# **Eastern Deciduous Forest**

# American woodcock

### **General information**

The American woodcock is a ground-dwelling, migratory shorebird that primarily inhabits moist, young forest and shrubland. They breed, nest, and raise their broods from March to June in their northern range. They migrate to their southern range in the fall through winter.

This game bird has declined steadily over the past 25 years as a result of land-use changes that have resulted in forest maturation, fire suppression, and increased human development. High-quality woodcock habitat has a diverse arrangement of dense, young forest (and must include some moist sites) on 80 percent of the area, interspersed with large fields (at least 5 acres in size and one field per 100 acres) and small openings (at least 0.5 acre in size and eight fields per 100 acres) in close proximity.





## **Habitat requirements**

*Diet*: invertebrates (earthworms equal 60 percent of diet) *Water*: obtained through diet

*Cover*: courtship sites – 0.5+ acre forest openings with sparse herbaceous groundcover and scattered shrubs and/or young trees

Foraging cover – young forest (2- to 15- year-old hardwoods) or shrub cover on moist sites Nesting cover – 1- to 5-acre areas of young forest (moist or upland; 2- to 25- year-old hardwoods with a dense shrub mid-story in older stands). Nests are located in slight depressions among dead leaves on the forest floor.

Brood-rearing cover – 1- to 5-acre areas of young forest (2- to 25-year-old hardwoods with sparse groundcover and some bare ground)

Roosting cover – 5+ acre openings with herbaceous cover and scattered shrubs or young trees within 0.5 miles of foraging cover

## Wildlife management practices

*Control Nonnative Invasive Vegetation*: may be necessary if habitat quality is degrading and the native plant community is being outcompeted

*Edge Feathering*: will create a soft edge between openings or agricultural fields and the forest that will encourage shrub and/or young tree growth

*Forest Management:* can produce a diverse-age forest canopy. On larger properties, forest regeneration cuts, especially *Clearcut* and *Group Selection*, can provide a mosaic of openings and successional stages *Livestock Management*: exclude livestock from areas managed for American woodcock

*Plant Shrubs*: where there is a lack of interspersed shrubs for foraging, nesting, courtship, or roosting cover

Plant Trees: where there is a lack of forest cover

*Set-back Succession*: Because smaller properties may not be practical for a forest rotation and woodcock do not use hardwood forests older than about 25 years, it may be necessary to use chainsawing/feller-bunching, prescribed burning, and/or herbicide applications to maintain shrub and young tree growth. These methods and root-plowing may also be used to create and maintain forest openings on large or small properties.

**Decrease Harvest**: may be necessary when surveys show a decline in the local population **Wildlife or Fish Survey**: surveys on singing-grounds provide an index to the relative size of the woodcock breeding population

# **Black bear**

## **General information**

Black bears primarily use mature deciduous or mixed deciduous/coniferous forest interspersed with early successional openings containing soft mast. Young regenerating stands, shrub thickets with dense brushy cover, and riparian corridors are also used. Black bears are generally secretive and avoid human contact. However, black bears are highly adaptable and may occur in and around human dwellings and become problematic, especially if food is available. Black bears are primarily nocturnal, but may be seen anytime during the day. They hibernate in winter (even in warm climates such as Florida and Louisiana) and have large home ranges (several square miles) that vary based on sex, age, and/or time of year. In general, adult male home ranges (up to 50 square miles) are much larger than female home ranges (15 square miles). Black bears are omnivorous. However, more than 90 percent of their diet consists of vegetation. Liberalizing or restricting females in the harvest influences population growth. Regulation of bear population density is influenced by public tolerance





toward bear-human conflicts, property damage, livestock and agricultural damage, and the desire to see bears.

## **Habitat requirements**

*Diet*: in spring, skunk cabbage, squaw root, grasses, and insects; occasionally, small to medium-sized mammals, such as deer fawns and young livestock (calves and lambs) are preyed upon; during summer and early fall, a variety of soft mast, such as blackberry, blueberry, serviceberry, black cherry and pokeweed, are important; during late fall, acorns, beechnuts, and hickory nuts, as well as field corn and soybeans, help bears prepare for hibernation; when natural foods are scarce, bears may wander near human residences and feed on bird seed, dog/cat food, and other food scraps

*Water*: free-standing water is used for drinking; spring seeps and other shallow water sources are used to cool off and get away from biting insects; water is seldom a limiting factor because black bears have such a large home range

*Cover*: mature hardwood or mixed hardwood-conifer forests for foraging; brushy areas and young regenerating forest for loafing and escape; early successional openings primarily for foraging, usually for soft mast; rock crevices, excavations, hollow trees, dense mountain laurel and rhododendron thickets for hibernation

## Wildlife management practices

*Control Nonnative Invasive Vegetation*: when nonnative invasive vegetation begins to reduce habitat quality for black bear

*Edge Feathering*: can stimulate increased soft mast production around row-crop fields (especially corn, soybean, and wheat)

**Forest Management**: Forest Regeneration (Clearcut, Shelterwood, Group Selection) creates dense escape and loafing cover for bears; an abundance of soft mast (pokeweed, blackberry, huckleberry, blueberry) is usually available in recently regenerated stands; *Timber Stand Improvement* practices can stimulate increased hard mast production and can stimulate groundcover, which usually increases soft mast production. *Leave Crop Unharvested*: strips of corn, wheat, grain sorghum, or soybeans should be left standing, especially where adjacent to escape cover, to provide food close to cover

*Plant Food Plots*: where available food may be limiting, forage and grain plots (especially corn) may be planted to provide additional nutrition

*Plant Shrubs*: crabapple, blueberry, hawthorn, wild plum, elderberry, and others can be planted within forest openings where soft mast is lacking

*Plant Trees*: apple, pear, cherry, persimmon, mulberry, and dogwood are good choices to provide additional soft mast

*Set-back Succession*: *Prescribed Fire* can stimulate groundcover and soft mast in early successional openings, maintain shrub cover when quality begins to decline, and stimulate understory structure and soft mast availability in forests, especially where sufficient sunlight reaches the forest floor

*Tillage Management*: eliminate tillage in the fall to provide additional waste grain during winter, especially when adjacent to dense shrub or forest cover

**Decrease Harvest**: may be necessary when additional bears are desired and hunting pressure may be limiting population growth

*Increase Harvest*: where populations can sustain additional hunting pressure for recreation and where populations need to be lowered

*Wildlife Damage Management Techniques*: may be needed if bear-human conflicts occur in agricultural or urban settings

*Wildlife or Fish Survey*: scent stations, camera surveys, and hunter harvest data are used to estimate population trends

# Bluegill

## **General information**

The bluegill is one of the most abundant Sunfish species. It thrives in a variety of conditions, ranging from freshwater lakes, ponds, and slow moving streams, to brackish waters of coastal areas. The bluegill's native range is the eastern U.S. from southern Canada to Florida and Texas, but they have been successfully introduced throughout the U.S.

## Habitat requirements

*Diet*: a variety of zooplankton (microscopic animal life) during the first few months of life, progressing to insects and their larvae, eggs, earthworms, tadpoles, small minnows, and crayfish *Cover*: submerged rocks, woody debris, and aquatic vegetation where small fish (prey) hide *Water*: basic requirements include dissolved oxygen (minimum of four parts per million); pH between 6.5 and 9.0; and water temperature should reach at least 70 F during summer (one foot below surface in the shade)





## Wildlife management practices

*Livestock Management*: livestock should either be excluded from fish ponds or only allowed access to a small part of the fish pond; livestock watering facilities should be developed away from the fish pond *Repair Spillway/Levee*: if not functioning properly

*Water Control Structures*: should be installed if none are present so water depth can be controlled *Decrease Harvest*: refer to wildlife management practices for specifics on fish harvest

Increase Harvest: refer to wildlife management practices for specifics on fish harvest

*Wildlife or Fish Survey*: fishing records, seining, and electro-shocking are used to survey bluegill populations

*Construct Fish Pond*: where no suitable water source is present or where an existing fish pond needs extensive repair, especially to the dike or dam

**Control Aquatic Vegetation**: when necessary to discourage rooted aquatic vegetation **Fertilize/Lime Fish Pond**: fertilize to promote phytoplankton growth when visibility is more than 18 inches below the water surface; add agricultural limestone to increase soil pH if total alkalinity is below 20 ppm

**Reduce Turbidity in Fish Pond**: by reseeding watershed if soil is eroding into the pond and causing muddy water, by preventing livestock from entering pond, by eliminating bottom-feeding fish, or by reducing suspension of negatively charged clay particles

**Restock Fish Pond**: if the population is too far out of balance to correct via seining or fishing or if undesirable species are present

**Streams: Create Pools**: in streams lacking slow water, add features such as rocks, logs, and dikes to create pools to provide structure for aquatic plants, insects, and locations for spawning; be cautious that "improvements" do not increase bank erosion.

*Streams: Remove Fish Barriers*: dams or other barriers restrict fish movement during weather extremes (e.g., drought, freezing cold); improve survivability by allowing fish movement to deeper pools or rivers.

# **Bobcat**

## **General information**

Bobcats occur throughout the U.S. Bobcats are carnivorous predators and are seldom active during the day. Bobcats may be a significant cause of mortality to pronghorn and wild turkeys, but are not considered a major source of mortality for deer. They are classified as a furbearer game species in many states.

#### **Habitat requirements**

*Diet*: rabbits, rodents, opossums, raccoons, skunks, deer, snakes, and many bird species, including wild turkeys, northern bobwhite, domestic poultry, and other livestock

*Water*: water requirements are not well known; free-standing water is used

*Cover*: dense cover, rocky outcrops and ledges, hollow logs, and other sheltered spots for denning





## Wildlife management practices

*Control Nonnative Invasive Vegetation*: when nonnative invasive vegetation begins to reduce habitat quality for bobcat prey species

Edge Feathering: can provide increased cover and food for prey species

Field Borders: can provide increased usable space for bobcat and prey species

**Forest Management**: Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection) will provide increased dense cover and food resources for various prey species; *Timber Stand Improvement* can provide enhanced understory development and forage for various prey species; down woody debris (logs) can provide denning sites for bobcat

*Livestock Management*: should prevent overgrazing; livestock should be excluded from forests to prevent destruction of forest understory, which provides food and cover for many prey

**Plant Shrubs**: where additional shrub cover is needed to attract prey and provide security cover **Plant Trees**: in areas where additional forest cover is needed to attract prey and provide security cover **Set-back Succession**: Prescribed Fire can be used to maintain early successional communities, Herbicide Applications, Chaining, Drum-chopping, and Root-plowing can be used to reduce or maintain shrub cover

**Decrease Harvest**: may be necessary when additional bobcats are desired and hunting or trapping efforts may be limiting growth

*Increase Harvest*: where populations can sustain additional hunting or trapping pressure for recreation and where populations need to be lowered

*Wildlife Damage Management*: may be necessary if poultry or other livestock depredation is a problem *Wildlife or Fish Survey*: track counts, scent stations, and trail cameras are used to estimate population trends

# **Brown thrasher**

### **General information**

Brown thrashers are normally found in shrub and bramble thickets, hedgerows, shelterbelts, young forests, forest edges, and brushy riparian areas. Brown thrashers forage primarily on the ground, using their beaks to turn-over leaves and debris looking for food. More food is available when there is substantial ground litter (leaves and debris). Nests are usually found in bushes or small trees 1 to 10 feet aboveground.

## **Habitat requirements**

*Diet*: invertebrates and plant seeds are main items in diet, but soft and hard mast are also eaten

Water: water requirements are not known

*Cover*: dense shrubs and brambles interspersed with some trees are used for nesting and escape cover; will use areas that have only shrubs; need a minimum of 2.5 acres of habitat to support a breeding population





## Wildlife management practices

*Control Nonnative Invasive Species*: when nonnative invasive species begin to compete with native species and degrade habitat for brown thrashers

Edge Feathering: will enhance habitat around the edge of fields

*Field Borders*: of brambles and shrubs will provide additional nesting and foraging cover *Forest Management: Forest Regeneration*, especially *Clearcut*, *Shelterwood*, and *Seedtree* will improve vegetation structure for nesting and foraging; *Timber Stand Improvement* can improve habitat by stimulating understory development

*Livestock Management*: should exclude livestock from riparian areas, shrublands and forests to allow shrubs and trees to regenerate

**Plant Shrubs**: in open areas of at least 2.5 acres to create additional cover for nesting/foraging **Set-back Succession**: Prescribed Fire, Chaining, and Herbicide Applications can be used to maintain and rejuvenate shrub cover when habitat quality begins to decline; Chainsawing can be used to clear woods and create additional brushy cover

Wildlife or Fish Survey: point counts can be used to survey populations

# Eastern box turtle

#### **General information**

The eastern box turtle occurs statewide in Arkansas. The subspecies called the three-toed box turtle inhabits our state. Their shell and limbs vary greatly in color from dullish brown to yellow and orange. It prefers deciduous or mixed woodlands, but will also inhabit thickets, old-fields, pastures, and wetlands. The species is named for its high, domed-shaped shell that closes tightly into a "box" when the turtle is alarmed.

The eastern box turtle is active throughout spring, summer, and fall. During the hot, dry summer months it is often found soaking around the edges of ponds, streams, or wetlands. When temperatures begin to drop in late fall, it burrows into the leaf litter and loose soil to overwinter (for up to six months of the year). It burrows deeper into the ground as the soil temperature drops. The same overwintering location may be used year after year. Eastern box turtles are long-lived reptiles. They have been recorded to live more than 100 years in the wild.

#### **Habitat requirements**

*Diet*: omnivorous; earthworms, snails, slugs, insects, mushrooms, numerous leafy greens, and soft mast (fruit)

Water: requires water to soak during the hot, dry months of the active season

*Cover*: moist, forested areas with a diverse understory and abundant leaf litter; nesting cover found in moist soil within small openings with an open structure at ground level

#### Wildlife management practices

*Control Nonnative Invasive Vegetation*: when nonnative invasive vegetation begins to compete with native vegetation and reduce habitat quality

Field Borders: to increase usable space around row crop fields

Forest Management: Forest Regeneration (Group Selection) and Timber Stand Improvement can increase understory vegetation for food

*Livestock Management*: should prevent overgrazing in open areas; livestock should be removed from forested areas to maintain understory

*Plant Native Grasses and Forbs*: to provide cover in open areas where there is little to no vegetation *Plant Shrubs*: where adequate cover is lacking in large open areas

*Plant Trees*: where additional forest cover is needed

**Set-back Succession**: Prescribed Fire and Disking are recommended to maintain herbaceous openings and provide open structure at ground level; it is important these practices occur during the inactive season to minimize negative effects on the turtles

*Water Development for Wildlife*: small ponds should be provided when water is absent *Wildlife or Fish Survey*: transect counts and dogs are used to estimate population trends

# **Eastern cottontail**

## **General information**

Eastern cottontails occur in the eastern half of the country. They prefer brushy cover interspersed with herbaceous openings. Eastern cottontails are also found in suburban areas, parks, golf courses, and stream corridors. Eastern cottontails are prey for the majority of carnivorous predators within its range. They are prolific breeders; females may have 7 litters per year, with 3 to 6 young per litter. This reproductive rate is required to perpetuate populations because 70 to 80 percent of all rabbits die each year.

#### **Habitat requirements**

*Diet*: forbs and grasses, browse, and soft mast from spring through fall; in winter, bark of shrubs and trees, as well as buds, grain, and browse

Water: necessary water obtained from diet

Cover: shrub cover, brushpiles, native warm-season grasses and

forbs for loafing and escape cover; burrows are also used for denning and escape

## Wildlife management practices

*Control Nonnative Invasive Vegetation*: where nonnative invasive vegetation is competing with native vegetation and limiting habitat for cottontails

Edge Feathering: to increase usable space around fields

Field Borders: to increase usable space around fields

**Forest Management**: Forest Regeneration (Clearcut), provides optimal brushy cover for a few years **Leave Crop Unharvested**: to provide additional food and cover, especially corn, alfalfa, and wheat **Livestock Management**: should exclude livestock from food plots and prevent overgrazing to allow sufficient herbaceous vegetation for nesting, cover, and forage

*Plant Food Plots*: where additional forage or grain is needed; best situated adjacent to dense brushy cover

*Plant Native Grasses and Forbs*: where early successional cover is limiting and planting is required to promote additional grasses and forbs

*Plant Shrubs*: in relatively large openings with few shrubs; field borders, fence rows, and other idle land areas are good places to plant

**Set-back Succession**: Prescribed Fire, Disking, and Herbicide Applications are recommended to maintain herbaceous openings, especially when litter accumulation or woody encroachment is excessive; Chaining, Prescribed Fire, and Herbicide Applications can be used to rejuvenate shrublands, especially where herbaceous groundcover is shaded out; in areas dominated by mesquite, Chainsawing and Root-plowing can be used to convert forest cover to early successional communities

**Tillage Management**: cropland tillage may be delayed in spring to allow use of standing stubble for cover; tillage may be eliminated in the fall to allow access to waste grain **Decrease Harvest**: may be necessary when additional rabbits are desired and hunting or trapping efforts are limiting growth; low rabbit populations are almost always a result of inadequate habitat, not harvest levels

*Increase Harvest*: where populations can sustain additional hunting or trapping pressure for recreation or where populations need to be lowered

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*Wildlife Damage Management*: shooting, trapping, and exclusion techniques can be used where there is damage to ornamental and garden plants

*Wildlife or Fish Survey*: observation counts, track counts, hunter harvest data, and transect flush counts can be used to estimate population trends

Mowing: can be used to maintain herbaceous openings in Urban areas

# Eastern gray squirrel

## **General information**

The eastern gray squirrel lives primarily in mature deciduous forests and woodlands. They also forage along the edge of crop fields, especially mature cornfields. Eastern gray squirrels have adapted to parks and other urban areas where mature trees are available. Eastern gray squirrels forage both in trees and on the ground. They den in cavities of mature trees and also build nests, generally 30 feet or more aboveground. Eastern gray squirrels will use nest boxes, but nesting structures are not necessary because squirrels build nests when cavities are not available. Thus, cavities are not a limiting factor for eastern gray squirrel populations.

## **Habitat requirements**

*Diet*: a variety of hard and soft mast, miscellaneous seeds, grains, bark, buds, and mushrooms; they may also eat eggs *Water*: necessary water is generally obtained through diet, but freestanding water is also used

*Cover*: mature forest and woodlands; suburban and urban areas with mature trees; den in tree cavities and also build nests of leaves and twigs

# Wildlife management practices

**Control Nonnative Invasive Vegetation**: when nonnative invasive vegetation begins to compete with native species and reduce habitat quality for eastern gray squirrel; several nonnative trees, such as treeof-heaven and royal paulownia, and nonnative groundcover and vines, such as Japanese stiltgrass, kudzu, and English ivy, can displace more valuable native species and make finding food difficult **Edge Feathering**: can enhance forest structure and increase food availability in forested areas surrounding fields

**Forest Management**: Forest Regeneration (Group Selection, Single-tree Selection) can increase soft mast and availability of various seed-producing plants used by eastern gray squirrels; *Timber Stand Improvement* can encourage larger crowns of mast-producing trees and enable oaks, hickories, beech, and others to produce more mast; can also increase soft mast availability and provide snags for potential den sites

*Livestock Management*: should not allow overgrazing in woodlands; livestock should be excluded from forests to prevent overgrazing of the forest understory; livestock should be excluded from riparian areas in open landscapes where tree cover is largely limited to riparian areas; livestock should be excluded from areas where trees have been planted to enhance habitat for eastern gray squirrels

*Plant Food Plots*: grain food plots, especially corn, can provide an important food source, during winters with poor mast availability

**Plant Trees**: plant mast trees (especially oaks and hickories) where they are limiting; most appropriate for large open areas that do not represent habitat for gray squirrels; may also be appropriate where composition of wooded areas is lacking mast and limiting gray squirrel population

**Decrease Harvest**: may be necessary when additional gray squirrels are desired and hunting pressure is limiting population growth





*Increase Harvest*: where populations can sustain additional hunting pressure for recreation and where populations need to be lowered

*Wildlife Damage Management*: may be required if squirrels become a nuisance around houses *Wildlife or Fish Survey*: observation counts are most often used to estimate population trends *Artificial Feeders*: may be used in Urban areas

# Eastern meadowlark

### **General information**

Eastern meadowlarks are medium-sized songbirds that live in grasslands throughout the eastern U.S. They have a bright yellow breast with a black chevron marking on the chest. They are often seen singing from fencepost, power lines, or hay bale perches during spring. Eastern meadowlarks are grassland obligates; that is, they require and are only found in grasslands. Males require grassy fields of at least 6 acres to establish territories and, even then, they may not be present if the surrounding landscape is forested. They prefer native grasslands, but will use pastures and hayfields of nonnative grasses.

Eastern meadowlarks nest on the ground and the female builds the nest of dead grass leaves. Nests contain 2-7 eggs and eastern meadowlarks may have 2 broods per year. Females will usually abandon their nests if they are disturbed off the nest while they





are incubating. Although males boldly sing in the spring, eastern meadowlarks are relatively shy, slinking away from intruders within the grass cover. Eastern meadowlarks primarily eat insects, but also consume various seed during winter. They forage while walking on the ground. Haying, overgrazing, and conversion of grasslands to row-crop agriculture or human development are major problems for reproductive success and population maintenance. Eastern meadowlark populations have declined 70 percent since

1970.

#### **Habitat requirements**

Diet: insects, especially grasshoppers, crickets, and caterpillars (moth larvae) and grubs (beetle larvae); various seed and grain in winter *Water*: obtained in diet *Cover*: grasslands at least 6 acres in size

## Wildlife management practices

*Control Nonnative Invasive Vegetation*: when nonnative invasive vegetation begins to degrade habitat for eastern meadowlark

*Livestock Management*: grazing pressure should be managed to maintain an average grass height of at least 18 inches

**Plant Native Grasses and Forbs**: when grassland cover is limiting; little bluestem, broomsedge bluestem, and sideoats grama provide excellent nesting structure; native grasses and forbs should be planted when converting agricultural fields or forested areas to eastern meadowlark habitat to ensure optimum grass coverage and structure

**Set-back Succession**: Prescribed Fire is strongly recommended to maintain and rejuvenate grasslands; Prescribed Fire and Herbicide Applications can be used to reduce unwanted encroachment of woody species; Chaining can be used to reduce shrub cover; Chainsawing and Root Plowing can be used to convert forests to grasslands

Wildlife or Fish Surveys: point counts are used to estimate trends in populations

# Elk

## **General information**

Elk primarily occur in mountainous regions of western North America (from New Mexico to Oregon and Canada). They also have been reintroduced in multiple states of the eastern United States, including Arkansas. Elk are ruminants (animals with a four-chambered stomach), as are the other ungulate species common to North America, such as white-tailed deer. Elk stomachs are much larger than those of deer, which allows elk to eat more and bed down to chew their cud for an extended period. For this reason,

elk may only feed twice a day during some portions of the year to avoid risk of predation.

Elk use mature forest with interspersed openings. This type of cover supplies food and provides protection from predation and weather. Male elk (bulls) rigorously defend a harem (breeding groups of up to 30 cows) during breeding season (September – October). Nutritional requirements and diet change seasonally. Elk rely on grasses and forbs in spring and



summer, and eat less-preferred browse, such as aspen, maples, and poplar, during winter when food availability is limited. Cows that occupy ranges with high elevations will migrate to lower elevations and south-facing slopes in winter to find food and avoid deep snow and cold winds. Elk can cause significant damage to ornamental plantings, forest crops, and row crops when overabundant, and can be hazardous for motor vehicles.

### Habitat requirements

*Diet*: predominantly grasses and forbs, but also browse, especially when palatable grass and forbs are not available

*Water*: free-standing water used regularly in summer; water should be within one-half mile *Cover*: mature woods for loafing and calving; early successional openings and young forest for foraging

# Wildlife management practices

*Control Nonnative Invasive Vegetation*: when nonnative invasive vegetation begins to reduce habitat quality for elk

Edge Feathering: may increase forage availability in woods around fields

**Forest Management**: Forest Regeneration (Clearcut, Shelterwood, Group Selection) will provide additional forage for a few years; Timber Stand Improvement can improve forage availability and stimulate understory/midstory cover

*Livestock Management*: livestock should be excluded from forested areas managed for elk; where elk is a focal species, livestock grazing in open lands and woodlands should be managed to prevent overgrazing and provide sufficient forage for elk

*Plant Food Plots*: where naturally occurring food sources are limited, forage food plots may provide additional nutrition, particularly during late summer and winter in some areas

*Plant Native Grasses and Forbs*: elk are grazers and eat native grasses; planting may be necessary where forage is lacking or where forage quality is insufficient

Plant Trees: where additional forest cover is needed

**Set-back Succession**: Prescribed Fire is recommended to maintain early successional openings and stimulate additional herbaceous forage in forested areas with adequate sunlight; *Chainsawing* and *Rootplowing* may be used to convert forest to early succession and increase forage availability

*Water Developments for Wildlife*: small ponds may be constructed if water is not available within onehalf mile

**Decrease Harvest**: may be necessary when hunting pressure is limiting growth of elk population where an increase is desired

*Increase Harvest*: where populations can sustain additional hunting pressure for recreation and where populations need to be lowered; when populations need to be lowered because of habitat considerations, increased harvest should concentrate on females

*Wildlife Damage Management*: necessary when elk begin to damage hay and crop fields, or when they become a nuisance in suburban areas; both lethal and nonlethal practices can be effective

*Wildlife or Fish Survey*: aerial surveys, observational counts, and trail cameras can be used to estimate population trends

# **Gray fox**

# **General information**

Gray foxes are typically associated with deciduous forest landscapes, and generally avoid areas with large expanses of agriculture. They are most active at night or near dawn and dusk. Dens are used primarily during the breeding season. Gray foxes are unique among Canids (species in the family that includes dogs) because of their ability to climb trees.

## **Habitat requirements**

*Diet*: primarily small mammals, birds, insects, hard and soft mast, and occasionally carrion

*Water*: requirements largely unknown; gray foxes likely drink freestanding water and get some water from the foods they consume *Cover*: mostly deciduous forest; breeding dens are located in brushy or wooded areas and found in hollow trees or logs, under large





rocks, or in underground burrows; daytime resting sites are generally aboveground in trees, thickets, and brushy areas, or rocky crevices

## Wildlife management practices

*Control Nonnative Invasive Vegetation*: when nonnative species begin to compete with native plant species and reduce habitat quality for gray fox

*Create Snags*: when large (>12 inches) down woody debris is needed for breeding dens or resting sites *Edge Feathering*: to enhance cover for prey and provide additional soft mast around fields

**Forest Management**: Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection, Singletree Selection) in large areas of mature forest and *Timber Stand Improvement* practices may increase prey abundance, soft mast, hollow logs for breeding dens, and daytime resting sites

*Livestock Management*: livestock should be excluded from forested areas because they consume plants in the understory that provide cover and food for gray fox and associated prey

*Plant Shrubs*: in relatively large openings devoid of brushy cover or thickets to create resting sites, provide cover for den locations, and provide soft mast

Plant Trees: in large open areas to increase deciduous forest conditions

*Set-back Succession*: low-intensity *Prescribed Fire* can be used in forests and woodlands to enhance cover for prey and soft mast production

**Decrease Harvest**: to promote an increase in population where current harvest levels are limiting population

*Increase Harvest*: when the population can sustain additional harvest and increased harvest is desired for recreational trapping or hunting; to promote increase abundance of prey species, such as eastern cottontails or tree squirrels, if gray fox has been identified as limiting those populations; when population reduction is desired

**Wildlife Damage Management**: exclusion practices can discourage gray foxes from denning under human structures; exclusion practices and trapping can prevent gray foxes from preying on small livestock, such as chickens

*Wildlife or Fish Survey*: scent stations, track counts, and trail cameras may be used to estimate population trends.

# **Great horned owl**

## **General information**

The great horned owl is a large, thick-bodied grey-brown bird with a white patch on the throat and characteristic ear-like tufts on its head. It is found throughout North America in a wide variety of environments, including forests, woodlands, farm woodlots, orchards, grasslands, wetlands, and city parks.

The great horned owl is mostly nocturnal, evident by its large eyes, and roosts during the day in trees or on sheltered rocky ledges. As a large raptor, it has large talons used to capture prey during a dive. The great horned owl's call is a familiar, deep, 4 to 5 hoots. These owls nest in larger trees where they find cavities or previously used nests, laying 1 to 4 eggs. They are monogamous breeders and usually establish a territory near a nest site before laying eggs. The great horned owl remains abundant and widespread, most likely because of its ability to live in a wide range of environments.





#### **Habitat requirements**

Diet: extremely varied, but commonly includes small-

tomedium-sized mammals including rabbits, skunks, squirrels and others, as well as reptiles,

amphibians, large insects, and fish

Water: water obtained from diet

*Cover*: nest in abandoned nests of hawks, crows, or herons, and in large tree cavities, stumps, caves, and ledges

## Wildlife management practices

*Control Nonnative Invasive Vegetation*: when nonnative invasive species begin to compete with native species and degrade habitat for prey

*Create Snags*: where large snags (>12 inches diameter) are limiting to provide possible nesting and roosting sites

Edge Feathering: to increase usable space for prey around fields

Field Borders: to increase usable space for prey around fields

**Forest Management**: Forest Regeneration in large areas of mature forest may provide additional cover for a variety of prey species; *Timber Stand Improvement* will encourage understory development and enhance habitat for a variety of prey species

Livestock Management: where overgrazing may be limiting cover for prey

*Plant Native Grasses and Forbs*: where necessary to provide cover for prey

*Plant Shrubs*: where shrub cover is lacking and needed to enhance habitat for prey, especially cottontails *Plant Trees*: where perching sites are limited and where nesting cover does not exist

**Set-back Succession**: Prescribed Fire, Disking, Herbicide Applications, Chaining, Root Plowing, Drumchopping, and Mowing may be used to maintain early successional communities that provide habitat for a variety of prey species; Chainsawing can be used to create small forest openings and enhance habitat for several prey species. *Tillage Management*: will facilitate hunting prey when waste grain is available *Wildlife Damage Management*: may be necessary where an owl is killing poultry *Wildlife or Fish Survey*: call counts are most often used to estimate trends in populations

# Indiana bat

#### **General information**

The Indiana bat is an endangered species that occurs over most of the eastern United States. The Indiana bat population is in decline because of susceptibility to disturbance during hibernation and a disease known as white nose syndrome. Bats must store fat reserves and then hibernate (from October – April) to survive through winter when food is limiting. If they are disturbed by human activity or if cave temperatures increase, they may starve from using critical energy reserves. Male Indiana bats roost alone or in small groups during spring and summer, whereas females roost in larger maternal colonies (100+ individuals). Females give birth to one pup in June, and then young are nursed under loose tree bark, usually in wooded areas near water. Inserting gates in front of cave openings that allow passage of bats but prevent human intrusion can prevent disturbing Indiana bats during hibernation.





## **Habitat requirements**

Diet: insects (up to half their body weight per night)

*Water*: although they get some from their food, they require considerable free-standing water *Cover*: winter hibernation occurs in caves, also known as hibernacula, or other areas that are cool, humid, with stable temperatures of 33-50 F (nearly half of all Indiana bats use caves); trees with flaky bark (like shagbark hickory or mature white oak) or snags along forest edges and water bodies are used for roosting; mature mixed deciduous forest with canopy gaps and riparian zones are used for foraging

## Wildlife management practices

*Conservation Easement*: can protect property with caves that this declining species is using for hibernacula

*Control Nonnative Invasive Vegetation*: may be required if desirable trees for roosting are being outcompeted by nonnative invasive species

*Create Snags*: can provide temporary foraging and roosting sites if an adequate number of trees are not already available

**Forest Management**: Forest Regeneration (Group Selection) provides small openings used for foraging; Timber Stand Improvement can favor tree species with flaky bark used for roosting

Plant Trees: in large open areas where forest cover is limiting

*Wildlife or Fish Survey*: roost counts during hibernation and acoustic sampling surveys are used to survey Indiana bat populations

# Largemouth bass

### **General information**

Largemouth bass are not really bass but members of the Sunfish family. Largemouth bass are the most popular freshwater sportfish in states where they are found. They can be found in freshwater lakes, rivers, large streams, farm ponds, and brackish marshes.

## **Habitat requirements**

*Diet*: young bass eat insects and other invertebrates (worms, crayfish and zooplankton); adults eat small fish, such as bluegill, and a variety of minnows, as well as tadpoles, crayfish, and even ducklings *Cover*: submerged rocks, woody debris and near aquatic vegetation where small fish (prey) hide

*Water*: basic requirements include dissolved oxygen (minimum of four parts per million); pH should range between 6.5 and 9.0; water temperature should reach at least 70 F during summer (one foot below surface in shade)





## Wildlife management practices

*Livestock Management*: livestock should either be excluded from fish ponds or only allowed access to a small part of the fish pond; livestock watering facilities should be developed away from the fish pond *Repair Spillway/Levee*: if not functioning properly

*Water Control Structures*: should be installed if none are present so water depth can be controlled *Decrease Harvest*: refer to wildlife management practices for specifics on fish harvest

Increase Harvest: refer to wildlife management practices for specifics on fish harvest

*Wildlife or Fish Survey*: fishing records, seining, and electro-shocking are used to survey largemouth bass populations

*Construct Fish Pond*: where no suitable water source is present or where an existing fish pond needs extensive repair, especially to the dike or dam

Control Aquatic Vegetation: when necessary to discourage rooted aquatic vegetation

*Fertilize/Lime Fish Pond*: fertilize to promote phytoplankton growth when visibility is more than 18 inches below the water surface; add agricultural limestone to increase soil pH if total alkalinity is below 20 ppm

**Reduce Turbidity in Fish Pond**: by reseeding watershed if soil is eroding into the pond and causing muddy water, by preventing livestock from entering pond, by eliminating bottom-feeding fish, or by reducing suspension of negatively charged clay particles

**Restock Fish Pond**: if the population is too far out of balance to correct via seining or fishing or if undesirable species are present

**Streams: Create Pools**: in streams lacking slow water, add features such as rocks, logs, and dikes to create pools to provide structure for aquatic plants, insects, and locations for spawning; be cautious that "improvements" do not increase bank erosion.

*Streams: Remove Fish Barriers*: dams or other barriers restrict fish movement during weather extremes (e.g., drought, freezing cold); improve survivability by allowing fish movement to deeper pools or rivers.

# **Mourning dove**

## **General information**

Mourning doves prefer areas of annual and perennial grasses and forbs for feeding with some shrubs and trees nearby for perching, nesting and roosting. Interspersed bare ground is an important component of foraging sites because mourning doves do not scratch in the litter to find seed. Bare ground is also beneficial for doves to obtain grit (small gravel) to help in digesting food. Nests are made of twigs and placed on branches of shrubs or trees. Nests are also placed on the ground. Mourning doves often use agricultural areas for feeding on a variety of grass and forb seeds. They also forage on waste grain from cropland and livestock feedlots. Mourning doves prefer shallowly sloping or flat shorelines without vegetation for drinking.





## Habitat requirements

Diet: a variety of grass and forb seeds, as well as several agricultural grains; small areas of bare ground are beneficial for obtaining grit (small gravel) to help digest food *Water*: free-standing water required daily *Cover*: shrubs and trees are used for nesting and loafing

## Wildlife management practices

**Control Nonnative Invasive Vegetation**: when nonnative invasive vegetation begins to compete with native vegetation and reduce habitat quality for mourning dove; sod grasses, such as tall fescue and bermudagrass, are particularly problematic because they have no food value and their structure at ground level limits mobility of ground-feeding doves and their ability to search for seed **Delay Crop Harvest**: (in some ecoregions) in spring to avoid nest destruction

*Leave Crop Unharvested*: for a variety of small grain crops, such as wheat, millets, grain sorghum, corn, and oats, to provide additional food resource

*Livestock Management*: should prevent overgrazing, which can eliminate preferred forbs that produce seed for mourning dove; in some cases, livestock can be used to reduce vegetation height and increase bare ground; livestock should be excluded from food plots

*Plant Food Plots*: grain plots may be planting in areas where food is lacking and to facilitate recreational hunting

*Plant Native Grasses and Forbs*: where food may be limiting, especially to increase some of the many native forbs that are extremely important sources of seed for mourning dove

*Plant Shrubs*: (in some ecoregions) to provide nesting, roosting, and loafing sites in areas where shrub/tree cover is limiting

*Plant Trees*: (in some ecoregions) to provide nesting, roosting, and loafing sites in areas where shrub/tree cover is limiting

*Repair Spillway/Levee*: if not functioning properly

**Set-back Succession:** Disking, Prescribed Fire, and Herbicide Applications can be used to maintain annual forbs and grasses and provide bare ground; *Chaining, Drum-chopping, Root Plowing, Herbicide* 

Applications, and Prescribed Fire may be used to reduce shrub cover; Chainsawing and Root Plowing may

be used to remove trees and clear forests and promote early successional plant communities *Tillage Management*: tillage may be eliminated in the fall to allow wildlife access to waste grain; tillage may be delayed in spring (in some ecoregions) to allow nesting in standing stubble (especially wheat) *Water Control Structures*: should be installed if none are present in existing dams or levees to allow water level manipulation

*Water Developments for Wildlife*: where water is limiting, small ponds, shallow impoundments, guzzlers, and windmills may be created or installed to provide free-standing water

*Wildlife or Fish Survey*: point counts and observation counts are commonly conducted to estimate trends in populations

# Northern bobwhite

## **General information**

The northern bobwhite is a stocky game bird about 6 inches tall. They are considered shrubland obligates, which means they depend on low-growing shrubby cover, but also use grasslands, fallow fields, and savannas and woodlands with well-developed groundcover for foraging, nesting, brooding, and loafing. Ideally, bobwhite habitat is composed of scattered patches of shrubby cover well interspersed with native grasses, forbs, and bare ground. Nests are on the ground, usually made of dead grass leaves, and often located at the base of a clump of native warm-season grasses, such as broomsedge and little bluestem. A typical clutch is about 12 eggs. Both the male and female may incubate nests, with nesting primarily occurring May through August.

Early successional areas dominated by forbs, such as ragweeds, are commonly used for brooding. Northern bobwhites eat a wide variety of seeds, leaves, and insects. Bobwhite chicks primarily eat insects during the first 6-8 weeks of life. Some agricultural crops





can provide seasonal food for bobwhites, but they are not a substitute for diverse native plant communities. Northern bobwhite populations have been declining precipitously for more than 40 years. Habitat loss and degradation is the primary reason for the decline.

#### **Habitat requirements**

*Diet*: young quail eat insects and other invertebrates (such as spiders); adult quail eat a variety of seeds (especially legumes, ragweed, crotons, lespedeza, etc.), green vegetation (mostly forbs), invertebrates, various crops (corn, soybeans, wheat, millets, grain sorghum), and mast (such as acorns and blackberries)

Water: necessary water is obtained through the diet

*Cover*: shrub cover for escape and thermoregulation throughout the year; perennial native grasses for nesting; native forbs for brood rearing

#### Wildlife management practices

**Conservation Easement**: can protect critical habitat for this declining species in some ecoregions **Control Nonnative Invasive Vegetation**: nonnative sod grasses, such as tall fescue and bermudagrass, are especially problematic as they limit bobwhite mobility and provide poor cover and structure; there are many other nonnative invasive species that can degrade habitat quality for northern bobwhite across their range

*Edge Feathering*: to increase usable space and increase escape cover around row-crop fields *Field Borders*: to increase usable space around row-crop fields

**Forest Management**: in pine forests, *Forest Regeneration*, especially *Clearcut* and *Seed Tree*, will enhance habitat for a few years until regenerating pines close canopy; *Timber Stand Improvement* can be used to reduce tree density in pine stands down to 50 square feet of basal area and enhance habitat; see **Set-back Succession** for managing hardwood forests for bobwhite

*Leave Crop Unharvested*: to provide additional food through fall and winter; corn, soybeans, wheat, and grain sorghum are readily eaten

*Livestock Management*: grazing pressure should be managed so sufficient groundcover remains for nesting and brood rearing; grazing management should discourage a uniform structure of plants across the landscape; cattle grazing in combination with prescribed fire can mimic historic natural disturbance events; grazing management should maintain dense shrub cover in some areas; up to one-third of an area can be grazed more intensively to encourage annual forb production for brood rearing cover, assuming the same areas are not repeatedly grazed the same way; livestock should be excluded from food plots

**Plant Food Plots**: relatively small linear food plots (one-fourth acre) may be established adjacent to escape cover where food is a limiting factor (this is rare; shrubby cover for escape and forb cover with bare ground are more often limiting factors)

**Plant Native Grasses and Forbs**: where nesting and brood cover is limiting and planting is necessary to develop nesting and brooding cover (suitable nesting and brooding cover usually establishes naturally after undesirable plants are controlled and after tree cover is removed or thinned)

*Plant Shrubs*: where shrub cover is limiting; if shrub patches are within 50 to 75 yards of each other, additional shrub cover is not needed

**Set-back Succession**: Prescribed Fire is strongly recommended to maintain and rejuvenate grasslands, native prairie, shrublands, savanna, and woodlands; fire consumes dense litter, limits succession of woody species, and encourages herbaceous groundcover; *Disking* can be used to reduce litter build- up, encourage annual forbs and grasses, and provide increased bare ground; *Chaining* can be used to set-back shrub cover when it becomes too dense and tall; *Chainsawing* and *Root Plowing* may be used remove trees and convert hardwood forest to early succession or savanna; *Herbicide Applications* may be used to remove undesirable woody encroachment

Tillage Management: eliminate fall tillage to provide waste grain

**Decrease Harvest**: may be necessary if populations are declining in areas of good habitat and where hunting pressure has been excessive

*Wildlife or Fish Survey*: covey counts, whistle counts, point counts, and hunter harvest and observation data are used to estimate trends in populations

# **Ovenbird**

## **General information**

The ovenbird is a ground-dwelling warbler found in uplands of closed-canopy, mature deciduous or mixed deciduous-coniferous forests throughout the eastern third of the U.S. Territorial males are quite vocal with their characteristic *"teacher-teacher-teacher"* song. Ovenbirds are typically found in mature forests with relatively little underbrush and plenty of leaf litter that harbors abundant insects and other invertebrates. They often forage in the leaf litter, but may also glean insects from leaves and tree bark.



They construct a dome nest of dead leaves, grasses, bark, and hair with an oval side entrance that usually faces downhill, all in the shape of an outdoor bread oven; hence the name. The nest is usually well hidden in herbaceous vegetation on the forest floor, often near a fallen tree or regrowth within a canopy gap. Ovenbirds are rather unique in that after the clutch hatches, the female takes half the brood and parts ways with the male, who remains with the other half of the brood. Ovenbirds may produce 1-2 broods per year.



#### Habitat requirements:

Diet: adult beetles and larvae, caterpillars, ants, and flies

*Water*: usually obtain necessary water from diet, but may also use free-standing water when available *Cover*: mature deciduous forest with sufficient leaf litter for nesting and foraging

## Wildlife management practices

**Control Nonnative Invasive Vegetation**: when nonnative invasive vegetation begins to reduce habitat quality for ovenbirds; several nonnative species, such as Japanese stiltgrass, threaten to reduce habitat quality for ovenbird in the Eastern Deciduous Forest

*Forest Management*: *Forest Regeneration* (*Single Tree Selection*) may produce scattered small canopy gaps that enhance nesting cover

*Livestock Management*: livestock should be excluded from forests managed for ovenbirds *Plant Trees*: in large open areas to produce future habitat

Wildlife or Fish Survey: point counts are used to estimate population trends

# Timber rattlesnake

## **General information**

Timber rattlesnakes are found throughout much of the eastern U.S. They are most often found in forests, particularly those with rock outcrops, ledges, and steep slopes. Timber rattlesnakes are long-lived reptiles, capable of reaching 25 years of age or older. They are pit vipers, having a heat-sensing organ behind the nostrils that can detect temperature differences, which the snake uses to determine if another animal is a predator or prey.

Timber rattlesnakes spend approximately six months of the year hibernating underground (fall-spring) and will re-use a den for many years. They emerge in spring and are primarily active during the daylight hours.

Timber rattlesnakes are sit-and-wait predators. They rely on their camouflage patterns as they ambush prey along runways, at the base of tree trunks, and adjacent woody debris.

Timber rattlesnakes are generally shy and unaggressive. When approached, they will normally "freeze" or retreat to thick cover, but if cornered they will form a loose coil, raise their heads, rattle their tails, and may strike. The rattle is made of the protein keratin and a new segment is added each time the snake sheds. To rattle, rattlesnakes move the rattle back and forth as much as 40-60 times per second. A rattlesnake cannot be aged by counting the rattle segments because snakes shed at varying rates, often multiple times in one year, and rattle segments commonly break-off. Timber rattlesnakes are venomous and should not be handled.

#### **Habitat requirements**

*Diet*: small to moderate-sized mammals; chipmunks, mice, voles, and squirrels; occasionally small birds

*Water*: receives necessary water from diet, but will drink freestanding water if available



*Cover*: upland forests with deep leaf litter and large amounts of downed woody debris; winter cover is necessary for hibernation in the form of rock crevices, rodent burrows, and root systems

## Wildlife management practices

**Control Nonnative Invasive Vegetation**: when nonnative invasive vegetation begins to reduce habitat quality for timber rattlesnakes; in particular, nonnative sod grasses should be eradicated **Forest Management**: Forest Regeneration (Clearcut, Shelterwood, Group Selection) and Timber Stand Improvement will provide dense groundcover that may support increased prey for several years and increased large woody debris for ambush sites and loafing cover; timing of Forest Management should ideally happen during the inactive season, especially around denning sites

*Livestock Management*: should prevent overgrazing and leave adequate cover for prey; livestock should be excluded from forests where timber rattlesnakes are a focal species to avoid eliminating understory cover

*Plant Trees*: in relatively large open areas where additional forest cover is needed *Wildlife Damage Management Techniques*: may be necessary to relocate timber rattlesnakes if found within or close to human dwellings

*Wildlife or Fish Survey*: transect surveys and searches near known hibernacula sites during spring and fall when snakes are entering or leaving hibernacula are used to estimate population trends

# White-tailed deer

#### **General information**

The white-tailed deer is the most important game animal in North America. There are more than 30 subspecies of white-tailed deer that occur throughout the U.S. and southern Canada, except for California and Nevada. They are extremely adaptable and are found in a wide variety of areas including deciduous and coniferous forests, tropical evergreen forest, dry grasslands, and shrub desert. They are adaptable to humans and exploit suburban areas very well. Whitetails thrive in areas with fragmented habitat containing several well- interspersed vegetation types. White-tailed deer are ruminants and are classified as browsers, but have distinct dietary preferences through the seasons. Where overabundant, they can cause significant damage to ornamental plantings and row crops and can be hazardous for motor vehicles.





## **Habitat requirements**

*Diet*: forbs, browse, acorns, beechnuts, grains, grasses, and mushrooms; in the northern parts of the range, coniferous browse is important in winter

*Water*: obtain most of their water from diet, but will drink free-standing water when available *Cover*: dense woody vegetation as well as relatively tall early successional cover, including native grasses, forbs, and shrubs

## Wildlife management practices

#### Control Nonnative Invasive Vegetation: when

nonnative invasive vegetation begins to reduce habitat quality for white-tailed deer; sod grasses and sericea lespedeza can be particularly problematic in fields and Japanese stiltgrass often reduces forage availability in forests; although white-tailed deer may eat many nonnative invasive plants in some seasons to some extent, control of many of those plants, such as kudzu, Japanese honeysuckle, and Chinese privet, can lead to increased plant species diversity and increased forage quality during various seasons

*Edge Feathering*: to increase forage availability around fields and enhance fawning cover *Field Borders*: to increase forage availability (forbs and brambles) around crop fields

**Forest Management**: Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection) will provide increased browse, soft mast production, and dense escape cover; *Timber Stand Improvement* can provide increased browse and soft mast production and stimulate better cover in stands with a poorly developed understory

*Leave Crop Unharvested*: to provide additional food resource, especially near escape cover *Livestock Management*: livestock should be excluded from forests managed for deer to avoid destruction of the forest understory; livestock should be excluded from riparian areas, especially in the Great Plains Grassland Ecoegion; should prevent overgrazing in woodlands and savannas *Plant Food Plots*: when naturally occurring food sources are limited, food plots may provide additional nutrition, particularly in late summer and winter of most ecoregions

*Plant Native Grasses and Forbs*: where early successional cover is limiting and planting is necessary for establishment

*Plant Shrubs*: where needed to provide additional soft mast, brushy cover, and browse; ravines, field borders, other idle land areas and across large open areas to provide travel corridors

*Plant Trees*: in large open areas to maintain at least 30 to 40 percent forest cover; where mast producers are lacking, particularly oaks

**Set-back Succession**: Prescribed Fire and Disking is recommended to maintain herbaceous openings; Prescribed Fire is recommended to stimulate the forest understory for increased forage and soft mast; Chaining can be used to rejuvenate shrub cover; in areas dominated by mesquite, Root-plowing combined with seeding grasses and legumes may be the best way to increase herbaceous groundcover; Chainsawing and Root-plowing when converting forest to early successional cover to increase forage and enhance fawning cover

*Tillage Management*: eliminate fall tillage of grain crop residue adjacent to cover to make waste grain available as an additional food source

*Water Developments for Wildlife*: where lacking (within one-half mile), dugouts, ponds, and shallow impoundments can provide free-standing water

**Decrease Harvest**: if hunting pressure is limiting population growth where an increase is desired **Increase Harvest**: when populations can sustain additional harvest pressure for hunting recreation and when populations need to be lowered because of overpopulation and habitat degradation; in these cases, it is necessary to concentrate increased harvest on females

*Wildlife Damage Management Techniques*: fencing, repellents, and scare tactics may be helpful to keep deer from ornamental plantings, vegetable gardens, and crops; reducing the population through shooting is recommended when widespread overabundance is causing crop depredation and increasing vehicle collisions

*Wildlife or Fish Survey*: camera surveys, browse surveys, and hunter observation and harvest data are used to estimate population trends

# Wild turkey

## **General information**

Wild turkeys are large game birds found across the U.S. They are adapted to use a wide variety of vegetation types, from deciduous forest to desert shrub to open grassland interspersed with tree-lined riparian areas. Their distribution is largely limited only by trees or large shrubs needed for roosting at night. Although wild turkeys spend most of their time on the ground, except when the fly up into trees in the evening to roost for the night, they can fly well and often take flight for short distances to escape possible predation.

Breeding occurs in spring when males gobble to attract females. Nests are a slight depression on the ground, usually placed adjacent to a log, shrub, or some other structure to aid in concealment. Shrub cover is often used for nesting, but wild turkeys also nest in open woods and in fields. Nests are lined with leaves and other vegetation and usually contain about 12





eggs. Poults (young turkeys) are precocial, meaning they are able to walk around with the hen and forage for themselves soon after hatching. Herbaceous openings, especially those with a forb canopy and open ground structure, are preferred for brooding. Wild turkeys flock together during fall and winter.

#### Habitat requirements

*Diet*: extremely varied; hard mast, especially acorns and beechnuts in the fall and winter; soft mast, such as blackberries, mulberries, and black cherry; insects and other invertebrates, including spiders and snails, are especially important for young poults and hens prior to nesting; miscellaneous seeds; leaves from forbs and grasses; grain from a variety of agricultural crops

*Water*: obtain water from diet, but may use free-standing water when available *Cover*: mature forest, regenerating forest, brushy areas, and old-fields for nesting; mature forest; herbaceous openings; grain fields for foraging; trees or tall shrubs for roosting

#### Wildlife management practices

**Control Nonnative Invasive Vegetation**: when nonnative invasive vegetation begins to reduce habitat quality for wild turkeys; common examples include sod-grasses, such as tall fescue, bermudagrass, and others, such as cogongrass, which limit mobility for turkey poults and food availability; kudzu and shrub honeysuckle are other species that often degrade habitat in forested areas

Edge Feathering: can enhance nesting and brooding cover around fields

**Field Borders**: to increase usable space for nesting and brooding around row crop fields **Forest Management**: Forest Regeneration (Clearcut, Shelterwood, Group Selection, Seed-tree) can enhance nesting and brooding cover and stimulate increased soft mast and miscellaneous seed for a few years after harvest; *Timber Stand Improvement* can improve the structure of the understory for nesting and brood rearing, increase production of soft mast and miscellaneous seed, and enable crowns of desired trees to grow and produce additional mast

*Leave Crop Unharvested*: especially corn, soybeans, and grain sorghum, to provide supplemental food source during fall and winter

*Livestock Management*: should prevent livestock from degrading habitat by overgrazing and damaging planted trees and shrubs

*Plant Food Plots*: to provide supplemental foods where food may be limiting or increase carrying capacity where increased wild turkeys is desirable; corn, soybeans, wheat, and clovers are often used *Plant Native Grasses and Forbs*: where herbaceous cover is limiting and planting is necessary *Plant Shrubs*: where additional soft mast or brushy cover is needed

*Plant Trees*: where additional hard mast production, especially acorns, is needed and where roosting sites are limited

**Set-back Succession**: Prescribed Fire is recommended to maintain herbaceous openings, rejuvenate shrubland, and improve understory structure and composition for foraging, brooding, and nesting in forests, woodlands, and savannas; *Disking* can be used to maintain herbaceous openings and reduce thatch build-up; *Herbicide Applications, Chaining, Root Plowing*, and *Drum-chopping* can be used to reduce shrub cover and stimulate more herbaceous groundcover; *Chainsawing* can be used to remove trees and create herbaceous openings, especially where brooding cover may be limiting

*Tillage Management*: eliminate tillage in the fall to provide additional waste grain during winter, especially when adjacent to tall shrub or forest cover

*Water Developments for Wildlife*: can be useful when there is little or no free-standing water *Decrease Harvest*: may be necessary if populations are declining in areas where hunting pressure has been excessive

*Increase Harvest*: where populations can sustain additional harvest pressure for hunting recreation and where populations need to be lowered

*Wildlife Damage Management*: may be necessary in rare instances when wild turkeys are depredating crops

*Wildlife or Fish Survey*: gobble surveys, poult surveys, and hunter success rates are used to estimate population trends

# Wood duck

## **General information**

Wood ducks are spectacularly colored ducks found throughout most of the U.S. They primarily use forested and shrubemergent wetlands and riparian systems (rivers and creeks), but may also forage and loaf in flooded fields, especially if there is plenty of emergent vegetation.

Wood ducks nest in tree cavities, usually within or adjacent to flooded timber, but possibly up to 1 mile from water. Cavity availability is critical for a sustainable population. Thus, artificial cavities (nest boxes) are readily used by wood ducks and have been, most likely, the number one reason for the increase in wood duck populations during the past 50 years.





#### **Habitat requirements**

*Diet*: acorns are the primary diet item in fall and winter; other hard mast, miscellaneous seeds and soft mast, as well as waste

grain (especially corn) also are eaten; insects and other invertebrates are most important for wood duck chicks and hens prior to and during the nesting season

Water: obtained through diet and drink free- standing water regularly

*Cover*: shallowly flooded bottomland hardwoods, emergent wetlands, swamps, and marshes are commonly used for loafing and foraging cover; tree cavities in forested areas and artificial cavities used for nesting

## Wildlife management practices

**Control Nonnative Invasive Vegetation**: when nonnative invasive vegetation begins to reduce habitat quality for wood ducks; this is applicable in wetlands as well as adjacent uplands where wood ducks may be foraging

**Create Snags**: where relatively large cavity nesting sites (trees >12 inches in diameter) may be limiting **Forest Management**: Forest Regeneration (Shelterwood, Group Selection) in relatively large forested areas that can be flooded will create openings with emergent woody vegetation that will attract foraging and loafing wood ducks; *Timber Stand Improvement* in bottomland hardwoods that can be flooded can lead to larger crowns of favored trees and increased mast production; woody stem density should increase following TSI and improve cover in stands that can be flooded

**Leave Crop Unharvested**: especially corn, to provide high-energy food source during fall and winter; this is especially important in fields that can be flooded and those adjacent to a water source used by wood ducks

*Livestock Management*: should prevent overgrazing in fields that are flooded for wood ducks; livestock should be excluded from bottomland hardwoods and areas where trees and shrubs have been planted

**Nesting Structures**: nest boxes should be erected where a lack of natural cavities may be limiting the wood duck population; nest boxes for wood ducks should be at least 100 yards apart and should not be placed within sight of each other to prevent dump nesting (if a wood duck hen sees another hen entering a cavity or nest box, she may be stimulated to enter that cavity and "dump" her own eggs instead of

laying in her own nest; thus, heat from incubation is not even over too many eggs and fewer eggs hatch overall)

*Plant Food Plots*: shallowly flooded grain plots, especially corn, can provide an important source of energy in fall/winter, especially during years of poor mast production

**Plant Shrubs**: where there is a lack of emergent woody vegetation in open areas that can be flooded **Plant Trees**: mast trees planted adjacent to or within open areas suitable for flooding may provide future food and nesting cavities in areas where these trees may be limiting

Repair Spillway/Levee: if not functioning properly

*Set-back Succession*: *Chainsawing, Prescribed Fire,* and *Herbicide Applications* can be used to reduce tree and shrub cover where needed to stimulate more herbaceous cover and provide increase food availability

*Tillage Management*: eliminate tillage in the fall to provide additional waste grain during winter, especially fields that can be shallowly flooded

Water Control Structures: should be installed in existing dikes if there are none present

*Water Developments for Wildlife*: shallow impoundments should be created where topography allows, to provide increased feeding and nesting space for wood ducks

*Wildlife or Fish Survey*: nest box usage rates, brood counts, and flush counts are used to estimate population trends