



Building a  
Culture of Conservation  
Farmer to Farmer: lowan to lowan



# Wetlands Implementation

Wetlands are vital to life as we know it. These amazing, diverse, and biologically productive ecosystems provide a multitude of services: water filtration, trapping of sediment, transformation of pollutants, carbon storage, wildlife habitat, and beauty. Understanding the ecological importance of wetlands, as well as how they function, will help us all better appreciate these vibrant—and vital—parts of our landscape.



## What are wetlands?

Wetlands are transition zones where the land meets the water—diverse ecosystems that are wet for at least part of the year. Wetlands are characterized as having unique hydrology, soil, and vegetation. The Clean Water Act defines wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

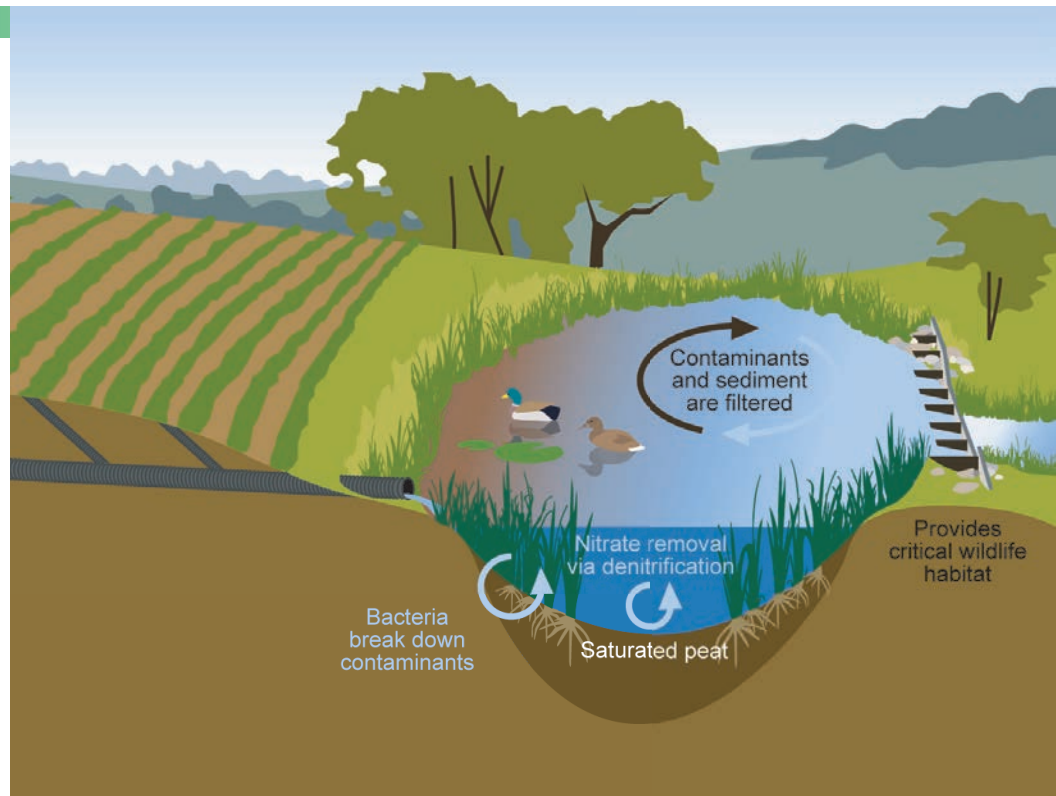
Much of what is now the Corn Belt was once characterized by extensive wetlands dotting the vast prairie. Today, an estimated 60 percent

## How do wetlands improve water quality?

Wetlands improve water quality by slowing the flow of water. When the velocity of water slows down, as in wetlands, sediment is unable to stay suspended. Thus, the sediment particles gradually settle to the bottom where wetland plants hold the accumulated sediment in place. This allows wetlands to act like a filter, capturing sediment and other pollutants.

Further, strategically placed wetlands can also improve water quality through the process of denitrification. Microbes consume nitrate ( $\text{NO}_3^-$ ), the way humans use oxygen when we breathe and respire, converting the nitrate to inert  $\text{N}_2$  gas (comprising 80% of the atmosphere).

These nitrate removal wetlands are ideal locations for denitrification to occur because they provide saturated anaerobic soil conditions, and the system is supplied with a source of nitrate from agricultural drainage water. Aquatic plants and wetland soils provide surfaces on which those microbes live, in addition to providing organic carbon to help maintain growth and metabolism of the denitrifying microbes.

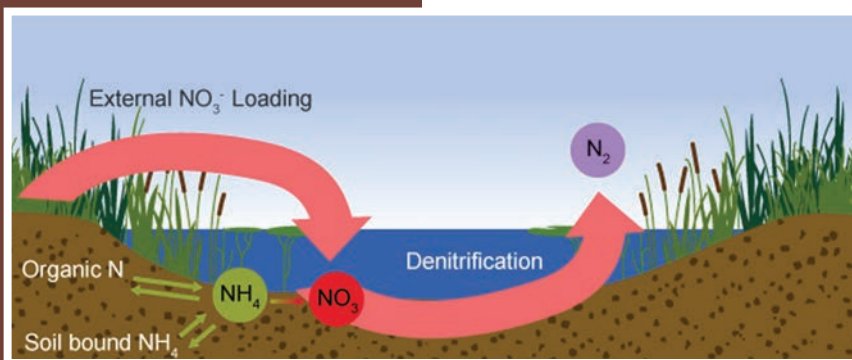


of wetlands worldwide have been damaged or destroyed. The rate of loss is even more dramatic in Iowa, where over 90 percent of wetlands have been lost since western expansion and settlement. Many of these “prairie pothole” wetlands were drained to make land suitable for agriculture. In addition, dam construction, urban development, pollution, groundwater pumping, and logging have also contributed to the decline of wetlands.

## Why are wetlands important?

Wetlands provide a multitude of benefits, including water quality enhancement, wildlife habitat, and mitigation of flood damage, in addition to a great deal of aesthetic beauty on the landscape. Wetlands house an impressive amount of biodiversity, providing food and habitat to half of U.S. migratory bird species as well as insects, reptiles, amphibians, mammals, aquatic plants, and a multitude of microorganisms unseen by the human eye.

In addition to wildlife benefits, wetlands are also widely accepted as an effective management tool to reduce the impacts of agricultural production. Research has shown that when strategically placed to intercept tile drainage water, wetlands can reduce nitrate loads by 40-70 percent, improving water quality on the watershed scale as well as sending cleaner water downstream.<sup>1</sup>



Converting 2-3 percent of the land area into wetlands production can substantially reduce nutrient export on the watershed scale. These changes can make a big difference towards Iowa's Nutrient Reduction Strategy goals of cutting nonpoint source pollution loads by 41 percent for nitrogen and 29 percent for phosphorus.

<sup>1</sup>Iowa Conservation Reserve Enhancement Program

## Implementing wetlands: It begins with you

The majority of land in the U.S. is in private ownership, which means that implementing wetlands in the quantity needed to restore their function on the landscape must come from the initiative of private landowners.

Frederick Martens, a Madison County, Iowa, farmer who has been involved in wetlands restoration on his land, says:

**“It just seemed like the right thing to do. Badger Creek Lake is on the Impaired Waterways list, and we’re part of the watershed, and we wanted to do our part to get the lake off the list. So if this is one way of us being able to help out, well that’s great... It really didn’t take that much land out of production compared to the benefits we’re giving the watershed.”**

Many of the prime locations for wetlands are also on marginal farmland that is already prone to ponding. Therefore, adding a wetland can substantially reduce farm nutrient export without sacrificing highly productive farmland.

Although their value is clearly apparent, implementing wetlands can seem a daunting task. However, there are numerous organizations and resources available to help successfully navigate a wetland project. Many federal and state agencies have local offices that can provide planning and/or financial assistance. Furthermore, topographic maps, soil maps, aerial photos, and historic land use data are readily available through such federal agencies as the Natural Resources Conservation Service (NRCS) and United States Geological Survey (USGS).

### Creating, restoring, and enhancing wetlands

Wetland projects fall into three basic categories: creation, restoration, and enhancement. Creation of a wetland involves building a wetland where none existed before. Restoration and enhancement involve recreating and/or improving areas that were formerly wetlands. While these sites have been drained and/or filled, they often retain their characteristic soils and hydrology, allowing the natural functions to be reclaimed.

Proper site selection is crucial for wetlands. Strategic placement of wetlands on the landscape can be a valuable tool in mitigating nonpoint source pollution. It is critical that the wetland receives the water to be treated. For example, if the wetland is targeted for nitrate removal, it must be strategically located where it can intercept tile drainage water. Other wetlands are placed primarily for wildlife and game habitat.

Since the 1980s, the number of wetlands in Iowa has increased modestly. Some wetland restoration and enhancement

projects have made use of natural revegetation when native soil wasn’t fully removed or covered and the endemic seed bank was still present. Other

### Financial assistance programs

*\*The following list is not exhaustive*

Numerous federal and state programs offer financial assistance for wetlands restoration and enhancement. Contact your local USDA-NRCS or USDA-FSA office to determine which financial program(s) you may be eligible for:

- Clean Water Act State Revolving Fund
- Conservation Reserve Program
- Conservation Reserve Enhancement Program
- Emergency Watershed Protection Program
- Environmental Quality Incentives Program
- Farmable Wetlands Program
- Nonpoint Source Implementation Grants

**“Iowa has already somewhere between 90 and 99 percent of its wetlands. In my view, whether it’s a recreated wetland, if it’s a restored wetland, or if it’s a constructed wetland, that’s still a positive move.”**

– Rebecca Christoffel, Wildlife Specialist, Snake Conservation Society

## References

*An Introduction and User's Guide to Wetland Restoration, Creation, and Enhancement*. 2003. National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, Natural Resources Conservation Service, U.S. Fish and Wildlife Service, and U.S. Army Corps of Engineers.

"Incredible Wetlands" A Water Rocks! video production.  
Directed by J. Comito. 2014.

Iowa Conservation Reserve Enhancement Program.

<http://www.iowacrep.org/>

*Iowa Nutrient Reduction Strategy: A Science and Technology-based Framework to Assess and Reduce Nutrients to Iowa Waters and the Gulf of Mexico*, 2013. Iowa Department of Agriculture and Land Stewardship, Iowa Department of Natural Resources, Iowa State University.

O'Geen, A.T., R. Budd, J. Gan, J.J. Maynard, S.J. Parikh, and R.A. Dahlgren. "Mitigating Nonpoint Source Pollution in Agriculture with Constructed and Restored Wetlands" 2010. In: *Advances in Agronomy*, Vol. 108, pp.3-41.

United States Department of Agriculture, Farm Service Agency.  
<https://www.fsa.usda.gov/>

"Wetlands as Nutrient Sinks in Agricultural Landscapes"  
Iowa Learning Farms webinar, 2013.  
Crumpton, W. G.  
<http://www.extension.iastate.edu/ilf/page/webinars>

restoration and enhancement projects may rely on seeding and transplants, which underscores the need for proper planning.

Invasive species can also be a challenge in wetland ecosystems as they can overtake native vegetation and/or rapidly degrade wetland quality. Invasive species should be identified and managed carefully as part of any wetland restoration project.

Finally, remember that the work continues even after successful wetlands implementation. Routine maintenance and monitoring will ensure that wetlands continue to provide a host of benefits and services to humans, wildlife, and the larger ecosystem as a whole.

## Wetlands by the numbers...

40-70% nitrate load reduction for water passing through wetlands strategically placed for water quality

46% of threatened and endangered species in the U.S. require wetlands

50% of migratory bird species depend on wetlands

60% of wetlands worldwide have been drained or otherwise damaged

90% of wetlands in Iowa have been lost since western expansion and settlement



## For more information

Contact your area Iowa State University Extension and Outreach Field Agronomist or your local Natural Resources Conservation Service office for more information about installing a wetland.

Iowa Learning Farms  
1201 Sukup Hall  
Iowa State University  
Ames, Iowa 50011-3080  
[ilf@iastate.edu](mailto:ilf@iastate.edu)

[www.extension.iastate.edu/ilf](http://www.extension.iastate.edu/ilf)

Iowa Learning Farms is funded by the Iowa Department of Agriculture and Land Stewardship through the Integrated Farm and Livestock Demonstration Program, in collaboration with Iowa Department of Natural Resources (United States Environmental Protection Agency), Natural Resources Conservation Service, Conservation Districts of Iowa, Iowa State University Extension and Outreach, Leopold Center for Sustainable Agriculture, Iowa Farm Bureau Federation and Iowa Water Center. This cooperative project has been funded in part through Section 319 of the Clean Water Act.

