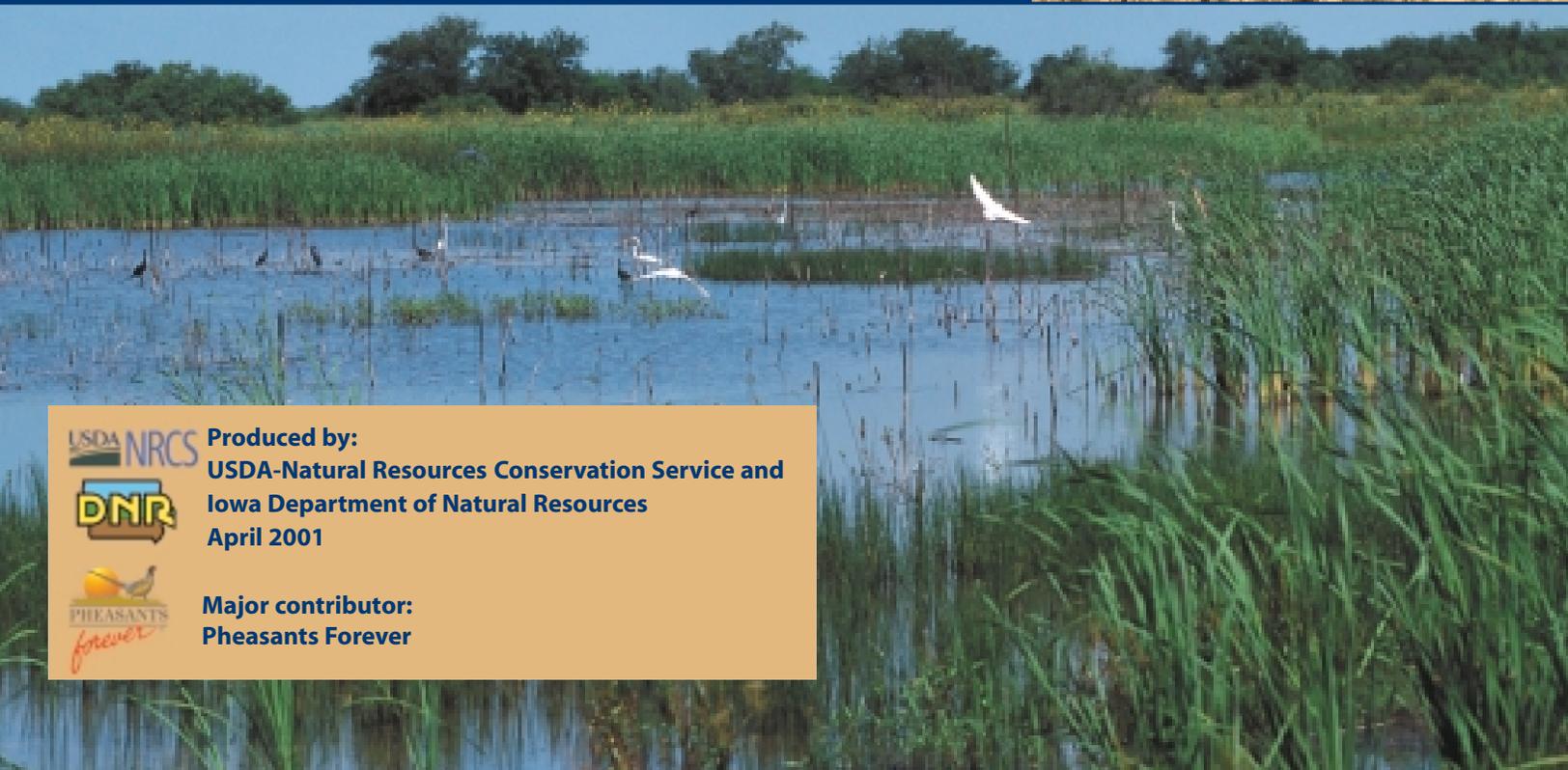


Attracting Iowa Wildlife

On Private Lands



Produced by:
USDA-Natural Resources Conservation Service and
Iowa Department of Natural Resources
April 2001

Major contributor:
Pheasants Forever

Introduction

Iowa's landscape has changed dramatically in the last 150 years. It is perhaps the most ecologically altered state in the Nation. Once a state of tall grass prairies interspersed with millions of acres of wetlands and gently bisected by wooded streams, Iowa's rich soils were among the most fertile and productive on earth.

For the majority of Iowa landowners, the state's farmers, these resources must provide an income to sustain their family and rural lifestyle. Iowa farmers care deeply about soil conservation and wildlife. However, a multitude of economic, conservation and changing farm programs carry enormous weight in determining their land management decisions.

Currently, more than 98 percent of the state is privately owned. The vast majority of Iowa's land will remain in the hands of Iowa's private landowners. These landowners have a tremendous responsibility to care for the land and provide for its future.

As a property owner who is concerned about conservation, there is much you can do to protect and improve wildlife habitat and the environment. Working as individuals, or in concert with our neighbors, conservation organizations and government agencies, we can become better stewards.

This guide presents landowners with several ways they can improve wildlife habitat on their property. It is meant to stimulate thought and encourage action. It includes tried and proven methods which will benefit many species of wildlife. It is intended as a general guide, to help increase interest and hopefully generate landowner contact with resource professionals throughout Iowa.

Regardless of the size of your property or the wildlife species you are most interested in, you can set goals and take proper steps to improve your property for its wildlife resources. Every piece of property is important in the "Big Picture", and it's not too late to begin improving your land. This guide provides information you will need to conserve and improve Iowa's plants, animals and ecosystems.



Jeffrey Vonk
Director,
Iowa Department
of Natural Resources



Leroy Brown
State Conservationist,
Natural Resources
Conservation Service



Photo by USDA-NRCS.

Table of Contents

Definition of Terms	3
Species Information	4-22
Backyard Birds	4
Cottontail Rabbit	6
Ducks and Geese	8
Eastern Wild Turkey	10
Furbearers	12
Nongame Wildlife	14
Northern Bobwhite Quail	16
Ring-necked Pheasant	18
Ruffed Grouse	20
Whitetail Deer	22
Habitat Management Practices	24-35
Brush Piles	24
Prescribed Burning	24
Farm Ponds	26
Food Plots	27
Grasses and Forbs	28
Legumes	30
Mowing/Haying	31
Nesting Structures and Homes	31
Pasture Management	32
Strip/Light Disking	32
Timber Management	33
Trees and Shrubs (Shelterbelts)	34
Wetlands	35
Help For Establishing Habitat	36

Definition of Terms

Brood Rearing or Brooding Cover – Habitat where young wildlife feed.

Browse – Woody vegetation that deer and rabbits eat in the winter months (raspberry, sumac, oak).

CRP, CCRP, and WRP – (Conservation Reserve Program/Wetland Reserve Program) available to agricultural producers from USDA to improve wildlife, soil, and water on their property.

Coniferous Trees – Trees that retain their leaves and remain green all year, primarily evergreens (juniper, spruce, pine).

Cool Season Plants – Plants that grow during the early spring and late fall, but quit growing during the hot summer months (i.e., bromegrass, timothy, bluegrass).

Crop Tree Release – Selectively removing certain trees from a forest so mast trees can grow.

Deciduous Trees – Trees that drop their leaves in the fall (oak, maple, ash).

Drawdown – Process of removing the water from a wetland. A management tool commonly used to improve the vegetation found in the wetland.

Escape Cover – Habitat used by wildlife to escape from predators.

Firebreak – Buffer area surrounding a prescribed burn that the fire will not cross (disked dirt, road, stream, green vegetation).

Forb – Any broadleaf plant that does not have a woody stem (i.e., milkweed, alfalfa, prairie clover, daisy, strawberry).

Introduced Plants – Plants that are not native to Iowa.

Legume – Plants of the pea and bean families. Legumes are plants that capture nitrogen from the air and return it to the soil, thereby increasing soil

fertility. Legumes also harbor abundant insect populations. Because it is a broadleaf plant, a legume is also a forb (i.e., partridge pea, lespedeza, alfalfa, red clover, prairie clover).

Loafing Cover – Habitat where wildlife rests during the daytime. May or may not be the same habitat used for roosting or escape.

Mast – Fruit or seeds produced by trees. In some years oaks produce more acorns than other years, these years are referred to as good mast years.

Native Plants – Plants that were found in Iowa before European settlement, occurred in Iowa naturally.

Nesting Cover – Habitat where wildlife nest to raise young.

Nongame – Wildlife that is not hunted (butterflies, songbirds, tree frogs, bats, hawks, owls, mice).

Pure Live Seed (PLS) – Term used to describe the viability and purity of native prairie seed. To calculate PLS use the following formula:

$$\text{PLS} = (\text{lbs seed}) \times (\% \text{ germination} + \% \text{ dormant seed}) \times \% \text{ purity}$$

Residual Cover – Usually dead vegetation that remains from the previous growing season(s).

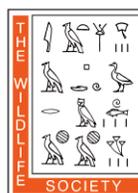
Roosting Cover - Habitat where wildlife sleeps or beds.

Snow Catch – An area designed to catch snow, thereby protecting winter habitat. Commonly used in conjunction with shelterbelts, windbreaks, and food plots.

Understory – Young trees, shrubs, and forbs that grow under the tall trees in a forest.

Warm Season Plants – Plants that grow during the hot summer months (i.e., big bluestem, indiagrass, switchgrass).

In addition to Iowa DNR and NRCS, other book contributors include:



The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotope, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Backyard Birds



Background

More than 362 species of birds have been documented in Iowa. Songbirds are by far the largest group of birds in Iowa and occupy every habitat. Your property can be home for many of these songbirds. Trees, shrubs, flowers, and other plants provide both food and shelter for birds. You can also construct birdhouses and put out bird feeders.

In urban and suburban areas, you may wish to focus on attracting spring and fall-migrating birds along with the more familiar birds. Rural landowners have more options, especially if the surrounding area is largely grassland, wetland, or forest. This is because there are more breeding species that require these habitats to survive. Regardless of where you live, it is helpful to maintain diversity with an abundance of trees and shrubs, as well as areas with leaf cover for ground-feeding birds.

Habitat Requirements

All species of wildlife need the basic habitat components of food, water, cover, and space. The amount and kind of each differ by individual species. Therefore, your backyard habitat determines the opportunities you have for bird conservation in your backyard. The more your backyard resembles natural habitat, the more attractive it is to a variety of birds.

For example, a native prairie consists of tall, clump-forming grasses mixed with an assortment of flowers of various shapes, colors, and fragrances. You will attract the greatest variety of birds by using the basic wildlife management principle: diverse habitat provides for a diversity of wildlife.



Photo and inset photo above by USDA-NRCS.



U.S. Fish and Wildlife Service photo by Dave Menke.

(Left) Goldfinches are highly attracted to thistle seed feeders. (Above) Cedar waxwings are attracted to backyards, especially those providing cover from conifer trees. (Opposite-left) Water is an essential habitat element for backyard birds. (Opposite-right) Using a variety of feeder types helps attract the greatest variety of birds.



Beneficial Management Practices

- Grasses and Forbs
- Nesting Structures and Homes
- Trees and Shrubs

Food

Natural foods such as fruits, nuts, and seeds provided by trees, shrubs, grasses, and flowers will attract a variety of birds. Feeding stations are also an entertaining and valuable way to provide food for birds. Location, feeder style, and food type dictate the kinds of birds that will visit the station.

To attract the greatest variety of birds, use feeding stations that include a variety of feeder types, such as a gravity-fed cylinder tube, hopper box, platform, or suet feeder and position them at different levels. Offer a variety of foods: millet for ground feeders, black oil sunflower and thistle for finches, and peanut and suet for woodpeckers. Provide more than one station and position them next to cover such as evergreen shrubs that will supply perching sites and protection from harsh weather and predators. Maintain and clean feeders continuously from October to April.

Following these simple rules minimizes competition among bird species and improves the number and kinds of birds attending the station.

Water

Most birds need open water throughout the year. Providing a water source in your backyard will attract more birds. A small pool with stones in a shallow edge draws them to bathe, drink, and help control their temperatures.



Photo and inset photo above by USDA-NRCS.

Providing a birdbath will also meet their needs. Birds are attracted to the sound of flowing water. Providing moving water through a fountain will increase bird use in your yard. In winter, you can provide water in a heated dog bowl or buy a birdbath heater.

Cover

Songbirds use cover for escape, roosting, nesting, and brood rearing. You can enhance the cover in your backyard and attract more species by planting trees, shrubs, grasses, and flowers. Using fruit-, nut-, and seed-bearing plants in your backyard can also provide a variety of winter foods in addition to cover. You can also make or buy birdhouses that are specifically designed for the species of birds you want to attract.

Space

Space and territorial needs vary with each bird species. By understanding how much space is necessary for each species, you can learn what birds are attracted to your backyard. Bluebirds, for example, are territorial and need about five acres per pair. In contrast, purple martins are not territorial and need only small areas.

House cats are a major predator of backyard birds. Keeping cats indoors is the best way to stop this problem. If this is not possible, securing bells to their collars when outdoors can help warn birds of their presence, thus reducing their impact as predators.



Photo by USDA-NRCS.

Cottontail Rabbit



Identification

Male (buck) and female (doe) cottontails are identical in coloration, their backs and sides vary from reddish to grayish-brown sprinkled with black that gives the fur a peppery grayish-brown color. The underside is gray to white, while the short tail is brownish above and fluffy white below. When a cottontail runs, the tail is turned up, and the white part is very conspicuous, hence its name—the cottontail. Adult cottontails weigh from 2 to 2-3/4 lbs. and measure from 14 to 20 inches, with females slightly larger than males. Although born hairless, young rabbits resemble miniature adults at 1 week of age and are indistinguishable from adults by 18 weeks of age.

Background

The cottontail or common rabbit is one of Iowa's most familiar native small game animals. Cottontails are found statewide in a variety of habitats ranging from rural agricultural habitats to urban backyards.

Cottontails have a short lifespan in the wild with most living little more than one year. A Michigan study showed that only 2 out of 226 tagged wild cottontails ever reached two years of age. Cottontails are prey for virtually all types of predators, which results in the loss

of great numbers of rabbits. However, cottontails are very prolific. A single pair of cottontails can produce 20 to 30 young a year. It is this prolific nature that enables them to survive as a species.

Cottontails spend their entire life within a 2 to 10 acre area. Therefore, all their life requirements including food, nesting, and escape habitats must be met within this small area.

In Iowa, the best rabbit densities can be found in areas that have a good mix of cropland, idle grassland, brushy draws or brushy woodland borders, briar patches, Osage orange or multi-flora rose hedgerows, and other idle areas. Historically, cottontails were found across much of Iowa, but intensive agriculture in northern Iowa has eliminated much of the habitat necessary for good rabbit numbers.

Southern and eastern Iowa have always boasted Iowa's highest densities of cottontails because of the mixture of shrubby/brushy habitats with agriculture. Unfortunately, these areas of Iowa have seen this habitat reduced substantially in recent years, as agricultural operations become larger and more efficient. With these habitat losses, rabbit numbers have declined.



Iowa DNR Photos and inset photo above by Roger Hill.

(Left and above) Cottontail rabbits are found statewide in a variety of habitats ranging from rural agricultural to urban backyards. (Opposite-left) Forbs provide excellent habitat for cottontail rabbits. (Opposite-right) Strip-disking crop or CRP fields adjacent to feathered edges provides ideal winter habitat.



Beneficial Management Practices

- Brush Piles • Food Plots
- Grasses and Forbs
- Strip/Light Disking
- Timber Management
- Trees and Shrubs (Shelterbelts)

Habitat Requirements

Nesting Habitat

Cottontails' normal breeding season in Iowa extends from March through September. Cottontails are most active near dawn and dusk, and most courting and mating occurs then. Young are born about 28 days after mating. A female can produce from 5 to 6 litters a year with litters averaging 4 to 5 young. Young are born in a shallow ground depression lined with grasses, roots, leaves, and fur that the doe pulls from her chest and belly.

The nest is normally located in idle grassy areas, hayfields, fencelines, or brushy areas. The young, weighing about 1 ounce, are deaf, blind, and naked at birth. Young grow rapidly on mother's milk and leave the nest at 15 to 20 days, switching to a diet of succulent vegetation. Young leave the nest weighing about 4 to 8 ounces and must fend for themselves, as the doe is mostly likely pregnant with her next litter.

The females' summer range averages only 2 to 3 acres thus habitat that provides a mixture of high quality food and protection is needed. A mixture of undisturbed cool or warm season grasses, forbs and legumes (30 to 50 yards wide) provides high quality nesting habitat, especially if located next to brushy/shrubby escape habitat. Green food plots can provide both young and adults with abundant food and cover during the nesting season. Drinking water is not needed as moisture from their diet of grass and forbs meets their daily water needs.



Iowa DNR photo by Roger Hill. Inset photo above by Iowa DNR.

Winter Habitat

Winter is a critical period for rabbits, as food resources and escape cover becomes limited. Persistent snowfall reduces escape habitats and eliminates the cottontails preferred grassy-herbaceous food forcing them to switch to a diet of woody stems and twigs.

Rabbits must spend more time searching for these foods, and the background of white snow makes them more vulnerable. During the winter months, woody twigs and stems of raspberry, sumac, apple, hawthorn, birch, and white oak become an important food source for rabbits.

An excellent year round timber practice beneficial to rabbits is called the feathered edge. This is a transition area between tall timber and open grass or agricultural fields. It involves simply removing all tall trees in a 40 yard wide strip along the edge of the timber. This promotes a lush regrowth of brush and trees providing excellent rabbit food and escape cover. Treetops can be used to create brush piles that provide more habitat.

Strip disking crop or CRP fields adjacent to a feathered edge provides ideal winter habitat. Probably the quickest way to create year round rabbit habitat is to construct brush piles, especially if they are located near idle grasslands, crop fields, and brushy areas. A brush pile constructed for rabbits should be at least 5 feet high and 10-15 feet in diameter. The more brush piles in an area the better.

Native warm season grass plantings adjacent to brushy fencelines, ditches or shelterbelts also provide good winter rabbit habitat. Cottontails will also utilize winter food plots of corn and sorghum if they are adjacent to shrubby habitat. Sorghum plots provide good winter rabbit habitat, particularly if taller sorghum varieties are planted. Brush piles and food plots should not be placed next to tall timbered edges, but toward the open field edge to reduce avian predation.



Photo by Missouri Department of Conservation.

Ducks and Geese



Identification

Each spring and fall, more than 30 different species of ducks, geese, and swans migrate through Iowa on their trek to and from wintering and nesting areas. They range in size from the smallest waterfowl in North America (green-winged teal) to the largest (trumpeter swan). Swans (trumpeter and tundra) are all white with long necks and wingspans (7 to 8'). Males and females look alike.

Geese that are intermediate in size between swans and ducks, include Canada geese (3 subspecies), white-fronted geese, snow geese and Ross geese. All Canada geese commonly seen in Iowa are similar in coloration, including black head and neck with broad white cheek patch, gray breast feathers and black wing feathers, but they vary in size from 5 to 12 lbs. Snow geese come in various colors ranging from all white to nearly all gray, but are much smaller than swans (4 to 5 lb., wing-span 4 feet) and have black wing tips (swan wings are all white). Ross geese look nearly identical to snow geese but are smaller at 3½ lbs. As with swans, male and female geese look alike.

Ducks can be grouped into two categories, dabbling ducks and diving ducks. Dabbling ducks, including mallards, wood ducks, blue-winged teal, shovelers and seven other species, commonly feed in shallow water by tipping up. They take off with a sudden upward leap and have bright iridescent patches on their wing feathers.

Diving ducks, such as redheads, canvasbacks, scaup and ruddy ducks, feed by diving to the bottom of ponds and lakes, as deep as 50 feet, to get submerged plants. They run across the water to get airborne and their wing-feathers are black, white and shades of gray.



USFWS photo by Wyman Meinzer.

Unlike swans and geese, the plumage of male and female ducks is markedly different. Male ducks are generally brightly colored whereas the females are feathered in various shades of brown. This brown camouflage helps to conceal the female when she is sitting on her nest.

Background

Iowa had a rich diversity of nesting ducks and geese prior to 1800. Subsistence and market hunting, in combination with the mass conversion of wetlands and prairies to cropland in the 1800's and early 1900's, eliminated many of these species from Iowa. Conservation efforts during the 20th century, however, have restored some of these species (e.g., Canada geese and wood ducks) to relatively abundant levels. Although populations are not nearly as abundant as before settlement. Historically, the greatest numbers of ducks, geese and swans nested in the prairie-pothole region that extends north from Des Moines to Spirit Lake and east to Mason City.

Even though much of this region has been converted to cropland, the highest numbers of nesting ducks and geese can still be found on this region's remnant wetlands. Iowa's wetlands continue to host millions of migrating ducks, geese and swans each spring and fall. Nearly 35,000 waterfowl hunters avidly pursue ducks and geese in Iowa each fall and harvest about 250,000 ducks and 75,000 geese each year.



Iowa DNR photo by Roger Hill; Inset above- USFWS photo by William Vinje.

(Left) Canada geese can vary in size from 5 to 12 pounds. (Above) Dabbling ducks, including mallards, wood ducks, blue-winged teal, shovelers and seven other species, commonly feed in shallow water by tipping up.



Beneficial Management Practices

- Food Plots (Green Browse and Moist Soil)
- Grasses and Forbs
- Nesting Structures and Homes
- Wetlands

Habitat Requirements

Waterfowl need both wetland and grassland habitats to reproduce successfully and maintain their populations. All dabbling ducks need shallow wetlands for feeding and undisturbed grasslands for nesting. Shallow wetlands that warm quickly in the spring are particularly important because they produce insects that hens eat for the protein they need to produce eggs.

Hens lay about one egg per day. Nests require anywhere from 23 to 28 days of incubation, depending upon the species, for eggs to hatch. Natural predators, like skunks, raccoons, crows, etc., eat numerous duck nests. Only about 20 percent of hens eventually hatch a nest. Any land management practices that idle grasslands, protecting them from haying and grazing during May through July, will benefit nesting ducks.

Wood ducks, the only dabbling duck in Iowa that nests in trees, need mature trees with ample “squirrel holes” for nest sites. Wood ducks and Canada geese will readily use human-made structures for nesting. Diving ducks, like the redhead and the ruddy duck, typically nest on clumps of cattails or bulrushes over water.

Wetlands with about 50 percent of their surface area covered by cattails, bulrushes, or other wetland plants provide ideal habitat for all waterfowl broods as well as nesting pairs, especially diving ducks. Not only do the cattails, bulrushes, etc., help conceal the ducklings from predators, they are also habitat for the insects that ducklings need for food.

Canada geese and trumpeter swans usually nest on island-like structures over the water. Muskrat houses are favorite nesting sites of Canada geese, while swans usually build their own nesting islands. Young geese (goslings) feed on succulent grasses/forbs adjacent to wetlands.

Green browse food plots adjacent to wetlands make excellent feeding areas for goslings. In contrast to geese, young swans or cygnets feed almost exclusively on plants that grow within the wetland. During the fall migration, green browse and grain food plots adjacent to wetlands provide important food for migrating waterfowl. Green browse plots of winter wheat/rye are excellent food for geese. Wetlands drawn down in the summer and allowed to regrow to annual weeds or fall flooded corn/sorghum food plots also provide excellent food for all species of waterfowl.



Iowa DNR photos by Roger Hill.

(Left) Waterfowl need both wetland and grassland habitats to reproduce successfully and maintain their populations. (Top) Goose tubs can help improve a habitat by providing a place for geese to nest. (Bottom) The grass near this nest will provide food for the goslings after they hatch.



Photo by USDA-NRCS.

Eastern Wild Turkey



Identification

Eastern wild turkeys are large native woodland gamebirds characterized by strong feet and legs, and short, rounded wings adapted for short, rapid flight. Adult males called "gobblers or toms", may measure up to 4 feet tall and weigh more than 20 pounds at maturity. Tail feathers are tipped with chestnut brown, while breast feathers are tipped in black and have an iridescent copper/bronze sheen. The gobbler has a red, white and blue head and a characteristic 1-10 inch beard protruding from his chest. The springtime gobbling and strutting, and fanning of the tail is used to attract the female for breeding.

Females or "hens" are much lighter, weighing between 8 and 12 pounds. Females are similar in color to the males, but are more brown, and less brilliant. Hens have a grey/blue head and their body feathers are tipped with brown rather than black. Newly hatched turkeys called "poults" are covered with soft buff-colored down with dark markings on the head and back, and weigh about two ounces at hatch. Juveniles of both sexes, up to 10 weeks of age, resemble females in color. By 14 weeks of age, the different sexes are distinguishable by body size and plumage.

Background

The wild turkey is an important forest gamebird in Iowa and thrives in mature oak-hickory forests native to this region. The Eastern wild turkey was found throughout Iowa when the first settlers crossed the Mississippi River in the 1830's. However, habitat loss and subsistence hunting for food led to the elimination of turkeys from Iowa by 1910. The DNR began an aggressive restoration program in the mid 1960's utilizing wild trapped birds. Populations continue to expand and Iowa's wild turkey population is currently estimated at more than 100,000 birds.



(Above-left) Male turkeys or gobblers have a characteristic 1 to 10 inch beard protruding from the chest as seen here. (Below-left) After hatching chicks grow rapidly and require a high protein diet of insects. (Right) The populations of eastern wild turkey is currently estimated at more than 100,000 birds. (Opposite-left) Nests are shallow scratched out depressions made by the hen. (Opposite-right) Food plots, near appropriately managed timber, provide excellent winter habitat.

Iowa DNR Photos by Roger Hill. Inset Photo above by USDA-NRCS.



Beneficial Management Practices

- Food Plots (Green Browse and Winter)
- Timber Management
- Trees and Shrubs

Habitat Requirements

Nesting

Nests are shallow scratched out depressions made by the hen. Nest sites are chosen for their moderately dense understory, which still allows the hen a view but gives protection from avian predators. Hens select nest sites in a variety of cover types including both grassy and woodland habitats, typically on the edge of the forest near field openings.

Egg laying usually begins in mid to late April, peak incubation occurs in May, and peak hatch is usually early to mid June. Laying a clutch of 10 to 12 eggs takes about two weeks and eggs are usually covered with leaves or other debris. Incubation begins about the time the last egg is laid. The eggs hatch in about 26 to 28 days. After hatching chicks grow rapidly and require a high protein diet of insects. By the end of the first week, poults are regularly dusting with the hen. By their second week they are able to fly short distances and at the third week they are able to roost in low trees with the hen. The ability to roost in trees is an important event in the poult's development as it removes them from the danger of ground predators.

There are three essential components for brood habitat. First, poults need an environment that produces abundant insects where they can efficiently feed. Second, they need habitat that permits frequent foraging throughout the day, and third, poults need an area that provides enough cover to hide them but allow the hen unobstructed vision for protection from predation. All these ingredients must occur within a relatively small area. Ideal brood habitat in Iowa consists of forested sites with open herbaceous understories in close proximity to



Iowa DNR photo by Roger Hill.

open fields. Green browse areas next to appropriately managed timber provide excellent brooding areas.

Winter Habitat

Wild turkeys seek two key habitat types for the fall and winter survival: food and roosting habitat. During the fall, food is critical to continued growth of young and the building of fat deposits by young and adults. For most of the winter, growth is halted and turkeys are on a sustaining or declining energy supply.

Food is critical, but protection from adverse weather is equally important. In Iowa, where agriculture is prominent, a mix of cropland and forest cover is highly suitable. Open oak-hickory woods with available hard mast are important features of high quality turkey habitat. Corn food plots adjacent to mature oak-hickory timber are very attractive to wintering turkeys. Fallow fields, spread manure, and idle areas are an important food source during years of low mast production.

Turkeys spend most daylight hours on the ground, but at night they roost in trees to avoid predators. Favorite turkey roosting sites include clumps of large pine, groups of large-limbed, open-branched trees, similar to those found in mature oak-hickory forests. Conifers and oaks that retain their leaves may be preferred in winter because they provide additional thermal protection and concealment. Southern and eastern exposures are often favored because lower snow depths in these areas allow the birds to move about and forage more easily.



Photo and inset photo above by USDA-NRCS.

Furbearers



Background

Iowa is home to 15 common furbearing species. These species include the opossum, woodchuck, beaver, muskrat, coyote, red and gray fox, raccoon, mink, badger, weasel, striped and spotted skunk, river otter, and bobcat. While most of these species are common in Iowa and can be trapped or hunted, the spotted skunk, river otter, and bobcat are considered rare and are protected in Iowa.

Iowa was also home to several other furbearers at the time of settlement, including black bear, mountain lion or cougar, and the plains wolf. However, these species were all eliminated from the state before 1900. Although furbearers are often not the highest priority in many habitat management programs, the fact remains that furbearing animals are primary beneficiaries of many of these practices. This is particularly true of wetland/grassland areas, which are prime habitat for muskrat, mink, beaver, river otter, raccoon, red fox, and skunk.

Furbearers often do so well on these areas that conflicts, such as high nest predation with other species or agricultural crop damage, can occur. Forest management practices also influence furbearer populations. Some species favor dense, brushy stages and others favor less dense mature stands.

Although it is difficult to say which habitat benefits furbearers the most, timbered river and stream valley corridors are probably the most important habitats for opossum, woodchuck, coyote, gray fox, and bobcat. Protecting and creating stream and river valley greenbelts will benefit many fur species. Planting trees and shrubs, protecting den trees, and water level manipulation for aquatic furbearers can greatly improve habitat for these species.



Iowa DNR photos and inset photo above by Roger Hill.

(Left and above) Iowa is home to 15 common furbearing species, including coyote and opossum. Coyotes prefer to live in brushy country along the edge of timber. Opossum are found throughout Iowa and make dens in brush piles, hollow trees, old buildings and cavities in rock. (Opposite-left) Raccoons can be found anywhere that food and shelter exist. Their preferred foods are aquatic animals, insects and corn. (Opposite-right) Beavers are dependent on water for survival and are found along many of Iowa's waterways. They primarily like to inhabit small rivers with willows and other brush lining the shoreline.



Beneficial Management Practices

- Food Plots
- Grasses and Forbs
- Timber Management
- Trees and Shrubs

Habitat Requirements

Opossum (or possum): are found throughout Iowa and prefer brushy areas near streams. Den sites include cavities in rocks, brush piles, hollow trees, and old buildings.

Woodchucks (or groundhog): prefer to live in timber habitat bordered by open land, or along fencerows and heavily vegetated gullies or streams. One woodchuck may have several burrows. Hibernating dens are located primarily in woodland areas while summer dens are in open grasslands or croplands.

Beavers: are dependent on water for survival and are found along many of Iowa's waterways. Beaver particularly like to inhabit small rivers with willows and other brush lining the shoreline. In agricultural areas they will sometimes use corn stalks to build dams, much to the dismay of farmers.

Muskrats: are found in conjunction with most permanent water bodies in Iowa. Muskrats are well adapted to an aquatic lifestyle and are dependent upon it for protection from predators. Muskrats can be found in the highest concentration in marshes with abundant cattails. They also will burrow into the banks of streams or farm ponds.

Coyotes: prefer to live in brushy country, along the edge of timber and in open farmland. Dens are usually located in unused fields and are often close to timber. They may be found in a bank, under a hollow tree or log, in a rock cavity or occasionally in a dug out area in a clump of brush.

Red Foxes: are extremely adaptable and thrive under a variety of conditions. They are considered more of a grassland animal than the gray fox and prefer to den in the farmlands interspersed with grasslands. Because Iowa's woodlands are quite small in nature. Red fox will frequent them as well. They tend to avoid areas where coyote populations are established and often renovate dens dug by badgers or woodchucks.



Grayfoxes: live in wooded areas and fairly open brushland. They are skillful tree climbers, a habit the red fox seldom exhibits. They are warm climate animals. Since Iowa is in the northern part of its range, grayfox use dens for warmth more than the red foxes. The dens are located in hollow logs and trees, hollows under rock piles or occasionally in the ground.

Raccoons: can be found about anywhere that food and shelter exist. Their preferred foods are aquatic animals, insects, and corn, although they will scavenge almost any edible food. Their largest densities occur near permanent bodies of water that offer a wide variety of food and den sites, such as hollow trees, abandoned buildings and burrows.

Mink: are almost always found in conjunction with water because of the diversity of food that is available there. Good places to find mink are lakeshores, marshes and stream banks that have trees or rocks to provide shelter.

Badgers: prefer open country, and plains where ground squirrels and other small-burrowing mammals, on which they feed, are abundant. They typically dig burrows or live under abandoned buildings.

Skunks: are at home in a variety of habitats but prefer timber borders, brushy field corners, fence rows, rock piles, old building sites and open grassy fields. They customarily den in the ground, but occasionally rock piles, stumps and buildings will be used as denning sites. They often utilize dens discarded by other animals.

Weasels: live in a variety of habitats but prefer woodlands, thickets and brushy fencerows near available drinking water. Their home is a shallow burrow, often the former abode of a mole, ground squirrel or mouse. Weasels may also live in rock piles, under the roots of trees. On occasion, their home may be in an old building where mice are plentiful.



Iowa DNR photos by Roger Hill. Inset photo above by Missouri Department of Conservation.

Nongame Wildlife



Background

More than 400 (80 percent) of the animal species living in Iowa are considered nongame wildlife. This section covers the habitat requirements of small mammals, frogs, toads, salamanders, snakes, lizards, turtles, and bats. (Songbirds are addressed in the section on backyard birds.)

Your property may not be large enough to provide the habitat needs of all the nongame wildlife you wish to attract. However, you can offer one or more types of habitat and still attract a variety of wildlife. A management plan with the widest range of plantings and structures will attract the greatest assortment and number of mammals, amphibians, reptiles, and bats.

See the following booklets, available from the Iowa DNR's Wildlife Diversity Program, for information about identification, life history, and habitat requirements of Iowa's nongame wildlife: *The Salamanders and Frogs of Iowa*; *The Snakes of Iowa*; *The Lizards and Turtles of Iowa*; *A Guide to the Bats of Iowa*.

Habitat Requirements

Nongame wildlife species show preferences for certain habitats. These habitats include wetlands, grasslands, and trees/shrubs/forests. The types of plants you use for food and cover will determine the nongame wildlife species attracted to your property.

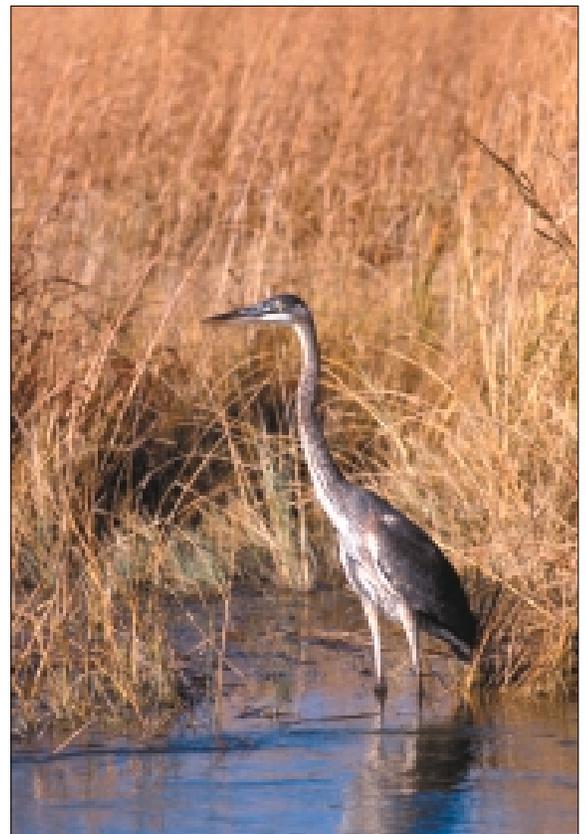
When planning your landscape, it is best to match the result you hope to create with the dominant type of habitat in your area. Then you can expect to eventually see most or all of the wildlife species living within the surrounding habitat on your property.

Any habitat manipulation will benefit certain species while discouraging others. Even making a decision not to change a habitat will positively effect one group while negatively impacting another. You will attract the greatest variety of wildlife by using the principle that diverse habitats provide for a diversity of wildlife.



Photo by USDA-NRCS.

More than 400 of the animal species living in Iowa are considered nongame wildlife. If you offer one or more types of habitat, you can attract many of these wildlife types. When planning your landscape, it is best to match the result you hope to create with the dominant type of habitat in your area. Some nongame wildlife include turtles, tree frogs and great blue herons.



Iowa DNR photo and inset photo above by Roger Hill.



Beneficial Management Practices

- Grasses and Forbs
- Farm Ponds
- Nesting Structures and Homes
- Wetlands

Wetlands and Ponds

Wetlands furnish homes for turtles, snakes, frogs, toads, and salamanders. A variety of wetlands (marshes, fens, and streams) will attract different wildlife species at different times of the year. Wetlands connected to forests are ideal habitat for frogs, toads, and salamanders; however, single habitats are also important. Wet meadows, wet ditches, flooded timber, and other temporary wetlands are important to a variety of wildlife, therefore it is important to restore degraded or drained wetlands on your property.

Ponds can become the center of activity for a wide range of wildlife species. Most desirable is a small, shallow pond with an area large enough to support plants that grow in the water and around the edge. Ponds should have: 1) a gently sloping area on at least one end, 2) a variety of depths, 3) areas of sunlight and shade, and 4) a transition area of vegetation from pond to yard.

Frogs, toads, and salamanders need submerged vegetation and/or brush to attach their eggs and for winter hibernation. Turtles and frogs also need vegetation, logs, or rocks in the pond for basking and submerged logs for cover.

Toads and salamanders find shelter in loose topsoil under logs and rocks next to the pond. Fish, except some minnows, should be excluded from ponds where a variety of nongame species is desired because they eat eggs and young. Areas should also be fenced-off from cattle to help reduce bank erosion and retain shoreline and emergent vegetation.



Iowa DNR photos by Roger Hill; inset photo above by USDA-NRCS.

Grasslands

Large patches of grassland are beneficial to snakes, lizards, turtles, and small mammals. Native plant species should be used whenever possible. However, other areas with tall, unmowed, or infrequently mowed grasses can provide nesting and foraging sites. Ground covers also offer an ideal opportunity to develop low-maintenance wildlife habitat for small mammals.

Trees/Shrubs/Forests

Trees and shrubs provide cover for nesting, rearing young, winter cover, and food. A diversity of tree species assures a variety of wildlife uses. Leaf litter, rotting logs, and fallen branches provide homes for salamanders and snakes. Standing dead or dying trees attract squirrels and other cavity nesters. Areas fenced-off from cattle provide better leaf litter and understory vegetation for salamanders. For summer nursery roosts, bats use loose bark and tree cavities. Trees along streams and rivers provide temporary roosts and food supplies for bats.

Structures

Piles of rock, brush, and leaves provide cover and improve the variety and quantity of food available for small mammals, toads, and salamanders. Old wells, buried rocks, or deep rock crevices usually provide suitable hibernating areas for snakes.

Caves used by bats should be managed to minimize human impact by excluding visitors during winter months when bats are hibernating. Bat houses can be used to attract bats to your property.



Northern Bobwhite Quail



Identification

Males have white chins and throats, a white stripe that extends from the bill through the eye to the back of the head, and a black chest collar under the throat and chin. Feathers of the breast and abdomen are white with black barring, while upper back and wing feathers are brown and gray barred with black.

Females have tan instead of white coloration on the throat, chin, eyestrip and underparts. Females also lack black neck collars and exhibit brown barring or mottling of body feathers. Newly hatched chicks have a downy grayish-buff underside with black stripes down the side and a chestnut-red back and head. Young are indistinguishable from adults by 15 weeks of age.

Background

The bobwhite is a small native gamebird; popular with hunters and second only to the ring-necked pheasant in numbers of birds harvested annually. Bobwhite prefer brushy-shrubby areas interspersed with small (20 to 80 acres) agricultural fields and pasture/hayland. Most live out their entire lives on less than 100 acres. Historically, bobwhite were found across much of Iowa, but intensive farming in northern Iowa has eliminated much of the shrubby/brushy habitat necessary for bobwhite survival. Bobwhites are now only found in southern Iowa.

Osage orange hedgerows intermingled with small Iowa farms once provided abundant quail numbers in Iowa. Unfortunately, southern Iowa has seen this type of habitat reduced substantially in recent years and will continue to see quail numbers decline as farming operations become larger and more efficient, dictating increasing field sizes, removal of fencelines and hedgerows, and reduced diversity in crops.



Iowa DNR photos and inset photo above by Roger Hill.

(Left) Male northern bobwhite quail have white chins and throats, a white strip that extends from the bill through the eye to the back of the head. (Above) Newly hatched chicks are about bumblebee sized and need sparse vegetation to move and feed.



Beneficial Management Practices

- Brush Piles • Food Plots
- Grasses and Forbs • Pasture Management
- Strip/Light disking
- Timber Management
- Trees and Shrubs

Habitat Requirements

The most “critical” aspect of bobwhite quail management is creating a good mixture of required habitat types in a small area of 50 to 100 acres. These habitats must provide suitable feeding, nesting, brood rearing, loafing, and wintering areas. A mixture of crop fields, pastures, and meadows containing native grasses, idle areas, hedgerows, and brushy fencerows and woodland edges make up quality quail habitat.

Nesting Habitat

Bobwhite nests are usually found in sparse vegetation, next to edges, consisting of mixed native grasses and forbs such as those found in pastures, fencerows, roadsides or idle areas.

The nest is a shallow scrape with a canopy of overhanging grass, lined with dead leaves and grass. Nesting lasts from April to September, but most nests are started in May with young hatching around the end of June. Average clutch is 14 eggs with 23 days of incubation. Hens will often start a nest and leave it to a male and start a second nest with another male.

Double clutching allows quail to increase their populations by as much as 400 percent in one year. Because their small stature gives them limited mobility, hens avoid heavy-matted vegetation (like brome, timothy and switchgrass) and seek out sparse-disturbed habitats for nesting and brood rearing.

Preferred habitats include moderately grazed pastures, native grasses with forbs, idle areas, weedy food plots and brushy fences and hedgerows. Nesting habitat only need to contain one clump of grass every 15 steps, with sparser vegetation between clumps.

Newly hatched chicks are about bumblebee sized and grow very rapidly. Chicks double their weight every

10 days and can fly at 2 to 3 weeks of age. Their tiny size and high growth rate demands sparse vegetation with abundant insects.

Feeding areas for chicks may contain as much as 70 percent bare ground. Idle areas in crop fields, pastures and strip disking along field borders encourage sparse, bug rich vegetation that make excellent chick-feeding areas.

Winter Habitat

In winter, quail form groups of 8 to 25 birds called coveys. Winter coveys roost in tight circles to conserve body heat and protect the covey from predators.

Iowa represents the northern fringe of the bobwhite range in North America and severe winters can eliminate 60 to 90 percent of the population in some years. Research has shown quail seldom range more than one-quarter mile in winter. Thus all habitats needs, including loafing, roosting, and food, must be in close proximity to each other.

In Missouri, wintering coveys were usually located within 70 feet of brushy vegetation at all times within their average 100-acre wintering areas. Areas without abundant brushy/shrubby vegetation did not winter quail. Shrub plantings and woodland timber management practices next to foodplots of corn, sorghum, German millet, cowpeas, partridge pea, and lespedezas make excellent quail wintering areas.



Iowa DNR Photos by Roger Hill; Inset photo above by USDA-NRCS.

(Left) Edge cover like this black raspberry provide excellent quail habitat. (Right) Crop fields are part of the mixture that make up quality quail habitat.



Ring-necked Pheasant



Identification

Pheasants are a long-tailed, seed-eating, chicken-like gamebird. Male pheasants, “roosters or cocks” are brilliantly colored with a combination of russet, copper, brown, gray and black on the body, iridescent dark green on the neck with a white ring, and bright red wattles on the head. In contrast, females or “hens” are light brown with black flecking on each feather.

Newly hatched chicks are covered with soft buff-colored down with dark markings on the head and back, and weigh about a half an ounce. Juveniles of both sexes, up to 10 weeks of age, resemble females in color, and by 16 weeks of age, both sexes are almost indistinguishable from adults.



Photo and inset photo above by USDA-NRCS.

(Above) Male pheasants, “roosters or cocks” are brilliantly colored with a combination of russet, copper, brown, gray and black on the body. (Right-above) The ringneck is the most important gamebird in Iowa with an estimated statewide population of 4 to 6 million birds. (Right-below) Open weedy/brushy areas during the day provide safety from predators during the winter while allowing the birds an opportunity to sun themselves.

Background

The ring-neck is the most important gamebird in Iowa with an estimated statewide population of 4 to 6 million birds. Pheasants are found on farmlands throughout the state, but are most numerous on lands that have a good mixture of row crops, small grains, hay, idle grassland, and wetlands. An Asian species, the ring-necked pheasant was successfully introduced into north-central Iowa about 1900. The DNR began stocking pheasants around 1910 with most regions of Iowa receiving large stockings by 1930.

Populations peaked in the 1940’s with numbers estimated as high 500/square mile, but populations have declined to less than 15/square mile over much of Iowa since 1970. The lack of safe nesting habitat (hayland, pasture, small grains, idle grassland and wetlands) has been identified as the primary reason for the decline. Safe nesting habitat is disappearing because present agricultural policy favors increased acreage in rowcrops at the expense of small grains, hayland, idle grassland and pasture.



Iowa DNR photos by Roger Hill.



Beneficial Management Practices

- Food Plots
- Grasses and Forbs
- Trees and Shrubs (Shelterbelts)
- Wetlands

Habitat Requirements

Nesting Habitat

Nesting can begin as early as March in southern Iowa, but most egg laying usually begins in mid to late April. Peak incubation occurs in May, and peak hatch is usually early to mid June. The nest consists of a shallow, scratched-out depression in the ground that is lined with grass, leaves, and feathers. Hens conceal their nests in erect, undisturbed grassy vegetation (small grains, hay fields, CRP, roadsides, pastures, and idle areas) at least 8 to 10 inches tall. Hens lay about an egg a day and first nests usually have 10 to 12 eggs. The eggs hatch in about 23 days. A complete nesting cycle from laying to hatch takes about 37 days.

Because nesting begins so early in the spring, nests are usually placed in cool or warm season grasses left standing from the previous year. Iowa research shows that nests in “blocks” of habitat greater than 40 acres have a higher chance of hatching (6 of 10 nests) than nests in small or “narrow strips” of habitat less than 40 acres (4 of 10 nests hatch). Nests in small or narrow strips of habitat are simply easier for predators to find and destroy.

After hatching, chicks grow very rapidly and can make short flights at 10 days of age. Such a phenomenal growth rate requires a high protein diet. Insects are the only food source available in late spring capable of supplying this high protein diet. Nesting habitats that contain a mixture of grasses and forbs provide greater numbers and varieties of insects, which are necessary for proper chick growth. Chicks also have very limited mobility the first few weeks of life and mixed grass-forb seedings provide more open space at ground level allowing chicks greater movement to feed.



Winter Habitat

Researchers have found pheasants prefer tall, grassy habitats for roosting at night, while areas with tall weeds or shrubby/brushy habitats are usually selected for loafing during the day. Dense ground cover may help roosting birds retain body heat at night, while open weedy/brushy areas during the day provide safety from predators while allowing the birds an opportunity to sun themselves.

Tall, lush stands of cattail or bulrush wetlands, switchgrass, or warm season grasses about 20 to 40 acres in size are good examples of winter roost habitat. Waste grain is a widely available and readily accepted food source, and lack of food rarely becomes a limiting factor to Iowa ring-necked pheasants. However, fall plowing and deep snow can certainly reduce available food supplies.

Corn or sorghum food plots can improve overwinter survival during severe winters or in areas with a lack of waste grains. Food plots should be situated adjacent to winter habitat as pheasants seldom travel more than one-quarter mile from winter habitat to feed. During severe winter's deep snows can eliminate grass habitats leaving pheasants vulnerable to predation and storms. Large, multi-row conifer/evergreen shelterbelts with dense, low-hanging branches can improve pheasant survival during such winters if established ¼ mile of winter food and roosting habitats.



Iowa DNR photos by Roger Hill; Inset photo above by Missouri Department of Conservation.

(Left) Hens lay about an egg a day and first nests usually have 10 to 12 eggs. (Above) During the winter, pheasants prefer tall, grassy habitats for roosting at night (as seen in background).

Ruffed Grouse



Identification

The ruffed grouse is a ground-dwelling, native forest gamebird that lives in young deciduous and mixed woodlands. It is mottled with various shades of brown, black, and gray with lighter underparts that have dark bars. Both sexes are similar, but there are two color phases—brown and gray. The brown phase is often called the red or reddish brown phase. Ruffed grouse have a broad black band on the fan-shaped tail. They also have a somewhat triangular patch of dark feathers on each side of the neck that, when erected, form an umbrella-like ruff from which the bird derives its name. Adult males, called “cocks” are slightly heavier than adult females (hens), averaging approximately 1¼lbs. Newly hatched chicks are covered with soft buff-colored down with a distinctive dark stripe from the eye to the nape, and weigh about ½ ounce.

Background

Ruffed grouse were found nearly statewide in Iowa during the mid-19th century, but deforestation and grazing of timber caused a dramatic decline of grouse populations. By 1900, ruffed grouse disappeared from southwest Iowa and further population declines occurred in the south and east-central portions of the state prior to the 1920's. By 1930, grouse were restricted to their present range in northeast Iowa.

The Iowa DNR began restoring ruffed grouse into southern and southeastern Iowa in the mid 1960's utilizing wild trapped birds from northeast Iowa and neighboring states. Small populations continue to exist in southern and southeast Iowa, but conditions that caused initial declines of grouse populations still exist and may be actually becoming more unfavorable. Currently, ruffed grouse hunting in Iowa is confined to the northeastern portion of the state.



Photo and inset photo above by Iowa DNR.



(Left-above) Ruffed grouse are mottled with various shades of brown, black and gray with lighter underparts that have dark bars. (Left-below) Ruffed grouse nests are little more than shallow bowl-like depressions formed in dead leaves and vegetation on the forest floor. (Above) Ruffed grouse have a broad black band on their fan-shaped tails.

Iowa DNR photos by David and Arthur Allen.



Beneficial Management Practices

- Food Plots
- Timber Management
- Trees and Shrubs

Habitat Requirements

Nesting

Ruffed grouse nests are little more than shallow bowl-like depressions formed in dead leaves and vegetation on the forest floor. The nest is usually situated at the base of a solid object, such as a tree or stump. Other sites frequently chosen include fallen trees, brush piles, and boulders. Occasionally the nest is by itself, without any solid object in close proximity. Hardwood stands that are fairly open at ground level make choice nesting sites. It is best when hens have a good view of their immediate surroundings and a ready escape route from predators.

The best nesting sites are hardwood stands with tree stems 2 – 5 inches in diameter. Egg laying usually begins in late April and hatching occurs in late May and early June. Hatching of late nests may continue into early July. Laying a clutch of 10 – 11 eggs takes about 2 weeks. The eggs hatch in about 24 – 26 days.

After hatching, chicks grow rapidly from their high protein diet of insects. By the end of the first week, chicks have nearly doubled in weight. By the time the chicks are 10 to 14 days old, they are able to fly proficiently. By the third week they are able to roost in low trees with the hen. By the end of the fourth week, chicks have their juvenile plumage and can fly almost as well as an adult.

Young chicks prefer small forest openings or equivalent habitats with a diverse mixture of herbaceous plants that provide succulent leaves or fruits and host an abundance of insects. The growth at ground level should be relatively open and free of dense grasses that would impede the travel of chicks and conceal ground predators. Patchy overhead cover of tree saplings, shrubs, brush, and brambles protects the birds from avian predators. Such conditions exist where fire, timber harvest, abandoned farms, or other human-made or natural

influences have created openings in the forest. When new openings become good brood habitat varies according to the site and the species of plants growing on it. But ruffed grouse broods usually find likeable conditions in four to five year-old openings.

Winter Habitat

The best ruffed grouse habitat contains an interspersed of plants of different ages and an abundance of species that provide both food and cover. Until deciduous trees drop their foliage in late October and early November, any habitat that offers adequate food probably has adequate cover as well.

Grouse show more concern for food than for cover during the late summer and early fall. They often concentrate in grape tangles and fruit-producing trees and shrubs, such as thorn apples, apples, viburnums, and dogwoods. These habitats attract and hold many grouse until the supply of soft fruit is exhausted. Similarly, forests containing black cherry may become focal points for feeding grouse.

Ideal winter cover protects grouse from the elements and predators. It can be dense brushy or shrubby vegetation, dense hardwood saplings, or conifers that provide insulation and profusion of cover at least 15 feet tall. Cutover woodlands where tree saplings are about six to fifteen years old are ideal. In much of Iowa, eastern red cedar provides relatively thick cover for wintering grouse. It offers the best available winter habitat in areas that do not have stands of young hardwoods created by clear-cutting.



Iowa DNR photo by Roger Hill.



Iowa DNR photo; Iowa DNR inset photo above by Ken Formanek.

(Left) Egg laying usually begins in late April and hatching occurs in late May and early June. (Above) Timber management is one of the beneficial management practices.

Whitetail Deer



Identification

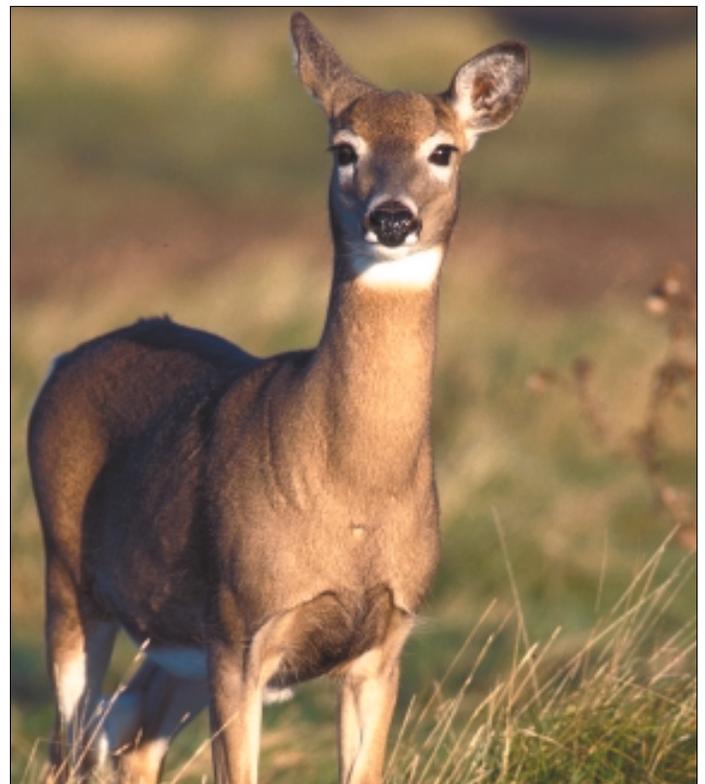
The whitetail deer's most distinctive feature is the white underside of its tail or "flag" that is flashed when the animal is disturbed. Deer are graceful, sleek and have long legs, which make them look taller than their actual height of 35 to 38 inches. Deer grow a lightweight, reddish-brown coat in the summer and a heavy grayish-brown coat in the winter. Fawns have a reddish-brown coat with white spots that helps camouflage them from their enemies. Fawns lose their spots at three to four months of age when they are more mobile and no longer rely on camouflage for protection. Fawns weigh from 4 to 7 pounds at birth and will gain 60 to 80 pounds in their first six months of life. The adult males (bucks) reach an average weight of around 240 to 265 pounds at about four and one-half years of age while adult females (does) average 140 to 160 pounds.



Background

Whitetail deer were reported to be quite abundant when European settlers arrived in Iowa in the early 1800's. However, uncontrolled hunting for food and hides by early settlers essentially eliminated deer from Iowa by 1900. Deer were slowly re-established in Iowa, in the 1930's-50's, through the escape of animals from captive herds, trapping and transplanting programs by the DNR and the migration of animals from Minnesota, Wisconsin and Missouri. Deer now occur in every county in Iowa, but the highest deer densities are found in the southern third and northeast corner of Iowa.

Although deer may be found in any area that offers food and cover, areas with the largest amounts of timber usually have the highest deer density. Because timber habitat is limited in Iowa, deer numbers are low compared to surrounding states. Good deer habitat in Iowa may support 10 to 25 deer per square mile of land while poorer habitat supports only 1 to 2 deer per square mile. With excellent habitat, a good food source and protection from hunting, deer densities can reach as much as 100 deer per square mile. These high densities are usually only found in a small area such as a state park or refuge.



Iowa DNR photo by Roger Hill, including inset photo above.



Beneficial Management Practices

- Food Plots
- Grasses and Forbs
- Timber Management
- Trees and Shrubs (Shelterbelts)

Habitat Requirements

The annual home range of deer varies from one-half to one square mile and is determined mainly by availability of suitable habitat, food and water. Daily movements are smaller in the spring and summer because of fawn rearing and plentiful food supplies. However, movements increase in the fall and winter because of breeding activity and reduced food sources.

Most deer move only 1 to 2 miles from winter cover to the area where they will fawn, but some deer establish new home ranges as far as 100 miles from where they were born. One benefit of this dispersal is that small isolated habitats can be replenished.

Adult does are bred in November, although dominant bucks will breed does and older fawns from October through January. Gestation is about 26 weeks and most adult does will have twin fawns. Fawns are born from late May through mid-June. Does seek seclusion for fawning in brushy fields, heavily vegetated stream bottoms, forest edges, pastures, CRP fields and grasslands.

Fawns are nursed on the rich milk of the doe for the first 16 weeks of life, slowly shifting to a diet of forbs and grasses as summer progresses. Fawns usually remain with the doe until the following spring. During the summer, deer are usually found wherever sufficient food, water and solitude exist. Standing corn is used for food, travel and escape cover in the fall. Crop harvest and snowfall during fall and winter reduce the habitat available for deer, concentrating deer in protected areas such as heavy timber, cattails, tall weeds and brush. Because winter cover is critical, any loss of this habitat will correspondingly produce a decline in population.

Quality and abundance of fall and winter food items are critical because they determine physical and reproductive success of the female. Deer eat a variety of plants, but cultivated crops, mainly corn and soybeans, provide 78 percent of their annual diet. A large portion of the fall and winter diet is limited to waste grains remaining in fields after harvest. Woody browse such as buckbrush, oak and sumac provides 13 percent of the diet and is utilized in the summer, fall and during periods of heavy snowfall in the winter. Various forbs/grasses make up 5 percent of the diet and are utilized heavily in the spring and summer. Timber management that increases the timber's woody understory of brush, shrubs and preferred woody browse plants is beneficial to fawning does as well as providing winter habitat.

The practice of "feathering back" timber edges is also very beneficial to fawning and wintering deer. Annual food plots of corn adjacent to these areas enhance the value of these areas as winter habitat, while green browse food plots of ladino clover and alfalfa enhance the spring and summer value, especially for does and fawns. Diverse native warm season grass/forb fields interspersed with cropland and timber provide additional fawning, loafing and escape habitat.

(Opposite page) Whitetail deer were quite abundant in Iowa in the early 1800's. Uncontrolled hunting for food and hides essentially eliminated deer from Iowa by 1900. (Left) Green browse food plots provide a good source of food for fawns. (Right) Feathering back timber edges is very beneficial to fawning and wintering deer.



Iowa DNR photo by Roger Hill; including inset photo above.



Photo by Missouri Department of Conservation.

Habitat Management Practices

Photo by Iowa DNR.



Brush Piles

The term brush pile describes a mound of material with a maze of cavities which can provide protection from predators or weather. Brush piles may include logs, brush, rocks, soil, debris and vegetation. They may be constructed to meet critical habitat needs for species like rabbits, reptiles, and amphibians. Other species also utilize brush piles as escape cover or for shelter during harsh weather. Brush pile habitat, once common on Iowa farms, has greatly decreased with fewer fence lines, farm wood lots and shelterbelts, less diversified agriculture, and clean farming attitudes. Good locations for brush piles include woodland edges, shelterbelts, field borders, and non-cropped areas. Although valuable habitat, brush piles also shelter predators, so locations near good nesting habitat might be avoided. Also, avoid placing brush piles in streams or ditches where they will provide limited wildlife benefits.

Brush piles can be constructed in several ways. The most common method is to stack smaller material on top of a larger structure. Brush pile bases could be pole size logs 6 to 10 inches in diameter, rocks, stumps, and wood pallets. Proper spacing and design provide tunnels and safe den areas for small animals to raise young.

When building your base place a minimum of 5 logs on the base parallel to each other about one foot apart. Then place another layer of the same size logs perpendicular across the base. Once a stable base is constructed utilize smaller materials to build the brush pile. NRCS specifications for brush piles are 15 x 15 x 8. However, smaller and larger piles have value for wildlife. A small brush pile poorly located can easily blow full of snow providing limited winter cover benefits.

At times many companies leave large numbers of wood pallets for disposal. Instead of destroying these heavy-

duty pallets utilize them for a strong brush pile base. Simply place 4 to 6 pallets next to each other on the ground and cover with whatever brush is available.

When using rocks make at least 4 to 5 piles up to 12 inches height. Angle 4 to 6 inch logs on top of the rocks to form some small tunnel areas. Place the next size layer perpendicular across the 4 to 6 inch logs and cover with smaller material. This same principal can be used when stacking material over cut tree stumps.

Hinge cutting can develop a living brush pile. Hinge cutting several small or large trees in one area will create a living brush pile. Partially cut the trees 2-feet above the ground until the tree falls leaving a portion of the tree still connected to the stump. This will allow a portion of the tree to survive for a period of time. Trees that work well for hinge cutting include locust, hedge, and cedar. This creates good habitat along timber edges, old fence rows, or wherever you have enough trees to construct a large pile. Additional brush can be stacked on the bases of the tree to enhance the pile. However, leave the treetops uncovered so they can continue to grow.

Annual brush pile management is needed to provide quality escape and nesting cover. Decay from weather and time will diminish wildlife benefits. Annually adding materials to existing piles or new piles is a good management practice. A good time to construct brush piles is when doing fence or pasture maintenance or after severe storms. Late fall or early spring construction is also a great time to avoid hot weather, leaves, and insects.



Photo by USDA-NRCS.

Prescribed Burning

The word wildfire conjures up the image of flames devouring prairie or woodland. But as surely as we understand the destructive nature of wildfire, we also value



fire's power to rejuvenate and have harnessed it for our uses. American Indians fired prairies knowing that new, lush growth would concentrate grazing buffalo. We used fires to expose food, clear the way for planting crops, and to attract waterfowl. Even today, on Iowa's working landscape, fire remains a natural force to shape vegetation for human and wildlife values.

Prescribed Burning: What is it?

Using fire to improve vegetation is called prescribed burning. Prescription burning uses fire as a tool to nurture some plants, harm others, and even to fertilize with a quick release of nutrients. Need to control invading trees on your wildlife seeding? Want to push low, dense grass to more vertical cover? Desire more food and ground level access to quail on your mixed grass/forb planting? Like to see your prairie flowers in bloom? Want some green browse for geese near your wetland? In all the above cases, you should consider prescribed burning.

Fire will not always improve wildlife habitat and there are important safety and biological concerns, but fire is a very useful tool. To review the applicability of prescribed burning on your land, contact your local Iowa DNR Wildlife Biologist or other conservationists.

Fire is powerful and unintended results are possible, whether the fire is planned or unplanned. All prescribed fires must be planned in advance with your thoughts centered on two areas: (1) objectives of the prescribed fire and (2), the prescribed fire plan and safety. You should know burns on CRP, WRP, EWP or other USDA program lands require coordination and approval. Please check with your local NRCS office before proceeding.

Objectives

Understanding your objectives will help you determine when to complete your prescribed fire. For example, spring burns from April 15 – May 31 will favor warm season grasses and forbs over more typical cool season species. Spring burning however, may reduce nest success so you may wish to burn only a portion of an area in one season. Late winter and early spring burns stimulate some cool season grasses. Fall burns are useful to control woody vegetation, but winter cover is reduced. Burning is a valuable tool to establish prairie grass and forbs and it is essential for management of prairie plantings. It should be clear that understanding your objectives is essential to selecting the right prescribed burn plan.

Fire plan and safety

Safe prescribed burns must be planned in advance. As with other endeavors, a bit of common sense is valuable. But common sense is not enough—it must be coupled with experience and training. If your objectives are clear and a prescribed burn is in order, don't hesitate to contact

people with burning experience.

Important considerations include a fire plan, fire-breaks, equipment, weather and forecast, local permits or notifications, and special situations including potential impacts of smoke and escape of fire, public utilities, and fences. A fire plan assures deliberate planning of how the fire will be ignited and controlled.

Firebreaks are anything which stop or slow a fire and include plowlines, a field edge, stream or road. Even a mowed strip can slow fires if most fuel is removed.

Useful equipment might include a drip torch for efficient fire starting and various sprayers, water tanks and fire management tools.

Weather influences fire success and a predictable, light wind of 5-15 mph, relative humidity of 20 to 50 percent, and temperature between 40 to 70 degrees is desirable. It's always a good idea to inform your neighbors, local fire departments and other authorities of your burn plans, and also check for any local ordinances. If there is potential for a prescribed fire to escape and damage high value crops or facilities, correct the problem or find another management alternative. Do not burn if drifting smoke may obstruct vision on roadways, and don't overlook potential damage to fences, utility poles and other utility facilities.

Summary

Prescribed fire is a useful tool to manage vegetation and improve wildlife habitat values. As with other vegetation management alternatives, such as herbicides or mowing, fire can be very valuable. But if improperly used it can be detrimental. It's important to understand your objectives, so that a correct fire plan, or none at all, can be prescribed.



Farm Ponds

A farm pond is an ideal spot for many forms of outdoor fun. Swimming, fishing, hunting, trapping, camping and picnicking are a few of the enjoyable outdoor uses of a pond.

Farm ponds contribute a significant portion to Iowa's water resources. There are more than 87,000 ponds statewide with an additional 1,000 added yearly. Most ponds are located in southern Iowa where the topography is best suited for their construction. Very few are found in the northern part of the state.

Life within a pond is a complex system with the various life forms dependent upon each other. Ponds contain minute plants called plankton. Crustaceans, insects, and tadpoles in the pond eat the microscopic plankton. Small fish, crayfish and frogs feed on the crustaceans and insects, and, in turn are eaten by larger fish.

Bluegills, although they may grow to nine inches, feed primarily on insects throughout their lives, while bass feed on insects only in their early stages. As bass get larger, they become the major predators in a pond consuming fish, crayfish and frogs.

Years of experimentation have shown three fish species are best suited for Iowa ponds— largemouth bass, bluegill and channel catfish. Largemouth bass and bluegill must be stocked in combination with each other if a good fishery is desired. Channel catfish also are recommended for pond stocking because they are popular with anglers and provide excellent fishing opportunities.

Farm Pond Management Advice

Each year, Iowa DNR personnel are questioned repeatedly by pond owners and anglers about proper procedures for managing a fishpond. Because each pond is different, additional help may be needed to solve specific problems. Contact the Iowa DNR concerning questions dealing with fish or wildlife resources and your local NRCS representative concerning questions dealing with soil, erosion, pond construction and cost sharing.

The NRCS is the agency to contact for farm pond construction advice, because of their construction and design expertise. The FSA administers cost sharing programs.

Pond Watershed

The best ponds in Iowa have about 20 acres of watershed for each surface acre of pond. Preferred landuse within the pond's watershed is timber, grassland or pasture/hay. Row crop is the least desirable landuse because sediment found in runoff shortens pond life and reduces fish populations. How people manage the pond and its surroundings is the most important influence on the pond environment.

Livestock Watering

Ponds can be used for livestock watering by installing a small pipe (2 inches) in the lower portion of the dam. The pipe should extend into the pond and connect with a standpipe whose top is 4 feet lower than the water surface when the pond is full. A watering tank can be placed below the dam and a float valve installed to keep a consistent water level in the tank. The pond and dam should be fenced. A watering pipe and tank will provide cool fresh water to the livestock and eliminate livestock trampling of the dam and pond banks.

One of the most important aspects of building a pond is excluding livestock with fencing. The fence should be constructed at least 60 to 100 feet from the pond edge and completely enclose the pond and dam. Fence construction should be adequate to exclude all livestock. Ponds without fences usually have the bank slopes and sod ruined by livestock, weakening the dam and spillway. Livestock wading into the water destroys fish spawning nests and results in muddy water. A grass buffer strip inside the fence will slow runoff entering the pond, allowing most silt and contaminants to settle before reaching the pond, improving fish habitat and increasing the life of the pond. This strip also will provide escape, nesting, and winter cover for many wildlife species.

For more detailed farm pond management advice, check publications from Iowa DNR Fisheries.

Stocking Fish

The Iowa DNR will provide fish free of charge if your pond meets the following criteria:

- New or renovated and free of fish
- Surface area of at least 1/2 acre
- Maximum depth of at least 8 feet
- Fenced to exclude livestock with a 60-foot minimum buffer between pond edge and fence

If your pond meets these criteria, contact your local NRCS office and sign up for fish. An Iowa DNR employee will contact you and arrange an on-sight inspection of your pond. The employee will discuss the potential of your pond and the adjacent area for fish and wildlife habitat. If the pond meets the stated criteria above, it will be approved for stocking. Pond owners approved for stocking will be notified by postcard at least 10 days prior to delivery of fish. The card also will indicate the date, time, and location of the truck delivering fish and the gallons of pond water the owner or his/her representative will need to transport the fish. Bluegill and channel catfish will be distributed in October and the largemouth bass will be distributed the following June.

Wildlife Benefits

Buffer strips adjacent to farm ponds will provide critical nesting, winter and escape cover for wildlife. This cover can greatly improve water quality and add to the life expectancy of the pond by reducing siltation from erosion.

All requirements for wildlife and erosion control can be met when adequate areas adjacent to the pond are managed properly. Seeding of suitable areas to grass or legumes is important for both erosion control and wildlife nesting. Alfalfa-brome is one good seeding. Similar benefits would be realized through the seeding of some of the native warm season grasses such as switchgrass, Indian grass, or big bluestem, all of which are excellent for providing wildlife habitat.

Other wildlife requirements can be met by planting trees and shrubs in the pond area. Conifers can be used to provide both winter and escape cover. Shrubs provide many benefits including food production, escape and winter cover and nesting areas for wildlife. Planting should be planned carefully to maximize the benefits to wildlife.

A wildlife biologist in your area can help you write a wildlife habitat plan for your pond area. Wildlife seedling packets as well as tree seedlings are available at low cost from the State Nursery to help establish wildlife cover. Habitat development may be cost-shared through FSA offices.

Beneficial Management Practices

- Brush Piles
- Grasses and Forbs
- Pasture Management
- Timber Management
- Trees and Shrubs (Shelterbelts)



Photo by USDA-NRCS.

Food Plots

Food plots can greatly increase the use of an area by many wildlife species. Most landowners have a target species that they would like to attract to their property. This is an important consideration as different species have different food requirements and preferences. Food

plots can be a single grain or a diverse mixture to attract a variety of game and non-game wildlife species. Other factors that need to be considered during the planning process are:

- Placement of the food plot on the land. Good soil conservation practices should be used whether the food plots are on CRP, cropland, or other lands. Agricultural food plots should not be planted on steep slopes. Proximity to heavy cover is advantageous in most cases, but not all.

- Availability of food on surrounding lands also affects how much food is going to be required by a local population. If agricultural production surrounds a property, smaller food plots will be sufficient. Conversely, if pasture and hay surround a property, sufficient acres should be planted to provide a food source throughout the winter.

- Abundance of deer in the local area. This is important even if deer is not the targeted species. For example, corn food plots of one acre or less planted in hopes of feeding a covey of quail all winter may be severely impacted by deer browsing. Size and variety of food plots may be adjusted to accommodate a high local deer herd.

There are three common types of food plots:

Annual Grain Plots – Consist of agricultural crops established to provide high energy food during periods of heavy snow or ice cover. Common annual grains are corn, sorghum, soybeans, oats, millet, and others.

Green Browse Plots – Consist of a pure stand of high protein legumes or a combination of grasses and legumes. Once established, these plots are easily maintained each year with mowing after July 15. Common green browse plants are alfalfa, clovers, partridge pea, annual lespedeza, orchard grass, timothy, wheat and others.

Fallow Areas/Plots – Consist of tilling or disturbing an area to expose the soil and encouraging native annual plants (weeds) to grow. Fallow plots can be accomplished by light disking 2 to 4 inches in depth leaving 50 percent residue or by simply tilling the area and leaving it unplanted for the cropping season. The best time to establish fallow plots is from October 1 to March 30. These areas provide a diversity of annual plants for some quality food, cover, and bare ground for dusting and brood rearing. This is an excellent practice for quail, rabbits, turkeys and songbirds.

The species being targeted dictates the crop, how much is needed and where it should be planted. Food plots should be treated just like commercial fields as far as fertilizer and herbicide inputs. Exceptions to this rule may be areas where deer are not a problem and the landowner would like a slightly weedy corn plot for hunting or in a wetland basin where annual weed seeds are heavily used by waterfowl. Soil tests should be done to determine N, P and K requirements and if lime is needed (in the case of a green browse planting.)

Food Plots for Deer and Turkey

For deer and turkey, a combination of corn and legume (clover or alfalfa) food plots should be planted. Corn, planted in sufficient amount for your area, provides a high energy winter food supply as well as summer

browse. If you are unsure of how much your local deer and turkeys can eat, start with larger food plots (5 to 10 acres) and if 40 percent or more is left in the spring, leave it another year and rotate it with a new food plot and adjust the size accordingly.

Wheat is another quality grain to use as it provides great nutrition during the early spring antler growth. It is also a very attractive area for strutting spring turkeys. Clover or alfalfa food plots provide a high quality year round food source but need to be maintained by mowing or baling. Delay mowing until after July 15 for pheasant, quail, turkey, and songbirds. Green browse plots with legumes and grasses can be established in existing sod by spraying a burn-down herbicide and no-tilling, spraying a burn-down herbicide and frost-seeding or by tillage and broadcasting with a nurse crop. Seeding rates vary from 5 to 8 pounds/acre for ladino clover to 12 to 18 pounds/acre for alfalfa.

Food Plots for Upland Birds

For pheasants and quail the most useful food and cover is corn, grain sorghum, or a combination of grain sorghum and forage sorghum. Small grains provide food but are quickly buried in years of heavy snowfall. In areas with high local deer numbers, sorghum is probably the better food plot choice. In areas where food remains in the plot following winter, leaving a portion of the food plot fallow will encourage annual weeds. The fallow area will add a diversity of food, cover, and bare ground next to the re-established food plot. The next year plant the fallow area and leave the original grain plot fallow for annual plants and cover.

The proximity of food plots to heavy cover is very important for pheasants, especially in northern Iowa. Pheasants are reluctant to feed more than 1/4 mile from good roosting cover once the snows come. Where roosting cover is not available, the food plot itself can serve as roosting cover but should be at least 10 acres in size. A snow catch of 10 to 20 rows of unharvested corn upwind of a food plot will protect it from drifting snow.

When food plots can't be located next to heavy cover, shrubs and a variety of trees or conifers can be planted for travel lands which permit birds safe access to the food plot. When planting plots for most upland game birds, always try to avoid planting next to tall trees as they can act as a predator perch.

Food Plots for Waterfowl—Green Browse and Moist Soil
Opportunities to provide food for migrating waterfowl consist of two strategies: moist soil/wetland type plants for ducks and green browse for geese.

Moist soil/wetland management involves planting crops or allowing annual weeds to grow in the marsh bottom by drawing down water levels in the spring to expose the marsh bottom. Natural annual growth is generally very productive on mud-flats exposed by June 15. Several varieties of food crops can be planted, depending on the capability to get water back in the marsh in the fall. If the capability to flood the wetland exists, row crops such as corn or sorghum will provide a tremendous amount of food for migrating waterfowl.

In most cases, where runoff is the only source of water, earlier maturing varieties (60 to 70 day) such as Japanese millet, pearl millet and buckwheat are more suitable. They should be broadcast at 10 to 15 pounds/acre either by airplane or from the ground while the mud flats are still wet (too wet for a tractor). If no seeding is done, beneficial annual weeds will generally sprout in the exposed marsh bottom.

Green browse plantings for geese can be winter wheat or rye, seeded at 1 to 1 1/2 bu./acre. This small seed can be drilled or broadcast and lightly disked in. Plantings should be done in late August or September to allow enough growth for the migration period. Placement of these green food plots should be in open exposed areas because geese are more reluctant to land in tight spaces.

Food Plots on CRP Land

Food plots are highly encouraged on CRP land to maximize the wildlife benefits for the term of the contract. Producers who include annual food plots in their CRP management plan increase their chances of being accepted into the program. Currently, food plots on CRP acres may not exceed 5 acres/plot or 10 percent of the contract acres. To establish food plots on existing CRP contact your local NRCS office for program specifications. For assistance on food plot location, seed selection, seeding rates, plot size, or free food plot seed contact your local Iowa DNR wildlife biologist or private lands wildlife biologist.



Photo by Missouri Department of Conservation.

Grasses and Forbs

Most of Iowa's songbirds, gamebirds, and mammals require diverse grassland habitats for nesting, feeding, brood-rearing, loafing, escape and winter cover. As a rule of thumb, wildlife prefer open to moderately open grasslands with an abundance and diversity of forbs and legumes for nesting, feeding, and brood-rearing, while heavier-thicker grass seedings are preferred for escape and winter cover. Grasslands that are 50 percent or more forbs/legumes are preferred nesting sites because they provide abundant clumps of vegetation for nesting and they host enormous quantities of food (insects and protein rich plants) that are readily available to young wildlife. Dense and rank grasslands are preferred for escape and winter cover because they provide protection

from predators and severe weather. Choosing the right type of grassland depends upon the species of wildlife you want to attract, as well as looking at what types of habitat are available nearby.

Which type of grassland do I choose?

Warm season grasses generally provide the best winter and escape cover because of their height and resistance to lodging under heavy snow. Any mixture of cool and warm season grasses that include at least 50 percent forbs and legumes can provide ideal nesting, feeding, and brood-rearing habitat. In Iowa, “most” cool season grasses/forbs are introduced species, while warm season grasses/forbs are “mostly” native species. Introduced species are usually cheaper to buy and easier to establish than natives, but require more periodic maintenance. Native species usually cost more and can be difficult to establish, but require less maintenance than introduced species. Some species of introduced grass should be avoided, fescue and reed canary, because of their tendency to spread and negative benefits to wildlife and livestock. Examples of grass and forbs beneficial to wildlife are listed below:

Cool Season Grasses/Forbs—Introduced

Grasses- smooth brome, orchard grass, and timothy.

Forbs- alfalfa, red, sweet, and white clover, birdsfoot trefoil, and smartweed.

Cool Season Grasses/Forbs—Native

Grasses- June grass, porcupine grass, Canada wildrye, and native sedges.

Forbs- hoary puccoon, indigo, prairie clover, foxglove beardtongue, prairie phlox, black-eyed susan.

Warm Season Grasses/Forbs—Native

Grasses- big and little bluestem, Indiangrass, switchgrass, dropseed, and sideoats grama.

Forbs- coneflower, bush clover, partridge pea, lead plant, bergamot, goldenrod and coreopsis.

Seed Selection

Whether planting introduced or native grasses and forbs consideration should be given to obtaining certified, “locally-adapted” seed to ensure germination, purity, and plants are adapted to local growing conditions. In the case of legumes it is also important that seed has been inoculated. Native grasses and forbs should be purchased and seeded on a Pure Live Seed (PLS) basis, to ensure adequate seeding rates and germination. Mixed native grasses are generally seeded at 6 to 10 PLS lbs. per acre, while introduced grasses are seeded at 4 to 10 lbs. per acre. If forbs are included with grasses, then grass-seeding rates should be reduced to ensure the grasses do not smother the forbs. As a general rule, introduced and native species are not mixed and seeded together in the same field because different management requirements. Local NRCS or DNR personnel can provide information on best mixtures, and seeding rates, as well as local seed availability, and available cost-share.

Seedbed Preparation and Planting

Grasses and forbs can be successfully established using any of the following methods:

No-till seeding into established sod is best accomplished with a fall application of Roundup™ herbicide to

kill existing vegetation; in preparation for no-till seeding into dead sod the following spring.

Dormant seeding is accomplished by drilling seed into prepared areas shortly before freeze up. Seed is conventional or no-till drilled into the soil and remains dormant over winter, ready for growth at first opportunity in the spring.

Frost seeding is accomplished by fall preparation of the site if needed and broadcasting seed on top of the ground between January and early March. Seeding rates are usually higher to increase the likelihood of seed establishment. This is an especially effective way to establish native forbs and legumes.

Conventional seeding is accomplished by preparation of the seedbed by disking and harrowing in the fall or spring, followed by broadcasting or drilling seed into the prepared seedbed. A nurse crop of oats or other small grain can be seeded to provide cover for the young plants.

Because they did not evolve under cultivation, native grasses and forbs should always be planted into a firm packed seed bed no deeper than ¼ inch, followed by packing again after seeding to ensure good seed to soil contact. It is not uncommon for 25 to 50 percent of native seed to be visible on the surface after planting. Generally it is not necessary to apply fertilizer to native grasses and forbs. Specialized drills permit easy seeding of fluffy warm-season grass seed, and are generally available from NRCS, DNR, SWCD, Pheasants Forever Chapters, or County Conservation Boards at nominal rental rates.

Maintenance

Introduced Grasses/Forbs

When left as undisturbed wildlife cover, most introduced cool season grass/forb plantings require occasional mowing to maintain the stand and control woody encroachment. It may be necessary to fertilize stands and control noxious weeds. Even with regular maintenance introduced forbs and legumes disappear after several years and the field may need to be re-seeded or inter-seeded with legumes to re-establish them.

Native Grasses/Forbs

Establishing a stand of native grass requires a measure of patience. Most native grasses grow down the first year providing only a narrow straight-leafed blade. Often the first year's growth can be lost in the stand of annual weeds and grasses. It is imperative that weed control be started early the first year and continued through the growing season to ensure adequate sunlight reaches new seedlings. Rotary mowing is effective in controlling weeds, but care must be taken not to mow below 6 to 8 inches. Rotary mowing 2 to 3 times during the establishment year produces the best stands. Several chemicals are now available for controlling weeds in native seedings, however care must be used, as certain natives are not tolerant of chemicals. Contact your local NRCS or DNR office for more information on the use of these chemicals. Mowing for weed control should not be necessary after the first year of growth, except for spots where grasses and forbs have not become well established. Burning provides a valuable tool in maintaining a healthy native

warm season grass stand. Spring burning the second year will stimulate young warm season grasses and forbs by returning nutrients to the soil, warming the soil to promote early growth activity, and stunt cool season grass or weed competition. After establishment, fire employed on a 3 to 7 year rotation will control undesirable grasses and brush and keep the stand in a vigorous state of growth. With proper care, a native warm season stand will remain healthy for many decades. Generally spring burns stimulate the growth of native grasses, while fall burns stimulate the growth of native forbs and legumes.

Grass Species to Avoid

Fescue and Reed's canary grass are two species of cool season grass that provide poor nesting cover and can be invasive and difficult to control. They should be avoided in all seeding situations where wildlife is a primary consideration.

Related Topics

- Prescribed Burning
- Mowing



Photo by Missouri Department of Conservation.

Legumes

Legumes are plants of the Pea and Bean family. Legumes harbor abundant insect populations, are high in protein, and enrich the soil. Bacteria within the plant captures nitrogen from the air and stores it in root nodules. As plants decompose, nitrogen and organic matter is produced, increasing soil fertility and reducing erosion. Legumes provide essential food and cover for a variety of wildlife species. Legumes such as partridge pea and lespedeza provide a direct food value for wildlife in the form of seeds. Alfalfa, clovers and trefoils provide food indirectly through the insect populations they harbor. The long-term benefit of establishing legumes for wildlife is a diversity of vegetation—the basic component of habitat.

Species Selection

Select legume species that will provide the desired height, texture and element of habitat that is desired. Tall legumes such as sweet clover, hairy vetch and lespedeza provide cover for roosting, loafing, escape cover and winter protection. Medium legumes such as alfalfa and red clover provide excellent nesting and brooding cover. Shorter legumes such as birdsfoot trefoil, ladino and

white clover provide feeding, nesting, brood and loafing cover for smaller mammals and birds.

Young pheasant, quail and songbirds are dependent upon insect rich vegetation for proper growth. Including legumes in grass seed mixtures can greatly improve their value as wildlife habitat. Including legumes in grass stands also reduces the density of the vegetation, making it easier for young birds and mammals to move.

In the spring and late summer, wildlife species, such as deer, turkey, and rabbits, seek out green food plots planted to legumes. This is because other preferred foods aren't available and legumes provide a good source of protein.

While cultivated legumes such as alfalfa are grown widely as forage, they often provide little value as wildlife habitat. Timing of the first hay cutting correlates closely with the peak nesting period for many grassland nesting birds, like pheasant and quail. Harvest of forage during this period destroys a large percentage of nesting wildlife. Second cuttings often result in mortality to re-nesting birds or surviving broods feeding in the insect-rich habitat.

Preparation and Seedbed Methods

Legumes may be seeded in pure stands, or added to cool or warm season grass mixes to provide diversity and increase nesting and food value. Local NRCS or Iowa DNR personnel can help you determine the best variety of legume as well as find local seed sources and available cost-share. The following guidelines will help to insure the success of your seeding:

- Purchase certified seed to ensure high germination and seed purity.
 - Use local eco-type seed, or seed that is disease resistant and adapted to local conditions.
 - Make sure that seed is inoculated prior to seeding.
- Legumes can be seeded by drilling or by broadcasting with a nurse crop or combined with warm or cool season grasses.

Prior to no-till seeding into existing grass sod, mowing or herbicide treatment is required. Herbicide rates can be adjusted to accomplish the desired degree of growth set back.

Dormant seeding is accomplished by drilling seed into prepared areas shortly before freeze up. Seed is conventional drilled or no-tilled into the soil, and remains dormant over winter, ready for growth at first opportunity in the spring.

Frost seeding is accomplished by fall or early preparation of the site and broadcasting seed on top of the ground from January through early March when frost and light snow is likely. Seeding rates are generally increased to offset the reduced likelihood of seed establishment. The legumes can be seeded separately or with a nurse crop or grass seeding.

Conventional seeding is accomplished by post harvest disking and harrowing, followed by broadcasting or drilling seed into the prepared seedbed. Legumes may be seeded separately or incorporated with a nurse crop or grass seeding.

Related Topics

- Grasses and Forbs
- Food Plots



Mowing / Haying

The primary purpose of mowing or haying is to alter vegetation by removing litter so it will benefit wildlife. Any alteration should allow targeted wildlife species to more efficiently utilize the habitat. Mowing or haying may be used to stimulate the growth of a desirable plant species or community. It may be used to allow wildlife to forage for food more effectively. It may enhance a site for breeding display or nesting.

Strip mowing is an effective way to enhance a field for wildlife. The amount of area to apply this practice to will be highly variable, but will generally be a small portion of the total area. Wildlife mowing or haying should only be done on 1/3 of the field in any year. Obtain prior approval for mowing CRP acres for wildlife and follow NRCS specifications.

Timing of the mowing is extremely important. It should be conducted to minimize the negative impacts on wildlife. Mowing should always be done after the primary nesting season (August 1) except to control noxious weeds. Mowing height should also be considered for wildlife. Cool season grasses should not exceed 4 inch mowing height and warm season grasses should not exceed 6 inch mowing height.

Mowing may also be used to control brush encroachment in grassland areas. The timing of the mowing should be conducted in such a manner that the growth characteristics of the target plant assists in the control.



Nesting Structures and Homes

In an ideal ecosystem, the need for bird houses and nest structures to augment wildlife populations would be minimal.

However, Iowa is perhaps the most ecologically altered state in the nation. As a result of this fact, the need to provide additional home and nesting sites can be a very important management technique for waterfowl and some nongame species.

For several wildlife species, nest structures and bird houses have proven to be successful. The most common species of wildlife currently managed by providing man-made structures include: Canada geese, mallard, wood duck, bluebirds, kestrels, bats, squirrels and screech owls.

As you consider a nest structure project, please review carefully each animal's biology and habitat requirements. All necessary components of habitat should be present. No home or nesting structure project will be successful unless these habitat needs are fulfilled.

Because of the great variety of nest and house structures available, this guide will not attempt to describe each of them. Instead, please visit the DNR's website (<http://www.state.ia.us/wildlife>) where many of these structures are described in detail. Just click "Private Lands Management" to link to plans for bird houses and nesting structures. In addition, you are encouraged to call your local DNR wildlife professional to get more tips and site specific information.



Pasture Management

Pastures are common on the Iowa landscape and with proper management they can provide wildlife habitat for nesting, brood rearing, and feeding. The most critical elements determining the wildlife value of a pasture are: extent and timing of grazing, and pasture vegetation or forage.

Ground nesting birds, for example, may initiate nests in pastures with enough vegetation to conceal a nest. However, high intensity grazing can expose the nest to weather and predation well before the 33-40 days needed for hatching. Lower intensity grazing, on the other hand, results in more hatched nests.

As a general rule of thumb, pastures grazed below 6 inches in height are detrimental to nesting wildlife. A pasture with a mixture of forage, including forbs and legumes, provides better habitat and more food for young wildlife than grasses alone. These critical elements for wildlife apply to both continuous and rotational grazing systems.

Continuous grazing systems are a single large pasture where livestock are left to graze continuously for the entire season. Heavily grazed continuous pastures are of little value to wildlife. Rotational pastures are divided into 2 or more units and livestock are rotated from unit to unit on a regular schedule. A variation of the rotational pasture is the short duration-high intensity rotational pasture. In this system the units are heavily stocked and grazed for a short period at least every 6 weeks. This system is of little value to wildlife.

A pasture management system, which blends warm and cool season grass/forb units, offers the best wildlife habitat. Typically cool season pastures (brome and bluegrass) are grazed in the early spring and summer and then again in the fall while they are actively growing. Warm season pastures are grazed in the hot summer months when they are actively growing, and the cool seasons have gone dormant.

Introducing warm season grasses and forbs into a rotational system with cool season grasses/forbs offers improved production of forage for livestock and wildlife. Fescue conversion to warm season grasses can diversify a grazing system and improve forage value. Total forage yield and quality are increased and wildlife values are

enhanced through less disturbance and more attractive vegetation for feeding and nesting. Areas that have been pastured for years may contain remnants of native warm season grasses and forbs, which if properly managed, improve forage quality and wildlife habitat at little cost to the landowner.

Reduced grazing intensity, and perhaps the use of controlled burning, can invigorate remnant native vegetation and diversify the pasture forage. Even without remnants, warm season grasses and forbs can be interseeded into existing pastures.

Fencing can be used to improve pastures and wildlife habitat. Important areas from which to exclude livestock include woodlands, erosive draws, farmponds, shelterbelts, and windbreaks. Excluding livestock from these areas not only improves water quality and slows erosion, but also provides undisturbed nesting, loafing, and roosting areas for wildlife. Several state and federal programs offer cost share assistance for fencing and watering systems. These systems can improve options for production of both forage and wildlife. Contact your local NRCS or SWCD office for more information.

Related Topics

- Prescribed Burning
- Grasses and Forbs
- Trees and Shrubs (Shelterbelts)



Strip/Light Disking

Disking may be used in a variety of places and may benefit several wildlife species. Quail, pheasants, turkey, rabbits, songbirds and deer are some primary species that may benefit. Light disking provides additional bare ground for dusting and brood rearing needed by wildlife species. The primary purpose of disking is to alter the stage of succession of the existing vegetation. It is most often used along timber edges or on large tracts of grassland where there is little or no agricultural cropland. The process damages or retards the growth of existing vegetation and exposes the soil.

When the soil is exposed, seeds of annual plants can germinate and grow, adding plant diversity. Many of these annual plants produce seeds or vegetable matter that provide food or cover during various times of the year.

Light disking is an approved practice for CRP on fields that have limited diversity and wildlife value. Examples of CRP fields that can benefit from light disking are monoculture stands of brome, fescue, and switchgrass. Light disking is an excellent option for inter-seeding legumes or forbs into existing CRP. Always obtain prior approval for light disking on CRP acres for wildlife.

Light disking should be done from October 1 to March 30. The actual process is quite simple and may be accomplished with a minimal cost. One or two disc widths are all that is required along the edges of grassland, timber and brushy areas. Equipment size and the amount of vegetation will determine how many trips will be required.

No more than 1/3 of the total field or grassland area should be treated with this practice in any year. NRCS specifications for light disking are 2 to 4 inches in depth not to exceed 50 percent residue. Strips should be from 25 to 75 feet wide and rotated across the field. The actual amount of edge treated with this practice may vary. When dealing with blocks of grassland, one may use irregularly shaped patches or strips randomly scattered through the grassland or along the contours.

Disking may also be used for controlling brush encroachment. A heavier specialized disc may be required for this activity. This is usually done over a larger area and generally requires additional work to establish new vegetation on the treated area.



Photo by Missouri Department of Conservation.

Timber Management

Iowa's woodlands provide food and cover for many species of wildlife. All woodlands can be managed to improve the wildlife habitat for woodland species. Woodland management activities beneficial to wildlife may include timber harvesting, thinning, creating or improving woodland corridors, and using human-made habitat structures.

Nut Production

More than 38 species of wildlife use acorns and other nuts for food sources. Woodland wildlife population density and health is often dependent on acorn production.

Thinnings, timed at 10- to 20-year intervals throughout the life of an oak-hickory woodland, can increase wildlife mast (nuts & acorns) production as much as seven times over non-thinned stands.

Thinnings remove tree top (crown) competition and allow selected crop trees (good mast producers) to receive more sunlight; thereby improving mast production. Generally, such thinnings "release" 20 to 50 crop trees per acre from other tree competition. Thinnings also expose woodland understory vegetation to more sunlight, improving nesting, escape, and brooding cover for several wildlife species.

Harvests

Small group selection and shelterwood timber harvests benefit wildlife by creating openings in the woodland. One-half acre to 2-acre harvests open up woodland understories to more available sunlight that increases wildlife cover and browse. These small openings also make ground conditions favorable for the natural establishment of a new crop of mast-producing tree species.

Maintaining older, larger mast producing trees in the woodland as long as possible before harvesting, will improve habitat for cavity dwellers as well as provide wildlife food sources for longer time periods. Den trees and snags (trees with cavities or damaged trees), both dead or alive, can be retained in woodlands to attract cavity dwellers and birds and animals that rely on insects for food. While there can never be too many den trees, a minimum guideline should be to leave five den trees per acre.

Younger woodlands with average tree diameters ranging from 4 to 10 inches, usually don't have many older dead trees or trees with cavities. Nesting boxes or artificial dwellings can be made and placed on trees scattered throughout woodland interiors or along edges to provide dwellings for bats, squirrels, bluebirds, and wood ducks.

Pathways within woodland interiors, along drainages, on ridgetops, and near woodland edges can be created or improved for wildlife travel. These corridors can be maintained by periodic brush cutting and tree thinning in bands ranging from 20 to 80 feet wide. The same treatments can be applied to woodland edges to expose vegetation to more sunlight. These edge areas often become transition zones between woodlands and openings that improve habitat diversity.

Certain species of birds need more dense, secluded woodland interiors to survive in. In this case, such areas would be left alone and not thinned or harvested.

The goal of any woodland habitat management plan should be to increase wildlife numbers and provide conditions that can sustain healthy populations. When you improve woodland wildlife habitat in close proximity to irregular-shaped field edges, food plots, and water, you will have the ideal mix of wildlife habitat. Iowa DNR foresters are available to assist landowners with more detailed forest management plans, as well as timber harvest considerations.

Carefully consider timber harvesting. Usually, timber harvests can be planned to regenerate the forest to specific kinds of species. In addition, the understory vegetation

and the next generation of trees must be carefully evaluated, considered and managed to improve the long term health of the forest and its dependent wildlife populations. How well you plan a timber harvest will determine what the next generation of landowners will have to enjoy and manage.

Photo by USDA-NRCS.



Trees and Shrubs (Shelterbelts)

Tree plantings, shrub plantings and shelterbelts provide excellent wildlife benefits all year round. In open farm country these plantings are invaluable as winter cover. They also provide nesting cover for songbirds during spring and summer. During late summer, fall and winter they are used extensively as wildlife travel lanes and for food.

Shrub Plantings

Linear (one direction) shrub plantings should contain a minimum of five rows and be at least 300 feet in length to be effective. Fewer rows can lead to unnecessary wildlife mortality during winter storms. Clump plantings should be at least $\frac{1}{4}$ to 1 acre in size. At least three species of shrubs should be included in most plantings to provide diverse cover and food. The diversity also protects the integrity of the planting in case disease strikes a particular shrub species.

Six to 12 inch bare rootstock should be planted 3 to 4 feet apart within the rows (1,100 to 1,200 per acre). Larger nursery stock can be planted 4 to 6 feet apart (800 to 900 per acre). Rows should be spaced 8 to 10 feet apart. Food value for target species plus site and soil requirements are important considerations when selecting species. That information is available from your local NRCS office or local Wildlife Biologist. An example of a good wildlife planting is wild plum (fall and winter food plus excellent dense cover), nannyberry (fall and early winter food), and cranberrybush (mid to late winter food). Plant survival is usually best when native species are used. On moist soils Redosier dogwood and ninebark should be considered.

Shelterbelts

Shelterbelts are a combination of trees and shrubs. They are usually planted on the north and/or west sides of farmsteads or feedlots. Effective shelterbelts usually contain a minimum of eight rows. A sample shelterbelt design for Northern Iowa would include two rows of

shrubs on the north or west side, a 50-foot snow catch area, two rows of shrubs and then four or more rows of dense conifers. Recommended minimum length for linear shelterbelts is 150 feet, and a minimum length of 100 feet per side for L-shaped plantings. Shrubs should be planted four feet apart within the rows while hardwood trees and conifers should be planted 16 feet apart. All the rows should be on 16-foot spacings. At least two species of shrubs and two species of trees are recommended to provide diversity to the shelterbelt and protection from plant diseases that may occur.

Riparian Buffers

Hardwood trees should be planted 10-15 feet apart in rows 16 feet apart as riparian buffers. Tree selection on most riparian strips should be species adapted to moist soils that can endure periodic flooding. Examples are green ash, silver maple, black willow and cottonwood. Swamp white oak, burr oak and black walnut will work on some sites. Where mature willows and cottonwoods are nearby an alternative to tree planting is natural revegetation. Disk a strip sometime between mid May and June 1. Willows and cottonwoods will readily seed the area and establish very quickly. Density will be much greater and growth seems to be much faster. The new seedlings can then be supplemented through planting with other desired riparian species.

Direct Seeding Trees / Shrubs

Direct seeding for both trees and shrubs can be used as an alternative to planting nursery stock in rows. This method involves preparing a seedbed like conventional row crop planting, then broadcasting collected or purchased seed and disking the seed into the prepared seedbed. This method has more variables. You are encouraged to seek the assistance of the local forester or other professional if planning to use this method.



Wetlands

The functions and values of wetlands are highly documented and very important. They provide significant benefits to society. Some of the more important benefits are:

- **Pollutant and sediment filtration:** Wetlands act as settling ponds and remove excess nutrients and other pollutants by filtration. The wetland vegetation also binds soil particles and slows the movement of sediment in slow moving water.
- **Store floodwaters:** Wetlands can store and slowly release floodwaters thereby minimizing flood peaks.
- **Groundwater recharge:** Some wetlands in upland depressions capture rain and snowmelt where it seeps away to groundwater deposits.
- **Fish and wildlife habitat:** Wetlands are biologically rich, with a greater diversity of plants and animals than is found in drier habitats.

Many people are correct in thinking that wetlands and waterfowl go hand-in-hand. The prairie pothole region of Iowa is part of a 300,000 square mile area (including Minnesota, the Dakotas, Montana, Manitoba, Saskatchewan, and Alberta) where up to half of the continents waterfowl population breed. But many other species also rely on wetland habitat. Birds from the tiny Marsh Wren to the Great Blue Heron utilize wetland habitats. Most reptiles and all amphibians require wet areas for breeding and winter hibernation. Riparian wetlands along streams are important as fish spawning and rearing areas. Many mammals associate with wetlands for food and cover. Muskrats, mink, and raccoons are some of the most commonly found.

The value of wetland wildlife habitat does not end when the temperature drops, and the water freezes. Cattail, a common emergent plant that can form dense stands and is found in many wetlands, provides excellent protection for pheasants from blowing snows and bitter temperatures. Also, deer often bed in cattail stands for protection from wind.

There are two forms of wetlands likely to be encountered in Iowa: Pothole wetlands and Riparian wetlands.

Pothole wetlands are small, shallow depressions formed by glaciation and are found in all or parts of 30 counties in northwest, north central, and central Iowa.

They range in size from less than 1 acre and a few inches deep (temporary in nature – usually dry up during summer) to hundreds of acres and several feet deep (permanent except during severe drought). Approximately 95 percent of these wetlands in the prairie pothole region of Iowa have been drained.

Riparian wetlands occur in riverine floodplains throughout the state. These bottomland wetlands are influenced by and associated with the flowing water of streams and rivers. They range in size from narrow, cut-off channels (oxbows) a few feet or up to several hundred feet wide, to large bottomland sloughs covering many acres. In general, the smaller riparian wetlands are found in the northern part of the state where the headwaters of the major rivers are found, with the larger wetlands being found downstream.

Management

Manipulation of wetland vegetation is a commonly employed tool in wetland management. Vegetation in wetlands can rapidly become a monoculture of hardy plants. Manipulations of these plant stands by drying or flooding, fire, mechanical, or chemical means can change the structure and increase plant and animal diversity.

Water level manipulation is the most often used technique for modifying plant communities. Water control structures can be installed on wetland outlets to artificially fluctuate water levels. By raising or lowering water levels at various times of the year, a variety of vegetation can be encouraged or discouraged depending upon objectives. For example, higher water levels may open up stands of dense vegetation by encouraging muskrats and stressing emergent plants in deeper portions, while lower water levels should result in growth of seed producing vegetation, and also help control rough-fish populations.

A simple way to enhance a wetland for wildlife is to provide nest structures for waterfowl. Nest success rates for Canada geese, mallards, and wood ducks may be increased for the wetland area since nest structures are more predator resistant than nesting on the ground or in natural cavities. Plans for building, installing, and maintaining the structures can be found in publications available from the Iowa DNR. It can take several years before ducks and geese will use them. However, once they do, they and their offspring will likely return and use them again.

One way to enhance a wetland for the enjoyment of people is to construct an observation blind. Human activity around a wetland will disturb wildlife. A comfortable blind will allow people to watch and/or photograph calm, non-alert wildlife. An observation blind can also be used as a hunting blind.

Help for Establishing Habitat

Help for Private Landowners

Below is a summary of the types of assistance available for establishing wildlife habitat on private lands. There are several state and federal agencies, as well as private organizations, which can offer assistance to private landowners wanting to improve or establish wildlife habitat. This help includes cost share funding, rental payments and expert technical assistance for wildlife planning and management.

In addition to those listed below there are also many other organizations and private groups that can provide assistance. For more information on any of these programs and services, please contact your local USDA service center or the Iowa DNR. Private lands wildlife information is available from the your local Iowa DNR wildlife biologist.

USDA Programs

Conservation Reserve Program (CRP): Helps establish permanent wildlife habitat through native grasses, wetland restoration, tree and shrub plantings and food plots. Signup periods are announced by USDA. Contracts last 10 years. Highly erodible lands and farmed wetlands are eligible for the program. Landowners receive rental payments, maintenance fee payments and up to 50 percent cost-share for cover establishment. Contact your local Farm Service Agency (FSA) for signup information.

Continuous Conservation Reserve Program (CRP): Helps establish permanent wildlife habitat. Signup is continuous for priority practices. Contracts last 10 to 15 years. Eligible practices include filter strips, riparian buffers, waterways, living snow fences, shelterbelts, windbreaks, contour grass strips and shallow areas for wildlife. Landowners receive rental payments (some practices receive a 20 percent incentive bonus), annual maintenance payments and up to 90 percent cost share. Contact your USDA service center for more information.

Conservation Technical Assistance (CTA): Technical planning assistance is available from NRCS to include wildlife habitat plantings and management as part of a complete resource conservation plan, or to carry out other USDA programs.

Iowa DNR

IDNR Shelterbelts: Helps establish tree and shrub shelterbelts around farmsteads. Signup period is from October 1 to February 15. All private lands are eligible. Up to 75 percent cost-share for shelterbelt establishment. (Funding is available on a first come-first serve basis). Contact your local Iowa DNR Wildlife Biologist or local NRCS office for more information.

Forestry Programs: Helps private landowners restore and establish forest habitat. There is a continuous enrollment

for habitat projects. All private lands, suitable for forestry management, are eligible. Between 50 and 75 percent cost-share available for tree plantings and site preparation and timber stand improvement. Contact your local Iowa DNR State Forester for available programs and forest nursery stock.

Fish and Wildlife Service

Partners for Fish and Wildlife Program (PFWP): Provides wildlife habitat assistance for wetlands, stream corridors and prairie areas. Private landowners are eligible for this program and acceptance is based on available funding. Each project is based on a 10-year agreement. Landowners can receive between 50 and 75 percent cost-share for wetland restoration, upland wildlife habitat and stream corridor work. Contact the Fish and Wildlife private lands coordinator or the local NRCS office for more information.

Private Organizations

Pheasants Forever (PF): Works with private landowners to provide equipment for habitat development and programs to enhance wildlife habitat. PF works with all private landowners on a continuous basis. Landowners receive up to 50 percent cost-share for cover establishment, shelterbelts and wetland restoration. Free food plot seed is also available. Contact your local PF chapter for various program information and equipment availability.

Iowa Natural Heritage Foundation (INHF): Works with private landowners interested in permanent protection of their land's wildlife habitat or other natural features. This member-supported, non-profit organization's free booklet, *The Landowner's Options*, describes a variety of permanent protection methods, ranging from private conservation easements to gifts or sales of land for public use. Contact INHF at 1-800-475-1846 or visit their website at www.inhf.org for more information.

Ducks Unlimited (DU): Works with private landowners to enhance wetland wildlife habitat. DU works with all private landowners on a continuous basis. Landowners can receive 12 percent cost-share up to \$500 for wetland restoration and upland wildlife habitat. DU also assists in land acquisition and the Conservation Easement Program. Contact your local Ducks Unlimited Chapter for more information.

National Wild Turkey Federation (NWTf): Provides support to private and public lands for wildlife development and management. NWTf works with all private landowners on a continuous basis for habitat projects. Landowners can receive financial assistance for habitat protection and acquisition; tree planing (up to 50 percent); and free food plot seed. Contact your local NWTf chapter for more information.