Wisconsin Wetlands Association
December 2003


Charles Schwartz

Foreword

Joy B. Zedler, Aldo Leopold Chair in Restoration Ecology, University of Wisconsin-Madison

Individual landowners can make a difference in restoring wetland habitat. In fact, private property owners are the hope for reversing the trend of declining "ecosystem services," that is, processes that wetlands carry out that benefit society as well as individual landowners. Your restoration of wetlands will help abate flooding, improve water quality, and support biodiversity!

Many readers will already know that over half of the wetland acreage in the contiguous United States has been lost over the past 200 years. The United States Fish and Wildlife Service compared historical maps with recent census data on wetland area to give us a quantitative measure of loss. But no one has a good measure of the cumulative loss of wetland biodiversity-how many of the native wetland species have declined, and over what portion of their historical range? In one small fen at the University of Wisconsin-Madison Arboretum, more than half of the historical 50 plus species are missing, perhaps as a result of groundwater drawdown and crowding by invasive species. If native species are being lost in protected areas, such as the Arboretum, biodiversity is sure to be declining in unprotected areas, wherever hydrological regimes have been altered and wherever invasive species are becoming dominant.

Driving across Wisconsin, I am reassured by the knowledge that about half of our historical wetland acreage is still intact, while at the same time deeply concerned by the degraded condition of many wetland remnants. Invasive plants such as reed canary grass, purple loosestrife, and hybrid cattails are extremely widespread and often dominant. It is clear that the expansion of invasive species has caused the decline of many natives.

How can we halt and reverse such trends? Three positive actions can be taken. We can: 1) protect the region's best wetland sites and manage them to sustain biodiversity, 2) improve conditions at wetlands that are losing biodiversity, perhaps by learning why species are being lost so we can correct the problems and reintroduce species, and 3) restore former wetlands to expand acreage and foster the growth of native species. As individuals, we can participate by contributing to organizations that do this work. As landowners, a privileged few of us can participate directly in all three activities.

My wetland has a dense stand of reed canary grass that appears to be marching across the sedge meadow. My students and other researchers have learned a great deal about this pest plant, and we are continually looking for new methods to control this invasive species without damaging other plants and sensitive animals. We don't have prescriptions yet, but we know that it is easier to remove the plant as it establishes in remnant wetlands than to wait and attempt to control dense stands without damaging the native plants.

Where former wetlands have been filled or drained, most of the native species died out when the water supplies were eliminated. Replenishing the water and watching the vegetation and invertebrate fauna develop would be like uncovering a great ecological treasure chest. Perhaps there is a species-rich seed bank that

would display its bounty as soon as the soil is wet enough to stimulate germination. If not, the wind and inflowing water would surely bring in seeds from other wetlands. The newly restored wetland would then grow plants that would attract birds and other animals which, in turn, would bring in more seeds and more species. Over time, it might accumulate dozens of native species.

But, even then, the gems of the wetland treasure trove would be vulnerable to attack by unwanted invaders—"marauding species" that could reduce the wetland's rich vegetation to a single invasive plant. In that event, it would be critical to be on the lookout for the earliest arrivals, so that they could be hand-pulled before they spread.

Obviously, wetland restoration has multiple responsibilities, involving both the renewal of wetland environmental conditions and the protection of the native inhabitants. Fortunately for landowners, this guidebook offers sound advice for accomplishing both objectives. Alice Thompson and Charlie Luthin have ably pulled together a wealth of information. If you put it to use in your degraded wetland, you *will* make a difference. Your contribution toward the restoration of lost wetland acreage *will* benefit native wetland species. If enough landowners participate in wetland restoration, the collective efforts will also enhance floodwater absorption and improve water quality. I'm sure you will find the advice you need to help sustain its diverse and valuable wetland resources.

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