

INTRODUCTION TO SPECIES MANAGEMENT



Because of its varied landscapes, soil and habitat cover types, and vast water resources, Michigan supports a wide diversity of wildlife species. The chapters in this section will help you create, restore, or enhance habitat on your property to

attract the kinds of wildlife that interest you. There are individual chapters on specific species throughout Michigan including wild turkeys, deer, grouse, woodcock, rabbits, pheasants, quail, squirrels, and waterfowl. Other species included are black bears, bats, and frogs, turtles, and snakes. Other chapters included are songbirds, bluebirds, woodland birds, wetland birds, and grassland birds.

Proper wildlife management considers species habitat requirements, and includes knowing how plants and animals respond to changes that occur to their habitat, both natural (windstorms, floods, succession) and human induced (timber harvest, haying). Your management plan can make a critical difference for targeted species or communities of species. The kinds and numbers of wildlife that use your land can very well be the direct and indirect result of your efforts. For these reasons it is important to understand your property's potential, to know its history, its soils, and to be able to identify its plant and animal species.

Whenever possible consult with and work with your neighbors. After habitat destruction, habitat fragmentation is a serious threat that many wildlife encounter. If you are managing your land primarily for turkey, and your neighbor wants more pheasants, your plans could cancel each other out. Therefore, finding ways to work



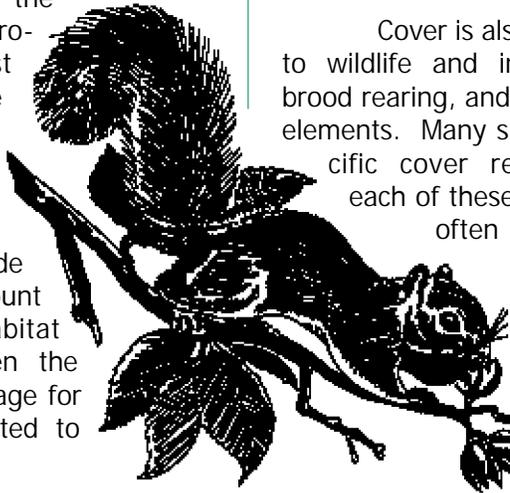
with your neighbors may result in more effective wildlife plans.

Habitat Considerations

Each species requires different variations of the four basic habitat components: food, water, cover, and space. In order to determine which species will benefit from your land, and subsequently which will not, you must determine what each species needs for survival. Instead of picking a species that you want to see on your property, you should first determine what habitats occur there, or could feasibly be created, and then decide which species are likely to benefit from enhancement of these habitats. For example, if your property and surrounding areas are comprised primarily of grassland and agricultural fields, it is not realistic to want to manage



your land for turkeys. You would be wiser to manage for pheasants or other grassland birds. Once you have determined what species are likely to frequent the habitat you can provide, you must determine the specific habitat need of the species you want to feature. If you provide the correct amount of required habitat components, then the species you manage for should be attracted to your property.



The presence of food will greatly enhance the attractiveness of your property. Food can best be provided through plantings of mast producing trees and shrubs, grasses, and flowers. These can be planted as borders on your property, in gardens, or as the main component of your land. There are also many ways to enhance the food that your land already produces with active management tools such as timber harvesting, mowing, and burning.

Water is another component essential to a species survival. The restoration of a wetland, creation of a pond, or maintenance of a stream are great ways of providing this component. An area with

water will attract a wide variety of species. Since Michigan is home to many lakes, and streams, water is usually not a limiting factor.

Cover is also very important to wildlife and includes nesting, brood rearing, and shelter from the elements. Many species have specific cover requirements for each of these uses, which are often seasonal. For example, establishing a stand of switchgrass, will provide winter shelter for pheasants. It is important to establish year round cover for a species in order to provide adequate habitat.

Space is another requirement that must be met. Some species require a small amount of living space. However, other wildlife may need large tracts of land to survive. You must be aware of the amount of space a species needs, and how your management activities will effect them. You must also be concerned with the edge sensitivity of certain species. For example, in managing for turkeys you decide to create openings in your forest to regenerate oaks. However, this decision would impact woodland birds that require a large amount of undisturbed forest.

Succession and Wildlife

"Succession" is the word used to describe how land changes over time, with or without our help. Each successional stage provides different habitat components. Natural succession does not only move forward, but is also set back by natural disturbances such as wildfire, windthrow, flooding, disease, and storms.

As habitats change, forward or backward in succession, different types of wildlife are attracted to them. Begin by understanding the five basic stages of succession and the kinds of wildlife attracted to each. Keep in mind that the species appearing in different successional stages vary in different parts of the state, with different soils, and with different natural disturbances. The species described in the following example are geared towards southern Michigan, but the concept is the same throughout Michigan.

Bare soil is the starting block, and the first plants to establish themselves in bare soil are annuals such as ragweed, lambsquarter, and foxtail. This successional stage provides seasonal nesting cover for killdeer, horned larks, and other small songbirds, as well as brood-rearing cover for pheasants and quail.



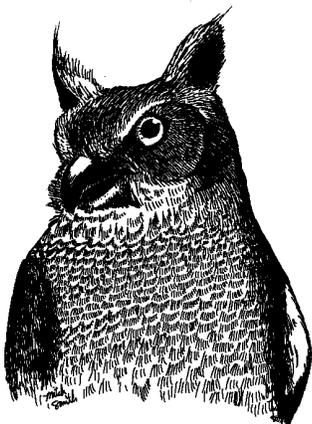
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The next successional stage is the perennial grasses and forbs. These include goldenrod, asters, black-eyed Susan, and many kinds of grasses. This provides food and cover for species such as mice, rabbits, skunks, foxes, hawks, owls, butterflies, meadowlarks, bobolinks, and other songbirds.

After a few years shrubby plants such as sumac, dogwood, and blackberry begin to invade the area. It now becomes more attractive to raccoons, opossums, deer, grouse and songbirds such as cardinals, brown thrashers, and song sparrows.

As succession continues the first tree species move in such as cottonwood, aspen, and chokecherry. During the early



stage of this forest development, young seedlings provide browse for rabbits and deer. The increasing amount of vertical structure attracts thrushes, ruffed grouse, blue jays, and orioles.

As the forest grows over time, more shade-tolerant trees like beeches and maples invade. Squirrels, wild turkeys, deer, and wood ducks are examples of wildlife that eat the nuts produced by these trees, which also furnish den cavities for screech owls, squirrels, raccoons, and woodpeckers. There are several different tree species in these stages that are dependent on the forest type that grows there.

You may decide to let succession run its course. However, you can also manage your land for any stage of succession. This is dependent on the current conditions of your land in conjunction with your goals. There are several ways to change successional stages such as burning, mechanical alterations, chemical use, or planting. These tools are either used to set back succession by removing unwanted species, or to speed up succession by promoting the growth of desired species.

Prescribed burning is the well planned and controlled use of fire. A hot fire will set back succession, while a cool fire can advance succession in a young forest such as Jack pine. Mechanical alterations include mowing, cutting, disking, and plowing. This is primarily used to set back succession, but can also be used to increase the growth of species such as aspen, sumac, and autumn olive that spread more rapidly when cut. Chemicals can also be used to speed up or set back succession. Herbicides are

used to remove vegetation, either to set back succession or to encourage the growth of desired species. Fertilizers are also used to enhance plant growth. Plantings are often used to advance succession. Refer to the chapters on **Prescribed Burning, Timber Harvesting, Grass Planting, Tree and Shrub Planting, and Grain Plot Planting** for more information.



Management Implications

Regardless of what you and your neighbors do to your land, certain species of wildlife will likely visit, and some will possibly occupy the habitat you have created. Therefore, species that use your property reflect both the habitat niche available as well as the collection of diverse habitats within the area.

As your property and the land that surrounds it change, so will the wildlife that use those landscapes. For every management decision you make, there are some species that will be negatively effected. For example, if we plant native prairie grasses to encourage

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pheasants, quail, grassland and ground nesting songbirds to use the habitat, we will discourage forest-loving wildlife such as thrushes, woodpeckers, and squirrels. You cannot manage for both species in one area as they have different habitat needs. Therefore, you must be aware of the trade-offs involved when making management decisions. Determine what species will be effected, and then decide if the benefits will be greater with your management plan. If not, then you may need to consider other alternatives.

You should also be aware that creating or enhancing habitats may invite unwanted guests. For example, if you plant trees and shrubs, in the hopes of attracting wild turkeys and songbirds, you will most likely also lure deer, rabbits, and mice that can become a nuisance by eating the new plantings. Free-roaming dogs and cats may also be attracted to any habitat that suddenly has an abundance of wildlife.

In summary, before providing habitat for wildlife, you must know what they need to survive. Providing the correct habitat requirements for a certain species will encourage them to visit and possibly occupy your land. It is important to know what habitat your land can provide before deciding which species you want to manage for. Also, you must be aware of the trade-offs that are involved, or what species will be impacted, in your management plan.

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BATS

Bats comprise one-fourth of the world's 4,000 species of mammals and are most often found in forested areas near water, which are insect-rich areas. Fruit-eating bats are nature's most important seed-dispersing animals. Nectar bats pollinate many rain-forest trees, shrubs, and flowers and without their help the forest would be less diverse. The ability of insect-eating bats is phenomenal--one little brown bat can eat 600 to 1,000 mosquitoes in an hour. Over-sized ears and nostrils help bats to use a sonar system that experts believe is a thousand times more sophisticated than the best airport radar invented to date.

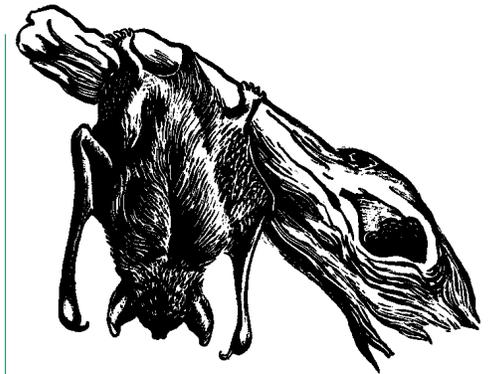
Bats are among the most fascinating of all wild creatures. Because they are also among



the least understood, myth and ignorance have caused many people to fear and hate them. For example, bats are not blind; in fact, they have good eyesight. Bats are actually very clean animals and they do not get caught in people's hair, nor do they eat through house attics or interfere with pets or backyard feeding birds. In addition, no bat species preys on humans. The non-aggressive vampire bats of South America and Central America have evolved to specialize in drinking small amounts of blood from cows, goats and chickens. There are no vampire bats in the United States.

Because bats are so distinctive, they have their own scientific order. Chiroptera is a Greek word that means "hand-wing" because the wing is similar to a human hand with a thumb and four long fingers. Also, they are our only true flying mammal.

Some bats are so small they weigh as little as a dime. Others have a wing span that may stretch to five or six feet. Another interesting fact: Bats have been known to migrate at cruising altitudes up to 10,000 feet, much higher than most birds. Of the 43 species of bats that live in the U.S., more than half are considered rare or uncommon. Nine insect-eating species of bats, including one classified as rare, live in



Michigan. All are nocturnal (active at night), and feed nearly exclusively on flying insects, including moths, beetles, and mosquitoes.

Bats in Michigan

The **hoary bat** is Michigan's largest with a wingspan of up to 15 inches. Heavily furred, the hoary's dark-colored hair is tipped with white giving it a frosted appearance. Its ears are short and rounded. It's rarely encountered by people and migrate south in winter. It is a solitary species that spends its summer months in forest trees near water throughout Michigan. Researchers know little about their feeding habits and predators.

The **red bat** also migrates south and is a solitary bat of forests near water. Its long, pointed wings may stretch 12 inches, and it has short, rounded ears, and a furred tail. Color varies from a bright orange to a yellow-brown, and the males are usually brighter in color than the



females. Like most other bat species, the red breeds in fall, but conception is delayed until spring when the female gives birth to one to four pups after a gestation period of 80 to 90 days. Blue jays prey heavily on the offspring. Other predators include opossums, sharp-shinned hawks, great-horned owls, and feral house cats.

The **silver-haired bat** lives in forested areas near streams and lakes. Similar in size to the red bat, the silver-haired species is black or dark brown with silver on the tips of its hairs. Considered scarce throughout their statewide range, the silver-haired bat is most easily identified by its slow flight, which is typically low to the ground. A solitary species, females are thought to establish nursing colonies in June and July when they give birth to two young. A southern migrant, the silver-haired is preyed upon by skunks and great-horned owls.

The **eastern pipistrelle bat** does not migrate as it hibernates in caves or abandoned mines through winter in the western Upper Peninsula where it lives year-round. This bat

occupies rock crevices and building ledges during the day, and leaves just before sunset to feed on insects. A tiny bat with a wingspan of 10 inches or less, the pipistrelle is often confused with a large moth. Ranging from a golden brown to reddish brown, the species has few known predators.

The **northern long-eared bat** until recently was also called the Keen's bat, which is now considered a separate species living in Canada. Very large ears make these bats easy to identify at close range. Similar in size to the silver-haired and red bat, the long-eared is brown in color. Although it typically roosts alone in buildings and under tree bark in the summer, small numbers hibernate together in caves, often with big brown bats. The species also forms small nursing colonies of about 30 bats in a tree hollow or under bark.

The **evening bat** lives in extreme southern Michigan and is easily confused with the little brown bat except the evening bat has a curved, rounded fleshy protrusion (tragus) on the ear instead of a pointed tragus. Their wings span 10 to 11 inches. The evening bat flies low to the ground and is sometimes seen swarming around caves, which it rarely enters. Young are born in summer in colonies that range from a few individuals to several hundred, and litter size is typically two pups.

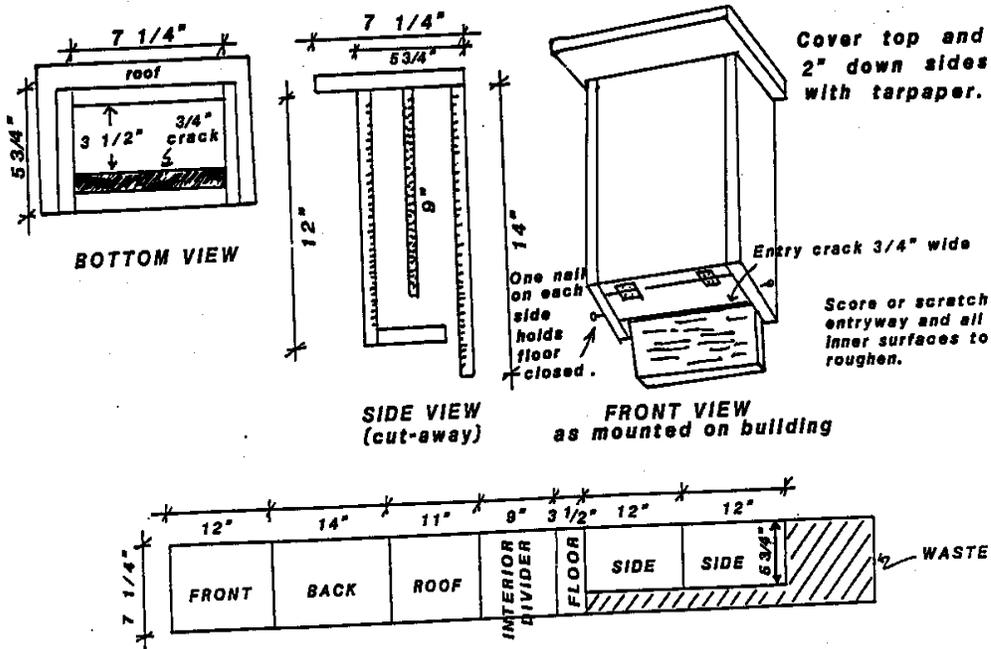
The **little brown bat** is especially abundant throughout the state and is the most seen species. A light brown to dark

brown in color, little browns are fairly small in size with a wingspan of 8 1/2 to 11 1/2 inches, small ears, and large feet. In summer, colonies of the species live in hot attics and under shingles and siding; in winter, they hibernate in caves, crevices, houses, hollow trees, or mines. Females form nursery colonies away from the males. Little brown bats like to feed on aquatic insects and are frequently seen dipping and diving over water but will also forage over lawns and pastures, among trees, and under street lights.

The **big brown bat** has a large nose, is reddish to dark brown in color, and sports a wingspan ranging from 12 1/2 to 13 1/2 inches. Its slow, steady flight, and large size make it fairly easy to identify. Beetles, wasps, mosquitoes and flies from pastures, lawns and vacant lots in the city make up its diet. They are late-dusk fliers that often swoop low to the ground. A colonizing species, big browns roost in buildings and under bridges in summer and hibernate in caves, mines, houses, hollow trees, and even storm sewers in winter. Efficient feeders, the species often roosts for



Bat House Instructions



a short nap after gorging itself. Porches, garages, and breezeways are good places to find them. The female gives birth to only one pup per year.

The Federally endangered **Indiana bat** is considered rare in southern Michigan, the only region in the state where it resides. A light brown in color, the Indiana bat closely resembles the little brown bat. A southern migrant, the species forms nursing colonies in tree cavities or under loose bark of trees along forested floodplains.

Habitat Management

The following are options to consider when managing habitat for bats:

- Retain trees with loose, scrappy bark. Cutting down shagbark hickory or other tree species with flaking bark reduces available habitat for some species to roost.

- Preserve and protect wooded corridors, riparian areas, and trees along streams, rivers, lakes, and ponds.

- Retain abandoned mines for hibernation. Twenty thousand bats have been found in a single mine. Destroying their winter "homes" would be detrimental to their survival. And, disturbing their sleep may even kill them because they expend valuable energy waking up and trying to go back to sleep. It may be beneficial to add

mine closures that will allow bats to enter, but keeps humans out.

- Minimize the use of insecticides. Their broad use can seriously impact bats. Although there may be an increase in insects near your home, maintaining natural conditions will increase food not only for bats, but for birds and even dragon flies.

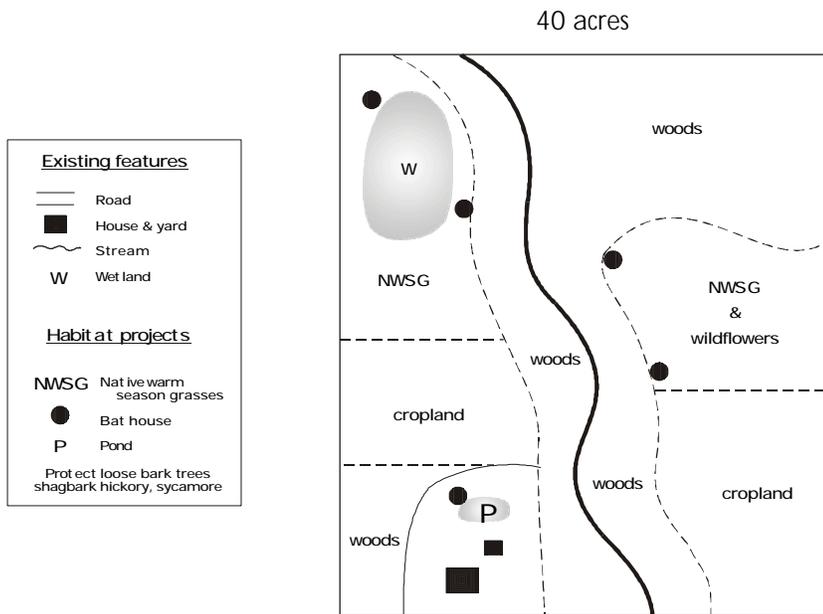
Concerns

Colonizing species that occupy human dwellings cause great alarm among fearful inhabitants. Rather than killing these beneficial mammals, prevent entry into your home by locating and plugging potential entrance holes. If bats are already present, plug the hole after sunset when they leave. Putting up a bat house nearby may discourage them from entering your home while keeping them in the area.

Building a Bat House

You can attract bats to your property by providing a bat house. You can make a simple structure by nailing the top of a





house on the east or southeast side of a pole, tree, or building at least 15 feet from the ground and out of the wind as much as possible. Be careful placing houses on trees, they may become feeders for cats or raccoons.

The best location is near water where insect populations are high. If bats must fly a half-mile or more to feed, they will most likely not use the structure. Once used, bat houses do not need to be cleaned.

Since bats are loyal nesters, putting up a bat house in an area they frequent is no guarantee they will use the structure. Solitary roosters (red, hoary and silver-haired bats) will likely ignore them, and one or two years might pass before the other species, all of which are colony roosters, may find them to their liking. In Michigan, little brown bats and big brown bats are the species most likely to use bat houses.

This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

two-foot wide piece of tar paper around a tree trunk so the tar paper will resemble a tight-fitting skirt. The idea is to keep water from leaking into the structure. Bats will enter from

below and cling to the tree bark. They can then move around the trunk as the sun rotates during the day.

To build a bat house from wood, refer to the diagram and directions above. Entry space should be about 3/4 inch wide, and all inner surfaces must be roughened to allow bats to climb on them with ease. Screen mesh also works well.

To bring the house to preferred daytime summer temperatures of 80 to 90 degrees, cover the house with tar paper or paint the structure black so it will absorb heat. Place the bat



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FROGS, TURTLES & SNAKES



Michigan reptiles include turtles, snakes, and one lizard species. Michigan amphibians include frogs, toads, and salamanders. Much of the time we are not aware of these creatures; when we are aware, their presence sometimes annoys or frightens us. Snakes, in particular, have been the subject of unwarranted fear and prejudice, but fortunately this attitude is beginning to change. Reptiles and amphibians are important to study because they are sensitive to subtle environmental changes such as water quality or ozone depletion in the atmosphere that permits more ultraviolet light to reach the earth from the sun. As "environmental indicators", reptiles and amphibians help us to monitor these and other changes that may eventually be harmful to us.

They also play an essential role in our ecosystem. Frogs, toads, lizards, and some snakes can destroy large quantities of harmful insects. The larger snakes eat mice, rats, and other rodents. Some turtles act as scavengers in lakes and ponds, and others prey on snails, which act as intermediate hosts for parasites, including the one that causes "swimmer's itch." Reptiles and amphibians provide an important food source for other animals including fish and birds. These creatures are interesting to observe and study, and most species carry out their ecological roles without conflict with people.

The Michigan Department of Natural Resources and the U.S. Fish and Wildlife Service administer programs that help us to understand and manage amphibian and reptile populations. In

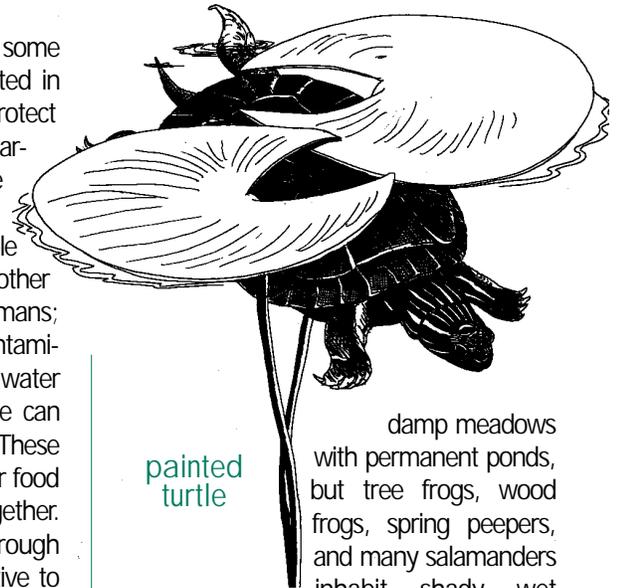
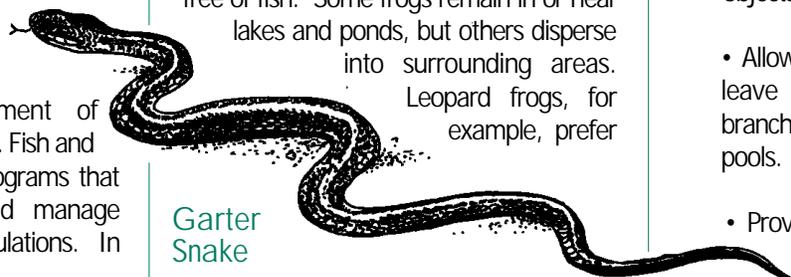
recent years declining numbers of some amphibians and reptiles have resulted in state and federal laws designed to protect them. Reasons for the decline are varied and complex. They include the fragmentation and destruction of wetland areas; exploitation by people for food, pet trade, fishing bait, and other purposes; direct persecution by humans; and exposure to environmental contamination. Pesticides entering the water where many of these creatures live can impact their ability to survive. These chemicals can also contaminate their food source (insects) or eliminate it altogether. Because amphibians breathe through their skin, they are especially sensitive to toxins in the air or water.

Overall Habitat Considerations

Amphibians and most reptiles require moist lowland areas that have available water at least on a seasonal basis. Turtles usually inhabit permanent water resources such as lakes, ponds, or slow-moving parts of rivers. Aquatic snakes spend much of their lives in and near the shallow edges of lakes and streams. Frogs, toads, and most salamanders lay their eggs in water and spend the early part of their lives as gill-breathing larvae or tadpoles. Many breed in temporary ponds such as vernal pools and other shallow wetlands free of fish. Some frogs remain in or near lakes and ponds, but others disperse into surrounding areas.

Leopard frogs, for example, prefer

Garter Snake



painted turtle

damp meadows with permanent ponds, but tree frogs, wood frogs, spring peepers, and many salamanders inhabit shady wet woodlands with temporary seasonal ponds.

Because most frogs, turtles, and snakes require different habitats at various times of the year, they become vulnerable when travel is involved. Roadway traffic, for example, claims large numbers of migrating breeders in the spring. When their habitat needs are in close proximity to each other, the need to travel lessens reducing mortality. Neighboring property owners can often cooperate to restore, protect, or create new critical habitats. To do this you can:

- Provide sun-basking opportunities such as logs, boulders, and other objects that these animals seek.
- Allow leaf litter to accumulate, and leave rotting logs and downed branches in woodlots and woodland pools.
- Provide plants in ponds, marshes, and other bodies of water.

Amphibians in particular rely on submergent aquatic plants (water plantain, coontail, and bladderwort) to support their egg masses, to act as nursery areas for larvae, and to offer feeding areas for adults. They use emergent plants (cattails, waterlilies, sedges, and rushes) for protection against predators.

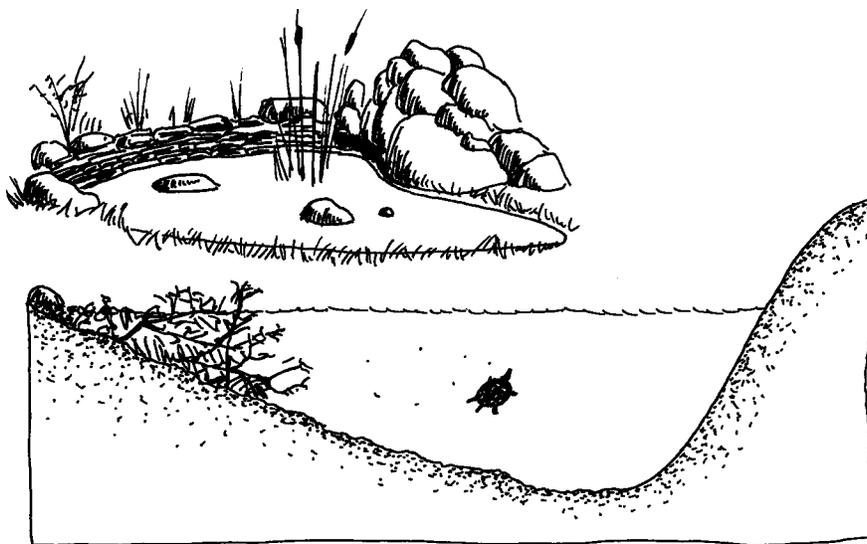
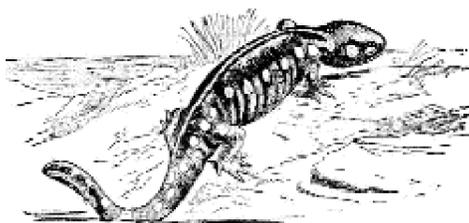
Managing Habitat for Frogs, Toads and Salamanders

Although more than 3,400 species of toads and frogs occur worldwide, only 14 live in Michigan, and two of them -- the Blanchard's cricket frog and the boreal chorus frog of Isle Royale -- are uncommon. Michigan is also home to eight species of salamanders, including the Eastern newt. Rare species, protected by the Endangered Species Act, are the marbled salamander and the smallmouth salamander.

Water is critical for population survival because these creatures seek shallow wetlands and vernal pools in which to breed and lay their eggs. When the shallow wetlands remain wet, and are free from egg and larvae-eating fish, most young, gill-breathing amphibians will make the transition from egg to larvae to adult in one summer. Dry years can result in very few eggs or hatchlings, or minimal survivability to adulthood. Species that do not require a large wet area may lay their eggs in ditches with just enough water to encourage breeding.

Most frogs, toads, and salamanders

Spotted Salamander



Frog and Turtle Pond

lay their eggs on submerged sticks and plants. However, the green frog and bullfrog lay their eggs in a large mass that floats on the surface or attaches to vegetation. The mudpuppy uses rocks in warm, shallow water for its nest chamber. The four-toed salamander is especially adapted to boggy cedar swamps containing sphagnum moss where it lays its eggs.

Other species with specialized habitat needs or unusual life cycles include:

- The **mink frog** lives in ponds, bogs, lakes and slow-moving streams of the Upper Peninsula.
- The **eastern newt** hatches into a larval form in shallow water, transforms into a land-loving juvenile, and then at two years of age or older becomes a fin-tailed adult that returns to water.
- The **pickerel frog** prefers cool, unpolluted water and will not inhabit bogs, lakes, or streams with excessive nutrients, suspended sediments, or contaminants.
- The Fowler's toad lives in open woods and sandy-soiled fields located along southern Lake Michigan sand dunes with ponds and wetlands.

Landowners interested in building ponds should consider creating them broad, weedy, and shallow, and plant natural vegetation along at least part of the pond margin. Surrounding the pond with beach sand or mowing to the water's edge will be of little or no use to amphibians. Because many larger frogs (bullfrogs, green frogs, and leopard frogs) hibernate in the bottom of ponds and lakes, you should provide an area deeper than five feet to prevent the water from freezing to the bottom in winter. Avoid stocking ponds or lakes with fish that will eat amphibian eggs and larvae. Consider building two ponds -- one for game fish and one for amphibians.

Salamanders consume worms, snails, slugs, and both waterborne and terrestrial insects. In the woodlands, salamanders seek leaf mold, decaying logs, and moist spots under rocks for food and shelter.

Frogs and toads eat insects, spiders, and mites. Leaving leaf litter and rotten logs in your woods will provide frogs and toads with important cover. Toads in particular are beneficial to gardeners because they consume insects harmful to flowers, vegetables and other plants. Attract toads by placing an old stump or hollow log in your garden. Propping up pieces of wood

FROGS, TURTLES & SNAKES



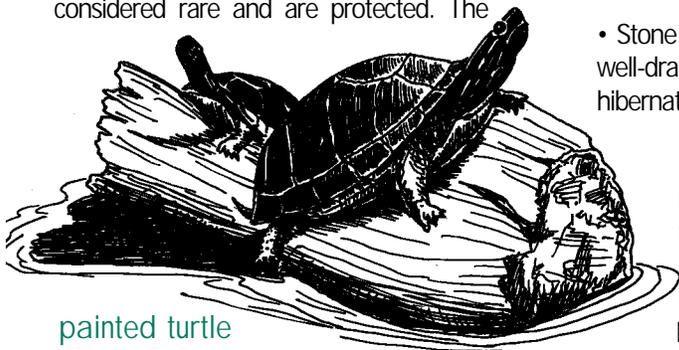
Toad Home: Create by placing a shallow depression under flat rocks. To create an entrance, punch a hole in an 8-inch flower pot and slide into depression.

or turning a flowerpot on its side will also give toads a damp, shady daytime haunt.

Managing Habitat for Snakes

Reptiles do not have a water-dependent larval stage as do amphibians, but many species live in or near wetlands and waterways where they find food and shelter. Creating, restoring, or enhancing wetlands is generally beneficial to snakes and turtles too. Aquatic snakes spend much of their time in or near the shallower edges of lakes and streams. Uplands are also favored by most snakes, all lizards, and the eastern box turtle.

Michigan is home to 17 species of snakes. Seven species lay eggs; the other 10 bear their young live. Egg-laying snakes bury their eggs in sand or soil in late spring or early summer. Many people are familiar with the common garter snake, but few have seen Michigan's only venomous snake, the massasauga rattlesnake, which is shy and unassertive. Another uncommon snake is the black rat snake and three other species (the Kirtland's snake, the copperbelly water snake, and the Eastern fox snake) are considered rare and are protected. The



Painted turtle

Kirtland's and northern copperbelly inhabit wet meadows, tamarack swamps, river-bottoms, woodland ponds, and open swamp-forests in the southernmost counties of the Lower Peninsula.

The eastern massasauga rattlesnake frequents marshes and swamps but will move into meadows and woodlands in summer. Wet meadows, marshes, and the grassy edges of lakes and streams are preferred by the butler's garter snake, northern ribbon snake, blue racer, eastern fox snake, and the eastern smooth green snake. The northern ringneck snake and black rat snake like moist woodlands. The hognose snake and western fox snake inhabit open sandy woodlands and wooded dunes.

Michigan's most common snake, the eastern garter, occupies open woodlands, meadows and old fields. Also preferring these habitats are the brown snake, the northern red-bellied snake, and the eastern milk snake, which also frequents barns and sheds.

The following are options to consider when managing habitat for snakes:

- When trimming trees and shrubbery or harvesting timber, leave the debris in piles of brush or logs to provide warmth and cover.
- Stone piles that face south along a well-drained slope are attractive as hibernation chambers.

- Maintain open, sunny places for basking within dense woodlands.

- In winter, maintain rodent burrows, natural cavities

around tree roots, and cracks in old house and barn foundations as places for hibernation.

- Keep grasses uncut along the water's edge, which provides cover.

You may wish to create a snake hibernation mound for use along the forest edge. It is essentially an underground brushpile designed to provide burrow sites for hibernating snakes. Build these mounds along forest openings, road cuts, timber landings, or any land clearing with slash and stumps. It is important that sunlight reaches the mound so it should be located on the north side of a clearing.

Trees on the site should be cut to approximately 12 to 18 inches above the ground level. Then cut the trunks into 10-



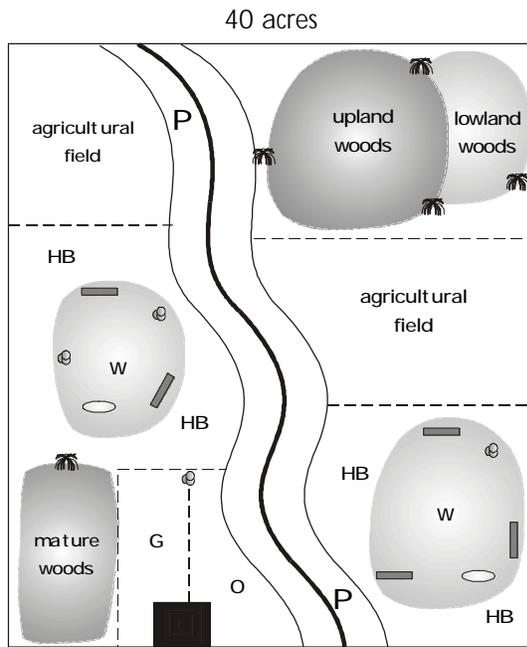
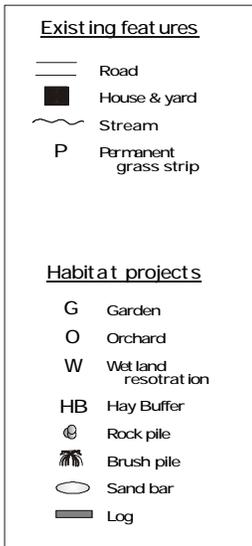
snake hibernation mound

foot lengths and remove all branches. Dig a trench eight feet deep and nine feet across. Fill the bottom of the trench with a layer of logs and continue filling the trench with some stumps and branches. Soil should then be pushed into the trench to ground level. The 10-foot logs should then be laid on top of trench side by side. Keep placing soil, logs, and branches until the mound is approximately 10 feet high. Please see figure above.

Managing Habitat for Turtles

Four of the ten species of turtles living in Michigan are considered uncommon.

FROGS, TURTLES & SNAKES



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

They include the spotted turtle, wood turtle, Blanding's turtle, and the eastern box turtle. The wood turtle prefers sandy-bottomed rivers and streams in the Upper Peninsula and northern Lower Peninsula. The eastern box turtle likes open woodlands near water in the western and southern Lower Peninsula. Both the spotted and Blanding's turtle seek clean, shallow water with a vegetated mud bottom. Slow-moving rivers, marshes, and mud-bottomed lakes provide habitat for painted, snapping, and spiny softshell turtles. The musk turtle prefers shallow lakes with marl, sand, or gravel bottoms. The map turtle inhabits larger lakes, river, and the oxbow sloughs of rivers.

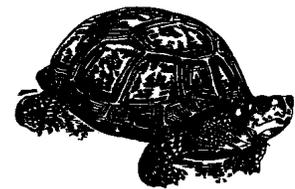
All Michigan female turtles dig a nest

hole in the ground with their hind legs to bury their eggs. The nest site is moist soil or sand in an open, sunny area near the water with little or no obstructing vegetation. Stream bank stabilization, though a good conservation tool, can eliminate nesting sites for wood turtles. When nesting habitat is not available, turtles may travel a considerable distance to find it, thus increasing their vulnerability.

Most females lay their eggs in June, and the young are hatched in late summer or fall. Because hatchlings may overwinter in the nest, the nest site must remain undisturbed all year. Turtle eggs are a popular food item among nest predators like the raccoon, skunk, and opossum.

Landowners can provide nesting habitat by spreading sand in a slightly elevated, open place near a pond or lakeshore to prevent flooding of the nest. Because aquatic turtles burrow into the bottom mud of lakes and ponds, the sites must not freeze completely in winter. Lakes and ponds with depths of five feet and greater provide over-wintering habitat for aquatic turtles that burrow into the mud. Land-based species dig into the leaf litter and hibernate in the forest, and emerge again in the spring. Note that pet turtles should not be released into the wild due to the spread of disease.

However you decide to manage your property, it is important to realize that education is the most important tool. There are many myths that exist about many of the species within this chapter that frighten people into thinking they should not exist on their land. Amphibians and reptiles play important roles in nature as do songbirds and insects. Inform yourself about the positive and negative effects that may occur due to the changes you implement.



box turtle

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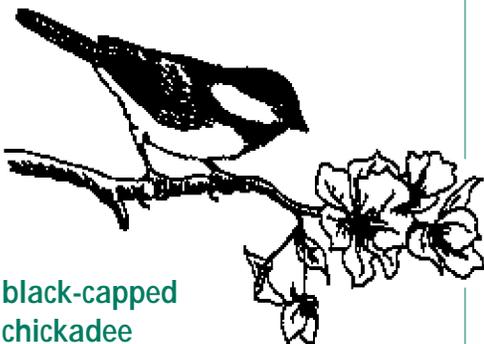
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SONGBIRDS



Bird watching is among the most popular of all American recreational pursuits. Songbirds in particular offer much pleasure to landowners who attempt to attract them to habitats as small as backyard feeding stations and as large as sweeping grasslands, large wetlands or dense forests. Of the world's more than 8,000 species of birds, a total of 233 are known to breed in Michigan and more than 360 spend at least some time in the state. The list includes many songbirds ranging from the common American robin to the endangered Kirtland's warbler.

Songbirds use many different types of habitat including forests, grasslands, wetlands, and shrublands. Therefore, birds that visit your property reflect the habitat available in your area. For example, if you attract a bobolink, a grassland bird, to your property, we can assume that there is a grassland nearby. Birds, such as the black-capped chickadee, are widespread and use a variety of habitat types. This is one reason why it is common and does not need special protection. On the other hand,



black-capped
chickadee

some species are more particular about their habitat needs and tend to be rare. For example, the Kirtland's Warbler, which breeds exclusively in Michigan, nests only where there are large stands of 8 to 20 ft tall jack pines. With proper management, and a clear understanding of what your land and the surrounding landscape can do, you can create important habitat for songbirds.

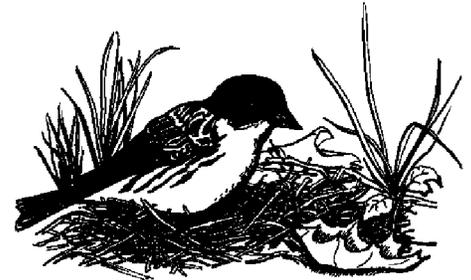
Habitat Components

Even though all species need the basic habitat components of water, food, cover, and space, the amount and kinds of each differs by individual species. Therefore, your landscape determines the opportunities you have for bird conservation. The following describes some of the basic habitat needs of songbirds.

Space

Space and territorial needs vary with each wildlife species. By understanding how much space is necessary for each species, you can learn what wildlife is attracted to your property. Bluebirds, for instance, are territorial and need about five acres per pair. In contrast, purple martins are not territorial, and need only small areas. You can create a larger area for those species that are territorial by working with neighbors.

Michigan's landscape has greatly changed since the early



Kirtland's warbler

1800's when the first European settlers arrived. No longer are there vast forests in southern Michigan, and we have lost over 35% of wetlands statewide. New home development continues to fragment the state. Fragmentation occurs when roads, homes, pipeline corridors, and other forms of development break up a landscape.

Many songbirds are sensitive to size and shape of their habitat. "Area sensitive" species, such as acadian flycatchers, wood thrushes, and ovenbirds have low tolerance to fragmented habitat. For this reason area sensitive species tend to seek out grasslands, forests, or wetlands hundreds of acres in size. Many of these species are declining in number as they no longer have these large areas. However, other species such as cardinals, chipping sparrows, and chickadees can tolerate fragmentation and smaller areas. These species are most often seen in urban areas, and are fairly common.

Water



Most songbirds need open water of some kind. Luckily, Michigan is home to wetlands, lakes, rivers, streams, and ponds. However, providing a water source on your property can attract songbirds to your area. A small pool with stones in the shallow edges draws them to bathe, drink and help control their body temperatures. They will use the dry tops of the rocks as preening sites after bathing.

Providing a simple birdbath should meet their needs. You can buy them commercially, or create one by simply flipping over the lid to a garbage can. Remember to keep it shallow--an inch or so of water is plenty. In hot weather, especially, it is important to clean daily. Make sure the water is shaded and cool during the hottest part of the day, and place it near escape cover such as an evergreen shrub.

Birds are attracted to the noise of flowing water. Providing moving water through a fountain may increase songbird usage but is not mandatory. Mistlers and drippers are other means to move water and draw more birds. Songbirds will use water sources year round. In winter consider providing water in a heated dog bowl or buy a bird-bath heater.

Food



Natural foods, such as fruits, nuts and seeds provided by trees, shrubs, grasses, and flowers will attract a variety of songbirds. Planting highbush cranberry, dogwoods, or other fruiting shrubs on your property may draw migrants as well as resident birds.

These plants can also provide areas to sing, court, nest, rest and hide, as well as pleasing landscapes.

Providing bird feeders can also attract songbirds. There is no best time to start feeding birds. Once food is established, they will visit year round. When food supplies are scarce, such as in the very early spring or during bouts of severe weather, birds will rely on your feeders the most. However, if you have to stop feeding for a month or so, the birds will find alternate sources, even during the winter.

Locating feeding stations in several places reduces crowding and lessens the chance for avian diseases that can kill certain small songbirds such as house finches. Clean the feeders periodically, cleaning more often during humid summer months. If possible, protect the feeders from the wind and try to locate them in or near winter cover such as evergreen shrubs. For more information, refer to chapter on **Bird and Other Wildlife Feeders** in the Backyard Management section.

Cover



Songbirds use cover for shelter, nesting, and brood rearing. Dependent on the type of species, required cover types could vary from woodlands to grasslands to wetlands. After assessing what cover types are available on your property, you can determine what species you will be able to attract. By planting trees, shrubs, grasses, and flowers, you can enhance the cover and attract more species.

Management Considerations

Landowners interested in attracting songbirds should realize that 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 it negatively impacts another.

After assessing what types of birds might frequent your land, it is then possible to make your land more attractive to these species. The following suggestions will help you to increase songbirds on your property. For more information see the individual chapters on **Woodland Birds**, **Grassland Birds**, and **Wetland Birds** in this section.

Forests

Due to the increase in urbanization and rural estates in southern Lower Michigan, the variety of bird species that live there has drastically changed. This area has become highly fragmented. Thus it houses more edge-dependent species than edge-sensitive species such as the wood thrush, red-eyed vireo, cerulean warbler, American redstart, ovenbird, and scarlet tanager. Nest predators such as crows, bluejays, opossums and skunks, along with the brown-headed cowbird, a major nest parasite, are most active along the forest edge.

Therefore, the following are options to consider when managing forests in southern Michigan (south of Clare, Newaygo, and West Branch):

- Maintain and enhance large blocks of contiguous forests for

those species that are edge-sensitive. Woodlots can be enhanced by planting trees and shrubs along their perimeter to increase their size and reduce the harsh edge.

- Creating forest openings is discouraged as it fragments the forest. However, selective logging can be used, especially where a continuous canopy is maintained, and scattered mature trees of a variety of species are kept.

Northern Michigan residents have far fewer limitations when developing management plans. The landscape is less developed, therefore less fragmented, and supports more species of birds than southern Michigan. Therefore, the following are options to consider when managing forests in northern Michigan:

- Small clearings may be developed to benefit certain species. However, be careful to not create fragmented conditions by cutting too much.

- Maintain and enhance evergreens, especially white and black spruce, balsam fir, hemlock, white cedar, and white pine, as they are preferred by many species of birds. Such birds include the brown creeper, black-throated green warbler, Blackburnian warbler, and Canada warbler.

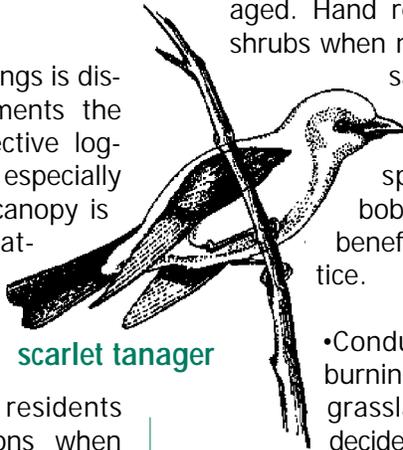
- As in southern Michigan, maintain a diversity of tree species and larger tracts of forest.

Grasslands

The following are options to con-

sider when managing grasslands:

- Large patches of grassland are recommended, and often trees within a grassland are discouraged. Hand remove trees and shrubs when necessary. Upland sandpiper, Henslow's sparrows, grasshopper sparrows, and bobolinks, especially benefit from this practice.



scarlet tanager

- Conduct prescribed burning to maintain the grasslands. If you decide to burn grasslands, do so only after seeking professional advice. Refer to the **Prescribed Burning** chapter in the Grassland Management section for more information.

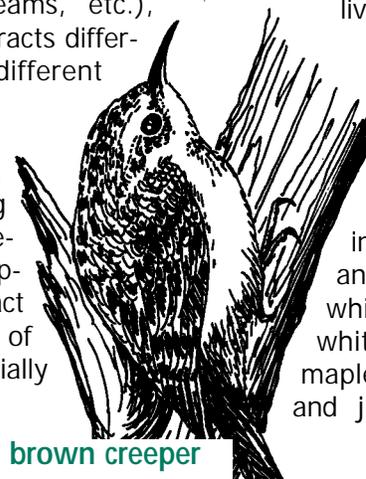
- Plant areas of both warm season grasses with forbs, and areas of cool season grasses with legumes to provide a diverse habitat.

Wetlands

The following are options to consider when managing wetlands:

- If possible, keep a variety of wetlands (marshes, swamps, bogs, fens, streams, etc.), because each attracts different birds at different times of year.

- Avoid building over or draining any wetlands present on your property, as they attract a wide variety of songbirds. Especially avoid constructing roads



brown creeper

in wet areas, even those areas that are wet only temporarily.

- If possible, restore degraded or drained wetlands.

Backyard Areas

Many kinds of songbirds are attracted to balconies, decks, lawns, and ornamental shrubs and trees in both rural and urban settings. You do not even need to own property to enjoy songbirds as they may visit your condominium or apartment complex. For example, robins, house wrens, song sparrows, mourning doves and eastern kingbirds are among at least 14 species that nest in urban

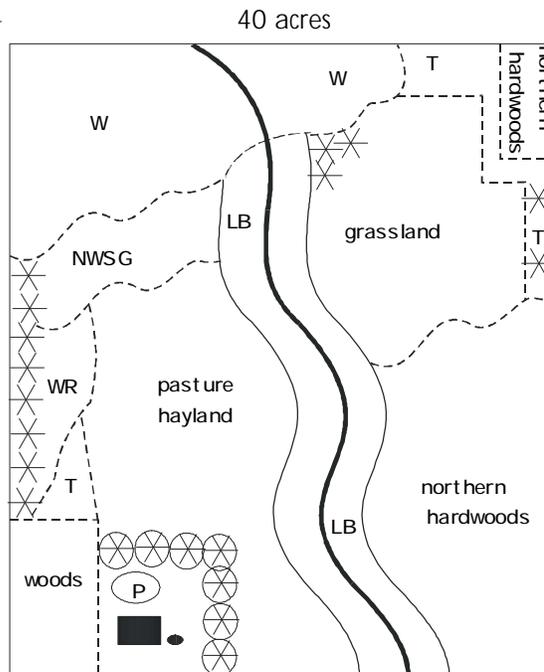


bobolinks

habitats. In urban and suburban areas, you may wish to focus on attracting spring and fall migrating birds along with the more familiar birds. However, rural dwellers have more options, especially if the surrounding area is largely grassland, wetland or forest, as there are more breeding species that require this type of landscape to survive.

Regardless of where you live, it is helpful to maintain a diverse yard with an abundance of trees and shrubs, as well as areas with leaf cover for ground-feeding birds. Consider planting a variety of native tree and shrub species such as white spruce, hemlock, white pine, oaks, sugar maple, flowering dogwood, and junberry. Cardinals will

SONGBIRDS



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

nest in dense shrubbery, chipping sparrows in pines and spruces, and house wrens in cavities of trees or nest boxes. Even wood ducks and screech owls will nest in town if tree cavities are present. Rufous-sided towhees and white-throated sparrows will use leaf-covered areas under trees and shrubs (and you won't have to mow these areas either). In winter, you may find pine siskins feeding on cones of your evergreens, especially in northern Michigan.

Other Considerations

- Use native plant species for plantings whenever possible.

Alien species, such as purple loosestrife, garlic mustard, autumn olive, and glossy buckthorn, should be avoided and actively removed as they displace native species used by birds as food sources and sheltered sites.

- House cats can be a major predator of songbirds, especially in southern Michigan. 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 and small mammals of their presence,

thus reducing their impact as a predator.

Feeding songbirds can be educational and fun. To enjoy the full benefit of songbirds, get a good field identification guide that contains color pictures or paintings and buy a quality pair of binoculars. You may even wish to keep a checklist of birds that visit your land in order to determine the variety of birds that you have attracted to your area.

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BLUEBIRDS

Although Eastern bluebirds have never been extinct in Michigan, bird lovers have been concerned about this popular member of the thrush family for more than 100 years. The winter of 1894-95 with its record cold and deep snow caused heavy mortality among certain semi-hardy species including the eastern bluebird and American robin. Although bluebirds were able to bounce back from this major loss, they then had to compete with introduced species from Europe such as the English or house sparrow and the European starling. With these introductions there was increased competition for cavity nesting sites, which further decreased bluebird populations.

By 1950, bluebirds were no longer common around people's homes. In addition to bad winters and foreign bird competition, habitat changes also contributed to their decline. As farming practices changed from small family farms to large operations, many fencerows were removed. Subsequently, this removed nesting cavities found there in trees and wooden posts, reducing bluebird nesting sites. Also, the increase in pesticide use and the gradual shift to more row crops had a negative impact on the bluebird's food availability. However, thanks to public education and a concerted effort by many people to provide nest

boxes, bluebirds have made a comeback in recent years.

Bluebirds can be found throughout the state, and are most common in rural areas. They prefer grassland habitat with scattered trees; especially where trees are large enough to provide nesting cavities and provide shelter from early spring storms. Bluebirds are found in old fields, abandoned orchards, open woodlands, oak savannas, oak barrens, jack-pine barrens, and the edges of bogs and sedge meadows. They usually avoid heavily forested areas, even during migration. Common associates of bluebirds include eastern kingbirds, tree swallows, field sparrows and American goldfinches. Most or all of these species will benefit from management for bluebirds.

Although this popular songbird nests in every Michigan county, it is most common in the northern Lower Peninsula. It is seen less frequently in the metropolitan area of southeast Lower Michigan and in the intensively farmed Thumb region. Most Michigan bluebirds migrate south in winter, but a few southern Michigan residents stay here during mild winters.

Life Cycle

From mid-February to mid-March, bluebirds return to Michigan in small flocks from

southern wintering grounds. Early nesters, they begin to look for woodpecker holes and cavities, which they will clean out if necessary.

Bluebirds are extremely territorial, and will often fight over nest cavities. Males typically show several potential sites to females, who will make the final decision. Males may mate with more than one female, and females may mate with more than one male.

Once the female selects a cavity, she spends a week or so bringing soft, dry grass with which to form a deep, cup-shaped nest inside the cavity. She will then lay a clutch of three to six eggs, with five eggs being the standard. For the next 12 to 14 days she will incubate the eggs. Once hatched, the nestlings will remain in the box for about two weeks. Therefore, bluebirds need four to five weeks



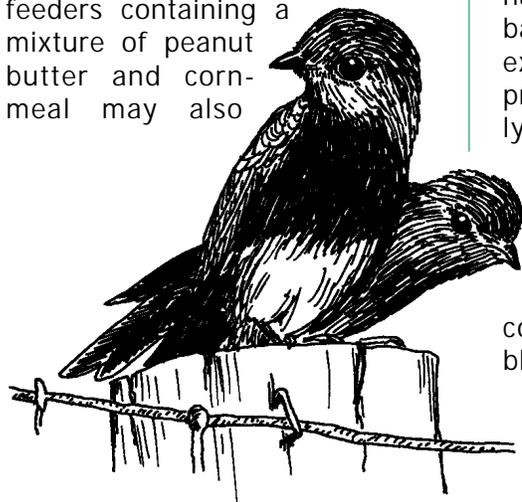
of uninterrupted time to rear their young.

Both sexes aid in feeding the young, and they stay with the juveniles for several days after the fledglings leave the nest. The adults may raise one or two more families during the summer-long nesting season before they head south again for the winter.

Food and Water

Bluebirds like to perch on telephone and electrical wires from which they prey on grasshoppers, crickets, beetle and other insects, which make up about two-thirds of their diet. Bluebirds are also attracted to mowed lawns where they catch ground-hugging insects. During fall migration and on its winter range, fruiting vines, shrubs, and trees are favored.

Although bluebirds do not winter in Michigan in large numbers, they may be found in wetlands where they feed on sumac, wild grapes, pokeweed, honeysuckle, poison ivy, and holly. Bluebirds do not migrate long distances, and when food abounds in mild winters, they go no farther south than is necessary. Bird feeders containing a mixture of peanut butter and cornmeal may also



attract them in winter.

Like most birds, bluebirds are attracted to water. Bluebirds like to bathe nearly every day and sometimes several times daily. Therefore, the presence of an abundance of water is important in their survival.

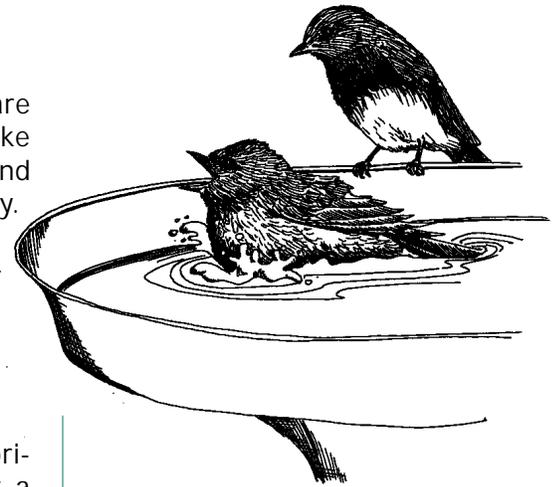
Management Considerations

Since bluebirds are territorial, your land will only support a limited number of bluebird pairs. They will usually not nest within 100 yards of each other. Keep this in mind when measuring the success of your management.

Oak savannas, oak barrens, and jack-pine barrens are good examples of native habitat important to bluebirds. Generally, bluebirds do best where soils are either very dry or very wet. Trees have a difficult time becoming established in these areas, and the scattered trees that result often make good nesting sites for bluebirds.

Habitat manipulation should be minimal in these types of areas, although fire management can be beneficial in oak savannas, oak barrens, and jack-pine barrens where it can be safely executed by fire management professionals (permits are usually required). In other areas, such as abandoned orchards and old fields, more active management may be needed.

The following are options to consider when managing for bluebirds:



- In orchards and old fields encourage scattered clumps of native fruiting vines, shrubs, and trees. Wild grape, dogwoods, serviceberry, and raspberry are all good in these areas.

- Mow your yard early and late in the typical mowing season to help increase insect foraging opportunities.

- Provide perches in and around your property. Dead tree limbs and garden stakes, with and without cross pieces, in your yard will improve foraging opportunities. Other birds that will use the perches include swallows, goldfinches, phoebes, and great-crested flycatchers.

- Set up nest boxes and provide water baths along fence-lines in orchards and old fields, or open area with scattered trees and low sparse grassy groundcover. Barrens and savannas are also great places for this since both sites for nests and water may be in short supply.

- Provide fresh water in a bird

BLUEBIRDS

bath no more than two inches deep. Add flat rocks to create varying depths and secure footholds. Locate the bath near tree branches as it gives bluebirds a chance to look it over from their perch.

•If you see bluebirds near your feeder, you may be able to keep them coming by providing what is called the Miracle Meal. To 1 cup of melted lard or suet add 4 cups yellow corn meal, 1 cup all-purpose flour, 1 teaspoon corn oil, plus sunflower hearts, peanut hearts and chopped, soaked raisins. Let set, cut into chunks, and feed as suet. If starlings or other birds drive off the bluebirds from their feeder, retro-fit an old bluebird nesting box by adding a feeding platform inside, just under the hole.

back. The body of the box is placed two inches from both the top and the bottom of the back-board. The bottom should be recessed a quarter-inch, and the inside corners cut away to provide drainage. Make the entrance hole 1-1/2 inches in diameter, and do not provide a perch on the box, which will attract sparrows and other undesirable birds. Install a predator guard (as shown below) around the entrance that will prevent predators from disturbing the nest.

Access: You need to be able to get into the box to clean it out after each clutch, or to remove nests of wasps and other birds. The design in our diagram allows for the side to pivot outward. Some box builders prefer access from the front or top of the box.

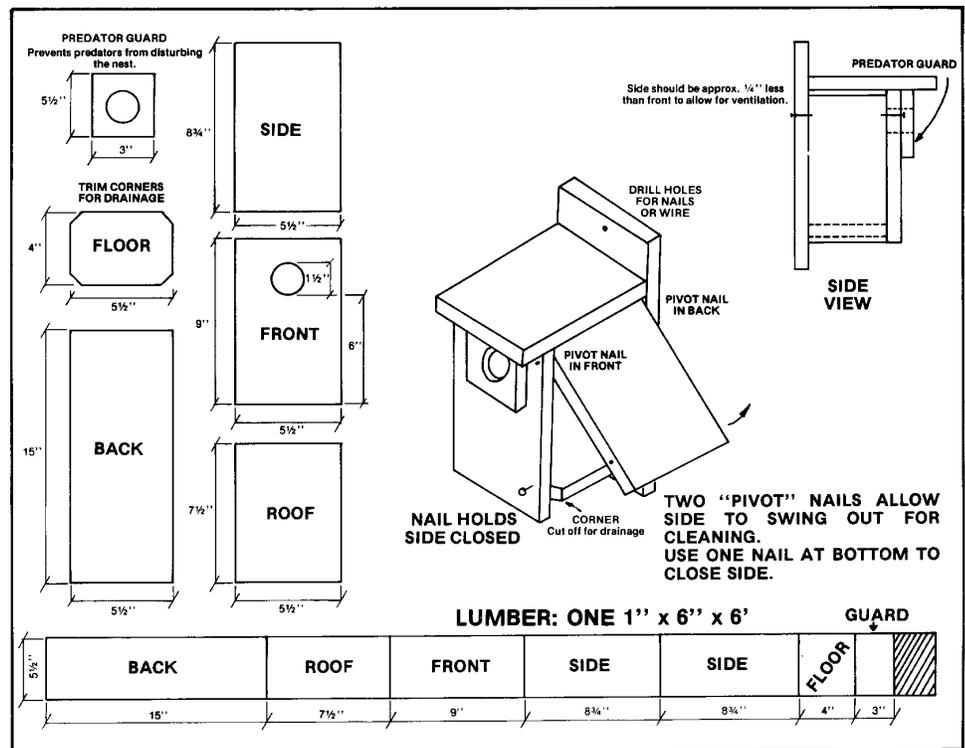
Mounting: Using holes placed in the extensions of the back, secure the box four to six feet above the ground. Metal poles provide better protection against predators, or you can place a collar of sheet metal 18 inches wide just below the box if necessary. If ants invade the box, greasing the mounting pole will prevent them from climbing. You can also place the box on a fence post.

Location: Locate the box in an open field area with plenty of insects but in an area where pesticides are not being used. The boxes should be placed away from buildings and near perches. If possible, mount it along a field edge near wires or other perches. If you place the box too close to trees and shrubs, though, house wrens will

Building and Placing a Nest Box

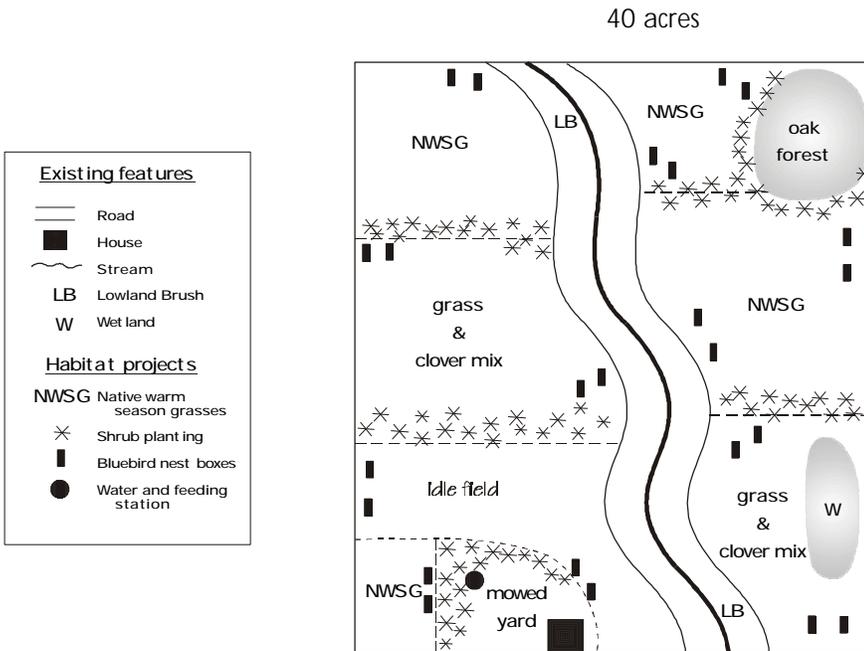
Materials: Use 1/2 inch or 3/4 inch wood such as cedar or exterior-grade plywood. Treat pine or other wood on the outside only to protect it from the weather. If you paint the box, use a drab color such as gray, green or tan, which will help the box to blend into surroundings and help protect it from overheating. Do not use pressure-treated wood, which contains copper arsenate. Use 1-inch coated box nails or wood screws. The box may be nailed, screwed or wired to metal poles, fence posts, private utility poles or tree trunks.

Design: The outside dimensions of the box should be 5-1/2 inches wide and 15 inches tall in



Bluebird nest box diagram

BLUEBIRDS



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

likely invade. Boxes placed near gardens may result in bluebirds helping to control garden insects.

Place two boxes 15 to 25 feet apart and at least 100 yards from the next pair of boxes. Pairing boxes allow tree swallows (or other territorial birds) to use one box and leave the empty one for bluebirds. Artificial nest boxes should be erected and ready by mid-February. Expect chickadees, titmice, sparrows, woodpeckers, wrens, and flying squirrels to also use the boxes.

Concerns

Wrens and sparrows are a special problem because they will evict bluebirds and destroy their nests. If the box is filled with unorganized twigs, a wren has likely moved in. Assuming the wren is not nesting, remove the twigs and plug the hole until the wren relocates. Then, consider mounting a wren box with 1-inch diameter hole near shrubbery, or move the bluebird box farther from shrubbery.

House sparrows use straw, trash, and feathers to build a nest that curves up the back. Look for other clues such as missing or pierced eggs, and pecked or dead nestlings lying under the box. An option is to move bluebird boxes away from buildings and bird feeders. Because sparrows are not protected by law, they can be destroyed.

Crows, jays, and grackles are other birds that prey on bluebird eggs and young. Solutions are to increase the roof overhang or deepen the box. To control wasps and bees, first remove their nests, then rub bar or liquid soap on the box ceiling. A predator guard will discourage raccoons, squirrels, and house cats.

Providing nesting, foraging, and watering sites is essential to attracting bluebirds to your property. Bluebird trails and cooperative projects with neighbors are an excellent way to build a population of bluebirds and associated species in your area.

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GRASSLAND BIRDS



Grassland habitats support a large variety of birds. Before European settlement, southern Michigan grasslands were largely dry prairies, oak savannahs, and wet meadows. During the settlement of Michigan, expansive, open prairies disappeared quickly as they were converted to farmland due to their rich soils. Wet meadows were drained and also made into productive agriculture lands. Michigan once had 70,000 acres of upland prairies and 350,000 acres of wet prairies. Today, they have been reduced to fewer than 2,000 acres.

Over the past 25 years, grassland bird populations have declined in North America more than any other group of birds. This decline is due to fragmentation and loss of habitat. Habitat fragmentation occurs when large blocks of habitat



eastern meadowlark

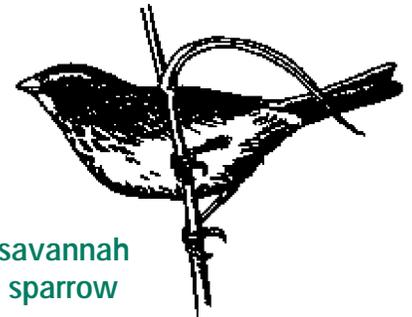
are broken up by human development such as roads, trails, powerlines, homes, farms, and other disturbances. In Michigan, two species that have been extirpated due to these impacts are the greater prairie chicken and lark sparrow.

Succession

Large grasslands support more bird species than small grasslands. Because of the massive decline of native grasslands in Michigan, it is critical to grassland bird survival that large blocks of this habitat be maintained and managed. Before management begins, it is necessary to understand the natural progressions that occur on the landscape over time.

"Succession" is the word used to describe these natural progressions. Over time, an area changes from annual plants to perennial plants to shrubs to forests. Succession can be set back or moved forward naturally (wildfire, windthrow, flooding, disease) or through human disturbance (prescribed burning, mechanical and chemical treatments).

As habitats change, different types of wildlife are attracted to them. For example, a large meadow will provide nesting cover for bobolinks, but when woody plants begin to emerge the bobolinks will no longer use it. However, now American goldfinches will appear. Therefore, to manage for grassland birds you will need to prevent succession from proceeding too far into the shrub stage



savannah sparrow

by maintaining a mix of annual and/or perennial grasses and forbs. Annual plants include weeds such as lamb's quarters, ragweed, mare's tail, and foxtail, and grasses such as quack grass and witchgrass. Perennial plants include goldenrod, asters, daisy fleabane, brome, timothy, switchgrass, Indiangrass, and big bluestem.

Warm season grasses are the most productive of cover types for grassland birds. Big and little bluestem, Indiangrass, and switchgrass are examples of warm season prairie grasses, which grow most rapidly during summer's peak when warm nights follow hot days. Because these prairie grasses stand up well to snow, they provide thermal cover for roosting birds and other wildlife. Consider mixing the grasses with forbs (native, flowering herbaceous plants such as wildflowers) to provide wildlife food and perches for songbirds. Black-eyed Susan, blazing star, coreopsis, wild bergamot, and coneflower are some examples of these forbs. Big bluestem, Indiangrass, and switchgrass are examples of tall prairie grasses. Short prairie grasses include little bluestem and prairie dropseed.

Cool season grasses, such as timothy grass, orchardgrass, and Canada wild-rye, and legumes such as medium-red clover and alfalfa grow most rapidly during spring and early summer and again at the end of summer when cool nights follow warm days. These grasses provide a variety of cover and food for grassland birds, and are considered short to intermediate grasses. Cool season grasses are best planted in conjunction with adjacent warm season prairie grasses.



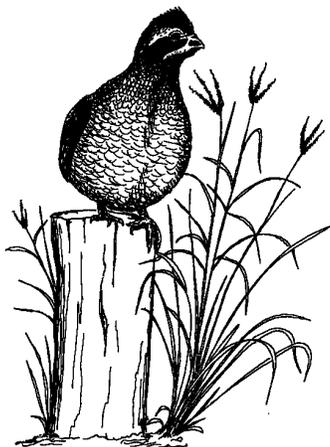
switchgrass

heights. This refers not only to the natural height of the grasses themselves, but also the height of the grasses due to human or natural disturbance. For instance, killdeer prefer very short grasses and sparse open areas. These usually include plowed agricultural and early stage old fields. The upland sandpiper, and horned lark are found in short grasses such as newly planted row crops and grasses, recently mowed hayfields, and old fields. Grasses intermediate to tall in height such as late stage old fields, uncut hayfields, and established prairies attract the eastern meadowlark, dickcissel, bobolink, and field and savannah sparrows.

Species Preferences

Depending on the grassland bird, each species may prefer a certain type of grass or grass/forb mix. Many species prefer around 75% grasses and 25% forbs, such as the dickcissel, song sparrow, horned lark, and upland sandpiper. Northern bobwhite quail prefer half and half. Whereas the Henslow's sparrow, and common yellowthroat prefer a minimum amount of forbs.

In addition, certain grassland birds are attracted to specific grass

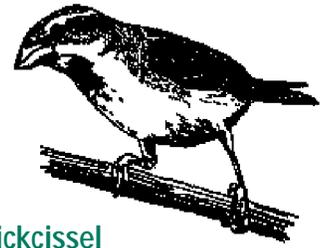


bobwhite quail

This chapter characterizes grassland birds as species that utilize grasses at some point throughout the year. These species can also be distinguished into two groups: grassland dependent and independent. Dependent species use grasslands for all of their habitat needs. Independent species use grasses for one or two habitat components while also utilizing other areas, such as forests or wetlands, for their habitat needs. For example, the American goldfinch prefers shrubs and small trees along with intermediate grasses to fulfill its habitat needs. The grasses are used for food and nesting materials. An example of a grassland dependent species is the eastern meadowlark. It only utilizes grasslands for all of its habitat needs.

Edge-sensitivity

Grassland birds also have a preference for the amount of unfragmented habitat available. Edge-sensitive grassland birds are those with the lowest tolerance for fragmented habitat. These are also usually the species that prefer only grasslands (grassland dependent species). Conversely, species that live in more



dickcissel

than one habitat usually have low sensitivity to edge.

Increasing edge for a certain wildlife species will also detrimentally impact other wildlife species. When grasslands are fragmented, many grassland birds are subjected to nest predation from crows, jays, skunks, raccoons, opossums, foxes, and cats. This problem reiterates the importance of expansive grasslands for the survival of declining grassland bird species.

Grassland birds that are edge-sensitive include the upland sandpiper, bobolink, and savannah and Henslow's sparrows. The eastern meadowlark and grasshopper sparrow are moderately sensitive to habitat fragmentation. Due to their sensitivity and the increase in fragmentation, many of these species are declining or no longer exist in southern Michigan.

Grassland birds that are tolerant to an abundance of edge include the northern bobwhite quail, red-winged



big bluestem

blackbird, American goldfinch, vesper, field, and song sparrows, dickcissel, and common yellowthroat.

Management Considerations

It is important to take a community or landscape approach to your management. If you own only a small grassland, it may help to determine what the surrounding landscape looks like. If other grasslands or agricultural lands are present, then it may be feasible for you to manage for grassland birds. However, if your grassland is surrounded by forest, you may want to consider other goals.

Although most of Michigan's original grasslands no longer exist, there are opportunities available to help grassland birds. Federal and State conservation programs are helping to increase grasslands by setting aside land that had been actively farmed. Some good ways to maintain grasslands in agricultural landscapes is through pastures, old fields left idle, and protecting vast, open meadows. Also, for those within smaller, parcels, prairie plantings in your yard may be beneficial to those tolerant species that do not only need grasslands.

The following management guidelines will not necessarily guarantee the presence or absence of certain species. Restoring and enhancing existing grasslands, and reducing fragmentation are the best management options for grassland birds. Whenever you increase the size of a grassland, you will increase the likelihood that grassland birds

will benefit. Therefore, the larger the grassland, the more species it will support.

The following are options to consider when managing for grassland birds:

- To manage for edge-sensitive species, you will need a minimum of 20 acres. Moderately sensitive species need between 10 and 20 acres, and tolerant species need less than 10 acres. These estimates are the minimum amounts these species need to survive. Again, the larger the grassland, the better.

- Avoid fragmenting existing grassland areas. If hiking trails are to be developed, restrict activities to the edges of the area. Avoid maintaining hedgerows that may serve as predator perches.

- Minimize the amount of linear edge by avoiding irregular borders. Circular tracts are ideal.

- If large tracts of grassland restorations are not possible, establish several patches. Try to incorporate adjacent grassy habitats such as pastures, hayfields, and grassy waterways as connections between the grassland patches or as non-wooded, open edges.

- Maintain succession in its earliest stages by managing for grasses and sparse shrubs. Manipulations such as burning and mowing are required to maintain grass productivity typically



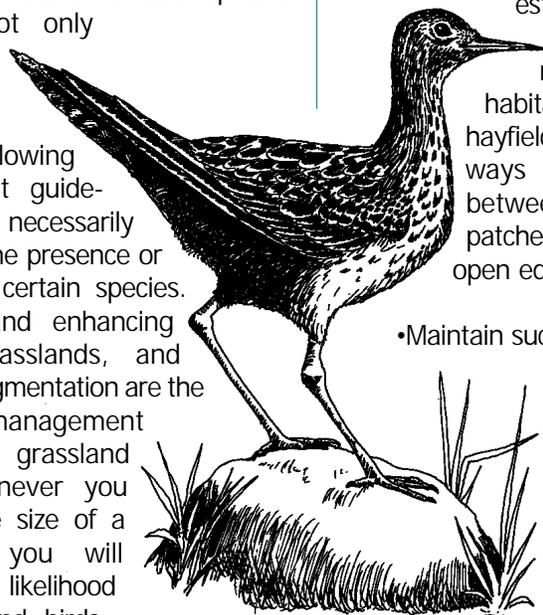
bobolink

within three to five year intervals.

- Manipulate your grasslands in 1/3 to 1/4 annual rotations. If several fields are maintained, it is better to manipulate one entire field, rather than a portion of each field per rotation. This will reduce fragmentation of your grasslands. However, if you have only one field, do not manipulate the entire field at once as it will displace the grassland birds. If possible, allow some subunits to lie idle each year.

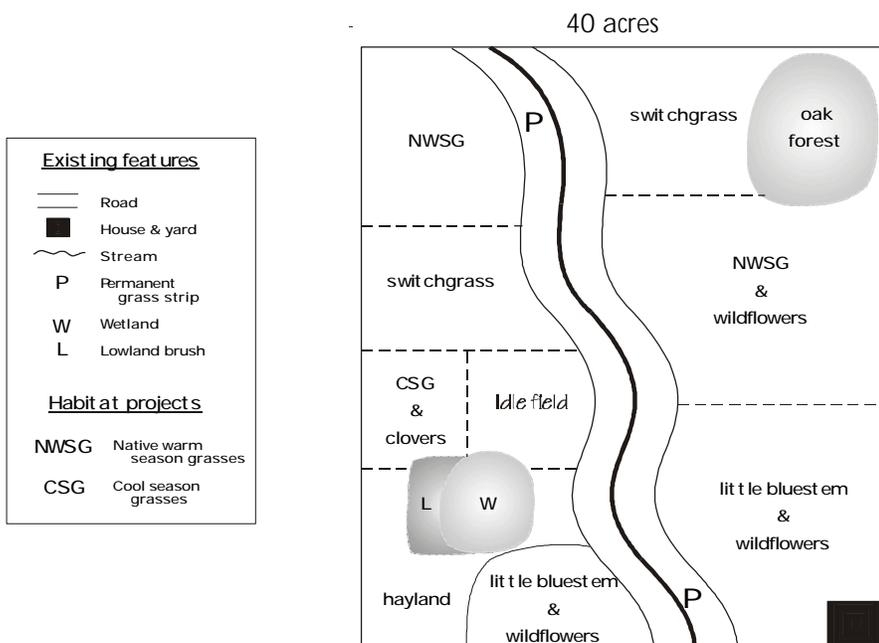
- Use prescribed burns to increase the productivity of warm season grasses in particular. Conduct burns in early spring (March or April) or late fall (October or November). Refer to the **Prescribed Burning** chapter for more information.

- Mow grasslands, including cool season grasses and hayfields, between July 15 and August 31. This will reduce the chance of destroying bird nests, and discourages the invasion of problem grass species that move in after late season mowing. Cutting height should be about 6 inches.



upland sandpiper

GRASSLAND BIRDS



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

- If you use the grassland for grazing, permit only light activity by livestock, and leave some areas ungrazed each year by rotating. Do not graze below 6 inches. Moderate grazing may actually benefit some wildlife species.

- Plant or maintain several types of grasslands in your area. A mosaic of tall and short grass fields will provide habitat diversity. If you can plant only one area to grass, a mixture of warm season grasses with forbs is best. Cool season grasses mixed with legumes is a second choice.

- Create 100 ft shrub buffers next to forest edges and human habitations to reduce the harsh edge. An alternative to planting shrubs along the edge of a forest is to allow the fire to burn slowly into the woods so as to create a "feathered" edge. Local fire authorities should always be contacted prior to the burn to discuss permits and/or restrictions.

- Chemical treatments of grasslands can also be used to control woody plants. Herbicides can be used to control any type of undesirable plants in your grassland,

from wood plants to grasses and weeds. Correct application is most important. Damage of non-target vegetation or to wildlife is possible if you do not follow the herbicides label instructions. Michigan State University Extension Office can provide more information of the types, use, and applications of herbicides.

- Reducing or eliminating the use of insecticides will provide more valuable insect food for birds.

In summary, to attract grassland birds you need to provide the most grassland possible in your area. Reducing fragmentation, and restoring and enhancing existing grasslands will greatly benefit grassland birds. Working with your neighbors to maintain larger tracts of grasslands in your area will likely increase your success.

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WOODLAND BIRDS



When much of Michigan's vast forests fell to the ax and saw in the late 1800s, many woodland bird species declined. These included the common raven, wood thrush, ovenbird, American redstart, whip-poor-will, scarlet tanager, and cerulean and hooded warblers. Wild turkeys were extirpated and passenger pigeons became extinct in Michigan, although this was also due to commercial overhunting. Hairy and pileated woodpeckers were also impacted along with great-horned, northern saw-wet, and barred owls. Today, wild turkeys have been reestablished and many species of songbirds are doing well in Michigan's forests. However, migratory species are declining at an alarming rate.

From an overall landscape perspective, many woodland birds survive best in large tracts of forests connected to each other by forested corridors. Therefore, there are many management opportunities for woodland birds in northern Michigan, which is currently more than 70 percent forested. Options within southern Michigan exist in forest areas, and riparian zones. Neighbors who cooperatively manage their woodlands also increase opportunities for woodland bird management.

Small forested tracts are also



pileated woodpecker

very important for some species like the northern cardinal and the great-crested flycatcher. Migrating birds may also use these small forests as stop over sites.

Forest Types

Michigan is home to many types of woodlands, each of which attracts certain kinds of birds. Therefore, the first step to managing for woodland birds is to determine what type of forest system is dominant on your property and surrounding lands.

Certain woodland birds are found in only one forest type. Requiring a certain element within the forest, these birds are considered habitat specialists. For example, red-winged crossbills almost exclusively feed on seeds from conifer cones within dry mesic conifer forests.

Another example of a specialist species is the Kirtland's warbler. Their survival depends on jack pine stands that are eight to 20 years old.

On the other hand, some species require a mix of forest types and different ages. For example, the indigo bunting does not require one specific forest type, but rather a mix of forest types to survive. They are located in brushy and weedy habitat along the edges of non-specific deciduous forests, swamps, abandoned farm land, roads, and railways. They prefer the fruits of shrubs, small trees, and vines.

Edge-sensitivity

Fragmentation occurs when roads, homes, trails, power lines, and other forms of development break up the natural wooded habitat. Some birds are greatly affected by human disturbance to their habitat, while others are less bothered or not impacted at all.

Edge-sensitive species are those birds with the lowest tolerance for fragmented habitat. Many of these birds seek forest interiors and shun forest edges. Species with moderate to high sensitivity to fragmentation do best at least 100 yards from the edge. Many habitat types create an edge next to woodlands such as grasslands, brushlands, wet-

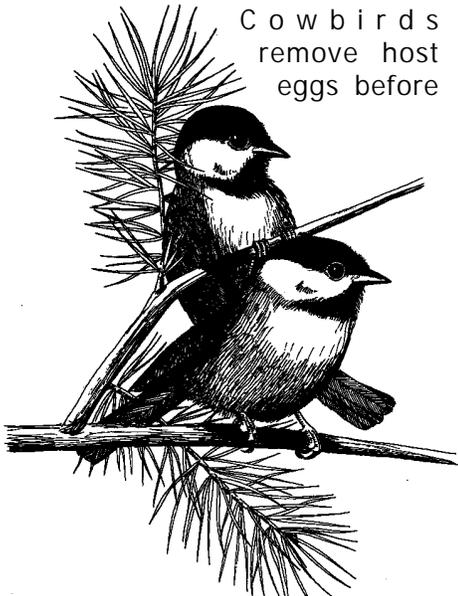


brown creeper

lands, and river corridors. Edge-sensitive species prefer forest areas hundreds to thousands of acres in size. These large tracts of forest lessen problems such as nest predation and brood parasitism which is quickly increasing due to the rise in habitat fragmentation.

One of the most common brood parasites is the brown headed cowbird, which is attracted to the forest edge. Cowbirds do not make their own nests, instead they invade the nests of others.

Cowbirds remove host eggs before



black-capped chickadees

laying one of their own in the host's nest. Their eggs tend to hatch one to three days earlier than the host's. Because cowbird nestlings are larger and grow faster than the young of their host, the young cowbird receives more food and parental care than the host's young. As a result, most of the host's young do not survive. A female cowbird can lay up to 77 eggs each season if she can find enough host nests in which to deposit them.

Woodland birds that are edge-sensitive include the broad-winged hawk, pileated woodpecker, wood thrush, yellow-throated vireo, ovenbird, American redstart, veery, and hooded warblers. Many edge-sensitive species are declining in populations as their habitat becomes more fragmented.

Woodland birds with a moderate sensitivity to habitat fragmentation, which can tolerate stands between 40 and 100 acres in size, include the yellow-billed and black-billed cuckoo, hairy woodpecker, acadian flycatcher, scarlet tanager, red-eyed vireo, northern parula, white-breasted nuthatch, tufted titmouse, and blue-gray gnatcatcher.

Woodland birds that are the most tolerant to an abundance of edge include the indigo bunting, gray catbird, Carolina and house wren, American robin, black-capped chickadee, northern cardinal, rose-breasted grosbeak, rufous-sided towhee, common grackle, northern oriole, brown-headed cowbird (a nest parasite), eastern wood-

pewee, great-crested flycatcher, and downy, red-headed, and red-bellied woodpeckers. It is not surprising that many of these species are found in urban areas.

Management Considerations



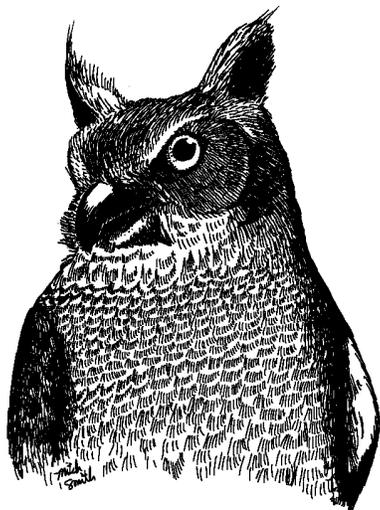
cerulean warbler

The following are options to consider when managing for woodland birds.

Edge-sensitive considerations:

- Maintain sites larger than 40 acres, and leave woodlands as undisturbed as possible.
- Manage your woodland in a circular shape rather than a rectangular or other long, narrow design. This will reduce the amount of edge.
- Maintain a well-developed understory of woody and herbaceous plants because many species of forest birds need the food, nest sites and cover provided by such low growing plants. Slightly opening the canopy can help maintain the understory. However, be aware that some species require a more sparse understory, such as

great-horned owl



the red-headed woodpecker.

- If you cut, remove only single mature trees. Single-tree selection results in the maintenance of the largest area of contiguous forest without the undesirable fragmentation caused by other types of timber harvest.

- When single-tree selection is not possible, owners of large forested tracts should adopt a uniform plan of rotation cutting to make sure the oldest sections are next to each other. This same plan of rotation cutting can help a manager to design wooded connections between disturbed areas and to keep gaps to a minimum. This practice is better for woodland birds because it causes the least amount of disturbance.

Edge-tolerant considerations:

- Plant shrubs along woodland edges and in grass openings.

- Maintain or create dense thickets or densely growing understories of young trees in mature forests. To provide such habitat, cut groups of

mature trees in stands no larger than one acre, or thin the large, mature trees to produce a dense understory. Watch for overbrowsing of new understory growth by white-tailed deer, and take necessary precautions.

General considerations:

- Attempt to protect or restore wooded areas along streams, as these areas are of special value to many bird species, and they provide movement between corridors.

- In areas where mature forests are limited, try to protect one or more mature tracts to serve as repopulation centers. Ideally, the mature tract should be at the center of the area being managed.

- Speed up natural succession by planting trees and shrubs in open areas, thereby reducing fragmentation. To provide a diverse habitat remove aggressive, non-native shrubs, and forbs.

- Allow large trees that are dead or dying to remain standing as they provide food and homes for many species. You can create these snags by girdling healthy trees (removing the bark in a band around the trunk).

- If mature live and dead trees left standing number less than one per acre, erect nest boxes for cavity nest builders such as the wood duck, and members of the woodpecker family. Information is available in the chap-

ter on **Homes for Wildlife** in the Backyard Management Section.

- During the nesting season of late April through early August, keep disturbances such as camping, picnicking, or cutting to a minimum. This "hands-off" practice is especially important in the forest interior. Avoid construction projects such as building roads, trails, ponds, powerlines rights-of-way or other land-clearing practices that fragment forested areas.

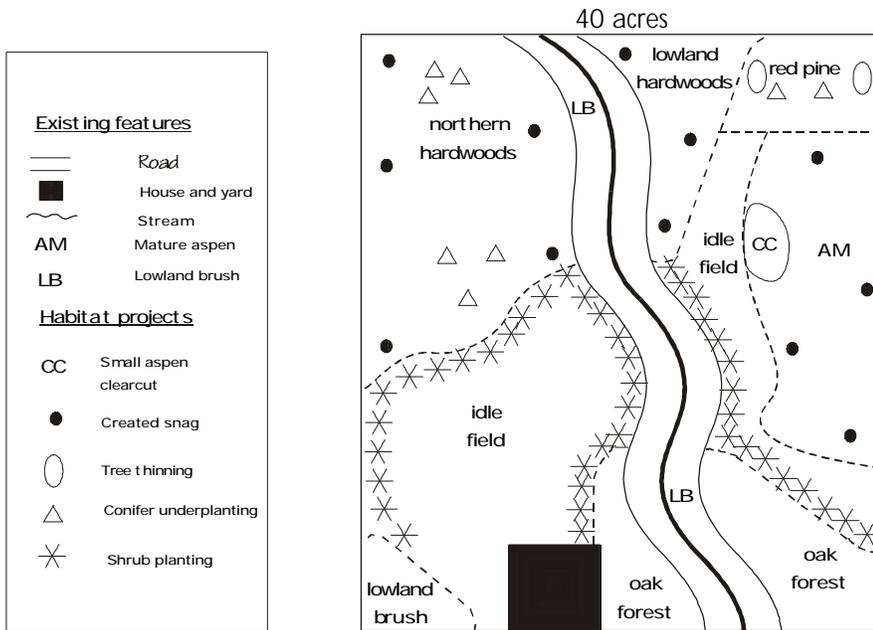
- Reduce brown-headed cowbird feeding opportunities near woodlands. You can accomplish this goal by eliminating mowing and grazing on land next to the forest. If you must mow roadside vegetation, cut it no shorter than six to nine inches to discourage cowbirds from feeding there. Plant bare ground to grass and revegetate logging trails and roads.

As you can see, even doing



veery

WOODLAND BIRDS



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

nothing to your wooded property will encourage some kinds of birds and discourage others. Specific management prescriptions will have a similar effect. For these reasons, it is important to classify the type of woodland habitat you own as well as properties adjacent to yours. You can then develop goals for the kinds of birds you want to encourage on your land.

Forming a landowners association with your neighbors is a good way to enhance a larger forested area than your own property. Applying legal restrictions such as a conservation easement to your land is also a good way to eliminate the threat of future development. For

information, contact the Michigan United Conservation Clubs.

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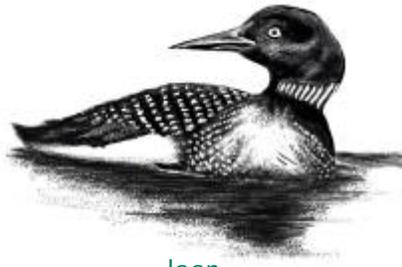
WETLAND BIRDS



Found throughout Michigan, wetlands, such as wet meadows, marshes, swamps, and peatlands, originally covered 11 million acres or about one-third of the state's landmass. During the last 200 years, over 35 percent of these wetlands have been drained or filled for agricultural fields, building projects, or other human purposes. Chemical contamination, isolation, and fragmentation have also contributed to the loss of wetlands. Fragmentation occurs when roads, trails, homes, and other forms of development break up the wetland area.

Since wetland birds rely on moist areas for food and cover, wetland losses have caused the decline of many of these species including least bitterns, yellow rails, black-crowned night herons, Forster's tern, and marsh and sedge wrens. More than half of all remaining Michigan wetlands are less than one acre in size. Bird species that inhabit small swamps and other wetlands include red-winged blackbirds, yellow warblers, green herons, woodcock and tree swallows. Therefore, protecting or restoring wetlands on your property may help increase wetland bird populations. The wetlands and associated uplands that are present on your property will determine what species of wetland birds will be attracted.

It is important to remember that some wetlands are not always wet. Seasonal wetlands, for example, may contain water only during wet periods in the spring and fall. All wetlands, however, are important to wildlife.



loon

Waterfowl, shorebirds, wading birds, raptors, loons, grebes, cranes, woodcock, kingfishers, and many songbirds depend on wetlands during all or part of their life cycles. Wetlands associated with springs and seeps may be as small as a few square feet while some Great Lakes marshes or peatlands cover thousands of acres. The identification and management of this habitat is explained in the **Wetland Management** Section.

Many different wetland birds are attracted to a variety of wetlands based on the type of food and cover provided. For example, plovers and sandpipers are attracted to shorelines with little vegetation where they nest, and find insects and other food. Bitterns, yellow rails, and herons are wading species that depend upon shallow water with cattails, bulrush, and smartweed to provide food such as small fish, frogs, and invertebrates such as snails, crayfish, and insects. The type of food and cover present in a wetland is based on water levels and vegetation composition. Throughout the year, different types of wetlands contain varying depths of water, or no water at all, which determines the type of vegetation that will grow there.

Wetlands with both dense and sparse stands of vegetation provide food and cover for specific types of birds. Some wetland cover types include dense cattail stands, grassy meadows, and wooded swamps. Sedge fields, wet meadows, mud flats, and beaches all provide good food sources, including insects and seeds, for a variety of wetland birds. The food and cover needs of many bird species also varies by seasonal activity. Migration stop-over, pair bonding, nesting, and brood rearing often require different components of a wetland.

In general, if you want to attract and manage for a diversity of wetland birds, restore and protect several wetlands or a diversity of wetland types, which will provide a variety of food and cover.

Cover Types for Wetland Birds

Because each wetland is different from the other, a different manage-



marsh wren



great blue heron

ment prescription may be involved for each. For more information refer to the **Wetland Management** section.

Wet meadows are seasonally wet and often have less than six inches of water depth at any given time. The following are options to consider when managing for wet meadows.

Marshes normally have water depths of at least several inches and typically contain perennial vegetation such as cattails, bulrushes and water plantain. Some species that frequent marshes are marsh wrens, common yellowthroat, American goldfinch, Virginia rails, great blue herons, and sandhill cranes. The common snipe, American and least bittern, and northern harrier are species that require marshes of 10 acres or more.

Shorelines can consist of beaches, mud flats, and rocky areas. At times, shorelines can border ponds, lakes, streams, or marshes. Shorebird species that use mud flats include dowitchers, common snipe, semi-palmated sandpipers and dunlin. Plover, sandpipers, yellowlegs, and gulls can be found on beaches.

Swamps, that are located near rivers, lakes, and streams are usually wet in spring, and dry in summer, and

sometimes wet again in fall. Lowland hardwoods, or swamps, typically have water less than a foot deep, and they harbor ash, maple, swamp white oak, basswood, cottonwood, and other broadleaf trees. The rose-breasted grosbeak, eastern wood-pewee, red-eyed vireo, white-breasted nuthatch, downy woodpecker, veery, and willow, alder and great-crested flycatchers are forest songbirds that inhabit forested wetlands. Swamps are also important to red-shouldered hawks, and can provide the structures for great blue heron rookeries.

Another type of swamp is the wet conifer forests which contain tamarack, balsam fir, black spruce, and white cedar. These wetlands attract forest-dwelling species such as the yellow-bellied flycatcher, golden-crowned kinglet, white-throated sparrow, red-breasted nuthatch, nashville warbler, black-and-white warbler, American goldfinch and cedar waxwing.

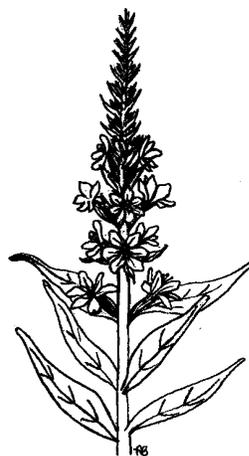
Peatlands are classified into bogs and fens. They contain a wide variety of vegetation from sedges or brush to broadleaf trees or evergreens. Alder flycatchers, swamp sparrows, rufous-sided towhees, palm warblers, hermit thrushes, and sandhill cranes are attracted to peatlands. Open peat-

lands may also contain shrub wetlands, which are favored by common yellowthroats, chestnut-sided warblers, song sparrows, and red-winged blackbirds.

Management Considerations

To meet the diverse needs of wetland birds, landowners should protect existing wetlands and restore former wetlands when feasible. What follows are general management considerations that apply to most wetlands.

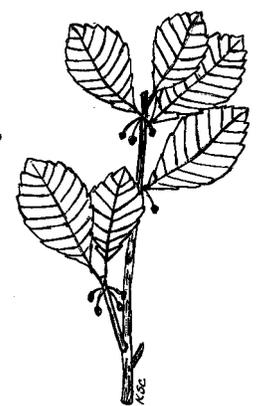
- Do not fragment any wetland on your property with roads, trails, or buildings regardless of the wetland size.
- Provide a buffer of upland vegetation of 100 feet or more around the wetland to protect it from sediment and chemical runoff, and other degradation.
- Plant buffers to dense grass. If necessary shrubs or trees can also be maintained within the grasses. Maintain this buffer along streams and rivers, and on lake front properties as well. In the process you will help maintain a healthy fringe of the wetland vegetation at the



purple loosestrife

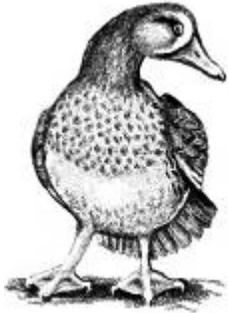


garlic mustard



glossy buckthorn

WETLAND BIRDS



blue-winged teal

edge of lakes and streams.

- Leave naturally dying and decaying trees standing in swamps because they provide insects for woodpeckers and homes for cavity dwellers.

- Use proper timber management techniques if timber harvest is an economic necessity. For more information refer to the **Lowland Hardwoods** or **Lowland Conifers** chapters in the Forest Management section.

- Prevent pesticide, lawn and farm chemicals, including fertilizer, and petroleum products, from reaching the wetland so they do not kill invertebrate food by contaminating the water body.

- Restore or create corridors of grass and/or shrubs that connect two or more wetlands. These areas are important for travel, especially for females with flightless young.

- Expect and allow natural fluctuations in water levels. Do not artificially manipulate water levels without assistance as you may alter the present vegetation composition. Incorrect manipulation of water levels may be harmful to wildlife or result in the invasion of undesirable plants. Landowners should seek professional advice before artificially manipulating water levels.

- Remove invasive plants such as purple loosestrife, phragmites, and glossy buckthorn, through the careful use of prescribed herbicides such as Rodeo. Be sure to follow all label directions. Invasive species tend to eliminate native species reducing plant diversity.

- Allow development of smartweed, wild millet, cattails, bullrush, sedges, reeds, and other valuable plants, which produce food and cover for wetland birds and a variety of other wildlife.

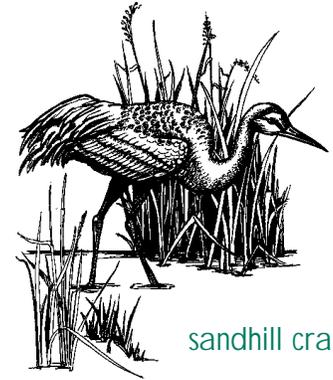
- Minimize disturbance to your wetlands. Enjoy birds and other wildlife from afar. Too many disturbances by people or free-roaming pets may deter breeding, cause nest abandonment, and reduce hatching success and fledgling survival.

- Do not drain or plow meadow as they are important producers of grasses and forbs that provide food and cover for many species of wildlife.

- Restrict forestland and grassland manipulation such as logging, min-



downy woodpecker



sandhill crane

ing, mowing, burning, and grazing until after July 15 and before August 30 to minimize impact to nesting birds and allow sufficient new growth for winter and spring cover.

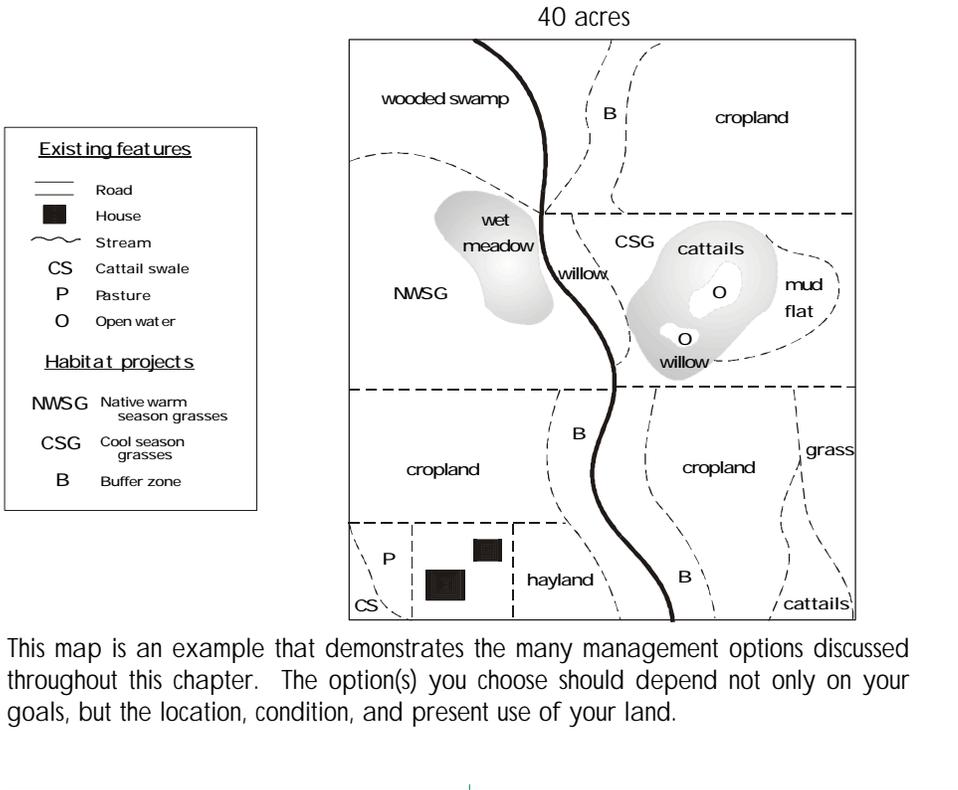
- Mow only one-third of grassy areas each year. The other two-thirds should be left alone to provide wildlife habitat.

- Burn in late winter or early spring (before April 1) to aid in the regeneration of warm season grasses and forbs, cattails, sedges, and other wetland vegetation, and to minimize impacts to frogs and turtles.

- Do not excavate for ponds and do not dam streams to create impoundments because such manipulation will change the wetland integrity by creating unnatural water fluctuations and possibly destroy rare plant species.

- Manage uplands in association with wetlands for nesting cover.

In summary, many bird groups rely on wetlands for food, shelter, water and living space. The more diverse a wetland is, the greater variety of birds it will attract. Multiple wetlands in close proximity, connected by grass/woody corridors, result in greatest wetland bird abundance and diversity. Healthy wetlands are dynamic and diverse, and when coupled with abundant upland



cover, provide habitat to a greater variety of birds for nesting, brood rearing, and migrational stages. Protect all wetlands on your property and restore former wetlands when feasible.

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Private Land Partnerships: This partnership was formed between both private and public organizations in order to address private lands wildlife issues. Individuals share resources, information, and expertise. This landowner's guide has been a combined effort between these groups working towards one goal: Natural Resources Education. We hope this guide provides you with the knowledge and the motivation to make positive changes for our environment.

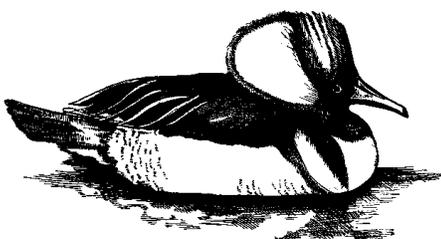
FOR ADDITIONAL ASSISTANCE: CONTACT YOUR LOCAL CONSERVATION DISTRICT

WATERFOWL



With its vast water resources, Michigan is a key state for protecting and managing North American waterfowl populations. Many species of ducks, geese, and swans pause to rest and feed here as they migrate further north in spring and south in fall. Mallards, wood ducks, blue-winged teal, and Canada geese are the most common summer residents and nest in all 83 counties. Hooded mergansers and black ducks are also widespread but less common. Ring-necked ducks, common golden-eye, and common and red-breasted mergansers generally nest only in the northern two-thirds of the state. Michigan nesting waterfowl that are the least common include green-winged teal, northern pintails, northern shovelers, gadwalls, American wigeon, canvasbacks, redheads, and ruddy ducks. Through reintroduction efforts, the native trumpeter swan, our largest waterfowl, is once again nesting in Michigan.

The long-term loss and degradation of wetlands and associated uplands has resulted in a national decline in several duck species, and other wildlife also dependent on these habitats. In Michigan an estimated 35 percent of



hooded merganser

the original 11 million acres of wetlands have been drained or filled, mostly for farming or building purposes. Wetland losses continue with an ever-spreading urban population. With much of the state's land base in private ownership, especially in southern Michigan, opportunities to protect and restore waterfowl habitat rest with private landowners. Landowners who protect or restore both wetlands and associated upland cover are likely to attract waterfowl, as well as small mammals, songbirds, reptiles, and amphibians.

Wetlands and associated uplands that are present on your property will determine what species of waterfowl will be attracted. Each species has certain needs that are linked to different kinds of wetlands and uplands. For example, mallards and blue-winged teals, nest in upland, grass-dominated habitats surrounding wetlands. They prefer uplands consisting of a diverse mixture of grasses and wetlands that have a variety of water depths at all times of the year. On the other hand, wood ducks, black ducks, and hooded mergansers select wetlands associated with wooded uplands.

Annual Cycles and Seasonal Needs

Waterfowl experience an annual cycle that includes several stages, generally dependent on the season. In the winter they bond with a mate, and in the spring they migrate, breed, nest, and rear their brood. In the summer molting occurs, and in the fall they migrate again.



black duck

As a result of this cycle, waterfowl depend on a mix of wetlands and associated uplands throughout the year as their cover and food needs differ. Cover needs vary as waterfowl breed, nest, and rear broods. Food needs also vary with season. At times, waterfowl may feed extensively on aquatic insects, but at other times their diet may shift to seeds and other plant materials. Egg production, molting, and migration all require high-energy foods, while brood rearing requires an area with an abundance of insects. Because waterfowl have such varying needs, a diversity of wetlands with a mix of adjacent upland nesting cover is most beneficial.

Available food attracts migrating waterfowl to stop and feed in Michigan each spring. Marshes, shallow lakes, ponds, river bays, beaver floodings, and seasonal wetlands such as flooded pastures and seasonal pools are all important because they usually contain food. The seeds of smartweed, wild millet, curly dock, and beggars tick can be found at these locations. These plants and their decaying material from the previous year attract snails, beetles, midges, caddisflies, fairy shrimp, water fleas, and scuds which are high-energy

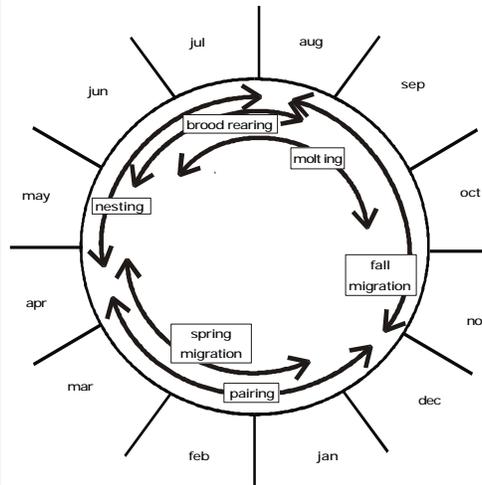
foods for migration.

Spring migrating waterfowl eat these invertebrates in large quantities because they are rich in protein and calcium. Waterfowl need a lot of protein and lipids to replenish fat reserves, especially in spring when they are flying long distances, and to help produce eggs. Seasonally flooded wetlands are important because they warm faster than deeper, permanent wetlands and thus produce preferred food earlier.

After waterfowl feed in the spring, some stay for the summer as residents. These birds use the wetland area to rest, loaf, preen themselves, pair bond, and breed. Pairs that stay in the wetland complex often nest in surrounding uplands, then lead their offspring to water where the young also feed primarily on protein-rich invertebrates.

Throughout the summer and fall waterfowl acquire as much protein as possible. Molting, the three to five week long summer period when the adult birds shed their wing feathers and grow new ones, requires a large amount of protein intake. Likewise, in the fall resident birds put on as much fat as possible to prepare for migration, and those waterfowl that nested farther north also rely once more on local wetlands as a crucial stopover.

Waterfowl foods do not only vary seasonally, but they also vary substantially among species. For example, wood duck females eat mostly acorns and other plant food in fall and winter, then rely more and more on invertebrates during the nesting season, with plant life furnishing about 20% percent of their needs during the egg-laying period. By contrast, gadwalls use half plant food and half animal food in both spring and summer. Canada geese are grazers and will feed mainly on vegetation.



Note: Males tend to be earlier than females in all stages as they do not have to recover from breeding or brood rearing.

annual cycle

As you can see, a variety of wetlands and uplands are needed to meet the seasonal needs of waterfowl. A wetland complex with different types of habitat is most desirable because it will provide different food and cover at different times of the year. Wetlands that feature secure cover and food production for brood rearing are critical for the welfare of waterfowl. However, each species has different specific needs.

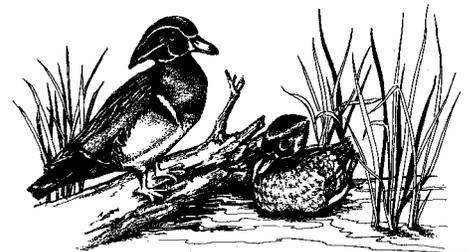
Life Cycles of Three Common Waterfowl

The following brief explanations illustrate the special needs that different species of waterfowl require:

Wood ducks arrive in Michigan from southern wintering areas typically in March. Because females lack the fat and protein reserves needed for egg production, they disperse into forested and stream bottom areas where they feed heavily on acorns and aquatic seeds. Water depths averaging 8 inches are ideal for foraging wood ducks, and loafing and roosting sites can be maintained where water is deeper. During this time, nesting pairs also begin searching for suitable nesting

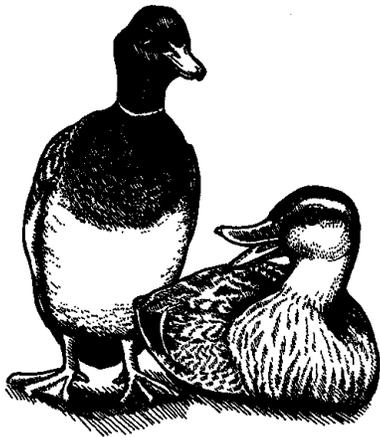
cavities mostly along forested waterways, although they may select trees a mile or more from water. Trees with diameters at least 14 inches at chest height produce most of the suitable nesting cavities. Average clutch size is 12 eggs, and incubation takes about 28 days. Hens and their broods are highly mobile from nesting sites to wetlands, occasionally moving up to 2-1/2 miles. Shallow, flooded habitat with good overstory cover are important brood rearing areas. Button bush, willow, and emergent vegetation such as cattails can provide this cover.

Breeding pairs of **blue-winged teal** prefer seasonally or temporarily flooded, shallow wetlands. They usually feed in those portions with less than 8 inches of water. In dry years, gently sloping basins that provide shallow water all summer are important. The hen typically nests in upland grasses or wet meadow sedges near such water, although nests may be located as far away as one mile. Areas with short grasses have the highest nesting success. Clutch size averages 10 eggs, which the hen incubates for 23 days. Semi-permanent wetlands located near nesting areas are important for brood rearing. Livestock ponds with well-developed emergent vegetation provide locally important brood habitat. Seasonal wetlands also provide excellent brood habitat, but because blue-winged teal are relatively late nesters, seasonal wetlands are often unavailable when ducklings leave nests.



wood duck

The breeding range of **mallards** is the most extensive of any duck species in North America. Like other ducks, female mallards are influenced by their homing instinct when returning to the breeding grounds. Because hens and drakes form bond pairs during fall and on the wintering grounds, the drakes follow their mates back to the hen's breeding site. In the spring, females



mallard

seek midges, crustaceans, mollusks, and other aquatic invertebrates rich in nutrients needed for egg production. Hens normally like grassy areas, including hayfields, in which to lay their eggs. Nest sites may be up to a mile away from wetlands, but are typically within 500 ft. The hen lays one egg each day for 9 or 10 days until the clutch is complete. After the last egg is laid, the hen will incubate her clutch for about 25 days. After hatching, the hen leads her ducklings to water. Mosquitoes, dragonflies and other insect larvae are among the types of protein-rich foods that the ducklings eat. The young are able to fly in 50 to 60 days. Fall and winter foods of mallards consist mostly of high-energy seeds from aquatic or emergent wetland plants and farm crops. Native foods include seeds, leaves and roots from sedges, millet, smartweed, coon-tail, duck potato, duckweed, and mast from nut-producing trees. Cultivated grains include corn, sorghum, wheat, barley, and oats.

Management Considerations

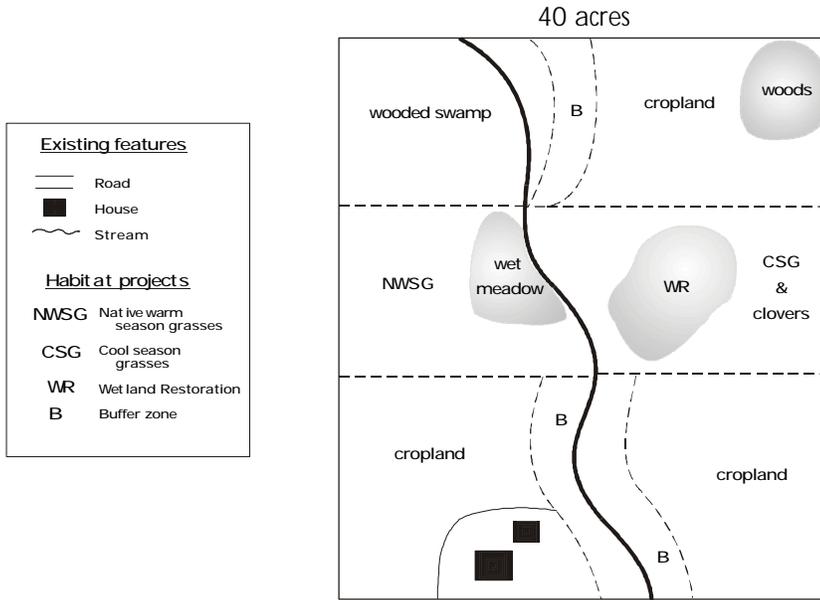
Landowners can adopt many practices to increase the number and kinds of waterfowl on their lands. Perhaps the most important consideration is to protect all wetlands on the property by maintaining them in their natural state. Temporary shallow pools and seasonally flooded woodlands or fields are just as important as permanent wetlands such as swamps, marshes, ponds, and streams.

The following are options to consider when managing for waterfowl:

- Restore any drained or degraded wetland basins you have identified. Potential sites may be located in former farmland or marginal farmland still in production. See the **Wetland Restoration** chapter for details.
- Protect, maintain, or restore upland habitats around the wetland. If a buffer at least 100 feet wide does not exist, create one by planting grass, which many duck species will use for nesting. A grassland that is three to six times larger than the wetland itself dramatically improves reproduction success by reducing the impact of predators.
- Plant upland nesting areas and buffer zones with a diverse mixture of native warm season grasses and forbs, such as big blue stem, little bluestem, Indiangrass, bush clover, leadplant, and wildflowers. Cool season mixes of orchard grass, timothy, and various clovers (ladino, white, and red), and alfalfa can also be used. Fields of native warm season grasses and forbs next to fields of cool season grasses make a good nesting complex. For more infor-

mation refer to the **Grassland Management** section.

- Mow grasses between July 15 and August 30 to minimize nest disturbance, and to allow time for grasses to grow before the next nesting season.
- Manage for large, overly mature trees along waterways and within one mile of good brood wetlands. Trees such as silver maple, sugar maple, basswood, and aspen as provide potential cavity sites for nesting wood ducks, hooded mergansers, and common goldeneyes. Also, leave mast-producing trees such as oak, maple, and elm to provide food for wood ducks, mallards, and black ducks.
- If you wish to encourage geese, who are grazers, provide mowed grass areas next to wetlands. In a similar manner, to discourage geese, do not mow next to wetlands, and promote tall grasses and possibly shrubs.
- Provide supplemental nesting structures if nesting cover (tree cavities, for example) is limited within one-half mile of brood wetlands. Information on wood duck boxes and mallard nest baskets is provided in the chapter on **Homes for Wildlife** in the Backyard management section.
- If you are managing a marsh, establish a 50:50 mix of open water and wetland vegetation, as this is preferred by many species. If cattails are invading, cut them just above the ice line during the winter. Allow them to lie on the ice until spring thaw as it can help boost the growth of invertebrates, providing more food for waterfowl. Burn a portion of the marsh every three years, or a portion of the marsh



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

each year, in late winter/early spring to help native vegetation regenerate. See the chapter on **Prescribed Burning** for details. Remember, that these types of habitat changes can reduce winter escape cover for other wildlife such as pheasants and other grassland birds.

- Monitor your wetlands for invasive, aggressive plants such as purple loosestrife, glossy buckthorn, autumn olive, and phragmites, and try to control these exotics before they become an overwhelming problem. Purple loosestrife can be cut in winter and the resulting new growth sprayed with Rodeo herbicide in June before flowering time. Be sure to follow label directions.

- If your wetland has a water-con

trol device, you can reduce undesirable plants through flooding, or allow development of smartweed and other valuable plants through drawdowns. Each wetland, however, is unique. A wildlife biologist or wetlands specialist can explain the advantages and disadvantages to manipulating water levels as well as certain other practices on your land.

- Because invertebrates are critical food items, avoid using insecticides in and around the wetland, including the upland buffer area. But when necessary, use insecticides that have little or no impact on both aquatic invertebrates and vertebrates. Landowners should also prevent lawn and farm chemicals from reaching the wetland.

- Minimize disturbance to your wet

lands. Disturbance by humans, free-roaming pets, and natural predators can cause waterfowl to expend critical energy reserves, prompting them to forego breeding or to abandon nests. In addition to mortality, other impacts may include reduced hatching success or reduced duckling survival. Enjoy waterfowl from a distance by using binoculars or spotting scopes, or build viewing blinds before nesting begins.

In summary, much can be done to manage your wetland for waterfowl. Providing a diversity of wetland types, with adequate adjacent cover is the best way to attract waterfowl. Wetlands differ according to location, topography, water level, water quality, and the kinds and numbers of plants and animals that use them seasonally. Those wetland complexes that are most diverse, in terms of water levels, cover types, and surrounding uplands, are the most beneficial to waterfowl. They should be protected at all times and restored whenever possible.

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EASTERN WILD TURKEYS



The eastern wild turkey can be found from northern Florida and Mississippi to Maine and northern North Dakota. Before the first settlers arrived in Michigan, wild turkeys were established mainly in the southern part of the state. They were absent in the northern Lower Peninsula and Upper Peninsula due to the colder weather and deep snows.

Turkeys prosper in a mix of forest and agricultural lands. Because of habitat loss and unregulated market hunting, Michigan wild turkey populations plummeted in the late 1800's and by the turn of the 20th century few observations were reported. By the 1950's Michigan's wildlife biologists began a reintroduction program releasing birds in southwestern Michigan and later in the northern Lower and Upper Peninsulas. Since the 1960's, turkey populations have grown in northern Michigan even though they have been subject to severe winters. In many areas of northern Michigan, supplemental feeding seems to play a major role in winter survival. Wild turkeys are also located throughout southern Michigan and flocks are growing and expanding.

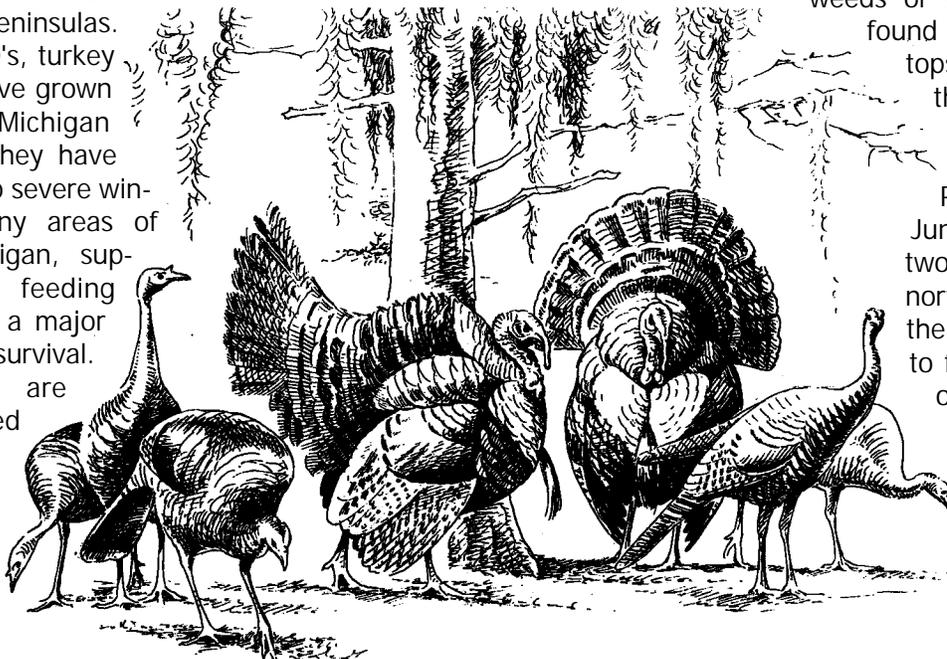
The home range of wild turkeys is one to four square miles or about 640 to 2,000 acres. Michigan landowners who are able to provide the necessary habitat components are likely to have turkeys on their property, especially if they live in a region of the state that does not receive more than 60 inches of snow each year.

Turkeys have exceptional hearing and eyesight. The bird's ability to run at 15 to 18 miles per hour and to fly on five-foot-wide wings at speeds approaching 55 miles per hour also make it a challenging quarry for predators. Many landowners simply enjoy seeing turkeys. Because the birds may travel several miles each day, opportunities for seeing them are good if habitat needs are met.

Life Cycle

Turkeys are social birds and in winter often separate into three distinct groups: adult males (toms), young males (jakes), and females (hens) of all ages. These flocks begin to disperse in late winter or early spring when courtship and mating rituals begin. Toms set up territories and begin gobbling, strutting, and displaying in hopes of attracting a harem of hens. Most hens, regardless of age, will breed with a gobbler each spring.

Egg laying begins in April, and each hen will lay a clutch of 11 to 12 eggs over a two-week period. She usually chooses the base of a large, mature tree or stump, such as an oak or beech, in fairly open, isolated woods. However, some hens may nest in idle fields of weeds or grass. Nests are also found next to downed tree tops and brush piles. When the clutch is complete, the hen will incubate her eggs for 28 days. Peak hatching occurs in June in southern Michigan; two to three weeks later in northern Michigan. Until the young poults are able to fly (at about two weeks old) and roost in the lower branches of trees, they are very susceptible to predation.

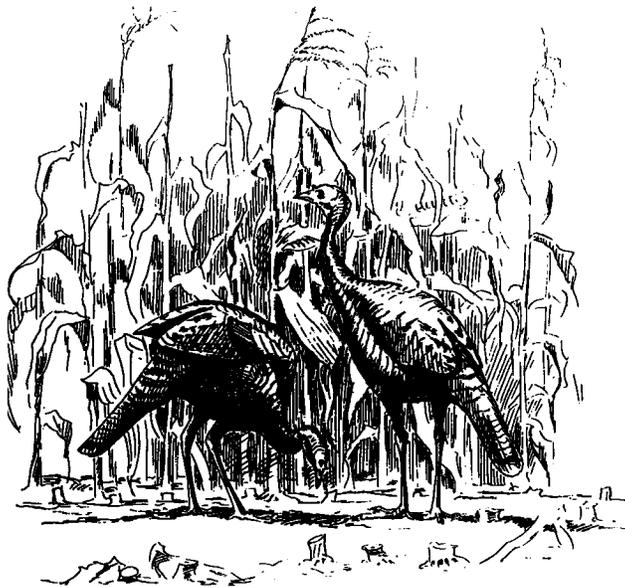
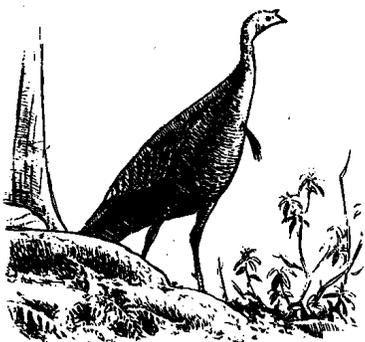


Nest predators such as crows, raccoons, skunks, opossums, domestic pets, and human disturbances are the biggest threat to successful hatching. Adult wild turkeys have few, if any, natural enemies. Although coyotes will sometimes kill an adult bird, turkey densities are seldom significantly affected, even in areas where coyotes are plentiful.

Food and Water

The diet of an adult wild turkey includes about 90 percent plant matter and 10 percent animal matter. Hens consume about 1/3 pound of food daily; adult gobblers may eat 1/2 to 1 pound of food each day. Turkey foods fall into four main categories: mast (nuts and fruits), seeds, greens, and insects. In winter they prefer hard and soft mast including acorns, beechnuts, crabapples, and hawthorns. They will also eat waste grains in harvested fields of corn, buckwheat, soybeans, oats, and grain sorghum.

Turkeys foraging in agricultural areas in the fall and spring eat mostly waste grains, wild plants, insects, and young grasses. Corn, buckwheat, and wheat are outstanding sources of fall, winter, and spring foods. More information on



planting these crops are available in the **Cropland Management** section.

As spring changes into summer, hens typically lead their young to open areas with succulent ground vegetation including grasses, sedges, and a variety of forbs and legumes, especially clover. These fields of grass and legumes contain protein-rich insects, which make up 75 percent or more of the poult's diet until four or five months old. Insects include grasshoppers, ground beetles, flies, caterpillars, ants, and crickets. As the poults grow, the seeds of ragweeds, sunflowers, and grasses are favored along with the fruits of dogwood, wild grape, cherry, sumac, and blackberries. Wildlife managers generally agree that artificial feeding of wild turkeys can overly concentrate the birds in a small area, making them more susceptible to poaching and the spread of disease.

Water is another important necessity. Turkeys need water almost daily, and hens rarely nest farther than a quarter-mile from a

reliable water source such as a creek, spring, seep, or farm pond.

Cover

Prime cover includes a mixture of open areas within a mature (or nearly mature) forest containing a variety of tree species including white and red oaks, hickories, ash, beech, and white and jack pine. Turkeys use these mature trees as roosting sites but seldom roost in the same place on successive nights. Therefore, several suitable roosting locations scattered throughout their range are needed. Understory trees, and trees/shrubs at woodland edges or in openings also provide cover. Such trees and shrubs include ironwood, musclewood, hazelnut, beech, wild plum, serviceberry, mountain ash, wild black cherry, dogwood, crabapple, black locust, hawthorn, and pin and chokecherries.

Although turkeys can survive in areas that are only 10 percent forested, their survival improves when mature woods comprise 30 to 50 percent of the available habitat. Turkeys like open, mature woods but will also use timber stands that have grown beyond the small-pole (2-inch to 9-inch diameter) stage, if the understory is not too dense. Turkeys prefer varied habitats and also make use of brushlands and openings as well as pastures and row-cropped and idle farm fields. Travel corridors for turkeys include forested streams and river floodplains, which connect adjacent woody cover.

On cold, winter nights turkeys often seek two to five acre stands of dense mature conifers, which

WILD TURKEYS

will provide thermal protection as well as roosting sites. Mature woods that contain nut-producing trees (oaks, beeches, hickories) are especially important in winter because they yield carbohydrate-rich food.

Grass and clover meadows produce high quantities of insects and can provide outstanding brood rearing habitat. Mixes of grasses, clover or alfalfa can be used. Refer to the **Grassland Management** section for more information on grass varieties, seeding rates, and methods.

Habitat Considerations

In Michigan, the ideal habitat mix is 20 to 30 percent bottomland hardwoods, 10 to 30 percent mature oaks, 5 to 10 percent conifers, 10 to 15 percent shrubs, 20 to 30 percent croplands and 15 to 25 percent grasslands, clover pastures or idled fields. In good-quality habitat, the area will safely support one bird per 30 acres or one flock for every 640 to 800 acres. But unless you own a lot of land--1,000 acres or more--it is unlikely that turkeys will remain on your property year-round because they need a large amount of living space. Even so, there are many things you can do to attract wild turkeys to your property at various times of the year. General management options include:

- (1) managing woodlots of any size to maximize favored wild foods and cover
- (2) creating or maintaining openings

- (3) providing year round food needs.

The following are specific management considerations for eastern wild turkeys:

- In areas where good thermal cover is limited, and where pines can naturally occur, plant a four to eight acre stand of pines. With proper management in 20 to 40 years this will provide necessary cover.

- Rivers or creek bottoms, swamps and lowland hardwoods should be protected and maintained because of their importance as a corridor to turkey and many other wildlife species. Corridors should be at least 100 feet wide.

- Mature hardwood stands should contain some younger trees that will eventually replace those that are harvested for timber or die of natural causes.

- Manage mixed stands of deciduous (leaf-bearing) trees to maintain and encourage those trees that produce nuts, fruits, or seeds. Encourage these kinds of trees by cutting species

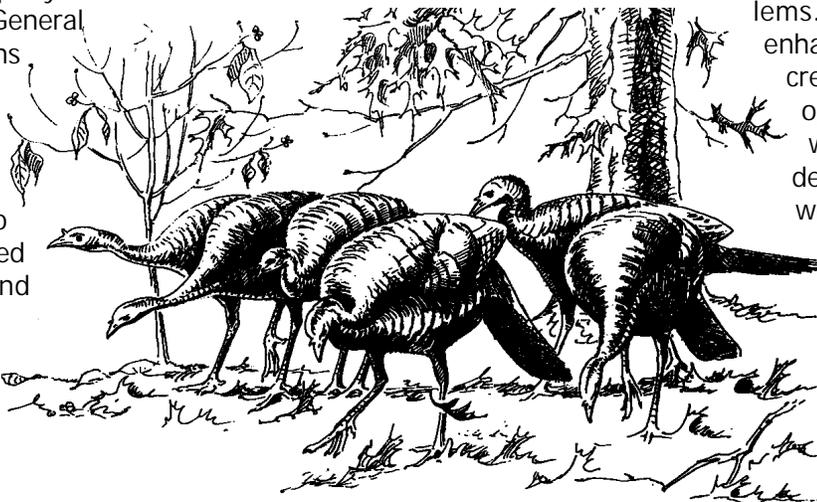


Nuts and berries are essential components of the turkey's diet.

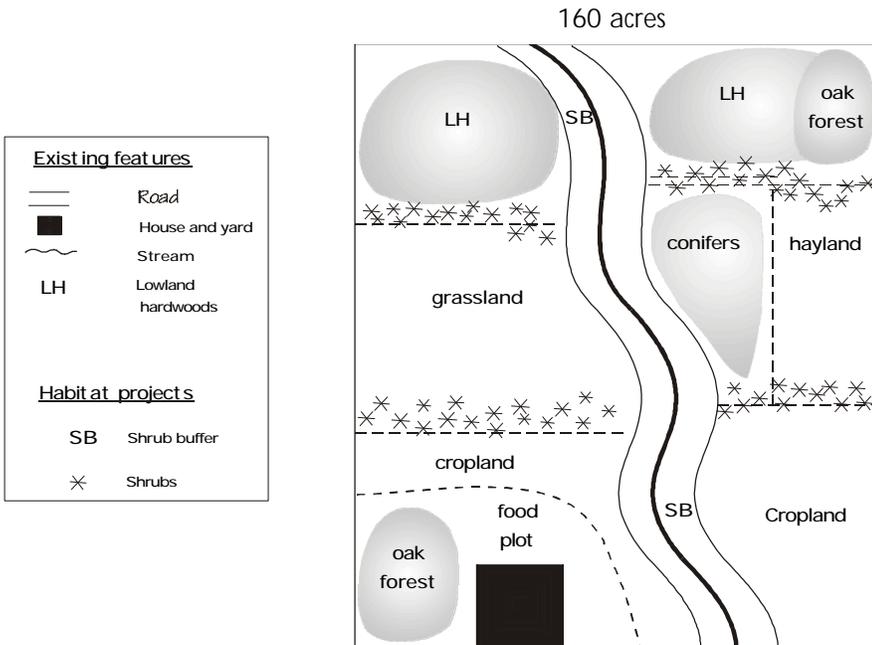
that provide little benefit to turkeys. Proper thinning of trees, therefore, may be necessary. Consult with a professional forester for details and also refer to the **Forest Management** section.

Managing Openings

Openings can vary in size from a half-acre or less to more than 10 acres. Actual size is less important than where the opening is located and what is planted there. Openings should be large enough to admit sunlight to create forage growth. For example, linear openings such as power line rights-of-way, should be at least 60 feet wide. The optimum shape of an opening is long and rectangular with an irregular boundary that follows the land contours, provided you do not create erosion problems. If possible, maintain or enhance existing openings before creating new ones. Too many openings within a small area will fragment your forest and detrimentally impact a variety of wildlife species. Within a 100 acre forest, maintain three to five acres of openings. Several small openings are usually better than a single large one. However, if your area is severely fragmented, do not create more openings.



WILD TURKEYS



eating the new plantings and even killing them. Free-roaming dogs and cats may also be attracted to any habitat that suddenly has an abundance of wildlife.

In summary, eastern wild turkey populations have returned to Michigan and prospered since their reintroduction. If your property contains a mix of forest and agricultural lands, you may be able to manage for turkeys. However, be aware of the negative impacts that this management may have on other wildlife.

This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

What to plant in an opening depends on your goals and turkey needs. Do you want to provide an additional source of food or establish permanent brood habitat or both? Are you planning to offer supplementary food during the summer (clover) or winter (corn)? Do you want low-maintenance plants that will be available over several years, or do you want to replant the opening each year with a grain crop?

Concerns

No matter how we manage our property for wildlife, our decisions will always have impacts. For example, if

we manage mature woodlands for turkeys we will discourage brushland species such as grouse and catbirds. Creating openings may produce habitat for turkeys and deer, but may increase cowbird or raccoon predation.

Habitat that is managed for wild turkeys also tends to benefit deer, squirrels, black-capped chickadees, and woodpeckers. You should also be aware that creating or enhancing habitats may invite unwanted guests. For example, if you plant trees and shrubs, in the hopes of attracting wild turkeys and songbirds, you most likely will also entice deer, rabbits, and mice that can become a nuisance by

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RUFFED GROUSE



Ruffed grouse live in 34 of the 49 continental states and in all Canadian provinces. Michigan is an important portion of the grouse range. Often thought of as a bird of the deep forest, grouse actually thrive best in young, aspen forests and brushlands. When aspen is not available, oak, lowland brush, and dense stands of trees are optional habitats. Grouse are a welcome sight at bird feeders in neighborhoods where natural habitat is available. Despite human encroachment, grouse are able to survive.

You can manage for grouse in Michigan if you own 20-40 acres of woodlands, and birds have access to other nearby woodlots. When habitat needs are met, ruffed grouse usually spend their entire lives in an area of 40 acres or less. If critical habitat is not available, grouse will disperse up to several miles in search of a new home. Birds are basically solitary and do not collect in coveys like bobwhite quail, although several grouse may feed or roost together. Be aware that populations fluctuate even when habitat needs are met.

Life Cycle

Adult males establish territories as small as six to 10 acres and aggressively defend them against other males during the breeding season. After territories are determined, males select a log, stone, or

earth mound from which to display in spring. Grouse beat their wings which results in a putt-putt-putt sound similar to a small gasoline engine starting up. This display is called "drumming" and is used to warn other males and attract hens. Drumming goes on all year but increases in spring. The male grouse chooses a drumming site that has the following characteristics: a large log for good visibility located in thick cover of young saplings or brush for protection.

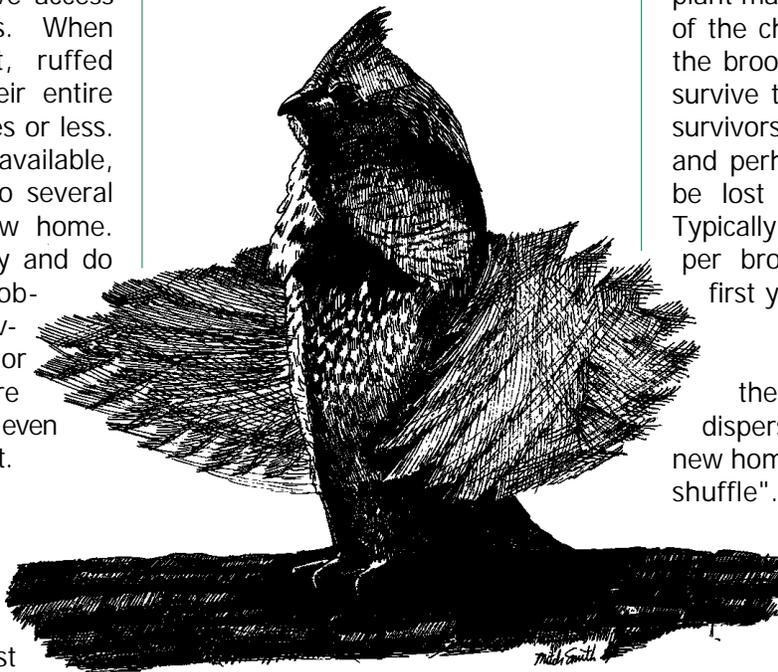
Hens usually nest within a half-mile of their mates. After hollowing out a depression in the leaf litter at the base of a tree or stump,

the hen lays one egg each day until her clutch, which numbers from eight to 14 light-colored eggs, is complete. After the last egg is laid, she incubates the clutch. Hatching occurs in 24 to 26 days.

Soon after hatching, the chicks follow the hen to a summer brood range, which can be several miles away. Ideal brood habitat is dense stands of brush, young aspen, and hardwoods, or lowland alders, with the ground clear of thick, low-growing vegetation.

Chicks feed heavily on insects during the first few weeks of life. Gradually their diet shifts to green plant materials and fruits. Mortality of the chicks is high. Only half of the brood hatched in late May will survive to mid-August. Half those survivors will not make it to winter, and perhaps one or two more will be lost by the following spring. Typically, only one to three birds per brood survive through their first year.

At 16 to 18 weeks old, the fully-grown young grouse disperse from family units to find new homes, which is called the "fall shuffle". During this period of movement grouse fill available existing habitat, and are vulnerable to predators and human hunting. The first to leave are the young males, which may travel as far as 4 1/2 miles. Young hens



A drumming log is a necessity for attracting hens in the spring.



leave the family about two weeks after the young males, and they may disperse 15 or more miles.

Grouse populations fluctuate according to weather trends, food availability, predation, and other reasons not fully understood. Evidence suggests the high-to-low population cycle repeats itself every 10 years.

Habitat Management

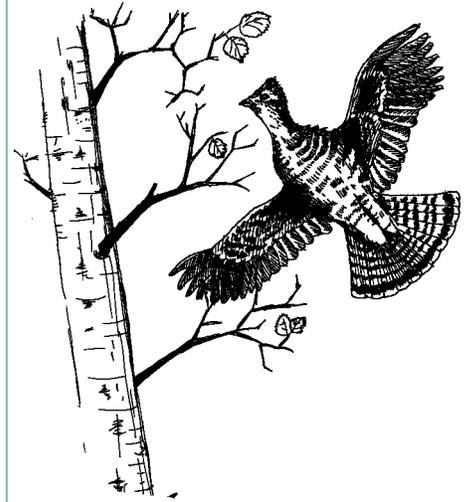
The best way to attract grouse onto your property is to offer habitat that meets the grouse's needs for food and safety. Optimum ruffed grouse habitat should include brushy areas, young aspen stands, mature aspen stands with an understory of hazel or ironwood, and dense sapling aspen stands. Oak, conifers, and lowland brush and trees are an option when aspen is absent.

The best grouse habitat is created when a forest with aspen is clear-cut every 40 to 50 years in small dispersed patches. Refer to the **Aspen/Birch** chapter in the Forest Management section. Aspen trees 15 years and older provide the most important year-round food sources in the form of green leaves, flower buds, and catkins.

During winter the flower buds of aspen become the staple grouse food, but winter catkins of hazel and those of willow and birch are also eaten.

Aspen younger than 12 or 15 years provide the thick, dense cover that helps protect nesting grouse and hens with broods from aerial predators (hawks and owls) and land predators (foxes and coyotes). Therefore, the key to more grouse is to create varying ages of aspen, when possible, and a variety of hardwoods and brushy covers when aspen is not available. A grouse can be sustained in 10 to 20 acres if the habitat is ideal.

Management opportunities for ruffed grouse and other forest wildlife in oak forests depend, in part, on the composition and arrangement of the principal tree, shrub, and herbaceous food and cover plants. A mixture of oaks, aspen, and conifers are beneficial to grouse. Providing a dense understory and overhead cover, these habitats are most productive when they are 10-15 feet in height. However, it is important to avoid a domination of one species within a woodlot mixture - especially hardwoods and conifers as this may reduce the potential movement of



grouse onto your property.

Species composition and density also determine the long-term capabilities of your woods in sustaining grouse. Tall shrubs, greater than 5 feet, provide year round food and cover. Recommended species include hazel-nut, dogwood, witch hazel, serviceberry, and nannyberry. Maintenance of dense young forest should be the highest priority of grouse habitat management. In addition, ground cover such as blown down trees and debris, also provide substantial cover and necessary drumming sites.

Oaks can be maintained by cutting 30 to 80 percent of all trees, except saplings. However, it is also important to leave small clumps of trees for seed such as aspen, birch, and ironwood. Oak cuts should be 5 to 20 acres in size. They can be as large as 40 acres as long as they are shaped irregularly. Spacing between cuts of the same age should exceed 600 to 900 feet.



RUFFED GROUSE



Grouse enjoy eating nuts and berries and gain cover protection from the shrubs that produce these foods.

In southern Michigan, grouse will inhabit lowland hardwoods such as red maple, cottonwood, white ash, swamp white oak, pin oak, sycamore, and black gum if there is sufficient understory growth. Opening the canopy by selective cutting will allow sunlight to the ground and stimulate ground vegetation necessary for cover and food for grouse, rabbits, deer, and other wildlife species.

Establishing a lowland hardwood stand beneficial to grouse can be accomplished by selectively harvesting in a three stage rotation within a 30 year cycle. Vertical cover, of seedlings and saplings, and 20-30 year old poles, along with the horizontal cover provided by shrub and herbaceous growth are all needed. The 30 year rotation will at all times retain 1/3 of the stand in cover less than 10 years old. These strips of herbaceous growth, paralleled by pole and saplings stands, are intended to provide the mixed food and cover needs for a greater variety of wildlife.

If there are no aspen, oak, or lowland hardwoods on your wooded property, grouse may still be attracted to woody plants such as apples, crabapples, hawthorn, wild plums, dogwoods, nannyberry,

raspberry, blackberry, sumac, grape, willow, cherry, hazelnut, and ironwood. Make small clearcuts no larger than 2 1/2 acres in size in the interior of the woods, sparing the above species.

The result will be an explosion of dense thickets of young trees and shrubs, which will attract grouse.

You may consider transplanting aspen sprouts from another location or planting aspen seedlings, which will grow in the newly created open sunlight. Make sure the soil is conducive to aspen. Also, protect young trees with guards to discourage browsing by deer, rabbits, and mice.

Whenever you make a clearcut for grouse, be sure to leave one log per acre as a potential drumming site. The log must be at least 10 inches in diameter and cut at least 3 feet from the ground so as to leave a sufficiently sized stump. Eventually young trees will grow over the log, and a drumming site will develop.

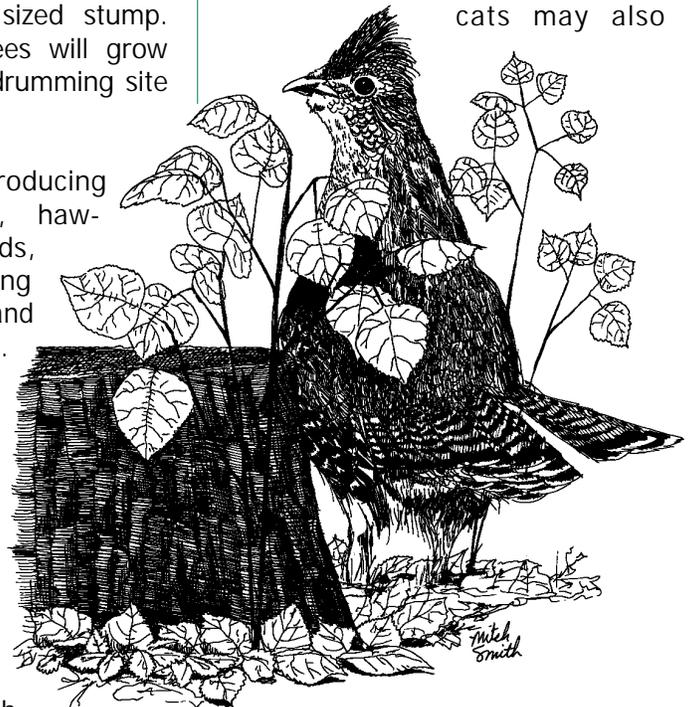
Plant fruit-producing shrubs (crabapples, hawthorns, dogwoods, sumac, etc.) along woodland edges and within openings. Encourage these and other shrubs by cutting away competing growth, thinning, and pruning if necessary. Protect the smaller shrubs with mouse guards (1/4-inch mesh wire or sheet metal 12 inches high) and deer and rabbit guards (1-inch mesh

wire or sheet metal three to four feet high). Mow open areas and trails and plant with mixtures of clover, legumes, and grass.

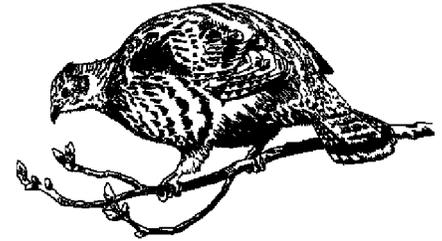
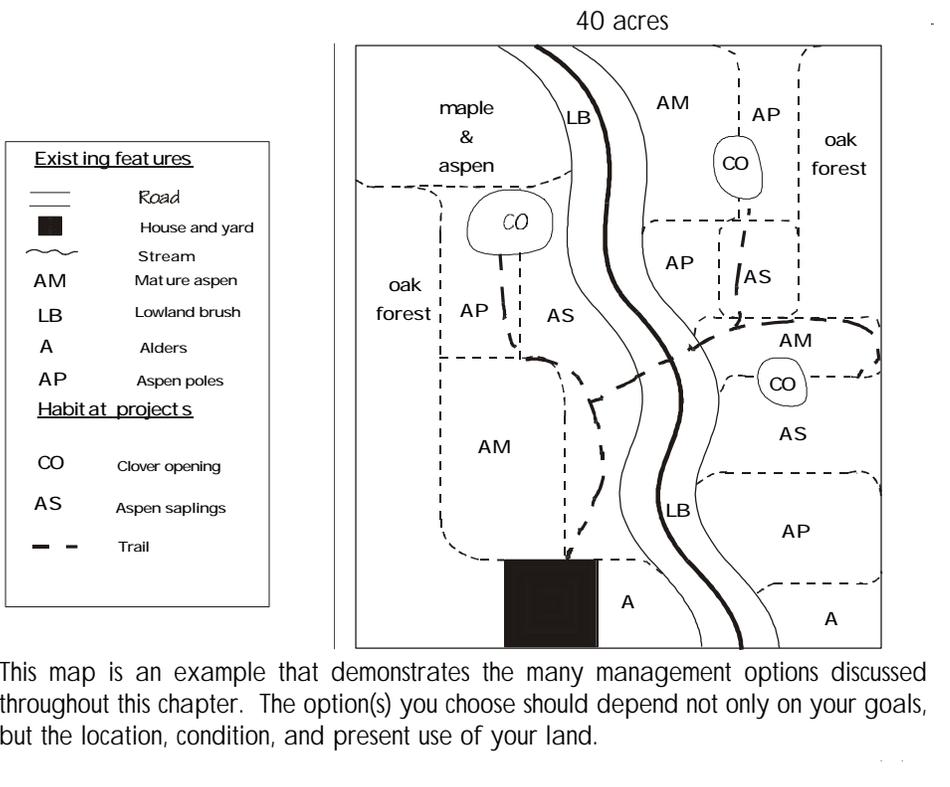
Concerns

No matter how you manage your property for wildlife, your decisions will always have impacts. For example, clearcutting aspen or oak stands for grouse will discourage mature forest loving wildlife such as woodpeckers, some warblers, and squirrels. For this reason, it is important to have an overall management plan with specific goals in mind.

You should also be aware that creating or enhancing habitats may invite unwanted guests. For example, if you plant trees and shrubs, in the hopes of providing food for grouse and songbirds, you most likely will also lure deer, rabbits, and mice that can become a nuisance by eating the new plantings and even killing them. Free-roaming dogs and cats may also



RUFFED GROUSE



be attracted to any habitat that suddenly has an abundance of wildlife.

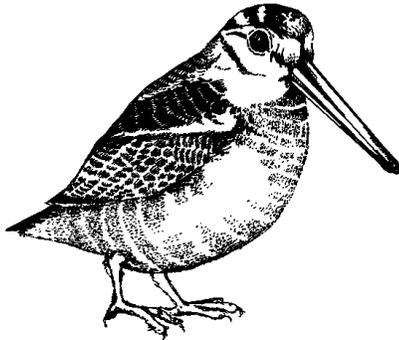
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WOODCOCK



Michigan serves as an important breeding ground for woodcock, along with Minnesota, Wisconsin, southern Ontario and Quebec, the Maritime Provinces, and some New England states. Because woodcock are migratory, their populations are monitored by the U.S. Fish & Wildlife Service. Numbers in Michigan and other Midwestern states increased dramatically after many old growth forests were cut during the 100-year period from about 1830 to 1930. The last woodcock population peak occurred in the 1950's. During the past 30 years, woodcock numbers have seen a steady decline. Since 1968, the number of singing males in spring has declined an average of 1.3 percent per year. Since 1985, the loss is even greater, an average of 2.8 percent per year. Hunting the birds seems to have little impact on overall numbers in the breeding population. Most experts agree that habitat loss and degradation are key reasons for the decline.

Although some people confuse woodcock with their close cousin, the snipe, the birds are separate species

that belong to the sandpiper family. Unlike others in its family, woodcock prefer uplands. Woodcock are forest birds known for their erratic flight patterns and unusual spring displays by the males.

A Senecan Indian myth says God made the woodcock from the leftover parts of other birds. Large eyes are located along the sides of the bird's head, allowing it to see in all directions, including directly behind. A long, thin bill that averages nearly three inches in length permits woodcock to probe in soft earth for worms, slugs and other invertebrates. Nostrils lie high against the skull so the woodcock can feed and breathe at the same time. Its ears are located beneath the eyes. Woodcock stand about eight inches tall, appear to bob when they walk, and weigh about a half-pound each.

Woodcock need young-growth forests with openings for reproduction; especially in the upper Midwest where the forests are growing older. This process of natural succession is a key reason for habitat degradation, but prime cover is also lost to roads, houses, croplands, and other human developments. This chapter explains what woodcock need to survive and how interested landowners can help by creating or improving habitat on their property.

Life Cycle

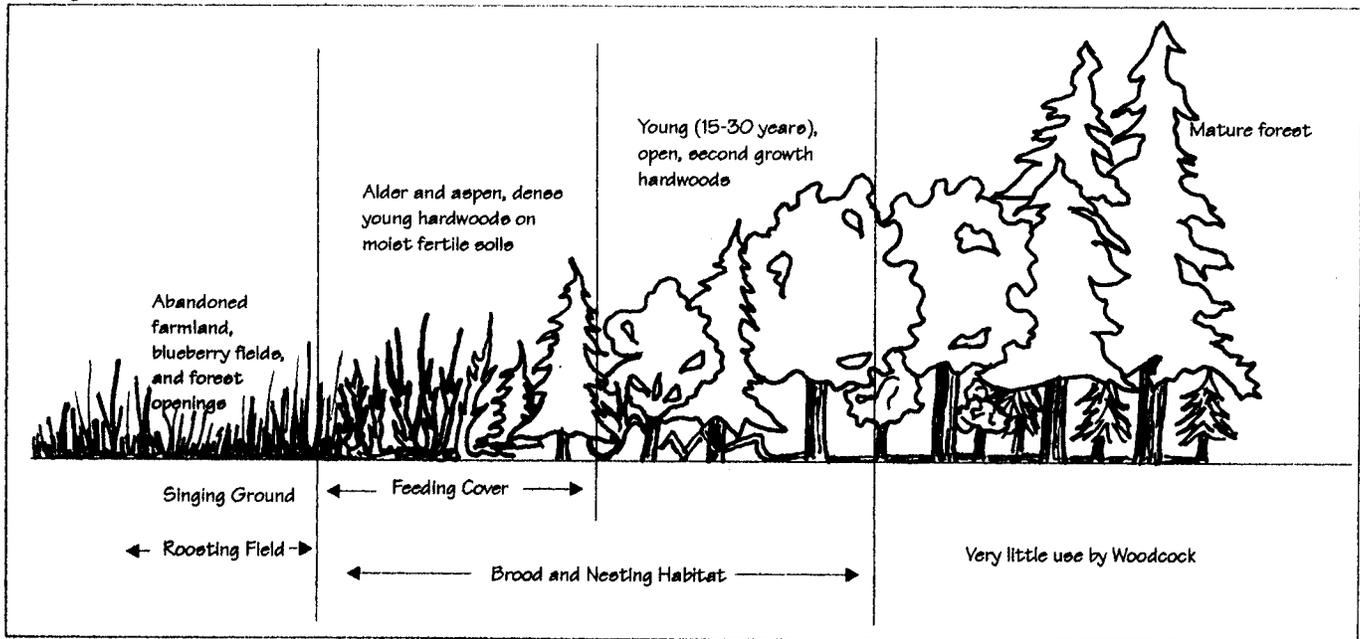
Woodcock return to Michigan from their southern wintering grounds typically sometime in March. Breeding males establish a "singing ground"

which they defend against other males, often in the same area year after year. Singing grounds are small clearings or very young stands of seedlings, and can be as small as a half-acre or as large as 100 acres. Every night, from March through May, the optimistic male puts on an aerial ballet, which is unmatched by any other bird in North America. The best time to hear and see the display is between sundown and full darkness.

Listen first for a buzzing, insect sound, an unusual noise, which biologists call a "peent." When the peents grow more rapid in succession, the male is ready to fly. The instant the peents stop, he will take to the air in a spiral ascent that grows wider and wider until he reaches heights of about 300 feet. If you miss him rising, listen for a chirping sound from high above, then a twittering--the sound of wind rushing through their wing feathers as the woodcock falls to earth.

A nearby female chooses a male to mate with. Hens build a shallow nest area in this same area of young-growth forest. Similar to snipe and certain other shorebirds, woodcock lay four eggs, which will hatch in about 20 days. As far as researchers know, woodcock raise only one brood per year. Each year brood sizes are fairly constant at about four chicks per successful nesting hen. However, chicks are lost each year between the early brooding season in spring and the hunting season in fall. In the event a predator destroys their eggs, hens will usually reneest. The young are capable of foraging for them

Stages of forest succession



selves when only a few hours old. Within a few weeks, they begin to fly.

Habitat Needs

Woodcock require four key types of habitat in order to thrive:

- 1) Small clearings that provide singing grounds for the males' sky dance.
- 2) Young, second-growth shrubs such as alders, and hardwoods of mostly birch and aspen (poplar) in northern Michigan, or young stands of maple and ash in southern Michigan that provide nesting and brood-rearing cover.
- 3) Moist, rich soils that provide the invertebrates, especially earthworms, that woodcock eat. When soils become too acidic to support earthworms, woodcock have to find food elsewhere.
- 4) Roosting area which could be an old field, hayfield, grassland planting, or cut young forest area. The birds prefer open ground cover

where they can see to run from predators and to probe for food. They will not use fields with thick, lush vegetation.

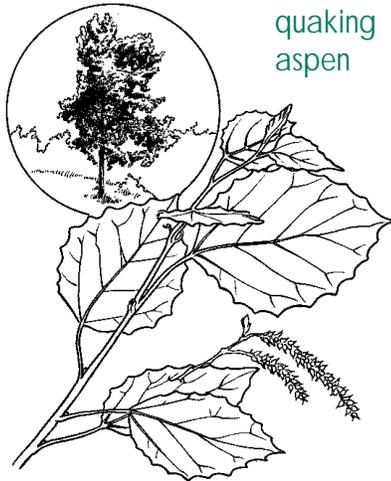
In general, woodcock need a mixture of small, scattered openings one to three acres in size among dense stands of shrubs and young leaf-bearing trees in a moist area. As young forests mature, they lose their value for woodcock. A general principle to keep in mind is that when most trees grow larger in diameter than a silver dollar, breeding habitat quality begins to diminish.

Woodcock prefer aspen stands because they form the dense stands needed for nesting and brood rearing cover. Woodcock heavily prefer young, recently harvested aspen stands where soils are moist and earthworms are plentiful. Aspen regenerates by sending up root sprouts through the soil after being cut. For every acre of aspen forest that is cut, it is estimated that up to 70,000 root sprouts are sent up. Openings and new growth from aspen cuttings provide singing, nesting, feed-

ing, and sometimes roosting areas.

Alder stands along streams and other lowlands are another type of preferred woodcock habitat. Like aspen, alder grows best when out of the shade of competing trees, and regenerates through cutting. It usually persists in streamside situations, but may be replaced with red maple, ash, and swamp white oak in lowland areas.

If you do not have an abundance of aspen or alder on your property, you may still be able to attract woodcock. Brushlands containing apple or crabapple trees, fruiting shrubs like highbush cranberry and dogwood, thickets of elderberry and sumac, and young-growth hazel, willow, cherry, and ironwood also make excellent woodcock habitat. Many of these brushlands are actually farm fields that were abandoned, sometimes because loam and clay soils made the field too wet for productive farming. In southern Michigan especially, lowland hardwoods such as red maple, cottonwood, white ash, swamp white oak, pin oak, sycamore, and black gum with an understory of



quaking
aspen

shrubs and ground cover can provide good habitat for woodcock. Forests dominated by evergreens such as hemlock, fir, larch, make only marginal woodcock habitat.

If your property contains stands of aspen and birch mixed with old farm fields, forest openings, and brushy lowland areas, you most likely will be able to manage for woodcock. The more acreage the better, but if your property is small, you can still provide one or more habitat components and work with your neighbors to furnish other parts. Managing for woodcock will also benefit ruffed grouse, golden-winged warblers, chestnut-sided warblers, snowshoe hares, and deer.

Management Considerations

The following are options to consider when managing for woodcock:

- In aspen stands, develop a clearcutting rotation to keep the stand young and dense. See the **Aspen** and **Birch** chapter in the Forest Management section for more information.
- Regenerate alder by cutting when the stand and individual stems show signs of decay. To determine decay, look at the stand as a whole

and decide if vertical stems are beginning to lie horizontally.

- If there is an abundance of alder on your property, in the winter cut strips 60 to 80 feet wide through existing stands. Cut adjacent strips three to five years apart in order to provide different ages of alder, and plan to re-cut the stand every 20 years. Maintain a buffer of 100 feet wide next to streams.

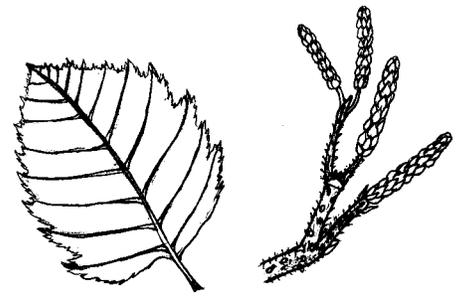
- Although some removal of slash (dead trees) is desirable to encourage singing males to use small openings, it is not necessary to clear all the ground. After seven to 10 years when the new alders have grown into suitable feeding cover, the slash will have decayed.

- Provide good nesting and brood rearing cover in areas without aspen by preventing old fields from proceeding into the forest stage of succession. To do this periodically remove trees as they grow older, or mow or burn half of the field every 10 years. Ideally, for woodcock nesting cover, old fields should contain 60 to 70 percent shrubs and young trees.

- Plant shrubs and trees along forest edges to help establish dense woodcock cover while waiting for new growth to occur in regeneration areas.

- Protect or restore lowland areas, as their moist soils provide excellent foraging opportunities for woodcock.

- If the lowland hardwood canopy grows too dense to maintain a productive understory, you may wish to thin the trees through single-tree selection cutting. However, be careful to not remove too many trees as this will disturb the lowland ecosystem. Refer to the **Lowland Hardwoods** chapter for more information.



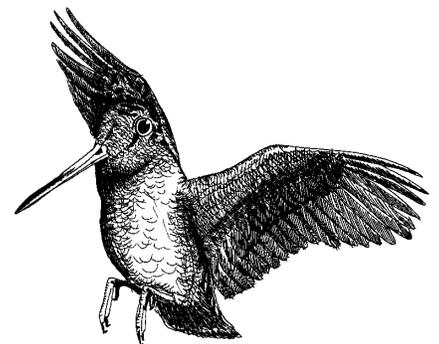
Alder

- Provide small clearings for singing at least a half-acre in size for every 20 to 25 acres of young forest. Clearings should be 5 to 10% of the total management area. You can create them by cutting or mowing. Where possible, create the clearings on a north-south orientation, and make them irregular in shape.

- Plant clearings with a low growing ground cover such as clover. This will provide good singing and roosting areas.

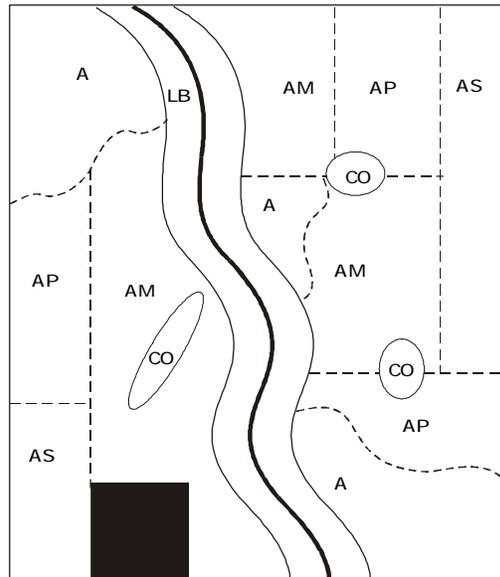
- Logging trails and landings, where felled trees were piled before transport to the mill, make excellent openings because they tend to stay open as the rest of the harvested stand grows thick with new seedlings.

- Locate roosting sites within a half-mile of feeding areas. Preferred



40 acres

Existing features	
	Road
	House and Yard
	River
LB	Lowland brush
AM	Mature aspen
AP	Aspen poles
A	Alders
Habitat projects	
CO	Clover opening
AS	Aspen saplings



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

sites tend to be about an acre in size, and one per 100 acres of overall habitat is sufficient.

- Maintain roosting sites by burning fields every three to five years to suppress invading woody species. To prevent nest destruction, conduct all burning before mid March, especially in southern Michigan. Be sure to contact your local fire authorities for permits, advice and regulation details.

In summary, Michigan is an important state for the production of woodcock. Landowners can help by restoring former woodcock habitats and creating new ones. It is important to remember that no matter how you manage your property, your decision

will impact other wildlife. In this case, clearcutting aspen for woodcock will discourage mature forest loving wildlife such as woodpeckers, some warblers, and squirrels. For this reason, it is critical to know what animals currently live in your area, and how management for woodcock would affect them.

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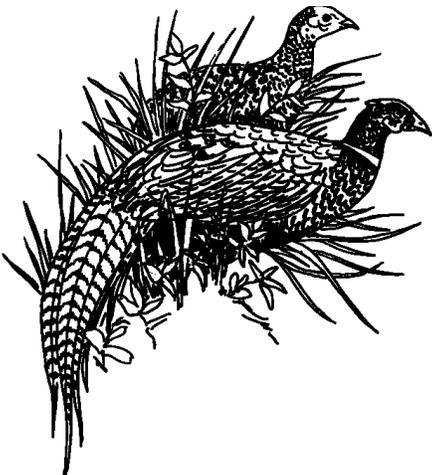
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PHEASANTS

After their introduction from China in 1895, it didn't take long for ring-necked pheasants to become one of Michigan's most popular wildlife species. Because pheasants thrive in a mix of cropland, hayland, grassland, wetland, and brush, populations exploded in southern Michigan. Much of the farmland in the 1940's and 1950's provided outstanding pheasant habitat. At that time, farms had small fields from 10 to 20 acres in size surrounded by brushy fencerows and diverse crop rotations.

However, by the 1960's farmland began to change and people weren't seeing as many pheasants. The number of farms fell from 190,000 in 1940 to less than 60,000 by 1990. The amount of land farmed also decreased from more than 18 million acres in 1940 to less than 11 million acres in 1990. Although predation, genetics, and overuse of pesticides are among many explanations for the decline of pheasants, Michigan's changing agri-



cultural scene and loss of habitat are the main reasons.

Furthermore, farming practices have changed over time. Many practices are no longer wildlife friendly, and are aimed at making more money. This has been detrimental to pheasants. Such practices include early and numerous cuttings of hayfields, overgrazing by livestock, spraying of pesticides and herbicides, double-cropping, and fall plowing and discing of crop residues.

However, there are still many opportunities for farmers and other landowners who want to increase pheasants on their property while continuing to make a profit. Many landowners are presently purchasing property to manage specifically for wildlife and, through proper grassland management, are experiencing the revitalization of pheasants in their area. Other landowners with larger acreage have signed agreements with the U.S. Department of Agriculture to take hundreds of thousands of acres out of crop production and put them into federal conservation programs. These programs are used to manage grassland species.

Habitat Needs

Pheasant habitat would include a combination of grasslands, idle fields, wetlands, croplands, haylands, and shrublands. Optimal habitat for pheasants include the following:



- (1) undisturbed low- to medium-high grasses and legumes for nesting and brood rearing
- (2) wetlands
- (3) windbreaks and dense covers of cattails or switchgrass to protect the birds from heavy snow and cold winds
- (4) fields of grain and weeds for a consistent winter food supply

The larger the parcel targeted for pheasant management, the bigger the positive impact will be. Ideally, you would want to manage at least a 40 to 80 acre tract. However, small landowners who work with their neighbors can increase their chances of helping pheasants.

Stocking of pheasants may increase sightings for a while, but game-farm birds are not equipped to thrive in the wild. Most become victims of predation. The best way to

produce more pheasants is to improve habitat—the places where pheasants live.

Breeding Habitat

Beginning as early as March and lasting into May, cock pheasants establish and defend breeding territories against other males. The territories, which may be as small as one or two acres, occur in weed fields, grasslands, crop-stubble fields, and along fence rows.

Cock pheasants display themselves by choosing open areas near secure habitat rather than displaying in the protective cover itself. They draw attention to themselves by flapping their wings and crowing once every minute or two to attract hens. This displaying makes them vulnerable to predators. When hens appear, they too become targets for predators. This is why it is important to have good cover nearby.

Nesting Habitat

Hens choose nesting sites in fields with cover that is low enough for them to see over, and not too thick to walk through. Eight to 10 inches of height is ideal. Alfalfa or other legumes, such as clover, fulfill these requirements. They will use a perennial mixture of legumes and grasses. However, brome grass and fescue are usually too thick, and neither goldenrod nor wild asters are preferred. Although hens will nest in narrow, linear cover such as brushy fence rows and roadside ditches, wider linear nesting habitat (at least 40 yards wide) is more secure.

Nesting habitat must be undisturbed for about 40 days. Hens visit the nest site for a half-hour each day for 12 to 15 days to lay a single egg. When the clutch is ready for incubation, the hen reverses her activities.

She now stays on the eggs for approximately 23 days, leaving once daily for one-half hour to one hour to feed. Eggs typically hatch from late May through June, and the average brood size is 11 chicks. Hens may renege up to three times if their clutch or brood is lost, but the number of eggs decreases each time. When the eggs hatch, the hen will stay with her chicks for at least three months. This time period allows for the rearing of only one brood per year.

The cutting of hayfields during the nesting season has the biggest negative impact on pheasants because a sitting hen usually stays with her eggs. Mowing machines and evening and night-cutting practices further increase the chances of the hen being killed.

Farmers growing alfalfa and other forage for livestock, but who also want to increase pheasant numbers, might want to plant clover and other mixed grasses and legumes that don't mature until late June. If possible, refrain from mowing until July 15. Also, don't mow after August 30 or the field may not grow to the minimum eight-inch height that hens require the following spring.

The U.S. Natural Resource Conservation Service and Michigan Department of Natural Resources recommend several different combinations of legumes and grasses to improve nesting habitat for wildlife and to check erosion. The Natural Resource Conservation Service or Conservation District in your county can be contacted for details.

Rearing Habitat

For the first five weeks of life, pheasant chicks thrive on protein-rich grasshoppers, ants, beetles and other insects. The best place to find insects and their larvae is in fields of weeds or grass that have not been treated with pesticides. The habitat should not be too thick for young birds to walk through, but it should contain enough overhead cover in the form of grass or leaves to protect them from hawks and owls. Wide brushy fence rows provide food as well as security for chicks to travel between food sources.



switchgrass

To provide optimum nesting and brood-rearing habitat, your property should be comprised of 20 to 50 percent grasslands in fields from 3 to 10 acres in size, surrounded by brushy cover or crop fields. To provide diverse stands, grasslands should be planted to orchard grass, timothy, and clovers like ladino, medium red, and alsike. Native prairie grass stands of big bluestem, little bluestem, Indiangrass, or side-oats grama provide outstanding nesting and brood-rearing cover.

By late summer or early fall,



when chicks are old enough to survive on their own, brood size will normally be half that at time of hatching. Ground and aerial predators, heat stress, and poor diet all take their toll on young pheasants. By providing quality cover, the impact of these mortality factors can be lessened.

Secure Winter Habitat

The pheasant's world changes drastically in winter. Canopy covers of leaves are gone, and high grasses are usually blown down or matted by drifting snow. Pheasants are better equipped than some birds, such as quail, for scratching through a few inches of snow for grit, grain residues, and weed seeds. But as snows deepen and winter intensifies, pheasants are forced into heavier security cover such as cattails, swales, and ditch banks.

Pheasants seeking grit along roads are victims of car collisions. The concentration of birds in winter makes hunting easier for predators, whose normal songbird prey has migrated south or is buried under snow, such as mice, voles, and other small mammals.

A snow or sleet storm blowing across unprotected fields can be dangerous for pheasants. Because birds must face into the wind in order for their streamlined feathers to keep them warm, their nostrils may ice up and they can suffocate. An especially vicious storm may fill even deep drainage ditches, smothering pheasants under several feet of snow.

Thick stands of cattails or switchgrass provide pheasants with secure winter shelter from such weather. A thick field of forage sorghum helps, although switchgrass, which grows



from four to six feet high and won't break down under snow, is better. Good winter cover, isolated from woodlands and tall trees, within a quarter-mile of winter food is the key to pheasant survival. Besides grain and seeds, fruit-bearing trees, and shrubs such as silky dogwood, hawthorn, elderberry, and highbush cranberry are good sources of food and cover for pheasants.

Three to five acre blocks of switchgrass, with two to three surrounding rows of shrubs, will provide great winter cover. If this winter home borders a food plot or non-tilled cropland, you will have the necessary components to maintain pheasants throughout the winter.

Management Considerations

Landowners interested in managing lands for pheasants should create blocks 10 to 20 acres in size. Each block should be comprised of the following:

- 3 to 7 acres of nesting cover (grasses/legumes)
- 3 to 7 acres of heavy winter cover (native grasses such as switchgrass)

- 2 to 4 acres of grain crops (corn, buckwheat or sunflowers)

- 2 to 4 acres of fruit-bearing shrubs (hawthorn, highbush cranberry, elderberry, or dogwood)

Modifying some modern farming practices can help pheasants without creating loss of income. In some instances, money can actually be saved. Examples are:

- Practicing conservation tillage reduces cultivation and compaction and makes grain residue available for wildlife.

- Planting slopes and waterways with native grasses such as switchgrass checks erosion, and provides winter cover and sometimes nesting cover.

- Undergrazing pastures slows erosion and also provides pheasant habitat.

- Planting warm-season grasses such as big bluestem, little bluestem, and switchgrass provides high-quality summer forage when cool-season grasses stop growing. Switchgrass gives pheasants nesting, brood rearing, and secure winter habitat.

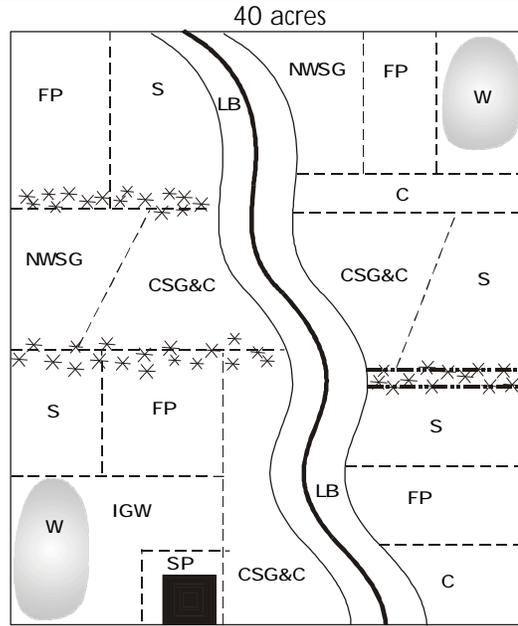
- Incorporating red clover, alfalfa, or other legumes into pasture management improves food value for both livestock and pheasants.

Other practices that will also help pheasants:

- Delay hayfield mowing until July 15 and do not mow after August 30.

PHEASANTS

Existing features	
	Road
	House
	Stream
	Brushy fencerow
W	Cattail marsh wet land
IGW	Idle grass and weeds
NWGS	Native warm season grasses
LB	Lowland brush
Habitat projects	
	Shrubs
FP	Food plot corn
S	Switchgrass
CSG&C	Cool season grasses and clover
C	Clover
SP	Shrub planting



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

- Alternate strips of corn, soybeans, and other row crops with wheat, legumes, or grass.
- Maintain field borders of brush, grass and shrubs.
- Plant idle land with grassland or crops, for winter food.
- Leave intact a portion of row crops until March 15 or later.
- Remove trees taller than 15 feet along fencerows. Cutting such trees eliminates sentinel perches for hawks and owls.

- Wetlands should be maintained or restored wherever possible.

In summary, pheasant populations have declined due to a change in farming practices and loss in agricultural lands. However, it is possible to incorporate wildlife friendly practices when farming to help increase pheasant populations.

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BOBWHITE QUAIL



Michigan is on the northern fringe of the bobwhite quail's range. Creatures of the edge, bobwhites prefer grasslands and early successional habitats containing brush and young trees. They also require a good amount of cropland as a food source. Good habitat provides a mix of quality nesting and brood areas, winter shelter, and a year-round food source. Populations often fluctuate, sometimes dramatically, with the severity of winter.

Southern Michigan landowners with 20 or more acres and who provide the right mix of habitat can expect to enjoy bobwhite quail on their property. They are relatively inconspicuous birds, spending most of their life in concealing cover. However, they can often be heard as their song is a distinct whistle which seems to say "bob-WHITE". Habitat developed for quail will also be of value to rabbits, cardinals, towhees, brown thrashers, eastern bluebirds, field and song sparrows, and many other grassland and shrub-inhabiting songbirds.

Life Cycle

The hen locates her nest along field edges, brushy fencerows, and old fields with weeds and grasses. The average clutch size is 12-14 eggs, with 10-12 of them usually hatching. This large clutch size is the main reason that bobwhites often rebound dramatically after population lows. The males also contribute to incubation chores, often sitting on the eggs while the hen is away feeding. Mated pairs stay together for the entire brood rearing and nesting season, which can begin in April and last until September.

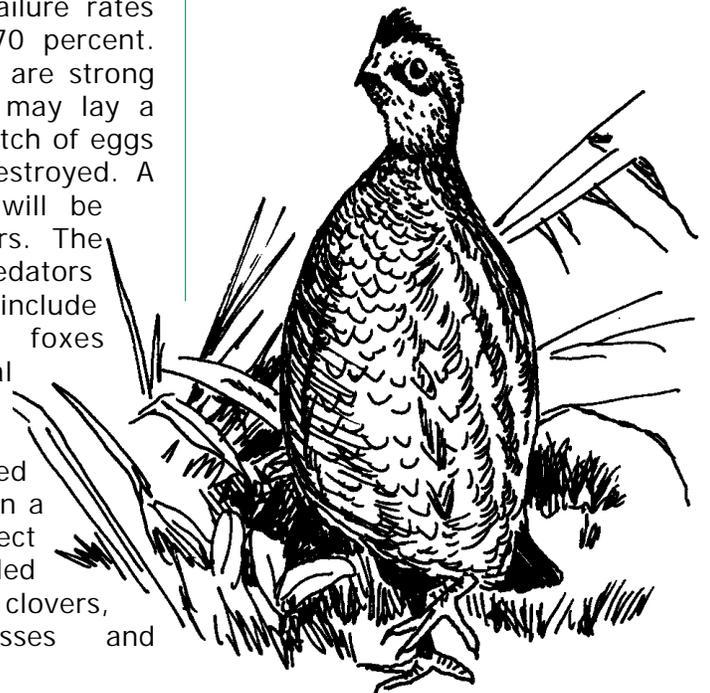
Nest disturbance and predation, along with bad weather and other variables, can contribute to nesting failure rates as high as 60 to 70 percent. However, bobwhites are strong reneesters, as hens may lay a second and third clutch of eggs if the others are destroyed. A good nesting site will be secure from predators. The bobwhite's main predators at this time of year include skunks, raccoons, foxes, snakes, and feral dogs and cats.

The newly hatched chicks rely heavily on a diet of insects. Insect abundance is provided by legumes, such as clovers, mixed with grasses and

broadleaf weeds. This insect diet will last for about two weeks and then, over the next six weeks, slowly change to a diet of grain crops and seeds.

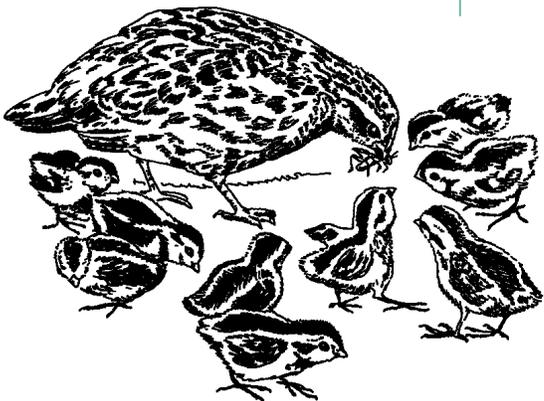
Food and Cover Needs

Bobwhite quail have different food and cover requirements throughout the year. As adults, quail feed mainly on grain crops and weed seeds. Popular weed species include common ragweed, yellow and green foxtail, beggar's tick, hairy vetch, smartweed, yellow nut sedge, wild sweet pea, lespedeza, tick clover, and black medic. Preferred grain crops include soybeans, corn, and grain sorghum. Quail also eat



rose hips, acorns, crabapples, and other shrub fruits. Although ensuring that all needs are met throughout the year is important, winter is the most critical time for food and shelter availability.

Winter severity is a great equalizer in Michigan for the bobwhite quail. A succession of mild winters may improve populations to the point where limited hunting seasons are allowed. Although native to Michigan, quail are limited to those parts of southern Michigan that receive less than 40 inches of snow per year. They cannot endure prolonged conditions of cold, or heavy snow or ice accumulation. Because of their high metabolic rates, bobwhites can starve to death in only three days during severely cold weather, or when ice covers their food. That is why on bitterly cold days, birds may stay in feeding spots all day, stuffing themselves every 90 minutes, which is how long it takes them to empty their crops, and returning to the roost early. By comparison, a ring-necked pheasant can survive up to ten days in winter without eating. Also, pheasants are better equipped than quail



for scratching through snow and ice to reach food.

Unharvested crops and grain food plots provide a good source of food for quail during critical winter months. Using minimum tillage practices in the fall leaves waste grain for winter food. Not harvesting a few rows of grain crops next to travel corridors or heavy cover areas will also help quail and other wildlife. Food plots with mature grain mixed with ragweed, lambsquarter, smartweed, and foxtail are optimum.

Nesting cover consists of grassland areas, such as idle fields that have been out of production for one to three years. Good grasses for nesting include timothy, orchard grass, redtop, Canada wild-rye, or mixtures of native warm season grasses.

Optimum escape cover is provided by woody vegetation. This can be in the form of hedgerows and fencerows, irregular-shaped brushlands, and brushpiles. A dense growth of tall weeds such as ragweed can also supply some winter cover.

Loafing cover is anything that gives quail protection from predators and weather, yet is open enough to allow for basking in the sun, preening, and delousing themselves through dust baths. Good loafing cover has some screening protection, such as high weeds or a canopy of leaves or brush.

Agricultural Foods Quail Enjoy Eating.



Winter roosting cover is usually open, clumpy vegetation that is not located next to thick escape cover. The best winter roosting areas are provided by erect stands of grasses and weeds, with a southern exposure. These include stands of foxtail, switchgrass, and big and little bluestem. Quail will also use roadside ditches containing brome grass, or fields of alfalfa or wheat stubble for roosting, although these are usually poor places to sleep.

Bobwhites roost in the form of a circle. The main reasons for this are to conserve body heat and to provide 360-degree surveillance of predators. At least seven quail are needed in the circle so that their tails will converge to trap the heat from the birds' droppings. Feathers and small piles of green-and-white droppings are clues to roosting sites. To ensure winter survival, hunters should be careful not to reduce coveys too low.

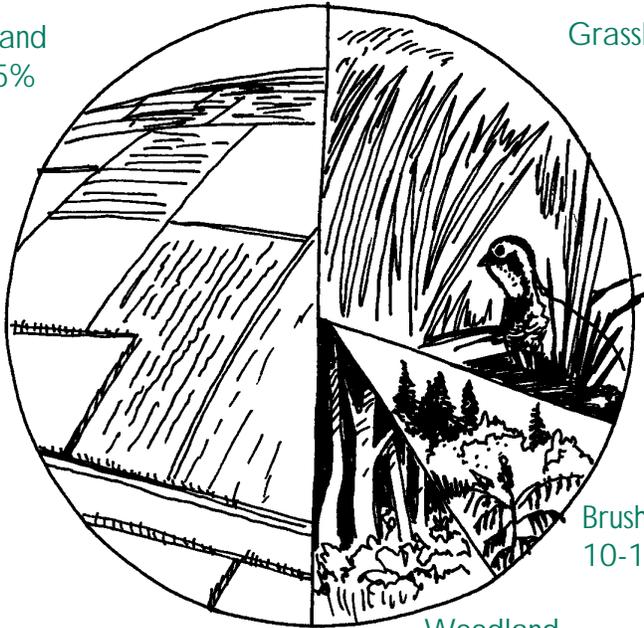
Management Considerations

The most ideal land-use pattern for quail is comprised of 25 to 30 percent idled fields and grasslands, 40 to 55 percent croplands, 10 to 15 per-

BOBWHITE QUAIL

Ideal Land Use for Quail

Cropland
40-55%



Grassland 25-30%

Brush
10-15%

Woodland
10-15%

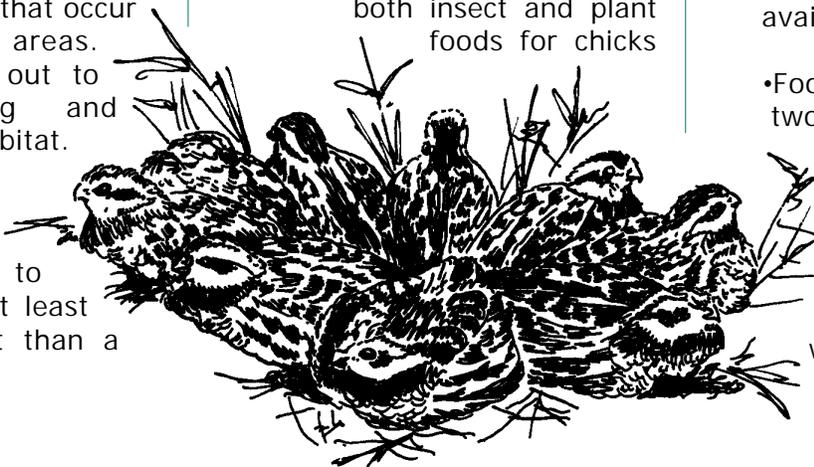
cent brushlands, and 10 to 15 percent woodlands. The more intermixed these components are, the better. These habitats must be available within one-quarter to one-half mile of each other.

The following are options to consider when managing for bobwhite quail:

- Protect any shrubby edges and waste areas that occur around farm areas. Fence livestock out to reduce grazing and improve quail habitat.

- During winter, food and cover should be next to each other, or at least no farther apart than a quarter-mile.

- Provide nesting and foraging areas by planting a warm-season grass mix of little bluestem, big bluestem, Indiangrass, and wildflowers. Orchard grass, timothy, and redtop are also good choices. Legumes and forbs (wildflowers) including sweet peas, coreopsis, hairy vetch, red clover, goldenrod, and black-eyed Susan mixed with the grasses help supply both insect and plant foods for chicks



as well as overhead cover. Do not plant in areas that will be wet in the spring.

- Nesting and roosting areas should be at least 40 yards wide to make nests more difficult to find by ground searching predators.

- Connect nesting areas with a corridor which will serve as an escape route. Quail will use fencerows and ditch banks as travel lanes between nesting and feeding areas. Maintain them in tall grasses and shrubs such as intermediate wheatgrass, switchgrass, sumac, crabapple, sassafras, and silky dogwood. Corridors should be from 30 to 60 feet wide, and are most beneficial when 60 to 70 percent overhead shrub cover is present.

- Avoid the use of pesticides, if possible, because protein-rich insects are critical to the development of chicks. In order to digest their food, each day quail need to eat at least seven percent of their body weight in moisture. Green plants and insects provide moisture needs when water is not available.

- Food plots should be one to two acres in size and at least forty yards wide. Some weed control may be necessary to get the crop started but once plants are one to two feet high weed control will not be necessary.

EASTERN COTTONTAIL RABBITS



Found throughout the state, eastern cottontail rabbits are most common in southern Michigan landscapes with abundant edge habitat. An edge is the area where two different habitats meet, such as a field and a forest. Cottontails are edge-dependent, and they require a large mix of habitats including sparsely forested areas, brushy thickets, dry and grassy wetland edges, hayfields, grassy cornfields, brushy fencerows, and to the concern of fruit and vegetable growers, densely planted orchards and gardens.

Rabbits need a good supply of food and cover throughout the year. Without an adequate source of food they will turn to landscape plants, and may cause considerable damage. They also need adequate winter and escape cover. This cover includes protected woodlots, rock or brush piles, hollow logs, shrub thickets, low-growing evergreens, woodchuck holes, and other abandoned dens. Here, they hide from predators and seek shelter from bad weather. Distinct "runways" sometimes lead to and from these hiding places. Corridors of cover, such as brushy fencerows or grassy strips that link larger

habitats, will also help to increase cottontail numbers. The corridors need only be five to fifteen yards wide.

Although the cottontail's home range may vary from one to sixty acres, it is typically small, averaging six to eight acres for males and two to three acres for females. Young rabbits may move two or three miles in an effort to find suitable habitat, and once they find it they lead a fairly solitary life.

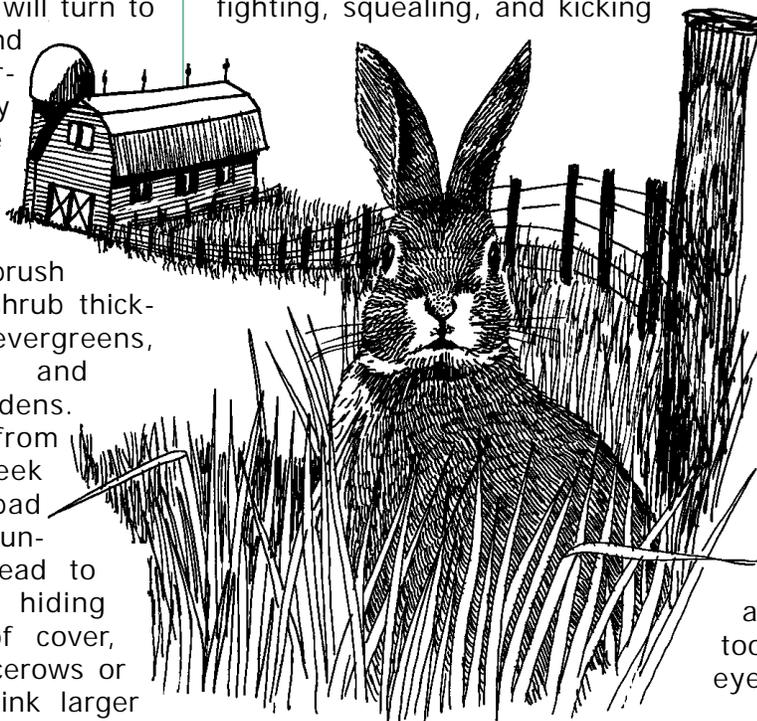
Life Cycle

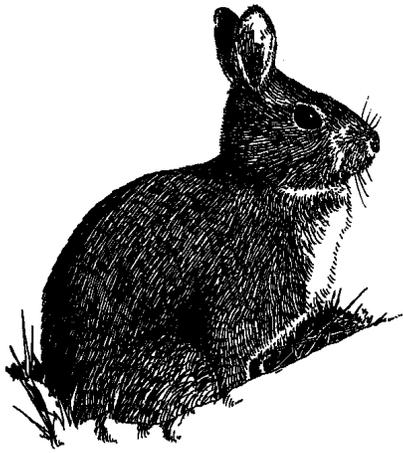
Cottontails may begin mating as early as February and continue through September. Courtship is best described as a "frolic" of racing, jumping, fighting, squealing, and kicking

animals. Dominant males drive off competing bucks for the right to breed. People often mistake the scattered bits of hide and fur resulting from these battles as predator kills.

Cottontail rabbits are very prolific. The average production is three or four litters a year, with four or five young per litter. However, many of these do not survive. The number of young that survive is largely a function of habitat quality; especially the availability of food and shelter within this habitat. Females typically mate again soon after their young are born. The number of times she renests is dependent upon her health and the weather.

First litters usually occur in early April in grassland areas. The mother scrapes out a nest that is four to six inches deep and three to five inches wide. She lines this small, shallow depression first with grass and then with fur from her own body. The young, which weigh only about one ounce and measure four inches in length, are born blind, naked and almost totally helpless. The offspring grow rapidly, and in only 10 or 12 days are too large for the nest. Their eyes are then open and





they begin to forage for grass, clover, and the buds, sprouts, and shoots of woody plants. Mature at four months old, some young cottontails from early litters may breed in their first year of life. Most, however, do not breed until the following spring.

Seasonal Foods

Winter

Winter is the most critical time period for rabbits. When they have to forage far, they become vulnerable to predation. The rate of exposure increases when snow covers the ground because the cottontail does not turn white in winter, as does its larger cousin the snowshoe hare.

If snowfall is persistent, rabbits must shift from tall grasses and other herbaceous foods to agricultural crops and woody foods such as raspberry twigs, stems of wild rose and the bark of sumac. Highbush cranberry, silky and gray dog-

wood, thornapple, and other planted shrubs will supplement their winter diet. Mixing these shrubs with spruces, junipers, jack pine, Canada yew, balsam fir, black or white spruce, hemlock, or other conifers which retain their lower branches will increase protection. Half-acre food patches of corn or grain sorghum will provide high energy food.

Spring and Summer

Cottontails are animals with constantly growing incisors specially adapted for ripping and gnawing vegetation. Opportunistic vegetarians, cottontails depend on succulent green plants for nutrition and water. However, they will also drink free-standing water when it is available. During spring and summer, their main fare is green plantlife, and they are especially fond of legumes (alfalfa, clover, peas and beans), grasses, dandelions, and domestic garden vegetables.

A mixture of legumes and grasses (timothy grass and orchardgrass), along with tall native grasses such as switchgrass provide food and cover throughout the spring and summer. Clovers such as ladino, medium red, alsike, white dutch, and sweet, mixed with grass, create optimal forage areas for rabbits as well as deer, and are also used as

brood sites for pheasants, quail, turkeys, and songbirds.

Autumn

Food and cover change dramatically as the growing season wanes. Cultivated grains ripen, trees and bushes lose their leaves, and lush grasses turn brown and become less palatable causing rabbits to turn to cultivated crops of corn, soybeans, apples, and other fruits. Clovers are also a good autumn food source since they stay green late into the fall.

Brushpiles

Brushpiles provide a hiding place from ground predators (dogs, foxes, coyotes, mink, and weasels) and give rabbits thermal protection during cold weather. Brushpiles should be placed away from the tall edge of the woodlot and closer to an open food source. Doing so denies avian predators (hawks and owls) a perch from which to launch their attack.

The best brushpiles are five feet high and 15 feet wide (about the size of a small car) and have more than one entrance/exit. Build a base of large logs or stumps or use nondecaying materials such as stones, at least six inches in diameter. Criss-cross a second layer of 12-inch diameter logs, and then add a third criss-crossed layer of 6- to 10-inch



diameter logs. Brushpiles can be placed 20-30 yards apart. Succeeding layers become smaller in diameter. Built in this manner, the brushpile should last for several years. As the material decays you can add fresh layers.

For additional cover place live-lopped trees on top of the pile. Live-lopping is the practice of cutting a tree trunk on a 30-degree angle three-fourths of the way through. The tree should be growing next to the brushpile. The best candidates have large side branches and are four to eight inches in diameter. If you make the cut about three feet from the ground, the tree will fall over the brushpile. Because the tree will not be severed, its branches may continue to provide green cover for several years.

Winter is a good time to build brushpiles from tree-cutting operations on your land.

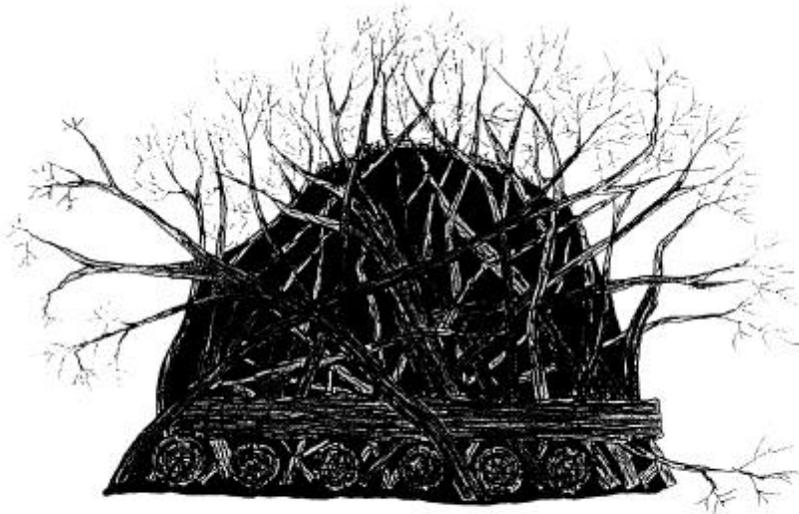


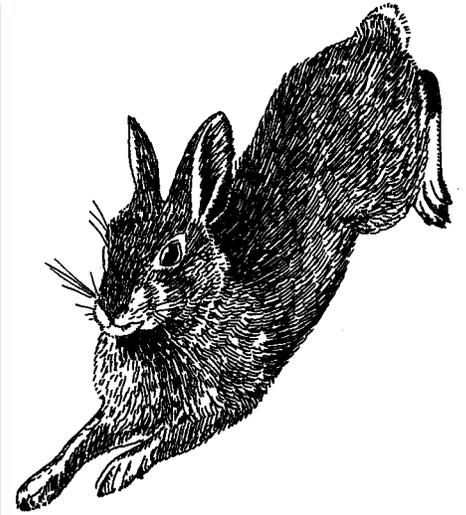
Diagram of a brushpile.

The tops and branches of felled trees make for a ready supply of material. As you thin your woodlot, build a series of brushpiles on the border with an open grass field or grain field. If you don't plan to thin trees throughout the stand, consider felling those immediately next to the open area so as to create favorable edge habitat and to have materials for building brushpiles. Brushpiles in areas with dense saplings or shrubs make outstanding rabbit habitat.

Management Considerations

The following are options to consider when managing for eastern cottontail rabbits:

- Maintain a large amount of edge (a mix of woodlots, brushlands, and grasslands) as rabbits are edge-loving species.
- Provide an adequate source



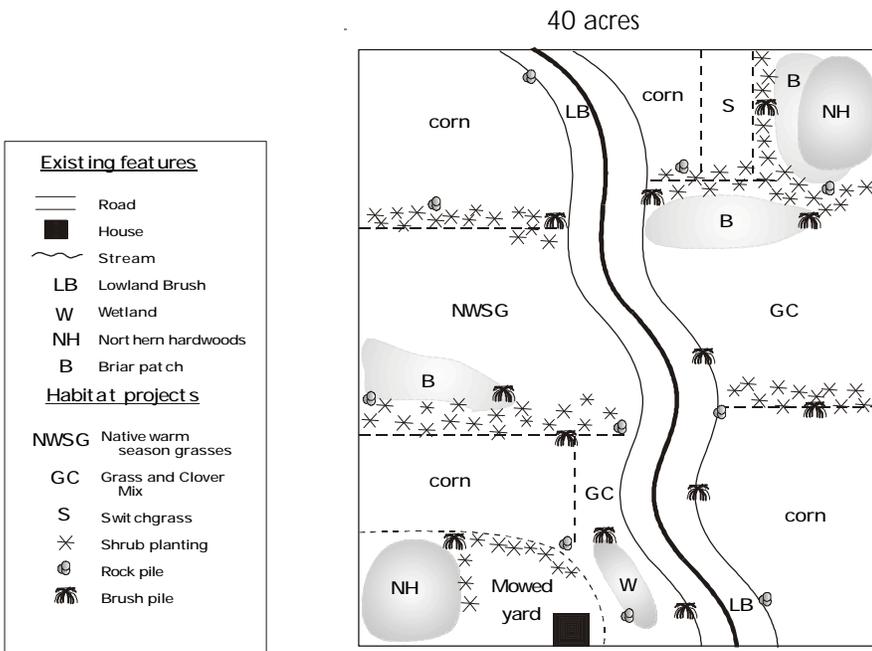
of year-round food (shrubs, grasses, legumes, and grain plots) next to cover (woodlots, rock or brush piles, hollow logs, shrub thickets, and low-growing evergreens).

- Do not plant food patches directly next to woodlots. Instead, provide a buffer strip of shrubs between the food source and woods. Make this buffer strip at least fifty yards wide, and be sure to include some brushpiles.

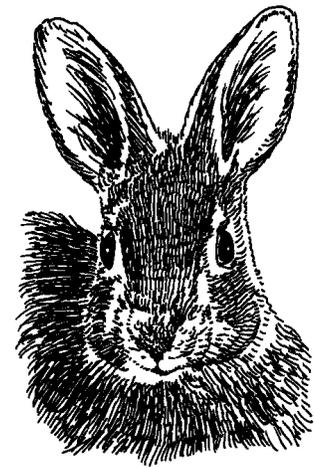
- Plant grasses at least 50 yards wide next to escape cover that contains denning sites, brushpiles, and hedgerows at least 60 feet wide. Grasses will provide food throughout the spring and summer, and if tall grass cover is available in autumn, along with a good food supply, rabbits will go into winter in healthy condition.

- Allow fallow croplands to develop brush. Croplands are not essential to rabbits; however, the habitat created by fallowed or abandoned croplands, with its briars and

RABBITS



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.



brambles, provide excellent habitat.

Concerns

No matter how we manage our property for wildlife, our decisions will always have impacts. For example, if you plant grasses and clovers to encourage rabbits and deer to use the habitat, you will discourage forest-loving wildlife such as thrushes, woodpeckers and squirrels. Cutting trees for brushpiles will eliminate former habitat where turkeys, squirrels, and wood thrushes once lived.

You should be aware that creating or enhancing habitats may invite unwanted guests. For example, if you plant trees and shrubs you will most likely lure deer, rabbits and mice that can become a nuisance by eating the new plantings and even killing them. Rabbits can have a tremendous detrimental impact on woody plant regeneration and establishment. Free-roaming dogs and cats may also be attracted to any habitat that suddenly has an abundance of wildlife. Rabbits are a key prey species for many predators, including these domestic pets.

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SQUIRRELS



Squirrels are wonderful subjects for nature study, photography, wildlife observation, and a favorite pursuit of small game hunters. They also inadvertently help plant forests because the nuts they bury in fall often sprout into seedlings the following spring. There are six species of squirrels in Michigan. The red and eastern gray squirrels can be found in both Michigan Peninsulas, whereas the southern flying, and eastern fox reside only in the Lower Peninsula. Lastly, the northern flying squirrel can be found in the northern Lower Peninsula and entire Upper Peninsula. These squirrel species have a variety of habitats and are important parts of our natural heritage. However, this chapter will focus mainly on gray and fox squirrels.

Profiles of the Species

The **eastern gray squirrel** occupies most of eastern North America within mature mixed hard

wood and conifer forests and was abundant in Michigan when the first settlers arrived. The gray squirrel has an overall silvery gray body, a generally white belly, and tail hairs that are white-tipped. Grays are eight to 10 inches long (minus the tail) and weigh up to one and a half pounds. Black squirrels are simply melanistic phases of the gray squirrels. The two commonly interbreed and litters may contain both color types. The gray squirrel lives most of its life in and around a single nest tree moving no more than 300 yards in a season and is the least social of all tree squirrels.

At one and a half to two and a half pounds, the **fox squirrel** is heavier than the gray and is also longer at 10 to 15 inches (minus the tail). The fox has a buff- to orange-colored belly, a back of tawny brown, and a long plumed tail of black-brown with rust-tipped guard hairs. Fox squirrels prefer small woodlots of mature trees throughout the Lower Peninsula. Before 1850, the fox squirrel was concentrated around grassland openings in oak forests of southwest Lower Michigan. As the forests were cleared for agriculture and timber, fox squirrels used fence rows as travel routes to expand their range. By 1925 the species was found throughout the Lower Peninsula.

Although both species eat the nuts and fruit of many trees and

shrubs, rarely do fox and gray squirrels share the same habitat. Grays like dense stands of timber and will frequent river bottoms of sycamore, swamp white oak, black maple, pin oak, ironwood, and elm. Fox squirrels prefer farm country and are attracted to woodlands next to farm fields. Because of their habitat preferences, they are found in different parts of the state. Today, seventy percent of Michigan's fox squirrels live in the southern Lower Peninsula. By contrast, gray squirrels mainly live in the northern Lower Peninsula. Those that reside in southern Lower Michigan customarily do so in city parks and suburbs with mature trees.

The **red squirrel** lives throughout the state. This small species prefers a forest of conifers or conifers mixed with hardwoods, where it can find both hardwood mast (nuts) and pine seeds.

Few people have seen a **flying squirrel** because they are active only at night. Both northern and southern flying squirrels are found



Flying Squirrel

in Michigan. They are more common than many people think, especially in southern Michigan, and can be attracted to bird feeders placed in woodlots.

The northern flying squirrel thrives in heavily wooded areas containing mixed conifers and northern hardwoods having mature growth. The southern flying squirrel requires trees that produce fruit or nuts.

Life History

The life histories that follow are for fox and gray squirrels, which may live out their lives on only five to 10 acres of habitat if their needs are met. The management prescriptions below are keyed to these two species although red squirrels and flying squirrels may also benefit.

These squirrels mate from January to March and again from June to July, and the gestation period is 44 days. Females, two years of age and older, may bear two litters each year. Males begin to reproduce at 18 months old. In a typical year, about 60 percent of the fall population will be young that were born that year.

Litter size and frequency depend on available food supplies - the less food, the fewer and smaller the litter. A typical litter contains three or four offspring. Nesting dens are found in tree cavities, which the female lines with feathers, moss, shredded bark, and other soft plant materials.

The young are born hairless with closed eyes and ears. Hair begins to grow on their back in about one week and the eyes open at 35 days. At about two months

old, the young may begin exploring outside the den. At this time if the weather is warm, the female may build a leaf nest high in the tree canopy among forked branches. At three months of age, young squirrels can survive on their own, and at 18 weeks they begin building their own leaf nests. These circular leaf nests are compact and waterproof and may be built in both leaf-bearing and evergreen trees.



A Squirrel Nest of Leaves and Twigs

Squirrels forage in tree tops and on the ground. A social hierarchy determines which squirrels get the preferred foods, best nest sites, and mates. Each animal in the local population will have a rank, ranging from the dominant male and female, to the newborn. When food supplies are abundant, squirrels may feed together. During severe winter weather, some even share winter dens which means they can share body warmth. Normally, though, they gather in groups only during mating season.

Management Considerations

A consistent food supply and a selection of good den sites in mature trees will attract squirrels to

your land. Although they are omnivorous and opportunistic, squirrels nevertheless have preferred foods. Important hard mast species include the nuts of white oak, red oak, black oak, beech, hickory, walnut, bur oak, pin oak, and butternut. Fox squirrels in particular like walnuts and hickory nuts. The gray squirrel's diet is more varied. Both species, however, also enjoy corn, sunflowers, and soybeans. Squirrels eat the seeds of maple, ash, and tuliptree. They like the soft mast of flowering dogwood, junberries, thornapples, apples, seasonal mushrooms, the buds and catkins of various shrubs, green grasses, and the leaves of legumes in spring. Sometimes they will eat beetles, salamanders, bird eggs, and nestlings. When very hungry, they will consume the bark and sap of sugar maple.

Michigan is at the squirrels' northern range, and it is not unusual for squirrels to die during especially severe winters. About 60 percent live less than one year, but this high mortality rate is also due to predation. Leaving standing corn or soybeans next to woodlots, where they can escape if danger appears, will help them get through lean times. Planting persistent fruit-bearing trees and shrubs along the sunny edge of forest openings or in woodlots will not only help squirrels but other wildlife too, such as grouse, deer, rabbits, raccoons and certain kinds of songbirds. Migrating songbirds, especially thrushes, some vireos and warblers, and finches, will feed extensively on these trees and shrubs. In a similar manner, cutting all trees greater than one inch in diameter in a 30 foot wide strip along the south or west side of a woodlot will lead to the regenera-

SQUIRRELS

tion of shrubs, brush, and brambles which make outstanding habitat.

A healthy forest contains old mast-bearing trees, and younger trees just starting mast production. Older trees are more likely to provide den sites; those with cavities should be spared at the rate of one to three trees per acre. The best den sites are found in ash, beech, basswood, oak, and maple. Den trees can be created by cutting a limb six inches from the trunk or by drilling a two inch wide hole, three inches deep. If you have a choice between leaving a nut-producing den tree (oak or beech, for example) and a tree that does not produce nuts (basswood or maple), leave the nut-bearing tree and cut the non-producing tree.

If you do not have enough trees with cavities, consider building nest boxes, which squirrels will readily occupy. Use cedar, but do

not use lumber that has been treated with creosote or some other decay preventive. Build the box as illustrated in the figure below. Attach the box with two aluminum nails to a healthy non-cavity tree that you don't intend to harvest. Insert one nail in the hole at the top of the galvanized strip, and insert the other in the niche at the bottom of the wooden hanger. For gray squirrels, place the box 18 to 20 feet from the ground on the east or south side of the tree. For maximum use by female fox squirrels, anchor the box under a limb high in the canopy of the tree and locate it close to a field edge.

Before cutting trees on your property, it is important to identify them and weigh their value to

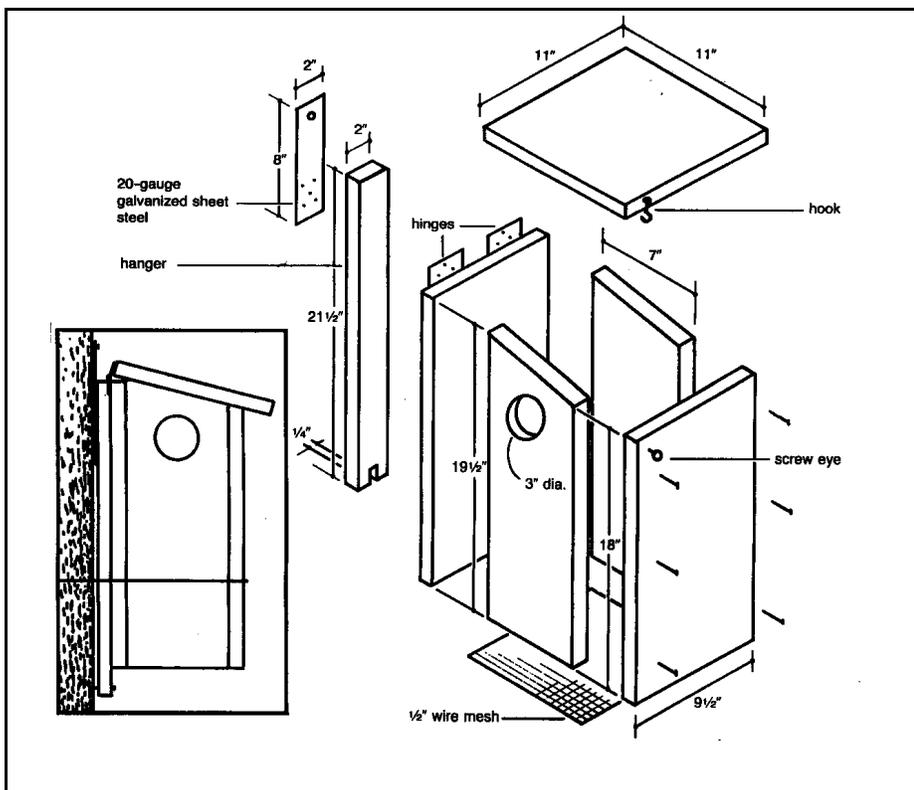


A Variety of Squirrel Foods

squirrels and other wildlife. It is possible to increase mast production if you manage any mast-bearing trees as crops. The idea is not to develop a forest where all the trees are the same age. Instead, periodic selective thinning will diversify homes for squirrels and ensure a steady food supply. A professional forester or wildlife biologist can help you make decisions that benefit wildlife on your property. Also, refer to the section on **Forest Management**.

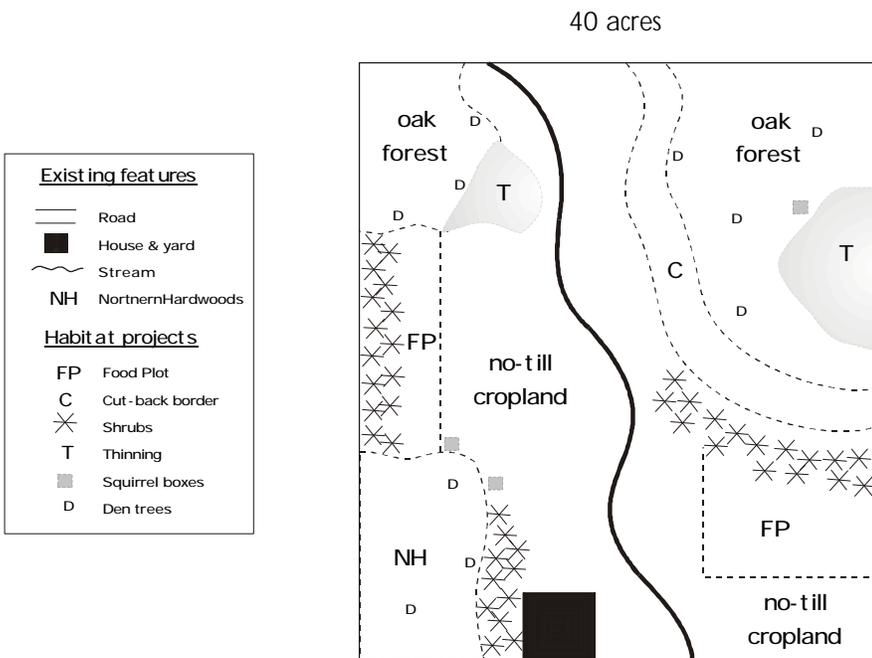
Oak and hickory are trees that regenerate following a fire. Before the arrival of settlers to Michigan, wild fires swept across large areas, which helped promote oak and hickory regeneration. Removing 30 to 70 percent of the mature trees through selective cutting, mimics natural disturbances. However, because of the perception that fire and timber harvesting are harmful to wildlife these activities have been restricted. But in the long run we have learned that the restriction of their use has reduced the acres of oak and hickory in our state.

By removing about half of the mature trees, you will get increased regeneration of oaks and hickories, healthier trees, and earlier and more consistent seed production. Removing some weak, deformed low quality, low priority, and competing trees can produce more mast. The remaining of these trees should be left for potential den sites. If possible hard mast



Squirrel House Dimensions

SQUIRRELS



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

(nuts and acorns) producing trees should be left to provide valuable mast for wildlife. Leave trees with grape vines and/or cavities for wildlife at the rate of one to three per acre. Also, establishing brush-piles will provide cover; use materials removed during improvement work. Brush piles should be at least 15 feet wide and five feet high. More information is available in the **Eastern Cottontail Rabbit** chapter.

Concerns

No matter how we manage our property for wildlife, our decisions will always have impacts. When squirrels enter homes and garages,

they tend to annoy homeowners and can create health and safety problems. In farming areas, they sometimes cause damage to corn and other grain crops. Encouraging squirrels may also result in more predation of bird nests or create problems at bird feeders. Lovers of corn and sunflower seeds, squirrels will travel over a quarter-mile from den sites to backyard bird feeders. Here, they can dominate smaller wildlife and sometimes damage feeding structures and frighten away songbirds. One solution is to install squirrel guards (baffles) on the feeders; another is to offer alternative food sources.

When managing your land for squirrels will deter such species as deer and grouse, which could be considered positive or negative. However, some bird species will benefit from squirrel management - such as pileated, red-bellied, and red-headed woodpeckers, thrushes, many species of warblers and vireos, and wild turkeys.

Because these potential problems are usually limited, most landowners welcome the squirrel as an important part of the wildlife community. They add hours of viewing pleasure to ones backyard or woodlot.



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FOR ADDITIONAL ASSISTANCE: CONTACT YOUR LOCAL CONSERVATION DISTRICT

BLACK BEARS

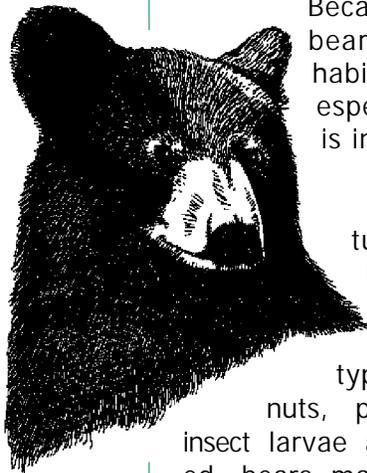


B iologists have been researching black bear in Michigan for nearly one-half century and know more about Michigan's black bear population and distribution than many other wildlife species. Currently, Michigan contains approximately 12,000 bears statewide, with an estimated 10,000 living in the Upper Peninsula and 2,000 residing in the northern Lower Peninsula.

Black bears often appear to be much larger than they are. Females typically weigh from 100 to 250 pounds, and males vary in weight from 150 to 400 pounds. Bears are usually heaviest in late fall prior to hibernating. Although they are large, heavy mammals, bears are surprisingly good swimmers and fast runners. In Wisconsin, one 200-pounder was clocked running 33 miles per hour.

Bears are shy, reclusive animals that avoid direct contact with humans. Non-aggressive by nature, bears rarely attack people, except when threatened. In larger expansive forests, bears tend to live without conflict with humans. However, bear-human conflicts are on the rise due to habitat loss and human encroachment. The conversion

of forested and wetland cover types to agriculture and other uses has forced bears to live in smaller geographic areas. Because of this, some bears have become habituated to people, especially when food is involved.



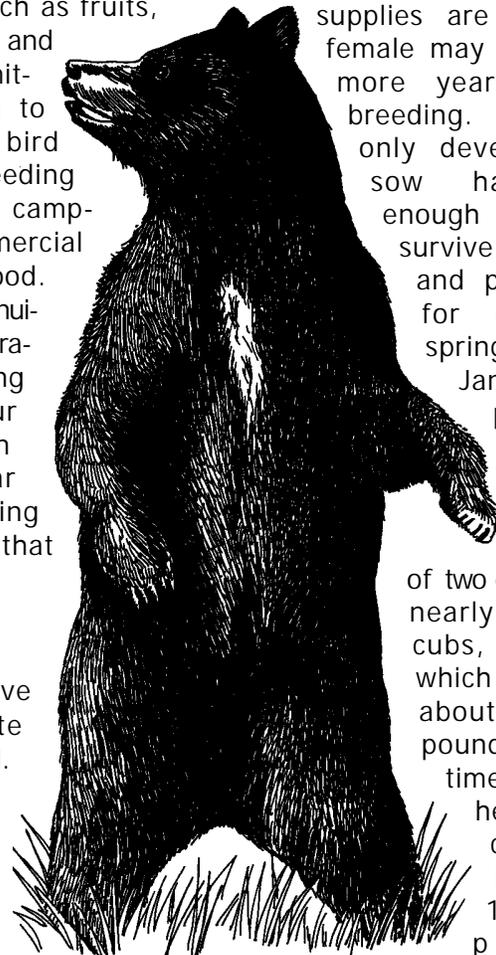
Bears are opportunistic animals taking advantage of many foods. When prime food types such as fruits, nuts, plants, and insect larvae are limited, bears may turn to garbage dumps, bird feeders, livestock feeding stations, farm crops, campgrounds, and commercial bee huts to find food. When this occurs, bear-nuisance complaints rise dramatically. Managing for bears on your property may lessen these human-bear conflicts by providing the natural foods that they need.

Life Cycle

Black bears leave their dens in late March into late April. The breeding season begins in late May and lasts through early July. Females are usually capable

of reproducing by age four, and they may breed with several males to ensure conception. By early fall, females begin searching out potential denning sites, which they will enter from mid-October to December. Black bears spend four to seven months of each year in their dens.

Females (sows) produce a litter every other year, depending on food availability and each sow's health. When food supplies are short, the female may skip two or more years between breeding. The fetuses only develop if the sow has stored enough body fat to survive over-winter and provide milk for cubs until spring. By late January most pregnant females have given birth to an average of two or three blind, nearly naked cubs, each of which will weigh about a half-pound. By the time she leaves her den, the cubs will have gained 10 to 12 pounds,





depending on the number of cubs. They will remain with their mother for 1 1/2 years.

In Michigan, den sites are typically brushpiles, open nests, or excavations under standing trees. An open nest is created by bears breaking off twigs or branches for a base and then adding grass, tree bark, and leaves for bedding. Bears will also hibernate in caves, rock crevices, burrows, slash piles, windfalls, and other forest debris. Bears have even been known to den in old beaver houses, road culverts, and basements of abandoned homes.

Seasonal Foods

After emerging from their dens in spring, often lethargic at first, bears turn to small wet areas with vernal ponds. Here they feed on lowland swamp grasses such as bluejoint reed-grass, fowl mannagrass, wild calla, skunk cabbage, jack-in-the-pulpit, clover, and some ferns. In June and early July, when vegetation growth has slowed, bears spend much of

their time feeding on ants in logs and stumps, which they find in upland forest openings. They gain weight slowly in spring and early summer. Resting habitats are primarily in upland areas in close association with lowland feeding and escape covers.

In the breeding season, bears begin to look for wild strawberries, raspberries, blackberries, blueberries, thimbleberries, serviceberries, and wild sarsaparilla. These plants thrive in open areas such as clearcuts, abandoned apple orchards, logging roads, rights-of-way, and regenerated openings within hardwood stands.

As summer deepens into fall, bears turn to dogwood berries, pin cherries, chokecherries, acorns, beechnuts, and apples. Weight gain becomes more dramatic because soft mast is high in sugars and carbohydrates, and hard mast is high in fats and protein. These foods allow bears to recover energy deficits that occur in winter and spring. When necessary, bears will also feed on deer fawns, calves of elk and moose, and other weak mammals.

Water must be readily available and well distributed throughout the year. Black bears drink frequently when feeding on vegetation, nuts, or insects but seldom when eating berries. They wallow to cool off on hot days.

Wetlands and wooded stream bottoms provide relief from heat, as well as important seasonal foods and denning sites. Bears use wetlands dominated by balsam fir, black spruce, and tamarack year-round. In the northern Lower Peninsula researchers found 68 percent of den sites in conifer-dominated wetlands, and the same preference is probably true in the Upper Peninsula.

Management Considerations

The home range of the black bear is dependent upon natural food availability, which itself is linked to climate, soil, and topography. Breeding success is also a function of habitat quality. Optimal bear habitat contains unfragmented swamps mixed with upland forests and forest openings. Forest openings are small clearings with plenty of edge and non-forest plant diversity. Bears use these open areas throughout the year for feeding.

Within your forest it is important to maintain both closed and open canopies. Closed canopies (close-growing

some preferred foods



BLACK BEARS

trees whose thick crowns block sunlight) provide important security and escape cover for bears. Open canopies (trees which allow sunlight on the forest ground) support a dense understory that produces berries and other fruit. The understory will be dense with fruiting shrubs and there will be plenty of hard and soft mast food reserves. This combination of adequate food and inaccessible terrain typically includes a large geographic area. When food is not available, bears will wander great distances to find it.

The following are options to consider when managing habitat for black bears:

- Do not fragment woodlands with roads, trails, and homes. Bears prefer connected habitats.
- Maintain diverse forests of many age classes in close proximity, and thin pine stands as they mature to enhance fruit production of understory shrubs.
- Maintain important diversity of plant types and increase or maintain the abundance of key foods. This can be done with responsible logging practices.
- Manage timber cutting rotations in hardwood stands of 60 years or more, or use selective cutting.
- Encourage the growth of both soft mast (blueberries,

raspberries, wild grapes, chokecherries) and hard mast (red and white oak acorns, beechnuts, and hickory nuts) food types. Leave downed logs to decay and produce grubs and insects.



- Protect large eastern white pine and eastern hemlock trees in excess of 20 inches in diameter 4 1/2 feet above the ground.

Sows with cubs rely on these trees with their rough bark to help cubs escape danger.

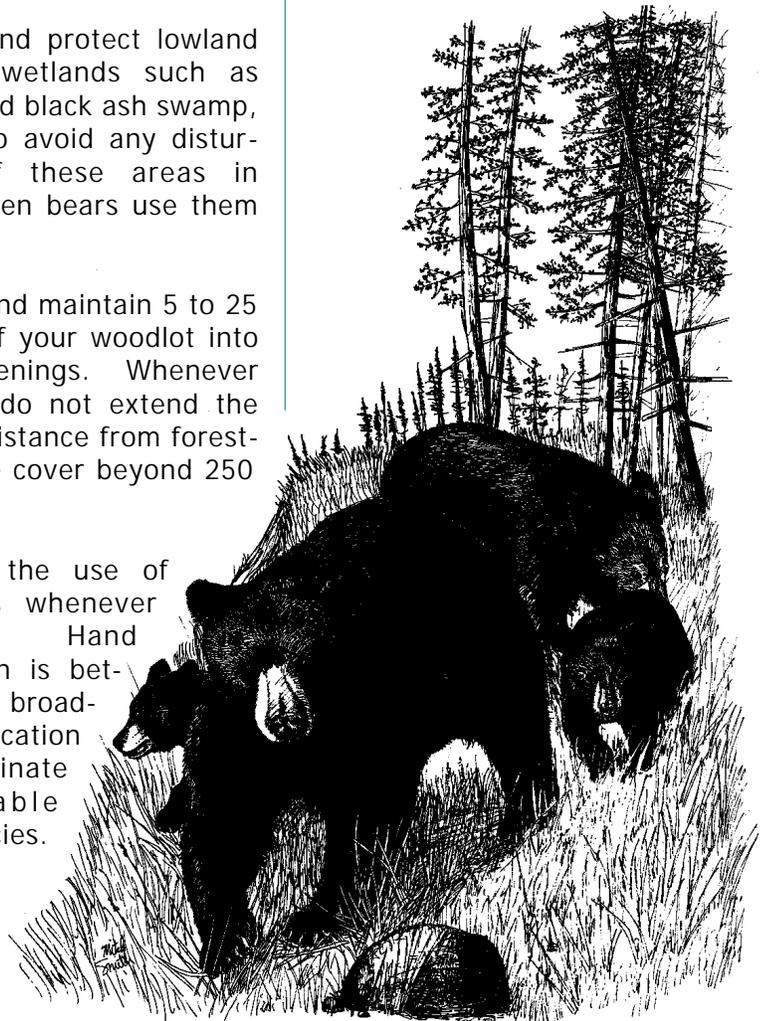
- Retain and protect lowland forested wetlands such as conifer and black ash swamp, and try to avoid any disturbance of these areas in spring when bears use them the most.

- Create and maintain 5 to 25 percent of your woodlot into forest openings. Whenever possible, do not extend the farthest distance from forested escape cover beyond 250 yards.

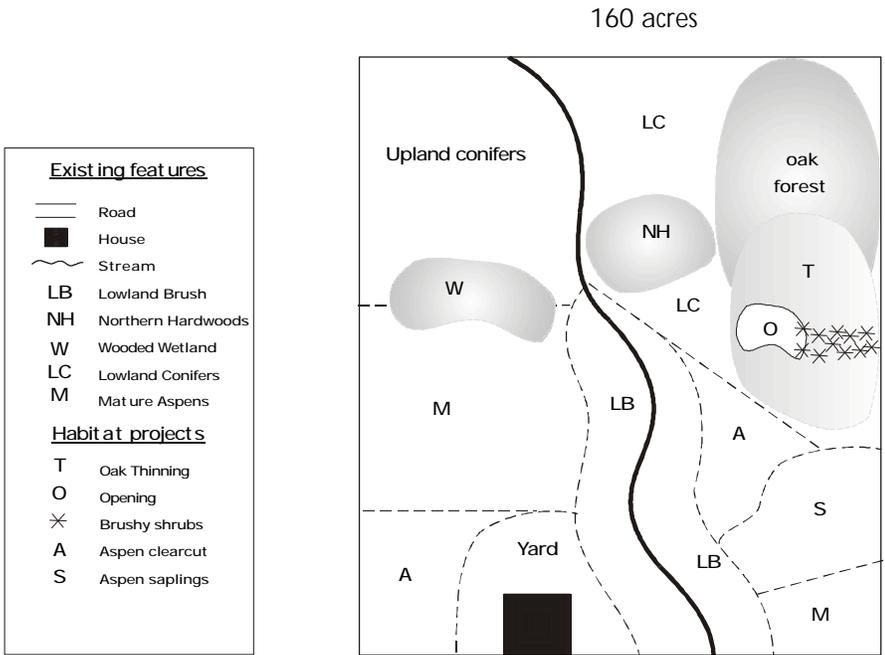
- Restrict the use of pesticides whenever possible. Hand application is better than broadcast application to eliminate undesirable plant species.

- Gate, or otherwise close timber roads and skid trails to human access and revegetate with clover and appropriate grasses as soon as possible. Please see the chapter on **Forest Openings**.

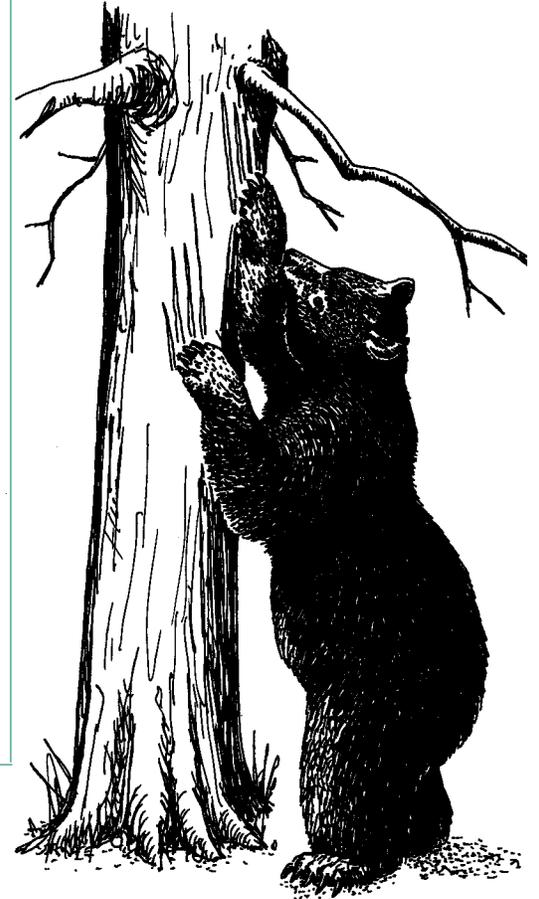
In summary, bears and humans can live without conflict if large expansive forests and swamps are left unfragmented and food producing forest openings are maintained. It is important not to artificially feed bears and attempt to bring them around your house. They are a species that you can share your land with but should be admired from afar.



BLACK BEARS



This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.



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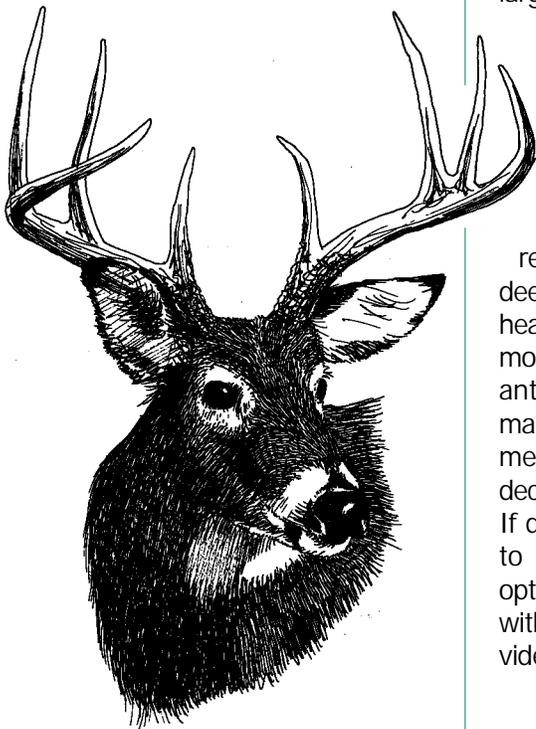


WHITE-TAILED DEER

White-tailed deer live in every county in Michigan and use many different habitats across the state. Their ability to use a variety of habitats was one of the factors that allowed the deer herd to grow from a half million animals in 1972 to nearly two million in 1989. To outdoor enthusiasts who watch or hunt deer, this is exciting. However, to others, deer are considered to be a management problem. For instance, many areas of the state are overpopulated with white-tailed deer and for some farmers, fruit growers, and rural landowners, high numbers of white-tails pose an economic problem. They may also have a tremendous negative impact on our plant communities. Therefore, as deer populations increase, there is an

inevitable result of habitat deterioration, lowered deer production and health, and frequent deer die-off. Too many deer also make for unsafe driving conditions. Thus, consider these negative impacts before deciding to manage for deer. Remember that your decisions will affect not only yourself, but also your neighbors.

To effectively manage the entire population of white-tailed deer in your area, you would need 600 to 3000 acres. However, if you would like to attract deer to your area you can do this with a minimum of 10 to 20 acres. The number of deer in an area depends on the kind and quality of habitat available, and the rate of deer loss. Currently, there is an annual surplus of deer because there is a large amount of quality habitat.



Since adult deer have few natural predators, harvesting deer through hunting helps to keep the herd in balance. A deer herd can increase rapidly, therefore, it is necessary to remove at least one-quarter of the deer herd each year to maintain a healthy and stable population. In most cases, half of these deer are antlerless. In addition, managing mature forests and discouraging fragmentation will help control or decrease deer numbers in your area. If deer are a problem, you may want to consider these management options. You may also wish to consult with a wildlife biologist who can provide guidance with this problem.

Deer Habitat

Deer thrive best in areas with young forests and brush where they feed on buds, branches, fresh grass, and green leaves that are close to the ground. In an older forest, these resources are not within their reach. If a forest stand is too old to support deer, quality habitat can be created by logging and developing forest openings. If existing habitat is fields, croplands, marshes, or other young cover types, deer habitat improvement may involve the planting of grasses, trees, shrubs, or annual food plots.

It is important to note that habitat needs for whitetails vary by season and area of the state. Deer, in different parts of Michigan, use different types of cover. In northern Michigan, deer may use a conifer swamp during cold winter days and venture out to feed on brush and young trees during milder days. Farmland deer may bed in woodlots, protect their fawns in cattail marshes, and feed in corn fields. Suburban deer may bed in cemeteries, graze on golf courses, and seek cover on a brushy hillside behind a shopping center.

Spring and Summer

When spring arrives, deer are looking for green growth to help them recover from limited and low-quality winter food. Deer feed throughout the early morning and spend the rest of the day bedded down along the edge of a field or in heavy cover such as cattail swales. They feed again from dusk until midnight spending



the remainder of the night resting in seclusion.

During spring and summer, it is important to have fields that green up early. They favor early growing grasses and legumes such as Canada wild-rye, June grass, orchard grass, blue grass, timothy, and clovers like medium-red, alsike, and ladino.

Because of the lower nutrient value of winter foods, it is important for does to increase their nutrient intake in spring to prepare for fawning. Improved nutrition promotes healthier fawns and better antler growth. Mineral blocks placed near field edges can be beneficial only if quality spring food is available.

During late May and early June,

does enter the period when birthing and raising this year's fawns are their primary focus. Michigan deer are very productive animals. More than 90 percent of the adult does become pregnant, and most carry twins. The herd size may increase at an average annual rate of 20 to 30 percent. In some areas, the population may double in three years.

During summer, food is much more abundant than at other times of the year. Summer foods include leaves of select trees and shrubs such as aspen, red maple, white ash, blackberries, dogwoods and sassafras. Important grasses for food include orchard grass, timothy, blue grass, redtop, wheat, and oats. Deer also eat agricultural crops of corn, soybeans, buckwheat, clovers, and alfalfa. Common ragweed, lamb's quarter, jewelweed, orchids, garden vegetables, and ornamentals are also heavily grazed.

Autumn

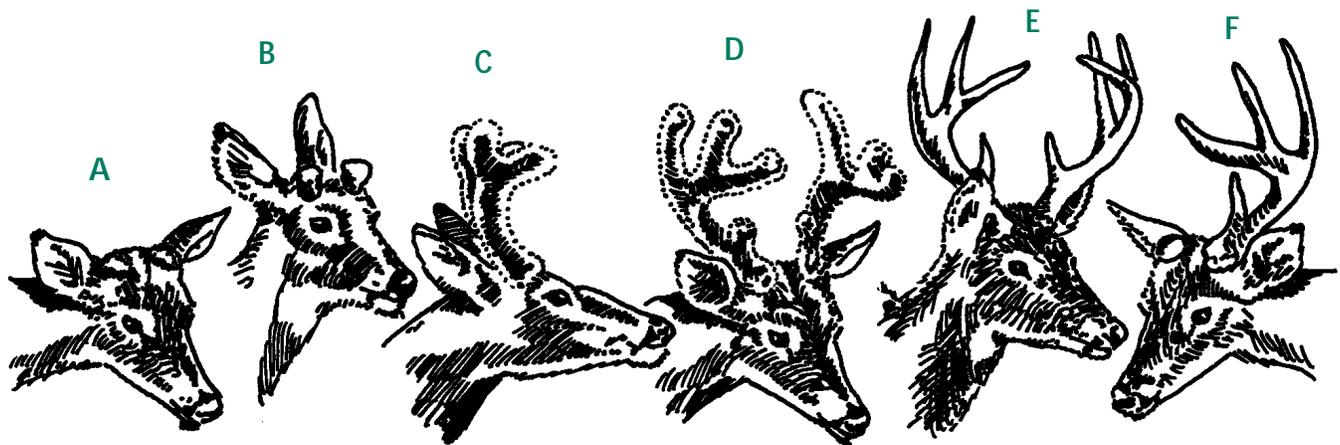
The major activity for deer in autumn is breeding. During this time deer move considerable distances as part of their breeding behavior and in response to changes in food supplies. Autumn nutrition is important to deer

since their physical condition as they approach winter has a strong bearing on their survival. During this period, deer must build fat reserves to help them survive. Fall foods must be abundant and high in nutritional value. Important foods include acorns, beech nuts, crabapples, maple and dogwood leaves, willow, and brambles. Preferred agricultural crops include corn, soybeans, apples, and fall-planted grains such as wheat.

Vegetative cover used during autumn is similar to that used during summer months. Open areas are used during the night, while in daytime brushy areas are preferred. Standing corn is not only a high quality food source, it is also often used during the fall as escape cover, as well as travel and resting sites. Quality fall cover includes cattail swales, standing corn, switchgrass fields, and plantations of young pines 10 to 20 years old.

Winter

Winter is the most critical season of the year. Deer mortality can be excessive if food and thermal cover are inadequate. Winter losses in local areas can range from as low as five percent in quality food areas to 50



(A) January 30 — Recently shed, pedicles healing.
(B) March 15 — New antler growth beginning.

(C) May 1 — Antlers begin to branch
(D) June 30 — All tines are formed, growth will continue until velvet is shed.

(E) September 15 — Antlers fully developed.
(F) January 15 — Antler shedding occurs.

WHITE-TAILED DEER

percent where food resources are severely restricted. Winter mortality depends on winter severity, and quality and quantity of available food.

During winter, protection from the cold and wind is important. Cover can be provided by hardwood and conifer swamps, brushy areas, and dense switchgrass or pines. Swamp conifers and hemlock are important because they help slow the wind and serve as thermal cover. Three to 10 acre dense plantations of spruce or Jack pine, 10 to 25 feet tall, also provide beneficial winter cover.

Important winter food sources include white pine, white cedar, red maple, yellow birch, dogwood, viburnum, sumac, and aspen. Since the major food during this season is woody browse, branches, buds, and leaves must be within reach to provide benefits. These foods are abundant in wooded areas that have had recent logging activity.

Deer movements during the winter months decrease and they may spend most of their time near winter cover. It is important that they find food within one-quarter mile of this cover. In areas of adequate soil quality and growing season length, agricultural crops planted near winter



cover are of considerable value.

Management Activities

The following are options to consider when managing for deer:

- Aspen management:* Clearcut one to ten acre areas on a rotating basis so that the overall stand has a chance to regenerate every 40 years. These cuttings should be at least 100 feet wide, irregularly shaped to provide maximum edge, and well distributed to prevent an over-concentration of deer. The goal is to conduct one or two cuttings within every 40 acres of forest, every ten years. For maximum regeneration, cut the trees in winter. To provide escape cover, leave clumps of aspen or other tree species within clearcuts larger than 15 acres. Also spare one to three standing dead or dying trees per acre because these provide den sites for wildlife.

- Oak management:* Manage the stand for full crowns and reduced competition from other trees. Thinning oak and beech stands allow the remaining trees to grow into large, more consistent nut-producing trees as well as promoting new growth. Thin 20 - 50% of the canopy every 10 - 20 years. This management option is optimal for areas with lower populations of deer since areas with high populations will have less regeneration because of heavy browsing on saplings.

- Northern forest management (hemlock and white cedar):* Cutting in these areas is discouraged. These tree species have difficulty regenerating when heavily browsed. The best habitat con-



Deer food: Aspen leaves and branches, acorns, and crabapples

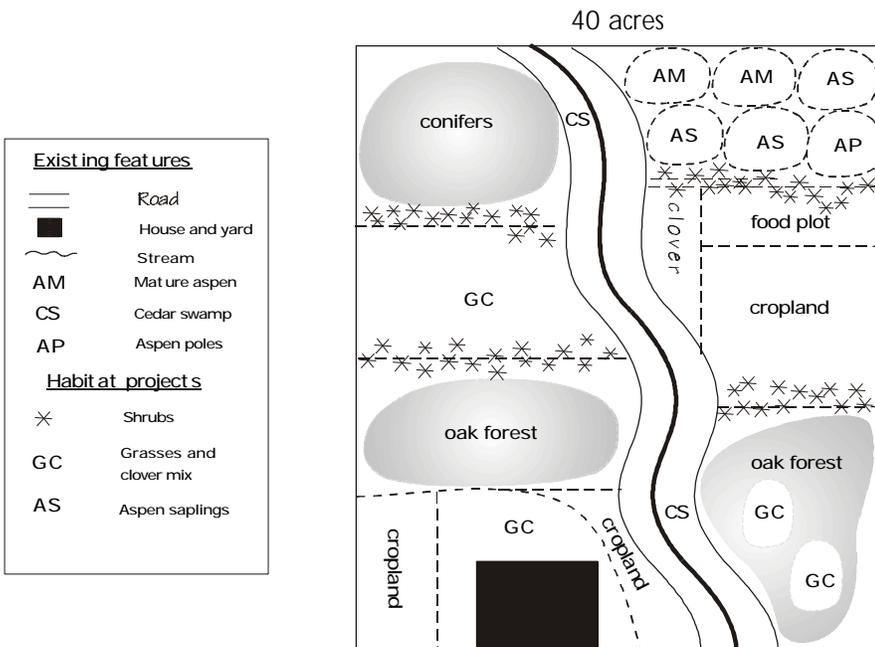
tains 70 percent canopy closure. These conditions reduce ground-level snow accumulations, provide warmer nighttime temperatures, and decrease wind chills. Deer are able to subsist on the choice woody browse within such stands.

- Grassland management:* Maintain areas one to five acres in size per 40 acres. Openings should be at least 100 feet wide and irregularly shaped. Once established, openings should be maintained by mowing or burning. Plant high quality travel corridors of trees, shrubs, or grasses for food and cover. Plant early growing grasses for spring food near woods, fencerows, wetlands, and brushy areas. These fields should be 1 to 5 acres in size and at least 60 feet wide. Fields on east- or south-facing slopes are preferred since they are likely to green up earlier. Ideal fawning areas consist of grassy areas located next to forest edges, with heavy, concealing ground cover. Fawning areas produce higher quality forage if mowed and fertilized in August every third year.

Techniques to Deter Deer

Where deer are considered a nuisance because of crop damage, many

WHITE-TAILED DEER



are negative impacts that may occur not only to your land but the surrounding. Choose your management options carefully to either maintain, increase, or decrease deer on your property.

This map is an example that demonstrates the many management options discussed throughout this chapter. The option(s) you choose should depend not only on your goals, but the location, condition, and present use of your land.

techniques can be practiced to protect crops or reduce crop losses. Planting lure crops of buckwheat, turnips, clover, corn, or soybeans on idle land, or set-aside lands may encourage deer to eat less crops designated for harvest. Plant these lure crops between major woodlands and production fields. Increasing woodland foods may also deter deer from your crops. Although there are some habitat changes and crop management techniques that reduce crop loss to deer, hunting is the most effective and least expensive way to control crop damage.

There may be special hunting permits available for landowners with

extensive deer problems. These permits may be obtained by landowners with documented cases of agricultural and horticultural damage. Other permits may be obtained by landowners in areas with documented deer diseases that affect livestock, human health, the welfare of the deer herd or an area of serious deer over population. These special permits may be used to harvest antlerless deer only, and do not count against a hunter's regular bag limit.

In summary, it is relatively easy to attract deer to your property. However, it is difficult for a landowner to manage an entire population. Remember, if you attract deer, there

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