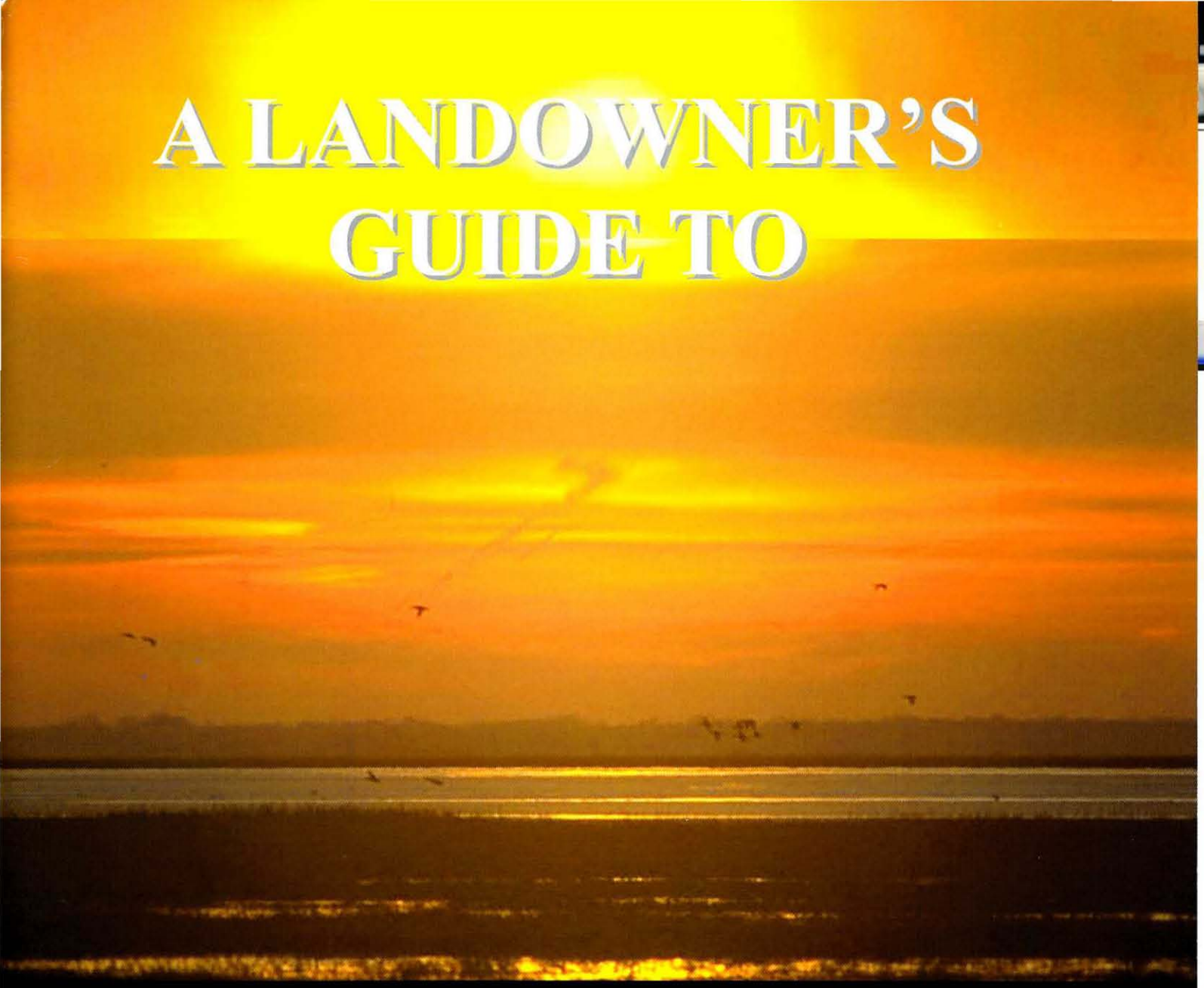

A LANDOWNER'S GUIDE TO

WETLAND CONSERVATION IN THE NORTHERN TALLGRASS PRAIRIES

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Acknowledgements:

Funding for publication of this booklet was generously provided by: Minnesota Department of Natural Resources (Division of Wildlife, and the Conservation Partners program); the Metropolitan Council, the Prairie Pothole Joint Venture through the U.S. Fish and Wildlife Service, and Ducks Unlimited.

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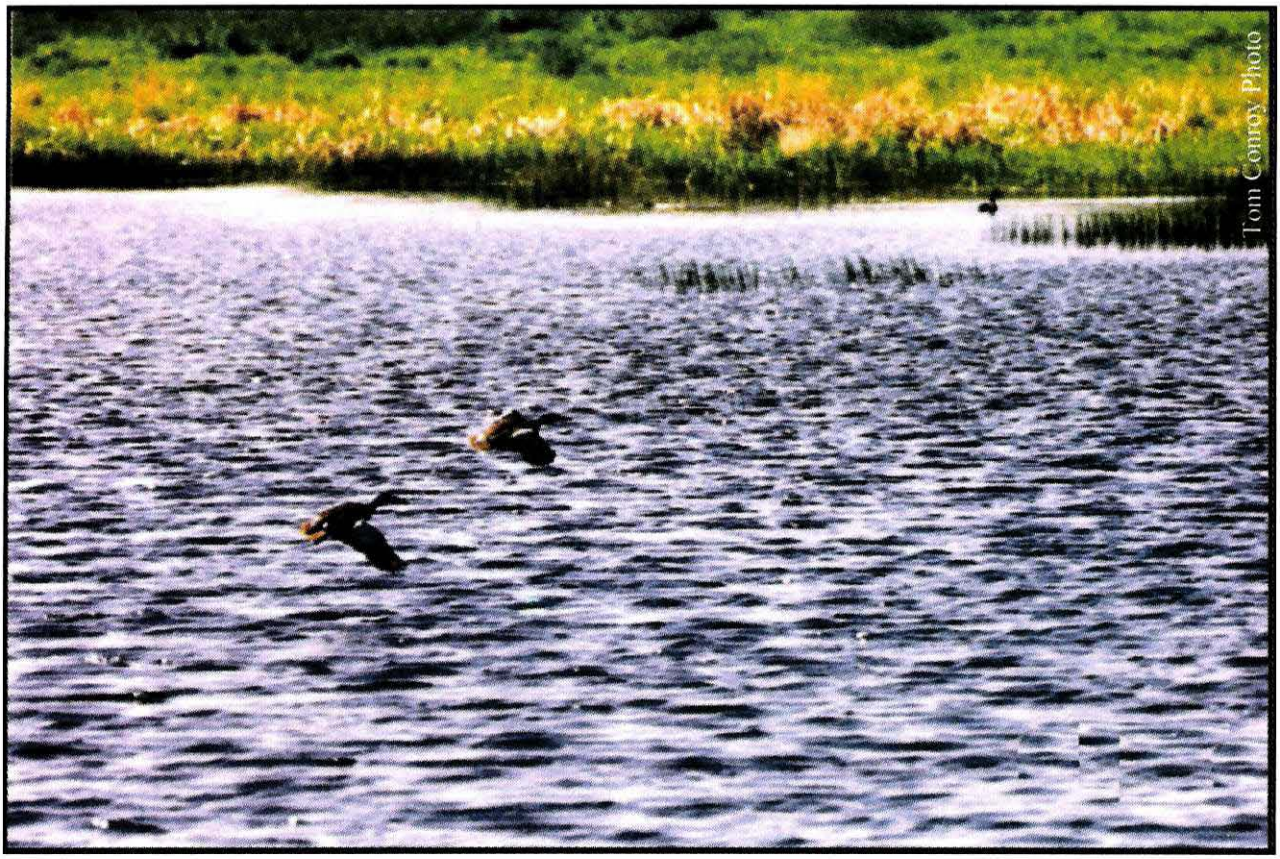
Ducks Unlimited conserves, restores, and manages wetlands and associated habitats for North America's waterfowl. These habitats also benefit other wildlife and people.

DUCKS UNLIMITED

Introduction



Chickens scatter as a young boy and his dog stride briskly across the farmyard. The lad carries a tooth-marked old shotgun in his arms, shells in his pockets. Corn husks and leaves skitter by in the wind as they round the barn and head across the corn stubble.

The dog quickly grows excited, its tail whipping back and forth. Across a fence-line, beyond the stubble—the marsh. And ducks. Swarms of ducks, coming and going, for no apparent reason. A pair of blue-winged teal suddenly zip past the boy, so close he can hear the 'whoosh.' The youngster tightens his grip on the old double-barrel and hunkers down.

Dusk is settling over the farm when the boy and the dog finally return from the slough. From inside the farmhouse kitchen come the muffled sounds of voices and laughter. The boy steps up on the porch and opens the kitchen door, the sweet aroma of home-made bread and ham filling his nostrils. Heads turn and smiling faces fill the room as the boy proudly raises his ducks for all to see.

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Slowly, the old man lifts himself from the chair and shuffles through the kitchen to the back porch. In the distance he can see the glistening blue water of the marsh. A wistful smile creases his face as his thoughts drift back in time.

He can still see those smiling faces in the kitchen and he can almost smell the ham and homemade bread. He remembers when years later they drained the marsh and then how they decided to restore it after the grandkids began to arrive.

The old man continues gazing out at the marsh. Tomorrow a grandson and friends will be here early. Another duck season has arrived! Seems like only yesterday. In his imagination he hears a "whoosh" - that sudden, wonderful "whoosh!"

The swirling winds of time have dramatically remodeled the landscape and the way we live. Today, farmyard chickens and barns are found as often on old pictures as on actual farms. Most of the cattail sloughs that once harbored ducks, pheasants, and a myriad of other life forms have vanished. Corn and bean fields are much larger and cleaner, unfettered by grassy fence rows.

Most of us once had friends or relatives "down on the farm." No longer. As more and more people moved off the farm and into the city, society began to lose its' connection to the land and with the people who do still live there.

Amidst all the change, however, one thing has remained constant - worry about water. In the "old days," we fretted about "too much" water on the landscape and how to get rid of it. Today, we worry about not enough clean water, on the ground and below the surface. Often, we are troubled by too much water, coming too fast, in places where it never used to come. What was once a smoothly-functioning hydrologic system is now, in many respects, broken.

Fortunately, we now understand the hydrologic problems that have arisen because of the destruction of wetland complexes. And, like the old man who was once a young hunter, many of us are choosing to do something about it.

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Purpose of This Guidebook

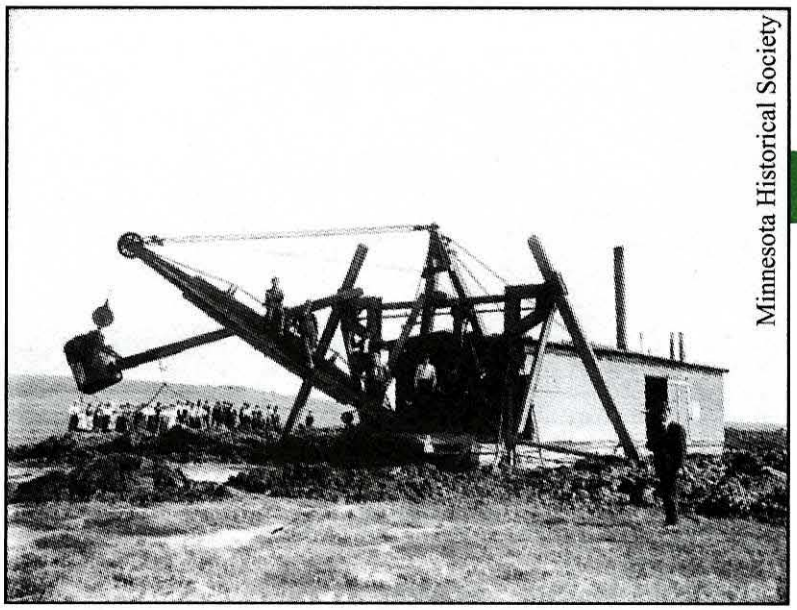
"We need the tonic of wildness - to wade sometimes in marshes where the bittern and the meadow-hen lurk, and hear the booming of the snipe; to smell the whispering sedge where only some wilder and more solitary fowl builds her nest, and the mink crawls with its belly close to the ground."

Henry David Thoreau, "Walden."

We were relentless. We broke it, drained it, filled it. A chip here, a chunk there. Day after day. All the while, we seemed not to notice that the "progress" we were measuring in feet was rapidly consuming acres.

In due time, the tallgrass prairie ecosystem, a once-vast expanse of prairie and wetlands, had all but vanished. Eventually we came to realize that sometimes you truly "don't know what you've got 'til it's gone." Today, efforts are underway to restore at least some of what once was.

The dramatic loss of wetlands in the northern Tallgrass Prairie Region has had dire consequences. Populations of most wetland wildlife species pale in comparison to what they once were, and their futures remain precarious. Water quality and quantity problems are growing. In short, excessive wetland drainage has caused a serious imbalance on the landscape.



Minnesota Historical Society

While the long-term future of waterfowl is unknown, this much is certain. The flickering wings of waterfowl will rise or fall in concert with the actions of private landowners and concerned conservationists. Nearly three-fourths of the wetlands remaining in the United States today are controlled by private landowners. The large majority of ducks hatched in the U.S. come from private lands.

This guidebook is intended for the landowner with an interest in restoring or protecting wetlands in the northern Tallgrass Prairie Region. From the "why" to the "how to," this booklet will provide information on how to get started and where to go for assistance. The description of management issues will focus primarily on waterfowl, for that is a principal goal of many landowners. Restoring prairie wetlands, however, benefits virtually all wetland wildlife. While thorough discussion of all management possibilities is beyond the scope of this booklet, we'll point out key issues and references when possible.

We hope you find this booklet helpful. We can make a difference. Today. For tomorrow.

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The Tallgrass Prairie: Then and Now

One day, not so long ago, a party of French explorers came upon a landscape unlike anything they had ever seen—the tallgrass prairie.

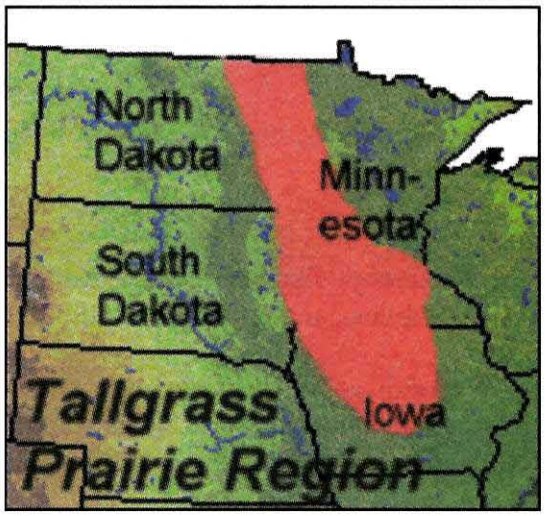
After passing through fringes of it in Ohio and eastern Indiana, the explorers first encountered the true vastness of the tallgrass prairie in Illinois. Before them lay a seemingly endless ocean of bluestem and other grass species as high as twelve feet.

Those grasses once covered western Illinois, 80 percent of Iowa, the southwest corner of Wisconsin, southwestern Minnesota, southern Manitoba, the eastern Dakotas, and parts of Nebraska, Kansas, Oklahoma and Texas. All told, some 142 million acres of tallgrass prairie existed at the time these early explorers first arrived.

This guidebook will focus on the northern tallgrass prairie (though it could be useful in other areas). This sub-region of the tallgrass prairie ecosystem is characterized by a glacial pothole topography and the dominance of tallgrass species such as indiangrass, big bluestem, and switchgrass. This area also has high levels of annual precipitation (up to 30 inches per year). Situated between the aspen parkland to the

north and northwest, mixed grass prairie to the west, and prairie-forest ecoregions to the east, the tallgrass prairie is most dominant on well-drained, drier sites. Wetter soils support prairie cordgrass, wetland forbs, bulrush and cattails.

Bison and elk once roamed these tallgrass prairies, where they were hunted by prairie wolves and mountain lions. These species are now mostly gone, although bison are sustained on large preserves and wolves occasionally enter the ecoregion from the northeast. Today, prairie songbirds, shorebirds, pheasants, waterfowl, white-tailed deer, white-tailed jackrabbits, skunks, red foxes, coyotes, mink, muskrat, several amphibians, and a host of other species characterize the wildlife of the Tallgrass Prairie Region.



Just 170 years ago, millions of acres of prairie and wetlands blanketed America's heartland, stretching from Mexico into Canada. By the 1800s, however, word of the extremely rich, deep soil of this region had spread like the wildfires that once helped nourish it. The prairie soil was ideal for farming and by the turn of the century the tallgrass prairie had all but disappeared.

Today:

- In Iowa and Minnesota, 99.9 and 99.6 percent declines in tallgrass prairie have occurred, respectively, leaving only about 300,000 of the original 25 million acres.
- 55 grassland-dependent bird species in the U.S. are now either on threatened or endangered lists.
- Once lost, intricate, complex prairie ecosystems can never be completely restored.

Characteristic Plant and Wildlife Species

Common	*Rare*
Big Bluestem	*Prairie Bush Clover*
Indiangrass	*Western Prairie Fringed Orchid*
Switchgrass	*Small White Lady's-Slipper*
Prairie Rose	*Upland Sandpiper*
Western Kingbird	*Burrowing Owl*
Lesser Prairie Chicken	*Avocet*
Northern Harrier	*Milk Snake*
Red Fox	*Western Hognose Snake*
Coyote	*Wilson's Phalarope*
Painted Turtle	
White-tailed Jackrabbit	
Eastern Garter Snake	

Along with the grasslands, wetlands have also disappeared from the tallgrass prairie landscape. As our fledgling nation marched westward, wetlands were considered nothing more than obstacles to eliminate. Where once hundreds of thousands of vibrant wetlands dotted this prairie canvas, 95 percent had vanished by 1980.

What now remains of the tallgrass prairie ecosystem is found only in scattered small tracts between Manitoba and central Iowa.

We can't turn back the clock, but we can make a better future by saving and restoring wetlands and prairie. That is today's tallgrass prairie challenge.

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Wetlands: What Are They?

Murky, muddy, mucky—maybe even smelly!

Think "wetland" and those are some of the words that might come to mind. While a wetland can be all those things, a wetland is also a life-giving thing of beauty and mystery. Supporting more life forms than just about any other habitat on earth, wetlands provide homes for some 5,000 species of plants, 190 types of amphibians, and one-third of all bird species in the United States.

Wetlands go by various names. Slough. Swamp. Pothole. Marsh. Bog. Fen. Simply put, a wetland is a natural, shallow area that holds water. It may hold water for as little as a few weeks or year-round. A wetland can be as small as a wading pool or up to hundreds or even thousands of acres in size.

While wetlands come in various shapes and sizes and have varying characteristics, all wetlands share these traits:

- They have soils that developed in wet conditions (hydric soils).
- Under normal circumstances they have vegetation that is adapted to growing in wet conditions.
- They are wet either on the surface or near the surface during all or part of the growing season.

The Circular 39 classification, developed by the U.S. Fish and Wildlife Service in 1956, is a wetland description system that identifies wetlands by types. Generally, there are five wetland types in the Tallgrass Prairie Region. These types provide the nursery that produces a large share of the continent's duck population.

Type 1 Wetlands

Seasonally-flooded basins or floodplains usually have water only a few days or weeks each spring. Vegetation varies according to the season and amount of flooding.

Type 2 Wetlands

These "wet meadows" are without standing water for much of the growing season but the soil is saturated below the surface. Vegetation includes grasses, sedges, rushes and various broad-leaved plants.

Type 3 Wetlands

Shallow marshes have soil that is usually waterlogged early in the spring and often covered with six or more inches of water. Vegetation includes grasses, bulrushes, spikerushes, cattails, arrowheads, pickerelweed, and smartweeds.

Type 4 Wetlands

These deep marshes are generally covered with anywhere from six inches to three feet of water during the spring and summer. Vegetation includes cattails, reeds, bulrushes, spikerushes, and wild rice. In open areas, pondweed, naiads, coontail, watermilfoils, waterweeds, duckweeds, waterlilies or spatterdocks may grow.

Type 5 Wetlands

Open water wetlands, including shallow ponds and reservoirs, where the water is less than six feet deep and fringed by a border of emergent vegetation. These are sometimes referred to as "tweener" lakes as they can provide either fish or wildlife habitat, depending on climatic conditions.

In this booklet, we will refer to wetlands simply as "seasonal" (Type 1 & 2), semi-permanent (Type 3 & 4) or permanent (Type 5). Be aware of what these types are, because each has different—but critically important!—values.

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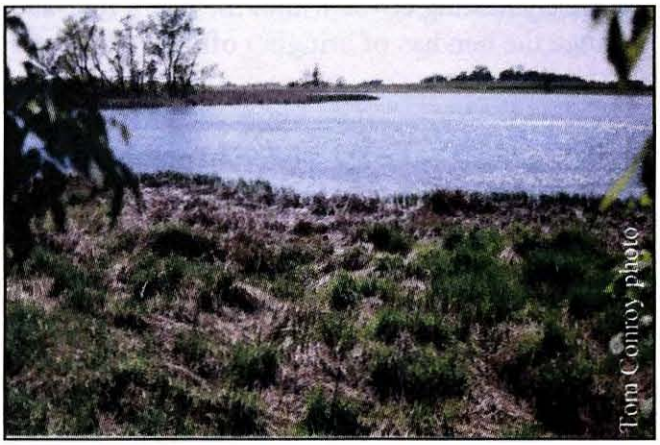


Needs of Waterfowl

Deep in a black southern night, something stirs within the mallard. The primordial urge quickly spreads amongst the flock. Around daybreak, the hen lifts off the water and doesn't look back. Others quickly join her. Although ice still covers the waters of the north, the spring migration is underway.

Until ducks start talking, we'll never know for sure exactly how they do it. But each spring they somehow manage to migrate from their southern wintering grounds all the way to the northern breeding grounds - and then back again in the fall.

While migration will probably always be something of a mystery, we do understand the essential role wetlands play all along the way for waterfowl. Once waterfowl finally reach the Tallgrass Prairie Region, wetlands will play a critical role in how many ducks are born and how many survive. In many ways, the needs of waterfowl mirror the needs of many other wetland birds - they'll serve as a "wildlife proxy."

Biologists have determined that four main factors determine how successful waterfowl will be in surviving and reproducing in an area. These factors are:

- A variety of wetland types and the way they change due to wet and dry conditions over the course of a summer and during prolonged wet and dry periods.
- The size and types of upland habitat and the way those grassland habitats are managed.
- The mix of wetlands and uplands and their proximity to one another within a hen duck's home nesting range—about 4 square miles for a mallard hen.
- The abundance and variety of predators present, as well as the availability of other prey species.

As a rule of thumb, biologists look for the presence of the above factors over a four-square-mile area—the home nesting area for a typical hen mallard. Although waterfowl needs vary by species and according to the phase of the breeding cycle (from spring pairing to fall flight), each of the above factors needs to be considered when developing a land management strategy.

From a duck's standpoint, a suitable area would have an abundance of wetlands and a sufficient amount of grassy nesting cover within the hen's four-square mile home nesting area. The less of this, the less chance the hen has of bringing off a hatch. Let's take a closer look at each of these factors.

Wetlands

Before they leave the wintering grounds, male and female mallards are already pairing up. On the way north, they do their best to retain or even gain body weight by feeding heavily on aquatic invertebrates and plant seeds in the shallow wetlands that are first to thaw out.

The most valuable of these shallow wetlands have neither an inlet nor outlet and thus are free of fish. This is key as it allows freshwater shrimp, midge larvae, snails and other aquatic invertebrates to flourish, providing waterfowl and numerous other birds with a high-protein smorgasbord of food. Protein and calcium are critical nutrients for nesting and egg-laying hens.

Unfortunately, because the value of these shallow, temporary waters is not often understood, they are considered "nuisances" by farmers and others who would prefer to drain them. Too, they are generally very easily drained, filled or otherwise destroyed. As a result, they are the most threatened of all wetland types.

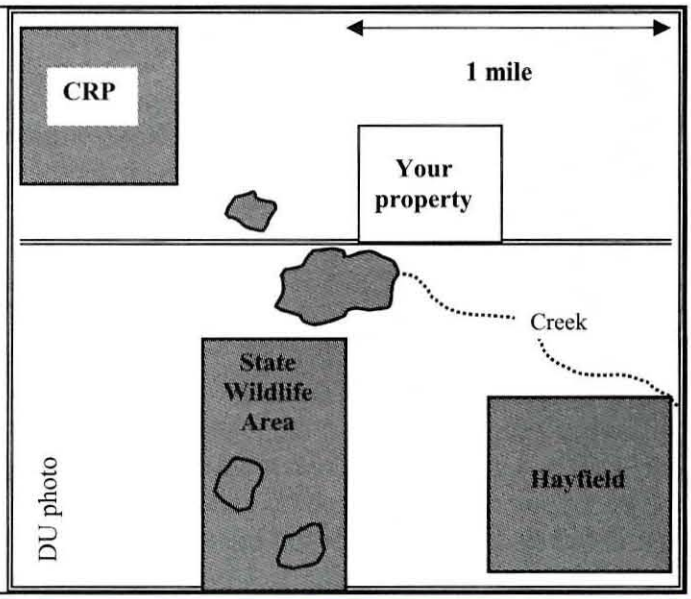
As ducks arrive on the nesting grounds, very soon after ice-out, pairs seek out suitable areas to get down to the serious business of nesting. At this point, hens will look for an area that also includes more permanent shallow water (semi-permanent wetlands or Type 4 in the circular 39 classification) that will provide needed habitat for later in the breeding cycle and for raising their young. This is also the wetland type that diving ducks like redheads and canvasbacks use for nesting. They build a platform of vegetation among the cattails and bulrushes—right near the open water.

Because mallards (like most waterfowl) are territorial, they look for privacy - a slough of their own - and will try to prevent other pairs from intruding. These may be relatively small wetlands (even less than an acre), but larger, semi-permanent wetlands should be close by. This is where the hen will bring her new brood upon hatching. Before and during migration, permanent wetlands (Type 5) are a preferred wetland type.

Uplands

Most dabbling ducks like mallards nest in grassy uplands—often quite a distance from water. But not just any clump of grass will suffice for a nest site. Biologists estimate that in the Tallgrass Prairie Region at least 20 percent of the surrounding landscape should be in safe, grassy nesting cover before the average mallard hen can nest successfully. That's approximately 120 acres in a typical square mile. Less than that and more hens in the population will die during the year than are produced, resulting in a declining population. This is generally true for other prairie birds, as well, all of which suffer greater predation losses when grasslands are fragmented into small patches. Strips of cover—like narrow roadsides or ditchbanks—also pose problems for these birds as they are so easy for predators to hunt. In sum, large blocks, comprising at least 20 percent of the landscape, should be in good grass cover to truly help waterfowl and other prairie birds.

On the right is a good example of how the surrounding properties can affect the value of your property for a nesting hen mallard. In this case, in the 4-square miles surrounding the large marsh adjacent to your property, there is an abundance of small wetlands and grasslands. With this abundance of grasslands, your efforts can focus on wetland restoration. Additional grasslands are always desirable, however, so make sure you maintain a 4:1 upland to wetland ratio on all your wetland restoration sites.



Wetland Complexes

A variety of wetland types within close proximity to each other is referred to as a "wetland complex." Because of the variety it offers, a wetland complex will understandably better meet the needs of waterfowl than an area that has just one wetland type.


DU photo

When both temporary and semi-permanent wetlands, along with adequate upland grass nesting habitat, is located within a hen's four-square-mile nesting home range, hens can produce numerous young. When it comes to managing your own land, this means you should also determine what available habitat there might be on adjacent lands. If key ingredients are missing (either wetlands or uplands), those are the habitats you would first want to consider providing.


DU

Predators

Predation is the number one limiting factor when it comes to the success of most wildlife species. In particular, for ducks and other grassland birds, predation can completely eliminate annual production. Predators may simply destroy eggs, or in the worst case, kill hens. Providing abundant upland cover is the key to minimizing the effect of predators **(see page 33)**. Unless you effectively eliminate nearly all nest predators like skunks, raccoons and fox, control programs don't work.

In summary, to address wetland wildlife needs, look at the habitat available within a four-square mile area (approximately a one-mile radius from the center of your property). Optimum habitat in that area would include:

- At least 500 acres of secure grassy nesting cover.
- At least one large, semi-permanent marsh of at least 10 acres.
- Several smaller, semi-permanent and seasonal wetlands.

For breeding wildlife like the mallard hen, it is an uphill battle at best. On average, only one or two of every 10 hen mallards that reach the spring breeding grounds will actually bring off a brood and only half the brood survives. Poor habitat conditions, predators, disease, and weather can all conspire against the hen in her attempts to hatch and raise her young. Your efforts can help her succeed.

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Benefits of Wetland Restoration

For more than 100 years wetlands were considered roadblocks to progress (and actually classified by county assessors as wastelands). It was not until many years later, as waterfowl and other wetland-dependent wildlife populations began a downward spiral, that hunters and other wildlife enthusiasts first sounded the alarm. Countless others have since joined the cause.


Tom Conroy photo

There are any number of reasons for wanting to conserve and restore wetlands, including:

Economic Rewards

Today, we recognize the value of wetlands and society has found ways to reward landowners for restoring and conserving wetlands. Also, counties often provide tax breaks on wetlands—check to see if yours qualifies.

Hunters, of course, have been leasing wetlands for generations and numerous landowners in the midwest have established long-standing lease agreements with them. Wetland lease rates vary by location and the value to waterfowl and other wildlife. It is entirely between the landowner and the hunter(s) to negotiate an agreement.

Most importantly, there are government programs that pay for wetlands conservation. Generally, landowners receive a one-time lump sum payment to guarantee that their wetlands will never be drained. Because this is a legal restriction that appears on your title, the payment often approaches the appraised value of the land. Shorter-term options may be available if your land qualifies for other programs (notably the Conservation Reserve Program).

Quality of Life

Whether it's listening to the trill of red-winged blackbirds or spring peepers, or simply watching leaping leopard frogs celebrate their release from the muddy depths of their winter home, wildlife uplift, inspire, excite and entertain us. Turtles and toads, mink and raccoon, voles, moles and shrews. Killdeer, willets and teal, kingfishers, hawks, sandpipers and snakes. Mallards, geese and gadwalls. Who knows, you might even be visited by majestic trumpeter swans! Wetlands attract and aid wildlife of numerous types, and not just in the spring, summer and fall. In the winter, species such as deer and pheasants seek the shelter of wetlands to survive winter's wrath.


MDNR photo

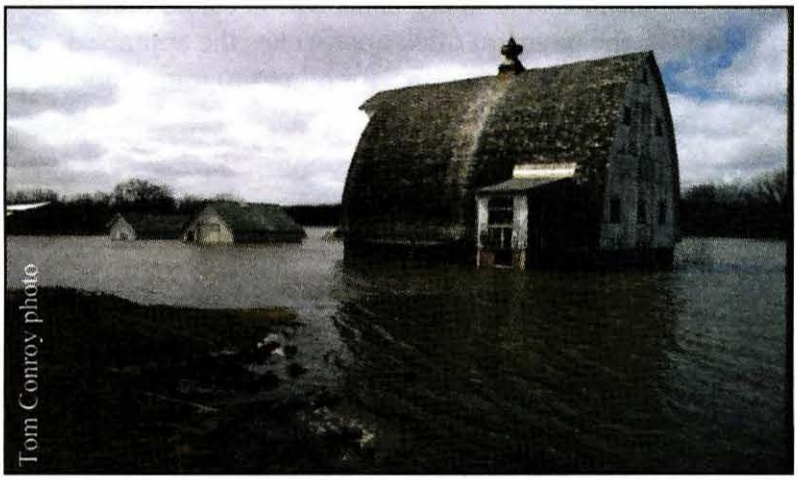
Recreation

Recreation means different things to different people. For millions of Americans, however, "recreation" and the "outdoors" are synonymous. Outdoor recreation, in all of its countless variations, is the run-away first choice for how Americans prefer to spend their leisure time.

Wetlands provide numerous recreational opportunities, hunting being the most obvious. Spend some time canoeing on a wetland. Hike around a wetland, searching for the mysteries that lurk there. In the fall, settle your backside on a muskrat house deep in the cattails. Sip some coffee, munch on a sandwich, let your mind wander. Relax. The ducks are a bonus. (Note: These experiences are greatly enhanced when accompanied by a young person and a camera!)

Water Quality

Wetlands improve water quality by trapping nutrients and other pollutants in their sediments, by converting these pollutants through biochemical processes to less harmful substances, and through the uptake of pollutants by wetland vegetation. By the time the water seeps into the ground, it has been cleaned. Water flowing out of a wetland and into a lake or stream has similarly been cleansed of many pollutants. For this reason they have been called "nature's kidneys."



Flood Reduction

By holding water on the surface and then slowly meting it out, wetlands can provide exceptional flood water containment. Dense wetland vegetation also helps to catch and slow flood waters, further helping to diminish downstream flood damage and soil erosion.

Groundwater Recharge

When surface waters are quickly removed from the surface by tiles and ditches, there is little opportunity for the waters to infiltrate into the ground. It is this infiltration occurring over the eons that has provided the priceless supplies of clean groundwater that we depend on for human consumption. When you conserve or restore a wetland, you allow the replenishment and purification of groundwaters. By holding water and releasing it slowly, wetlands also help maintain flows of streams and rivers during dry periods.

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Developing A Management Plan

You've farmed since you were a kid. Over the decades, you have seen plenty of changes—big and small—on the land. The acreage under plow steadily increased. Woodlots and wetlands disappeared. The cows and hogs went away and so did the pasture and grassland.

Gone, too, are most of the wildlife you remember seeing and hearing as a kid. The song of the meadowlark, the cackle of the rooster pheasant, ducks pitching pond-ward in the twilight – gone.

It was not as if you suddenly woke up one morning, stretched, looked out the bedroom window and exclaimed, "Hey, what happened!?" It was over time that you began to realize something was missing. Experiences you had as a kid, your own kids are missing. You eventually decide you want to restore a little of the farm's old diversity. But, where and how to begin?

Step One: Decide What You Really Want

There are various reasons you might want to restore a wetland or otherwise enhance natural resources on your property. It could be to reduce soil erosion, improve hunting opportunities, generate income or improve water quality. Maybe it's for reasons more of the heart and spirit. Seeing or listening to wildlife gives many of us pleasure and solace, helping sooth frazzled nerves. Others of us want to leave something for our descendants, a chance for them to enjoy the outdoors while living in a society that has become increasingly detached from wild things and wild places.

Your goal(s) will determine your land management decisions, making this a critical first step. To help define your goals, answer the accompanying questions. Thinking about this ahead of time will help your planning efforts.

Remember that it will take time—often several years—to get good habitat in place. Further, once it is on the ground, it will likely stay in place for many years—especially if it is enrolled in a government program. Hence, you want to spend time in the beginning making sure of what you want.

Define Your Goals

1. How much of your property do you want to convert to wildlife habitat?

2. Do you need to have an income from property you put into habitat?

3. How much money can you afford to commit to habitat development?

4. How long would you like to dedicate the land to wildlife (10 years, forever)?

5. What wildlife species do you most want to see?

6. Are you planning to hunt, and if so, what are the species you wish to hunt?

7. Do you plan to lease your land for others to hunt?

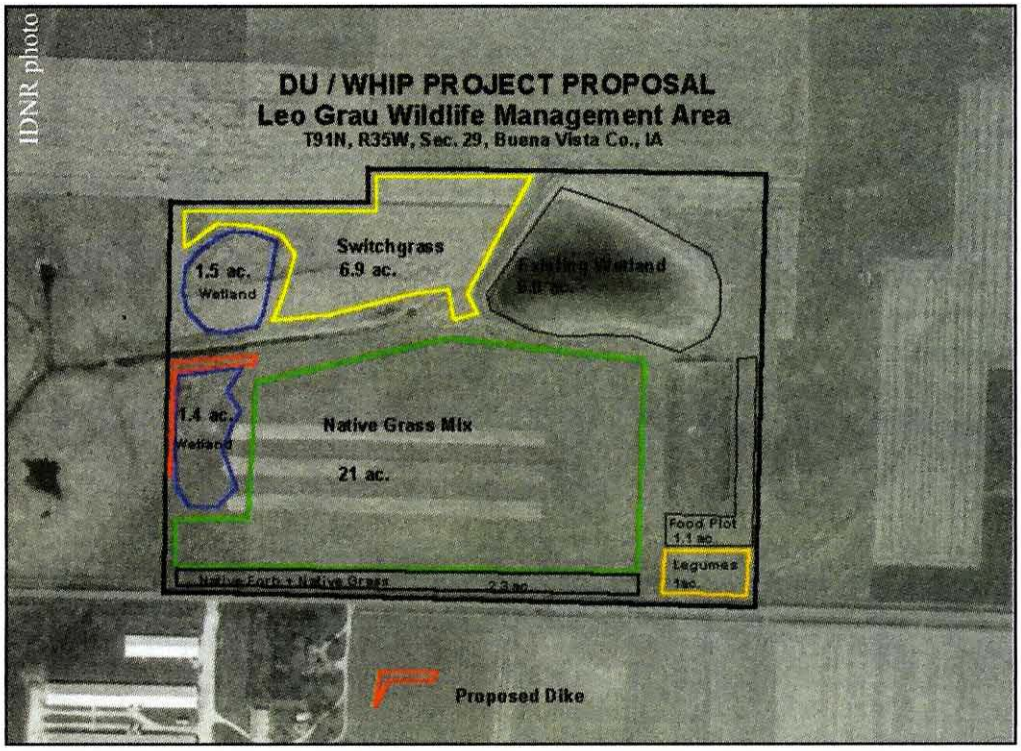
Step Two: Seek Professional Help!

Good news! There are numerous financial and technical resources available to help landowners who want to improve their land for wildlife. Government agencies at the federal, state, and local level all employ natural resource professionals whose job it is to help you with your project. **(See the list of references on p. 37.)** Cost– share assistance can minimize your expense.

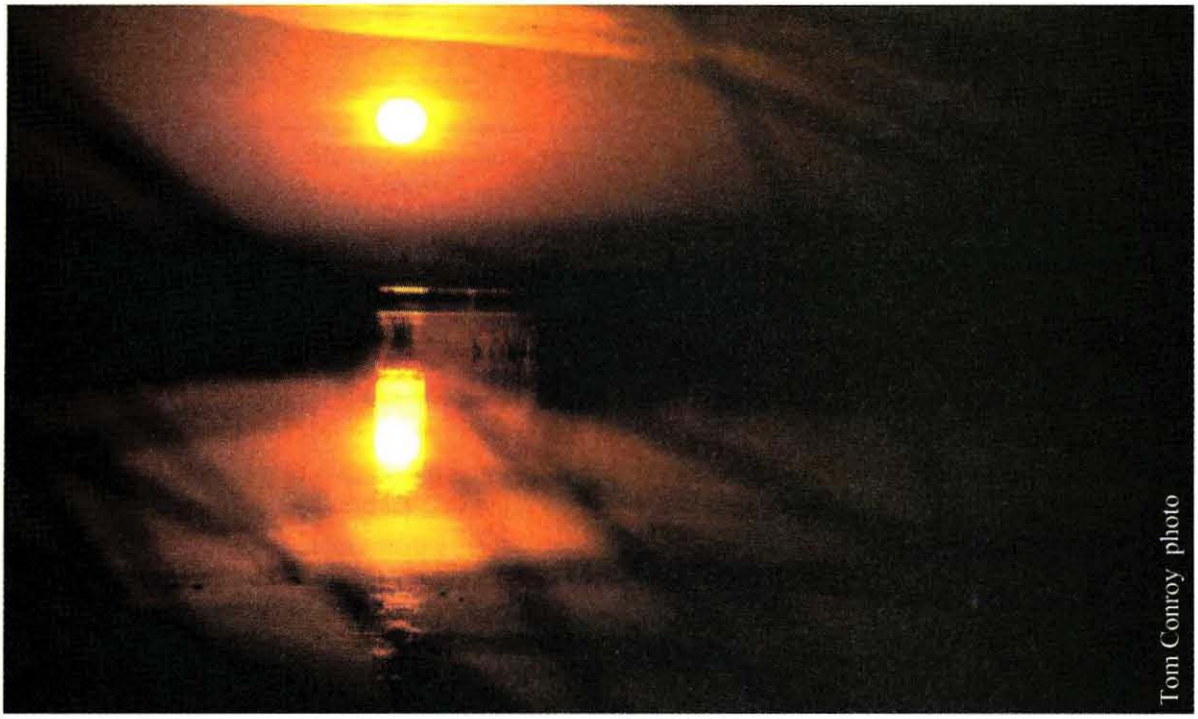

MDNR photo

When you contact one or more of these people, explain that you would like to improve the natural resources on your land and that you would like their assistance in developing a management plan. They will meet with you to discuss your goals, look at the characteristics of your property, and sketch out ideas on an air-photo or map.

After collecting as much information as possible about your property and adjacent lands, the natural resource professional will identify the best restoration projects for your property and determine the potential for certain government programs. While most of the information about your land is usually readily available, you can help by providing a legal description of your property as well as any aerial photos or maps you might have.



The resulting plan might be as simple as an air-photo with projects sketched on it. Planned restoration projects are shown as overlays on this photo as an example. The resource professional will also be able to estimate a time-line and budget for completing the projects. Good habitat projects can take two years or more. But be patient—it pays to take the necessary time!


Tom Conroy photo

Step Three: Evaluate Your Wetland Options

Many landowners today are choosing to develop wetlands on their property. This usually involves one of two techniques - restoration or creation. A wetland project is a restoration if you are restoring the hydrology (historical water level) of a wetland basin that has been drained or filled. A wetland creation is establishing a wetland on a site where none previously existed or creating open water areas in basins that have been drained and restoration is not feasible.

In addition to creating or restoring a wetland, you might hope to enhance an existing wetland by deepening it or establishing new vegetation, by planting grasses on adjacent uplands, or managing it by controlling water levels. By controlling water levels, you can encourage desired vegetation and eliminate undesirable vegetation and/or fish.

Finally, you may want to ensure that your wetland always remains and is never destroyed. Wetland protection programs can assist in this regard, and can compensate you for lost value.

The next sections will explore landowner options for restoring, creating and managing wetlands. Many of these practices are eligible for cost-sharing, so don't let funding prevent you from brainstorming!

"What would the world be, once bereft
Of wet and of wildness?
Let them be left,
O let them be left, wildness and wet;
Long live the woods and the
Wilderness yet."
Gerard Manley Hopkins

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Wetland Restoration

"I have always had a soft spot in my heart for marshes. They challenge me to come back and look. Their capacity for mothering wildlife is far greater than the drier uplands, no matter how beautiful they may be. It seems to me that no man is closer to the beginning of things and the eternal motherhood of the outdoors than when he is familiar with a marsh."
Gordon MacQuarrie, "Shallow Bay Comes Back"

Obviously, to restore a wetland you must have a drained or filled wetland on your property. Drained wetlands are usually fairly easy to identify, but it can be very difficult to identify a filled wetland. The latter will likely only be identified if you have old airphotos of an area that may show where wetlands once existed, or if a previous owner can identify a site. Your local Natural Resources Conservation Service (NRCS) office can provide aerial photography and soils information to assist you in identifying filled wetlands. Restoring these essentially requires removal of the fill material.

Identifying Drained Wetlands

In the northern Tallgrass Prairie Region, drained wetlands usually demonstrate the following characteristics:

- They are depressional - that is, they are low areas that may resemble a bowl or basin.
- A ditch or tile line will be running out of or through them in order to carry water to another basin or body of water (tile lines may be difficult to locate but many tile-drained wetlands will have tile inlets that rise above the soil as in the photo on the facing page).
- In spring or after a heavy rain, drained wetlands may temporarily hold water or often remain saturated longer than the surrounding soils.
- If viewed from the air when crops are absent, wetland soils at the surface appear darker than the surrounding area (below the surface, soils will be gray with flecks of rust).
- Some wetland vegetation may be present, including cattails, smartweeds or reed canary grass.
- In some cases, drainage removes most of the water (but not all), so a wetland may still be present (scientists call these 'degraded' wetlands and closing a ditch or tile can restore their original hydrology).

Natural resource professionals can generally identify drained wetlands from aerial photos, and are a good source of information for the landowner. A few minutes in the NRCS or Soil and Water Conservation District (SWCD) office with the soil technician and an airphoto may be all you need to identify the principal drained wetlands on your land. The technician can also alert you to any public ditches that must be treated differently than private ditches—and any needed permits.

Once identified, drained wetlands are generally restored one of two ways - by plugging a ditch with a small dam or by breaking a tile line to render it ineffective. Other dikework may also be necessary to prevent water from flowing into undesired areas, and special structures may be needed in either case to facilitate management. Neither technique should be undertaken without the help of a soil conservation technician, but we'll briefly describe the processes here.

Plugging a Ditch

Plugging a ditch is more complicated than it sounds. First, the technician must do a good topographic survey of the basin and ditch to understand where water may flow when a dam is installed. Property lines need to be identified and surveyed to prevent inadvertently flooding adjacent lands. To ensure that the plug or dam doesn't wash out, the organic soil at the site of the dam must be scraped away and the dam itself must have a core of clay or other impermeable soil. As these impermeable soils are piled to construct the dam, they must be carefully compacted with special equipment. Water control structures (discussed later), must be given special attention with soil packing or they will wash out very quickly. Finally, topsoil must be laid on the surface of the dam to allow growth of vegetation to prevent erosion, and riprap may be necessary at the outlet to prevent washout in heavy runoff.

In general, the larger the drained wetland, the more complicated the restoration and the larger the required dam. As restorations get progressively larger, engineers may recommend using sheet-pile steel or concrete for the dam and control structure. Obviously, this increases the complexity and cost of the project. It is critical, however, that projects be adequately engineered and are not compromised by "cutting corners." A dam that washes out in a few years because a reduced-cost design was used does not represent a cost savings!

Breaking Tile Lines

Tile lines are generally completely below the soil surface, except for the outlet and some inlets. For this reason, the biggest challenge is often just to identify where the tile is located. Maps are rarely available, but when they are, offer the easiest solution (remember that next time you install a tile line!). Outlets can sometimes be located and the tile line's location inferred by approximating their likely course. Ultimately, however, it is usually necessary to explore with a backhoe to locate specifically where the tile line is located.

DU photo

As with the ditch plug, the technician must ensure that a restored wetland doesn't adversely affect neighbors or other features that shouldn't get wet. However, tile breaks are easier than ditch plugs after that is done. The technician will identify a section of tile to be removed from outside the perimeter of the basin, and in the direction of the outlet. When a 30' to 50' section is removed, the up- and down-stream open ends of the tile are blocked with a plywood square or other material. Finally, the trench resulting from removing the tile is filled with impermeable soil and packed well. As with the ditch plugs, special control structures may also be installed to allow water level control. Tile breaks can involve complex designs – often including re-routing sections of tile to keep the remaining system intact – and again should be under the direction of a natural resource professional.

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Wetland Enhancement

For purposes of this book, wetland enhancement generally means changing vegetation directly by mechanical means, eliminating fish, modifying water levels, seeding, or transplanting tubers and seedlings. (The section titled 'Wetland Management' will also provide relevant information along these lines.)

Changing vegetation directly means mechanically cutting or pulling, grazing, treating with herbicides, or deliberate burning. It is important to understand that the benefits are usually short-lived because new plants usually volunteer into these sites within a year.

Modifying water levels is usually accomplished by raising or lowering levels with a control structure, or by excavating deeper bottom contours in an existing wetland.

The former technique is usually not available to the private landowner, but is discussed in more detail in the "Wetland Management" section. The latter method—excavation—is not often used by professional wildlife managers, but is very popular with private landowners. The reason it's not popular with wildlife managers is primarily due to the high cost per acre and the marginal results usually obtained. Further, when done in an existing wetland there is a great danger of ruining a currently functioning wetland. For more information on the pros and cons of excavating in cattail-choked wetlands, refer to the following section on wetland creation. When you deepen an existing wetland, you run the risk of draining all the water into one smaller basin, effectively draining a larger area. There's also a good chance you could puncture the impermeable soil layer creating the wetland, effectively pulling the plug on the wetland and losing the water to a sand or gravel layer below. Finally, several laws govern digging in existing wetlands, so permit issues arise. In general, if this seems like the only option to improve your wetland, get professional assistance early on.

In most situations, **planting vegetation** is not necessary to have attractive wildlife habitat. In wetland restorations, there is usually sufficient seed material in the soil that will develop into wetland plants on their own. Wetland seeds can stay viable in the soil for twenty to thirty years and will germinate when conditions become favorable. Cattails and smartweeds will usually be obvious almost immediately while it may take longer for other plants to become established. Certain rare species, however, may never become established on their own.

When establishing vegetation where a native seed bed is not available, it is best to obtain locally-adapted vegetation. A number of nurseries now carry native wetland vegetation. However, it is very important to not establish damaging vegetation, such as the exotic species purple loosestrife.

Again, always seek the counsel of a natural resource professional before embarking on a project!

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Wetland Creation

It's not just digging a hole in the ground.

Creating a functional wetland from "scratch" is a difficult proposition at best, and always very expensive. For these reasons, wetland creation should only be considered where other wetland restoration options are not possible. Restoring a wetland is always preferable. Detailed guidelines are provided here, not to encourage excavating but to minimize unnecessary or detrimental projects. As with many wetland projects, you should seek advice from a resource professional before taking on this kind of project.

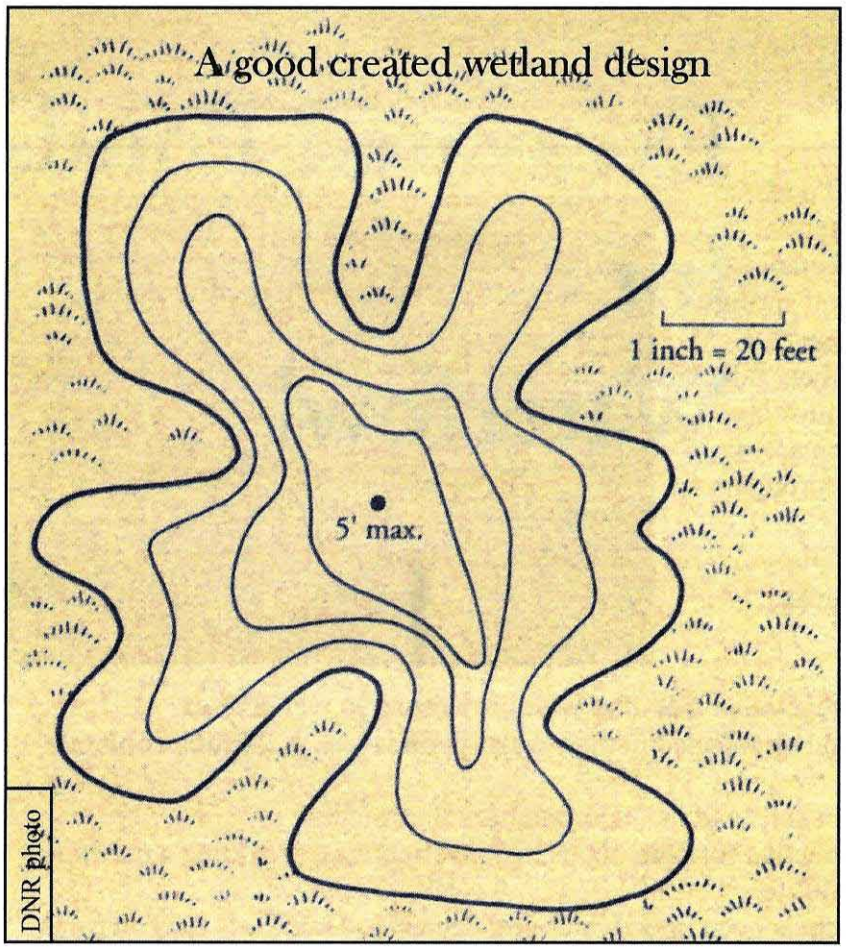
Location

In general, wetland creation – usually achieved by excavating—should only be done if there are other semi-permanent wetlands within one-half mile. Waterfowl and other wildlife use semi-permanent wetlands for courtship and territorial sites, but need other wetland types for feeding and raising young.

You should not excavate in an existing wetland, especially one with open water. This can destroy the existing wetland by draining off surface water. Excavations should be outside the edge of the wetland where the water table is high. Many factors—such as watershed size, soil types, and downstream wetlands—need to be considered. Again, consult with a professional and make sure you check on any needed permits before beginning these projects!

Depth and slopes. Wildlife generally need shallow water. When filled with water, your excavation should be no more than four feet deep. In mid-summer, most of the pond should be less than three feet deep, and 10 percent of the basin should be less than one foot deep. As much as possible, grade the slopes of your basin at a 3:1 (steep) to 10:1 (flat) ratio. Flatter slopes are better, as they maximize the shallow water.

Bottom and shoreline features. A pond bottom with variable depths (i.e., an undulating bottom) is very desirable. This allows an interspersion of vegetation and open water which is very attractive to wildlife. The perimeter of your pond should also have an irregular edge, with many points and bays as shown in the accompanying drawing. This also provides a variety of habitats for many wildlife species.



Size. Wildlife use all sizes of wetlands, but usually, bigger is better. In building your pond, you should consider a minimum size of 2500 square feet (equal to a square with 50 foot long sides). Larger, irregular shaped ponds are preferred, but costs can get high. If your property allows, you might consider two or more excavations in close proximity as an alternative to one large basin.

Islands. Excavations less than two acres in size are too small to include an island. They are rarely used for nesting, and take up valuable space better used for water. As an alternative, you can use nest baskets, boxes or floating rafts for nesting. A floating log, anchored in place, provides an excellent site for turtle and waterfowl loafing.

Spoil. Excavating a pond means you end up with a lot of soil removed from the dugout; this is called "spoil." Spoil must be carefully dealt with to optimize wildlife use and comply with wetland laws. In peat soils and cattail-choked wetlands, you should remove the soil from the wetland to a spot on high ground. In other wetland creation situations, the top 6"-12" will probably be black topsoil, high in organic matter. This should be stockpiled separately for later spreading over the excavated bottom to facilitate vegetation growth. All other spoil should be spread evenly over high ground so no "rim" or berms are visible, and seeded to permanent grasses.

Generally, a bulldozer or scraper gives better results than a backhoe or dragline, as they can sculpt shallower slopes. In peat soils, however, the latter may be the only equipment that can do the job. Blasting with dynamite or ammonium nitrate is highly dangerous and rarely provides a good pond. Finally, because costs for digging are so high, and results are usually much less desirable than restoration, most agencies won't provide financial assistance for this practice. Plan to spend at least $2000 out-of-pocket to do a fair job.

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Wetland Management

"I call it Revolt– revolt against the tedium of the merely economic attitude toward land. We assume that because we had to subjugate the land to live on it, the best farm is therefore the one most completely tamed. These two farmers have learned from experience that the wholly tamed farm offers not only a slender livelihood but a constricted life. They have caught the idea that there is pleasure to be had in raising wild crops as well as tame ones."
Aldo Leopold

Prairie wetlands developed and evolved under a cycle of drought and wet, both on an annual basis and over longer periods. Each year, wetlands generally are their wettest after snowmelt and spring runoff. They retain water for a while into summer but are typically their driest by early fall. Then, fall rains start, followed by winter's snow, replenishing waters for the next spring. This cycle is seen across the decades, too, as regional climates foster droughts and wet cycles that may span several years.


MDNR photo

Wet and dry cycles are critical to the health of wetlands in the following ways:

- Drought allows for re-establishment of vegetation that otherwise drowns out in wet periods.
- Drought kills off harmful fish that become established in high-water periods **(see p. 21 for problems created by fish).**
- Drought allows for compaction of bottom soils and the incorporation of nutrients.
- Newly re-flooded wetlands are very productive for both plants and invertebrates, providing a nutritious soup for waterfowl and other wetland wildlife.
- Once a wet cycle begins, heavy cattail stands open up as water gets deeper and muskrats feed on roots.
- When high water dominates for several years, minnows and small fish may re-colonize and survive over winter, eating invertebrates and accelerating algae bloom. Wetlands provide very marginal wildlife production habitat in this condition.

It is understandable that wildlife-lovers want a wetland that is constantly productive, one that year in and year out has a nice mix of cattails and water (scientists call a 50:50 mix of cattails and water a "hemi-marsh" and recognize it as the most productive for wildlife). Trying to force nature to produce this, however, works against the natural cycle of drought and wet. Experience shows that allowing nature to function through the wet-dry cycles—and exercising tolerance and patience through the non-productive years—is truly best for the wetland. Each phase of the cycle offers something for wildlife. Watch and enjoy it.

Sometimes, however, artificial drainage dumps so much water into a wetland that it would not otherwise go dry, even during the most severe drought. In cases like these, there are options for managing wetlands that can mimic the wet-dry cycle.

A "water control structure" is a type of dam or other device used to temporarily lower water levels in a wetland. These are often considered for large wetland restoration projects (i.e., greater than 10 acres) but rarely are they placed on existing wetlands. The structure usually has removable boards that set the outlet level for the wetland. When boards are removed, the wetland holds less water, even if water continues to drain into it.

When done at the right time (generally in the spring through early summer), vegetation growth is encouraged, increasing productivity of the wetland. However, it can be very easy to do the wrong thing with this type of management. Lowering water at a critical time for muskrats, for instance, can push them out of the wetland. Muskrats are key to opening up dense cattail stands. You might also fail to re-establish desired water levels prior to freeze-up, limiting critical over-winter habitat for muskrats, turtles, and amphibians. If you do have a water control structure on your wetland, resist the urge to use it too much. Consult with a natural resource professional to develop a management plan for using the structure.

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Fish and Wetlands: A Bad Mix

Call them "aquatic highways." They are the culverts, tile lines and drainage ditches that now criss-cross the country-side, linking wetlands and other water bodies that were once unconnected. And that is a problem for wetlands.

Using these "aquatic highways," fathead minnows, black bullheads and carp are able to find their way into previously isolated wetlands, posing a major threat to wetlands and wildlife.

These fish reproduce at a very high rate during the spring and summer and compete vigorously with waterfowl for invertebrates, the tiny bugs that waterfowl so desperately need as a food source. Invertebrates are particularly important for hens in their efforts to bring off a brood, as well as for the survival of the ducklings themselves.

Invertebrates also feed on potentially damaging plants, such as algae. By keeping algae in check, "good" plants like sago pondweed, wild celery and chara are able to flourish. These plant foods, along with invertebrates, provide a food feast for waterfowl. As the invertebrate population declines, water clarity diminishes and algae becomes more prevalent, eventually causing the blue-green algae blooms often seen in the summer. Sunlight is then unable to reach the bottom of the lake or wetland and beneficial plants such as sago pondweed and wild celery begin to disappear. The wetland soon becomes almost totally useless to wildlife.

To make matters worse, when most wetlands were isolated, they were usually shallow enough to freeze out during many winters, eliminating most, if not all, of the fish in them. Today, the infusion of more water has increased the depth of many of these wetlands to the point where they do not freeze out often enough and fish survive.

Options for private landowners to reduce fish problems are somewhat limited. However, there are a couple of things to consider. On some projects, you may be able to construct a fish barrier like the one shown here at a wetland outlet to prevent fish from migrating into your wetland from downstream reservoirs. Ask your natural resource professional for ideas on this. Also, discourage the use of your wetland for raising fish. Many people are in the business of raising fish or minnows for sale and often want to lease wetlands from private landowners to plant and trap wild minnows. Keep them out of yours!

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Wetlands and the Law

Because wetlands are valued and protected by society a host of laws are on the books that specify what can and cannot be done to a wetland and when a permit is required.

Before doing any work in or around a wetland, no matter how well-intentioned, check with authorities first! Wetland laws are largely intended to prevent the drainage or filling of wetlands but even wetland restoration work is likely to require a permit.

The best place to begin checking about permit requirements is with your local Soil and Water Conservation District (SWCD) or the Natural Resources Conservation Service (NRCS) office. The next stop should be with the Department of Natural Resources (DNR). Ask, too, if anyone else should be consulted.

In all cases, it is best to be prepared. If possible, bring along an aerial photo of the site and a description of the project. If you have been working with a soil conservation technician, they will likely be able to provide you the necessary documentation.

Remember: neglecting to consult with these authorities, or proceeding without the necessary permits, can delay or even stop your project, not to mention result in monetary fines. Although it can take some time and energy, it could also save you grief down the line.

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Understanding Uplands

Like love and marriage and the horse and carriage, wetlands and upland nesting cover naturally go together. While you can have one without the other, neither will provide optimum benefits alone for ground-nesting waterfowl, pheasants, or songbirds. Wildlife species that evolved with the prairie are heavily dependent on grassland nesting cover, including most dabbling ducks.


Tom Conroy photo

Uplands are Critical

Uplands comprised of grasses and forbs (non-woody, broad-leaved plants) are critical to the welfare of most prairie wetland wildlife. While some wildlife species spend all their time in a wetland, most spend at least part of their life-cycle on adjacent uplands.

Leopard frogs and American toads, for instance, leave the wetland in early summer and spend a substantial portion of their time until August foraging in uplands for insects. Prairie ducks such as mallards and blue-winged teal do most of their nesting in tall grass within a mile of the brood-rearing wetland. If secure grass cover is missing or inadequate, wildlife will not survive.

Location, Location, Location

Good quality nesting cover located within one mile of wetlands is clearly best for waterfowl. While a hen may travel further than that in search of a suitable wetland to raise her brood, such a long trip is fraught with dangers from predators and vehicles. Nesting cover directly adjacent (i.e., within 100 feet) to a wetland may get heavier predation from skunks and raccoons than that further out. But generally, good cover must be in close proximity to the brood wetland. The best areas have more than 20 percent grass cover within a one-mile radius.

Sources and Sinks

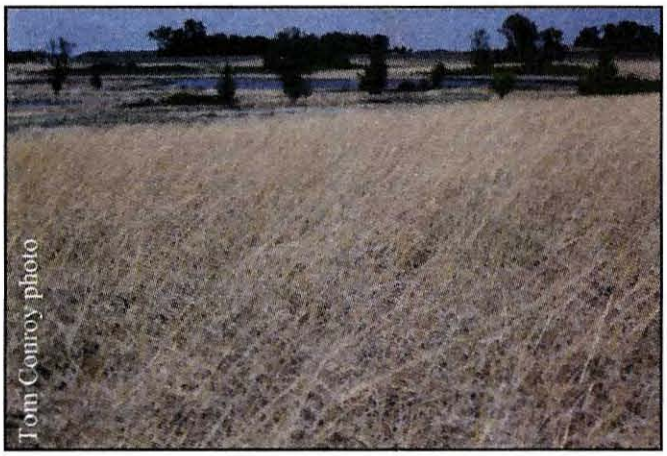
A simplified example will serve to describe "sources" and "sinks." Imagine 100 hens nesting in a one-square mile area one spring. If each of these hens survived until the fall, and each succeeded in raising one hen duckling, there would be 200 hens leaving the area in the fall. This is effectively a doubling of the population. This area is a "source" for ducks as more are produced than originally settled. Now imagine the opposite. Of the 100 hens originally nesting, 50 are killed by predation and none of the survivors raises a duckling. Only 50 would leave the area in the fall, or half the number that originally settled there. In this case, the area is a "sink" for waterfowl, resulting in a reduction of the overall population.


DU photo

Because so few large grassland tracts exist in the Tallgrass Prairie Region, much of this once ideal habitat is now unsuited for nesting waterfowl and other prairie wetland species. Without adequate grasslands, wildlife become highly vulnerable to predation and cannot produce enough young to just break even. In many areas, more wildlife are destroyed each year than are produced.

While the example is overly simplified, the concept is real. Throughout the Tallgrass Prairie Region, different areas serve as sources and sinks. Why do waterfowl and other wildlife keep showing up in "sink" areas? They are "wildlife pioneers"—animals raised in source areas that, in seeking their own first home, stumble upon the insecure habitat in a sink area. Hence, source areas feed sink areas, to the overall detriment of the population.

Wildlife managers are just now beginning to recognize the implications of this for habitat projects. Sometimes it means if your interest is waterfowl, for instance, you shouldn't restore a wetland if there is not enough grassland around (unless grasslands will be created soon). If you do, you may create a sink, and inadvertently be hurting the very population you're trying to help. A conundrum, indeed!


Tom Conroy photo

Standing Up to Winter

One climatic feature many folks in the Tallgrass Prairie Region would rather forget is winter. High precipitation is a formative characteristic of the tallgrass prairie, and this translates to lots of snow. Lots and lots of snow, beginning in October and staying until April, seemingly half the year. This snow helps feed the prairie wetlands, and that's good, but it has a decidedly less beneficial effect on grass. Heavy, wet snows weigh down grasses, pressing them to the ground. In bad winters, grasslands are virtually flattened by the snows.

This can have serious implications for early nesting species like mallards. If a breeding hen arrives on the nesting ground and all the grass is flat, her chances for hatching a clutch are minimal. But a good, tall, dense stand of last year's grass provides the cover she needs to hide a nest and succeed in hatching her young. The remnants of last year's vegetation is called "residual cover" and is highly important to wildlife. Some grass species provide better residual cover than others simply because they stand up to snowpack better, or they spring back once the snow is removed. These are the species most preferred for establishing grasslands. Native prairie grasses like indiangrass, switchgrass, big and little bluestem, and several others are ideal species.

For more information, refer to the landowner assistance list at the back or consult a natural resource professional. Remember, your grassy uplands are as important as your wetlands!

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Establishing Uplands

By now, you understand the critical need for adequate grasslands with any prairie wetland project. We'll emphasize some key points here, but you'll need to refer to another information source to really understand how best to get your grassland going.


MDNR photo

Planning

In order to maximize your chances of getting a good stand of grass, you'll need to plan two or more years in advance. Eliminating weeds by planting corn in year one and soybeans in year two will also help establish a great, firm seedbed. Planting grass seed directly into undisturbed soybean stubble is a preferred practice with native grasses. Make sure any earthwork associated with your wetland development project is completed before you plant, to minimize disturbance to new seedings.

As we've discussed elsewhere, you also need to make sure you provide an adequate amount of grassy nesting cover in the vicinity. Biologists recommend a minimum of four acres of grassy cover for each acre of wetland; and strive to achieve the 20 percent nesting cover goal for the surrounding four-square mile landscape. When planning your seeding, bear in mind that you will likely need to burn your grassland periodically to keep up its vigor. Use convenient features like roads and ditches to establish the borders of your grassland—that will make it easier to burn safely.


MDNR photo

Native Versus Non-native Grasses

As mentioned in the previous section, it is crucial for early nesting wildlife that grass cover be available in early spring (i.e., March). Because this is prior to green up, any vegetation will be the remnants of the previous year—the "residual" cover.

Generally, in the Tallgrass Prairie Region, the best grass species for residual cover are those that were here historically—what are called native grasses. These comprised the prairies the pioneers saw, and include more than

a dozen species. Commonly planted species are indiangrass, switchgrass, big- and little-bluestem, side-oats gramma, and cordgrass. These are often called "warm-season grasses" because they grow most quickly during the warm summer months. Because these seeds are very fluffy, special planting equipment is necessary; check with your soil conservation office for local sources. These grasses also provide fair winter cover for resident wildlife like pheasants and cottontails, and their colors lend a warm glow to the countryside.

Until the widespread availability of native grasses and specialized planting equipment a couple of decades ago, most biologists used non-native grasses for cover. Typically, in the Tallgrass Prairie Region, this meant bromegrass with a legume like alfalfa or sweetclover intermixed. These are often called "cool-season mixes" because they grow most quickly in spring and fall. These mixes have a couple of pluses—they can be planted with equipment a farmer typically has on hand, and they establish very quickly. For up to four years they may also provide fair nesting cover. Usually after that, however, the legumes start disappearing and the quality of the grass stand deteriorates. These mixes provide typically poor residual cover, and weeds can become a real problem. In general, for any planting that is intended to be in place for more than five years, you should use a native grass seed mix.

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Managing Uplands

Burning, mowing, and grazing - the three keys to effectively managing nesting cover habitat. Of the three, burning (when done properly) will provide the most benefits.

Burning

Controlled burning can provide tremendous value to prairie habitats, and the wildlife species that depend upon those habitats. In the Tallgrass Prairie Region, Native Americans and early settlers commonly used burning as a means for improving prairie.

Prescribed burns are intentional fires in which the safety of people and property are given paramount consideration. They have a specific objective, for a specific area. They are done only under pre-determined weather conditions generally in the spring of the year, prior to green-up. Indiscriminate or uncontrolled burning, obviously, can often be both damaging and dangerous, to wildlife and people! Get professional help for your prescribed burn.

Fire helps sun-loving grasses and prairie flowers by burning back trees and shrubs that shade out the sun. The blackened soil after a burn quickly absorbs sunlight, which encourages seed germination. Charred plant remains are converted into a fertilizer, further encouraging new plant growth.


MDNR photo

Prior to planning a burn intended to improve grassland habitat, consult a DNR wildlife manager or forester for assistance in developing a plan as these burns are regulated activities.

Mowing

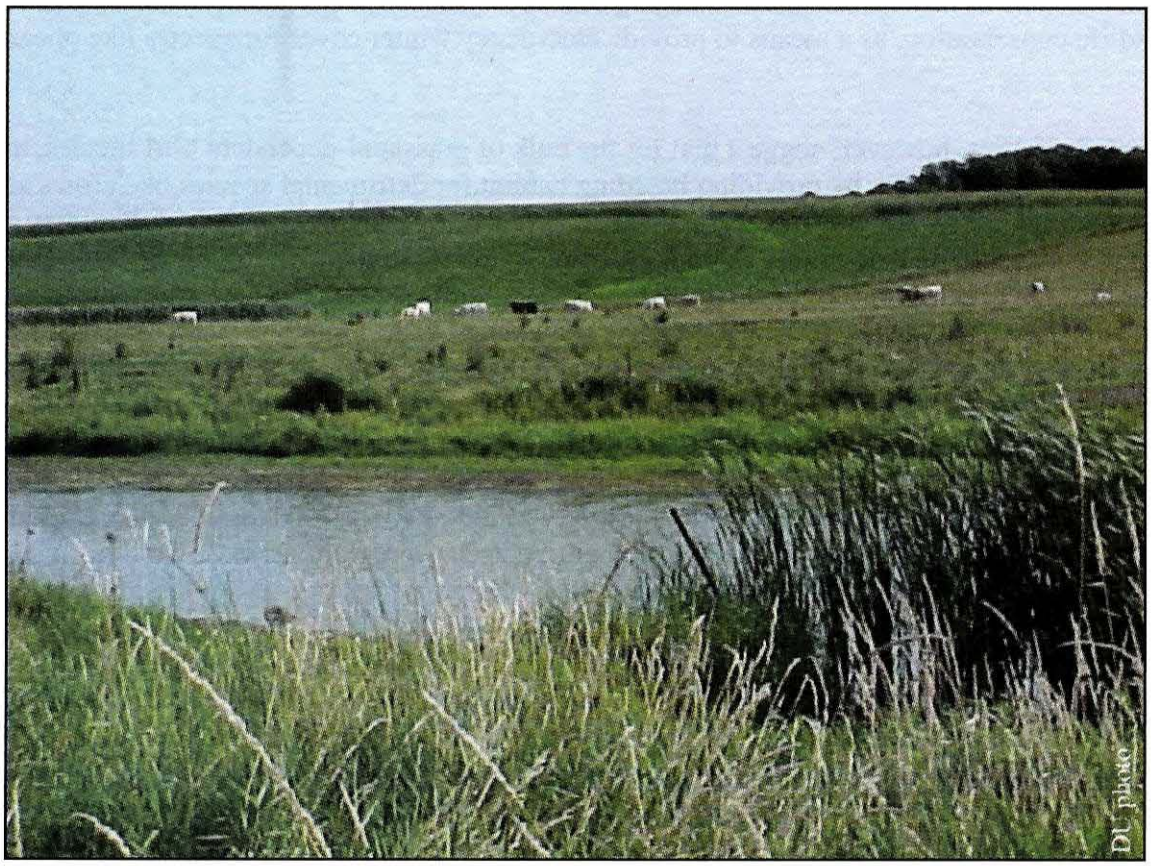
Mowing can also be used to rejuvenate grass stands and eliminate invasive woody growth. Mowing of any kind should be delayed until after the nesting season, if at all possible. That is usually around the middle of July. The number of hens and nests that are destroyed by mowing each year in the Tallgrass Prairie Region is impossible to know for sure but the number is most certainly staggering.

If weed competition in a newly established planting is severe, mowing once or twice the first year may be necessary. Once the vegetation is established, however, segments of a field can be mowed on a 3-4 year rotation to keep the vegetation rejuvenated, though burning is always preferable. It is recommended that 10-12 inches of cover be left after the last cutting, especially in the case of warm season grasses. This will provide some residual nesting cover the following spring. Also, use spot mowing rather than blanket cutting, whenever possible.

Grazing

The vast grasslands of the Tallgrass Prairie Region evolved under a cyclical regimen that included intense grazing by buffalo and regular burning. Grazing and burning served to rejuvenate the prairie by releasing stored nutrients and eliminating invasive woody vegetation. Scientists believe that any given acre of grassland was grazed and/or burnt at least every few years. Its no surprise, then, that the vigor of a re-established prairie can also be maintained by managed grazing. (Cattle, however, should be kept out of wetlands).

This is more challenging than it might first seem, however. To benefit grasses, grazing should only be done for a short period of time in any growing season, then allowed to regrow. There are good management strategies called "rotational grazing" that implement this type of short, intensive grazing, and an extension service agent can provide good information. If you think grazing might be an option you'd be interested in to manage your grassy uplands, contact your extension agent for more information.



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Tree Trouble

Early explorers were puzzled at what they saw when they reached the tallgrass prairie. Or, rather, what they didn't see. There were no trees.

Indeed, by its very nature, prairie is devoid of trees. Prior to European settlement, trees were kept out of the prairie by three major forces: climate, bison grazing, and fire.

Climate is controlling simply because annual precipitation rates and dry-wet cycles do not favor thirsty, long-lived trees. Coupled with frequent wildfires in pre-settlement times, trees could find refuge only on adjacent wet floodplains or on the downwind side of large waterbodies. Further, intense grazing by millions of bison served to further prohibit tree growth.

Now, of course, two of these limiting factors are no longer in effect. Climatic limitations are largely overcome by planting non-native trees that can grow in dry conditions – like the Russian olive. Further exacerbating the influx of trees on the prairies has been our longing for the cooling shade provided by trees in hot summer months or relief from winter's raging blizzards. Indeed, trees have often been planted in the name of wildlife conservation, as a means to provide emergency winter cover for species like pheasants and deer.

Most scientific studies, however, suggest that for the bulk of grassland-dependent bird species, trees are bad news for two reasons. First, by providing breeding habitat for detrimental species like crows and skunks, they serve as homes for egg and nest predators. Second, by providing aerial perches, they allow avian predators—hawks, owls, and other raptors—a better vantage from which to ambush hens and young. The result is that fewer songbirds, ducks, and other grassland birds survive the breeding season. Shrubs shorter than approximately 4 feet—like buffaloberry, snowberry, or prairie rose—are a different animal. These plants have always dotted the prairie landscape, and there is good evidence that their presence can enhance grassland bird survival. These can and should be considered in small upland plantings.

Trees are often recommended as a technique to provide emergency winter cover for pheasants. Indeed, in truly severe winters – the kind seen in the region every 10 years or so—certain trees may provide enough alternative cover that pheasants aren't totally eliminated in a region. In most winters, however, cattail sloughs and dense stands of native grasses are the preferred winter cover.

Hence, if you are concerned about pheasants, consider only using one small cover planting (less than 2 acres) per 2 square miles of grassland (1280 acres). Again, as with nesting cover, consider what is available on adjacent properties. If a neighbor has a large woody cover planting for pheasants, you don't need to duplicate that, and will be harming other species if you do. Finally, use mostly low, native woody cover like plum and buffaloberry, as these present fewer control problems than exotic species.

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Predator Problems

Spring is appearing on the tallgrass prairie. You hardly notice the bundle of black and white as it waddles clumsily along through the new growth. Nose to the ground, it stops, sniffs, moves on. Suddenly, it freezes, its' beady eyes staring straight ahead.

The mallard hen also tenses. Her eyes riveted on the approaching shape, she flattens herself on the ground, holding tight as long as she dares. And then, at the last second, she frantically bursts into the air. The hen escapes but the skunk has found a meal. Eggs.

Predation is the biggest factor in preventing hens from successfully nesting. During the four weeks they spend incubating their clutch, hens are immensely vulnerable to predators of all kinds. Mammalian predators such as red fox, raccoons, skunks, and mink are the most damaging. However, several avian predators (most notably crows and large raptors) can also have a serious impact on both hens and eggs. (Paradoxically, coyotes may actually help ducks by forcing out other predators.)

Early-nesting ducks like mallards are especially vulnerable because they nest at a time when other prey species, like rodents, are generally unavailable and cover is thin. Later in the spring, the presence of other nesting birds such as pheasants and the new young of small mammals provide alternate foods for predators, taking pressure off ducks.

Want to start an argument? Bring up the subject of predator control in a room full of waterfowl enthusiasts! Opinions on predator control are varied. However, there is strong research that shows that predator control can dramatically improve nesting success - IF! The "IF" is that it must be done very intensely, with nearly all predators removed from an area during the entire nesting season. Less than that, and nest success does not improve.

Because of the intensity required, along with the expense, most predator control efforts are doomed from the start. The far better option is to ensure that there is a suitable amount of good nesting cover available. Even with a 70 percent loss of nests to predation, waterfowl numbers can still increase. It is worth noting that coyotes can play a positive role by pushing out other predators like fox; coyotes, by themselves, tend to have a minimal impact on nesting hens

When birds are forced to nest in narrow strips of cover, predators have little difficulty finding them and their nests. In large blocks of cover, nesting birds stand a much better chance of escaping detection. In short, where there are large blocks of good grassland nesting habitat, bird populations are much less likely to be significantly impacted by predators.

Landowners can also help by removing sites that can harbor predators, such as old buildings and rock piles. Free-ranging cats should also be controlled as they kill millions of birds and small mammals in this region alone each year.

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Wetland Protection

If you have an existing wetland, or if you are undertaking a project to restore or create a wetland, consider how you might protect that resource for future generations. When your land is sold or transferred to the next owner, will the wetland remain? You can ensure this by providing additional legal protection on the deed for your property. A "conservation easement" is a legal restriction that is described on your deed and stays with the property forever (although there are shorter term easements, as well).

While certain government programs may pay you for an easement if it fits a specific program, you might also consider donating an easement on your property even if it is eligible for a program. Donating an easement can have valuable tax benefits. Check with a tax advisor to see if you can take advantage of this opportunity.

Generally, a government agency or non-profit organization (like DU) can accept donated easements; check the list of contacts at the end of this booklet for addresses. Of course, you can also protect the habitat on your property by selling or donating it to a natural resource agency or non-profit. As with an easement, there are also tax benefits for donating full interest in your land.

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Artificial Nesting Structures

As their natural habitats have shriveled and changed, waterfowl species like the mallard, Canada goose, and wood duck have been able to benefit from artificial nesting structures.

Providing nesting structures is inexpensive, involves little work, and is personally satisfying. Anyone who has ever erected a wood duck house or mallard nesting basket, and was then fortunate enough to see the brood of fluffy ducklings begin to flitter, one after the other, down to the ground or water, knows the satisfaction. And even if you aren't so lucky, just knowing that your efforts have resulted in the successful hatch of a brood of ducklings is sufficient reward.

Mallard Structures

Mallards have evolved with the prairie wetland ecosystem for eons. When "house-hunting" in the spring, nothing looks better to a hen than a wetland surrounded by tall grasses. Under normal circumstances, this is a hen's first preference. But hen mallards have a remarkable adaptability to using artificial structures—something to consider when you've exhausted your grassland options. If you cannot attain at least 20 percent grass cover within a mile of your wetland, structures should be emphasized.

Two types of structures have generally been developed for mallards: baskets and tubes. Baskets are usually wire or plastic open cones (like flat snow-cone cups), usually lined with grass or hay. Mounted on a post in a wetland (or sometimes on a floating platform), they provide a site that is generally safe from fox and skunk. Not so, unfortunately, with mink and raccoon that can swim to floating structures or crows and raptors that easily access pole mounts ("nests on a stick"). Also, these structures require annual maintenance, as ice action often dislodges poles and floaters and nesting material blows out.

Nesting tubes are generally constructed of chicken wire, or other metal or plastic mesh. This is rolled into a 12" diameter tube (2-3 feet long), and mounted on a pole or floating platform. To make it more attractive to hens, straw, hay or an artificial material like carpeting is interwoven in the mesh. The resultant tube is open at both ends, providing access for hens but also cover from aerial and terrestrial predators. Structures need to be in place by March, as mallards are the first ducks to arrive in the spring. As with the baskets, annual maintenance is required. Due to this and the needed efforts in construction, both types of structures require a long-term commitment. Floating structures can also be easily modified to provide a nesting platform for Canada geese. **(See references at the end of this section for plans.)**

Wood Duck Boxes

Wood ducks begin arriving two to three weeks after mallards— usually by early to mid-April. While not a typical prairie species, wood ducks have likely always bred in trees adjacent to prairie rivers and are common in much of the Tallgrass Prairie Region today. Part of this success is due to their willingness to use artificial nest boxes. Conservationists have erected tens of thousands of these in the Tallgrass Prairie Region in the past half-century. Not infrequently, these also provide nest sites for hooded mergansers, squirrels, and a variety of other animals.

Remember that wood duck hens on a house-hunting mission are naturally drawn to woodlots—this is the best place to erect your box. Houses can be erected on a tree or on a tall (greater than 6 feet), rot-resistant post. Be aware that raccoons and other predators learn to search out boxes; take steps to exclude them from your boxes. Since wood ducks are not territorial, two or more boxes can be placed on the same post or tree. Avoid placing boxes in direct sunlight as this can cause hot temperatures in the box, stressing the hen. For this reason, it is often beneficial to place houses on the north side of trees, facing away from the midday sun. Make sure there is a clear flight path—at least 30 feet of open space free of branches—in front of the hole.

When locating a suitable area for placing boxes, remember that the hen needs to quickly walk her ducklings to a suitable wetland or flowage, though they will nest up to a mile away. A good wetland is more than an acre in size (a 300' circle is roughly an acre). Permanent creeks and rivers also serve as temporary brood water. Boxes should be within 100 yards of water, but need not be directly over the water. They should also be a minimum of 30 feet from water to reduce raccoon traffic.

There is a tendency to scatter boxes widely throughout a woodland area near water. This makes boxes difficult to locate and maintain. It is much more efficient, and effective, to cluster your houses in a small area to facilitate maintenance. For example, placing and monitoring 20 or 30 boxes in a 10 -to- 20-acre park-like woodland near a good marsh or lake complex would be an ideal situation for intensive wood duck management by a group. Get them up by March 1, and keep a good record of your wood duck box locations. Annual maintenance on wood duck boxes is essential and should be completed by March 1. Boxes should be opened, inspected and more sawdust added if necessary. A side door near the bottom of the box makes this job much easier.

For more information on artificial structures, see these websites and books
Multi-structure reference site: http://www.npwrc.usgs.gov/resource/tools/ndblinds/ndblinds.htm#contents
Wood Duck Box reference site: http://www.ducks.org/conservation/duck_box_plans.pdf
http://www.npwrc.usgs.gov/resource/tools/ndblinds/woodduck.htm
Hen house mallard tube reference site: http://www.npwrc.usgs.gov/resource/tools/ndblinds/henhouse.htm
Goose structures site: http://www.npwrc.usgs.gov/resource/tools/ndblinds/canada.htm
Hardcopy reference: Henderson, Carrol. 1992. Woodworking for Wildlife. MN Department of Natural Resources. 112 pages. Available from: Minnesota's Bookstore, 117 University Av., Room 110A, St. Paul, MN 55155 (phone toll-free: 1-800-657-3757); website: http://www.comm.media.state.mn.us/bookstore/bookstore.asp (This site also sells other habitat management books for private landowners, including "Landscaping for Wildlife" and "Lakescaping for Wildlife", author: Carrol Henderson.)

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Landowner Assistance

Numerous organizations and programs are available to help landowners manage their lands for conservation. Listed here is a summary of the principal of these.

FEDERAL AGENCIES

USDA - Natural Resources Conservation Service (NRCS); through offices in each county, administers the Wetland Reserve Program (WRP), the Wildlife Habitat Incentives Program (WHIP), and several other conservation programs. To find the number of your local county office, check the phone directory, visit their website (www.nrcs.usda.gov), or call the respective state office (Iowa: 515-284-4260 ; Minnesota: 651-602-7900; North Dakota: 701-530-2110).

USDA – Farm Services Agency (FSA); through offices in each county, administers the Conservation Reserve Program (CRP), Farmable Wetland Pilot Program, and others. To find the number of your local county office, check the phone directory, visit their website (www.fsa.usda.gov), or call the state office (Iowa: 515-254-1540 ext 480; Minnesota: 651-602-7700; North Dakota: 701-239-5224)

U.S. Fish and Wildlife Service (USFWS); has offices on National Wildlife Refuges (NWRs) and Wetland Management Districts (WMDs) throughout the TGP region. To find the office closest to you, check the local directory under "Federal Government Offices", visit their website (www.fws.gov), or call the regional office for more information (for Iowa and Minnesota: 612-713-5400; North Dakota: 303-236-7920).

STATE AGENCIES (IA, MN, SD)

Iowa Department of Natural Resources (IDNR) has numerous field offices around the state and can provide information on wildlife habitat planning, wetland regulations, private lands cost share assistance, and related programs. Visit their website (www.iowadnr.com) or call 515-281-5918 for more information.

Iowa Extension Service is a statewide education and information resource that works locally through county extension agents. Check their website (www.extension.iastate.edu/) or call the state coordinator (515-294-6192).

Minnesota Department of Natural Resources (MDNR) has numerous field offices around the state and can provide information on wildlife habitat planning, wetland regulations, private lands cost share assistance, and related programs. Visit their website (www.dnr.state.mn.us) or call 651-296-3344.

Minnesota Extension Service is a statewide education and information resource that works locally through county extension agents. For more information, check their website (www.extension.umn.edu/) or call the state external affairs coordinator (612-624-5360).

Minnesota Board of Water and Soil Resources works through local SWCDs to protect and enhance the state's soil and water resources by implementing the state's soil and water conservation policy, comprehensive local water management, and the Wetland Conservation Act. Check their website (www.bwsr.state.mn.us) or call the state office (651-296-3767).

North Dakota Game & Fish Commission has numerous field offices around the state and can provide information on wildlife habitat planning, wetland regulations, private lands cost share assistance, and related programs. Visit their website (www.state.nd.us/gnf/) or call 701-328-6300 for more information.

North Dakota Extension Service is a statewide education and information resource that works locally through county extension agents. Check their website (www.ag.ndsu.nodak.edu/) or call the state coordinator at 701-231-8944.

COUNTY AND LOCAL AGENCIES

Soil and Water Conservation Districts (SWCD) fill the crucial niche of providing land and water conservation services to owners of private lands. They can provide both technical and financial assistance for a variety of conservation practices. They are located in most every county of each state, and can be found in most local directories. There is not always a statewide coordinating office, but for more information, check the websites or phone number below.

Conservation Districts of Iowa at (www.cdiowa.org/); phone (641) 774-4461.

Minnesota Association of Soil and Water Conservation Districts website www.maswcd.org; phone (651) 690-9028.

North Dakota Soil and Water Conservation Districts website (www.nacdnet.org/resources/ND.htm) or check with the state Soil Conservation Committee at (701) 328-5125.

Watershed Districts or Drainage Districts operate in many but not all areas of each of the states. Generally, they regulate activities that change the flow of surface waters, sometimes including wetland restoration type activities.

Iowa – Contact your local SWCD office for more info (numbers above).

Minnesota Association of Watershed Districts (MAWD) is a coordinating group for the principal watershed districts in the state. Visit their website (www.mnwatershed.org/mawd.htm) or call them at (651) 452-8506.

North Dakota State Water Commission serves as a coordination agency for a variety of surface water issues. Check their website (www.swc.state.nd.us/index.html) or call them at 701-328-2750.

Conservation Boards are a unique and key partner in Iowa's conservation effort. They acquire land and provide information to landowners. Check the website for the **Iowa Association of County Conservation Boards** (www.george.ecity.net/iaccb/welcome.html), or call 515-963-9582.

NON-PROFIT ORGANIZATIONS

Non-profits provide different types of assistance to landowners, depending on the state. For information and contact numbers, check the web sites below.

Ducks Unlimted (www.ducks.org)

Pheasants Forever (www.pheasantsforever.org)

IA Natural Heritage Fdn. (www.inhf.org)

The Nature Conservancy (www.tnc.org)

Trust for Public Land (www.tpl.org)

Notes

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A LANDOWNER'S GUIDE TO WETLAND CONSERVATION IN THE NORTHERN TALLGRASS PRAIRIES

Minnesota
DEPARTMENT OF NATURAL RESOURCES

DUCKS UNLIMITED

Metropolitan Council

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR