

Wildlife Species

This chapter contains information on species featured in each of the ecoregions. Species are grouped by Birds, Mammals, Reptiles, Amphibians, and Fish. Species are listed alphabetically within each group. A general description, habitat requirements, and possible wildlife management practices are provided for each species. Wildlife management practices for a particular species may vary among ecoregions, so not all of the wildlife management practices listed for a species may be applicable for that species in all ecoregions. Refer to the WMP charts within a particular ecoregion to determine which practices are appropriate for species included in that ecoregion.

The species descriptions contain all the information needed about a particular species for the WHEP contest. However, additional reading should be encouraged for participants that want more detailed information. Field guides to North American wildlife and fish are good sources for information and pictures of the species listed. There also are many Web sites available for wildlife species identification by sight and sound.

Information from this section will be used in the Wildlife Challenge at the National Invitational. Participants should be familiar with the information presented within the species accounts for those species included within the ecoregions used at the Invitational.

It is important to understand that when assessing habitat for a particular wildlife species and considering various WMPs for recommendation, current conditions should be evaluated. That is, WMPs should be recommended based on the current habitat conditions within the year. Also, it is important to realize the benefit of a WMP may not be realized soon. For example, trees or shrubs planted for mast may not provide cover or bear fruit for several years.

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Note: Refer to this list for the correct spelling and capitalization of species for Activity I (Wildlife Challenge).

Highlight yellow is Eastern Deciduous Forest

Highlight green is urban; Highlight blue is wetlands

Birds (86)

American bittern

American black duck

American kestrel

American robin

American wigeon

American woodcock

barred owl

black-backed woodpecker

black-bellied whistling duck

black-capped chickadee

black-throated sparrow

blue-winged teal

Brewer's sparrow

broad-winged hawk

brown thrasher

California quail

California thrasher

Canada goose

common nighthawk

crested caracara

crissal thrasher

dickcissel

dusky grouse

eastern bluebird

eastern meadowlark

European starling

ferruginous hawk

Gambel's quail

golden eagle

golden-cheeked warbler

golden-fronted woodpecker

golden-winged warbler

grasshopper sparrow

great horned owl

greater prairie-chicken

greater roadrunner

greater sage-grouse

hairy woodpecker

house finch

house sparrow

house wren

ladder-backed woodpecker

lark bunting

Lawrence's goldfinch

loggerhead shrike

long-billed thrasher

mallard

marbled murrelet

mountain bluebird

mourning dove

northern bobwhite

northern flicker

northern goshawk

northern harrier

northern pintail

Nuttall's woodpecker

ovenbird

peregrine falcon

prairie falcon

prothonotary warbler

pyrrhuloxia

red-cockaded woodpecker

red-eyed vireo

red-tailed hawk

redhead

ring-necked pheasant

rock pigeon

ruby-throated hummingbird

ruffed grouse

sage thrasher

scaled quail

sharp-tailed grouse

song sparrow

sooty grouse

southwest willow flycatcher

spotted sandpiper

spotted towhee

Virginia rail

western bluebird

western kingbird

white-tailed ptarmigan

white-winged dove

wild turkey

Wilson's snipe

wood duck

yellow-rumped warbler

Mammals (34)

American beaver
American marten
big brown bat
black bear
black-tailed jackrabbit
black-tailed prairie dog
bobcat
Brazilian free-tailed bat
collared peccary
Columbian black-tailed deer
common muskrat
coyote

desert cottontail
eastern cottontail
eastern fox squirrel
eastern gray squirrel
elk
fisher
gray fox
Indiana bat
mink
moose
mountain cottontail
mountain lion

New England cottontail
pronghorn
raccoon
red fox
red squirrel
river otter
Rocky Mountain mule deer
snowshoe hare
white-tailed deer
wild pig

Reptiles (9)

eastern box turtle
eastern indigo snake
eastern snapping turtle

Gila monster
gopher tortoise
plains hog-nosed snake

Texas horned lizard
timber rattlesnake
western diamond-backed rattlesnake

Amphibians (7)

American bullfrog
crawfish frog
Monterey salamander
northern red-legged frog

rough-skinned newt
tiger salamander
wood frog

Fish (6)

bluegill
channel catfish
Coho salmon

cutthroat trout
largemouth bass
rainbow trout

Range map keys for wildlife species

Range map key for birds:

 Year Round
 Summer
 Winter
 Winter
 Migratory

*Range map key for mammals,
reptiles, and amphibians:*

 Year Round

Range map key for fish:

 Native Range
 Introduced Range

Birds

American bittern

General information

The American bittern is a medium-sized heron typically found in dense emergent vegetation in moderately shallow freshwater wetlands. This migratory bird may be found near the coasts during winter. It is rarely seen except when flying. It moves slowly through vegetation stalking food and is well camouflaged with brown and white streaks. American bitterns occasionally use adjacent upland grasslands for nesting and foraging. Larger semi-permanent wetland complexes are favored over small, isolated wetlands.

Habitat requirements

Diet: fish, amphibians, snakes, insects, and crustaceans

Water: obtained from food

Cover: dense emergent wetland vegetation, such as reeds, cattails, or sedges; nest is built in dense cover a few inches above shallow water; water depth should be maintained at less than 2 inches throughout the year

Wildlife management practices

Control Nonnative Invasive Vegetation: is necessary when nonnative invasive vegetation begins to outcompete native vegetation, limit food abundance, or alter the hydrology of a wetland favoring dryer land.

Livestock Management: livestock should be excluded from wetlands managed for bitterns

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Periodic Prescribed Fire, Disking, and Herbicides* may be used to maintain appropriate vegetation structure. However, disturbance should be infrequent (2-5 years) because bitterns prefer dense cover.

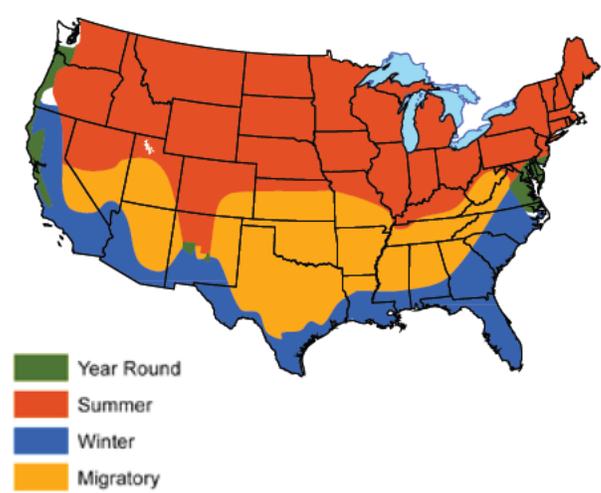
Water Control Structures: should be installed when wetlands do not have control structures to maintain appropriate water depths. Drawdowns can be conducted to favor appropriate vegetation. Drawdowns should be conducted slowly and after the breeding season (mid-August or later).

Water Developments for Wildlife: shallow wetlands can be constructed if habitat is not present

Wildlife or Fish Survey: bitterns are typically surveyed by listening for calls. Also, ropes can be dragged across the vegetation between two or more observers to flush the birds.



Sallie Gentry



American robin

General information

American robins use a wide assortment of vegetation types, from mowed grassy areas to forested areas. In urban areas, robins use large open areas and nearby trees and shrubs. Parks, golf courses, and lawns in residential areas are attractive to robins. They are found throughout North America, though they may migrate out of northern latitudes during winters with sustained cold and snow. Robins build a nest of grass and mud on a tree or shrub limb, but will occasionally nest on building ledges. Robins spend considerable time on the ground feeding on earthworms, but also will perch on branches to eat berries, fruit, and insects.



Lee Karney

Habitat requirements

Diet: insects and worms during spring and summer; soft mast from shrubs and trees in winter; seldom use artificial feeders

Water: require water daily in warm seasons; obtain water from low-lying areas, ponds, and rain-filled gutters

Cover: shrubs, evergreen trees, and deciduous trees used for nesting and escape; evergreen trees often used for early nests

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for American robins

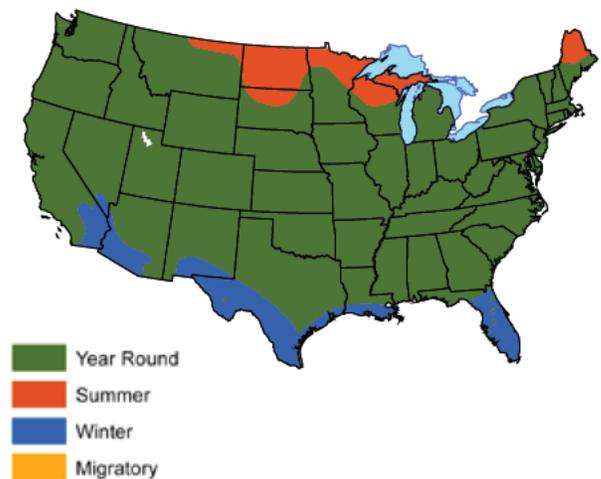
Plant Shrubs: where soft mast is lacking; examples might include dogwoods, hollies, golden currant, and winterberry

Plant Trees: both deciduous and evergreen; where nesting sites may be limiting

Set-back Succession: *Prescribed Fire, Disking, and Mowing* can be used to set-back succession and provide suitable structure for robins; *Mowing* may be used to maintain foraging and loafing cover for robins in **Urban** areas

Water Developments for Wildlife: birdbaths and pans of water can be provided in urban areas; do not place water in areas where cats can catch the birds; cats should be removed

Wildlife or Fish Survey: observation counts and point counts are used to estimate trends in populations



American woodcock

General information

The American woodcock is a ground-dwelling, migratory shorebird of the eastern United States and southeastern Canada that primarily inhabits moist, young forest and shrubland. They breed, nest, and raise their broods from March to June in their northern range. Nests are located in slight depressions among dead leaves on the forest floor. They migrate to their southern range in the fall through winter. This gamebird 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 and small openings in close proximity.

Habitat requirements

Diet: invertebrates (earthworms represent 60 percent of diet)

Water: obtained through diet

Cover: openings with sparse herbaceous groundcover and scattered shrubs and/or young trees; for courtship and roosting; young hardwood forest 2- to 25-year-old, for foraging, nesting and brood rearing or shrub cover on moist sites

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: *Forest Regeneration*, especially *Clearcut* and *Group Selection*, can provide dense structure in young stands that woodcock select for several years, especially when a mosaic of openings and young forest is well-interspersed; *Forest Stand Improvement* also may be used to reduce overstory tree density and increase stem density in the understory and midstory.

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: *Prescribed Fire*, *Chainsawing*, *Drum-chopping*, and *Herbicide Applications* can be used to maintain young tree/shrub cover; *Chainsawing*, *Root-plowing*, and *Dozer-clearing* can be used to create forest openings

Wildlife or Fish Survey: surveys on singing grounds can



Richard Baetsen



be used to estimate the relative size of the woodcock breeding population

Brown thrasher

General information

Brown thrashers occur in the eastern two-thirds of the U.S. They 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; *Forest 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* and *Dozer-clearing* can be used to clear woods and create additional brushy cover

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



Dan Sudia



Canada goose

General information

The breeding range of the Canada goose extends across the northern half of the U.S. across Canada and Alaska. Although an increasing number of Canada geese winter in Canada, the majority fly south to southern areas of the U.S. and Mexico. Many southern areas of the U.S. have year-round resident populations of Canada geese, which is not reflected on the map below. Canada geese nest and rear young in wetlands with relatively sparse to dense emergent aquatic vegetation. Riparian areas and wetlands containing 20 percent tall emergent aquatic vegetation and 80 percent open water are usually preferred areas for Canada geese.

Habitat requirements

Diet: variety of forbs and grasses, grains, and some aquatic insects

Water: relatively open water wetlands, ponds, and lakes are used for brood rearing, feeding, and loafing

Cover: nest in a variety of places, such as mats of bulrushes, tops of muskrat houses, and most of all, in relatively thick cover on islands, usually within 200 feet of the water's edge

Wildlife management practices

Control Nonnative Invasive Vegetation: applies to both uplands and wetlands; nonnative invasive vegetation can degrade nesting cover in uplands and make wetlands unattractive to Canada geese

Leave Crop Unharvested: to provide additional food during winter

Livestock Management: proper grazing can maintain lush vegetation for foraging Canada geese; restricting livestock grazing from areas where geese may nest can increase nesting success

Plant Food Plots: both forage (green growing wheat) and grain (corn) food plots can provide additional food where food is limited

Plant Native Grasses and Forbs: to provide nesting cover where limiting

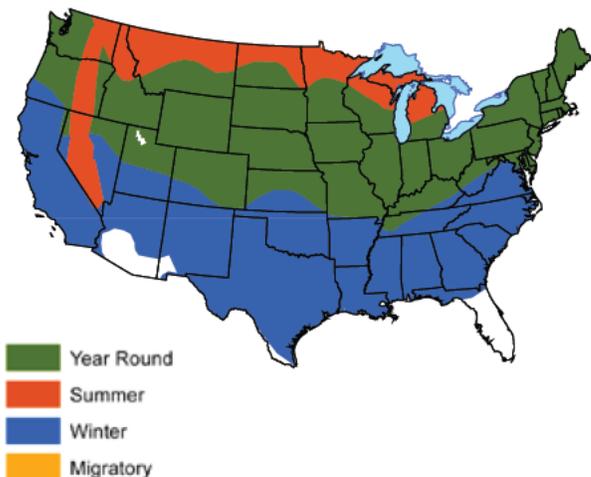
Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* and *Herbicide Applications* set back succession in cattail-choked wetlands and stimulate lush vegetation in uplands where geese may feed; *Chainsawing* and *Dozer-clearing* can create more early succession for nesting cover near wetlands

Tillage Management: fall tillage in grain crops can be delayed until spring to provide supplemental food source



Ryan Hagerly



Water Control Structures: allow water level manipulation to maintain 80 percent open water and 20 percent emergent vegetation

Water Developments for Wildlife: can be used to temporarily flood fields for feeding and raising broods

Wildlife Damage Management: may be needed where Canada geese damage lawns, golf courses, and crop fields, and other areas in cities and suburban areas

Wildlife or Fish Survey: broods counts and visual surveys can provide estimates of goose abundance

Common nighthawk

General information

Common nighthawks are found throughout the U.S. during summer, but migrate to South America during winter. Common nighthawks are found in grasslands, open woodlands, cities, and towns. In cities and towns, they are often seen flying over city parks and other open areas in late evening and early morning. Common nighthawks nest on bare soil or gravel areas common in fields or on rooftops. They use open fields for foraging. They are nocturnal and feed “on-the-wing” on flying insects.

Habitat requirements

Diet: flying insects, including flying ants, mosquitoes, moths, and June bugs

Water: obtain ample water from diet, but water sources attract insects, which provide food for nighthawks

Cover: riparian areas, ridge tops, flat rooftops, and other places with numerous sand and gravel areas are favorite nesting locations

Wildlife management practices

Livestock Management: grazing regimes that maintain open herbaceous areas provide foraging sites for common nighthawks

Set-back Succession: *Prescribed Fire, Disking, and Mowing* can maintain early successional areas for foraging; *Disking and Herbicide Applications* can promote bare ground for nesting; *Chainsawing, Dozer-clearing, and Root-plowing* can convert wooded areas to open, early successional areas; *Mowing* may be used to maintain foraging and loafing cover for common nighthawks in **Urban** areas

Wildlife or Fish Survey: observation counts can be used to estimate trends in populations



Gary Kramer



Eastern bluebird

General information

Eastern bluebirds are found across the eastern U.S. They use herbaceous openings, savannas, pastures, parks, backyards, edges of hayfields and cropfields, and other early successional communities well-interspersed with trees and shrubs, for perching, foraging and nesting (where cavities are available). Large open areas without interspersed hedgerows, fencerows, and scattered trees may not receive as much use by bluebirds as those areas with more structural diversity. Bluebirds forage in open areas, but typically near trees, shrubs, or a fence that provide perches. Insects dominate the diet during spring and summer, whereas various fruits are most prevalent during fall and winter. Eastern bluebirds nest in cavities, especially old woodpecker cavities, as well as nest boxes. Clutches are normally 3-6 eggs. Eastern bluebirds may have 1-3 broods per year. Nest box programs have had a major impact in restoring eastern bluebird populations.

Habitat requirements

Diet: insects, especially grasshoppers, crickets, adult beetles and larvae, as well as other invertebrates, such as spiders; various fruits, such as black cherry, sumac, blueberry, blackberry, blackgum, hollies, dogwoods, pokeweed, and hackberry

Water: necessary water obtained from diet, but may use free-standing water when available

Cover: nest in cavities of trees and fence posts

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to compete with native vegetation and reduces habitat quality for eastern bluebirds

Create Snags: where cavities are limited to provide potential nest sites and perching sites in open areas (not in forests because eastern bluebirds do not use forests)

Edge Feathering: to increase foraging opportunities, perching sites, and potential cavity trees (if trees are killed and left standing) around fields

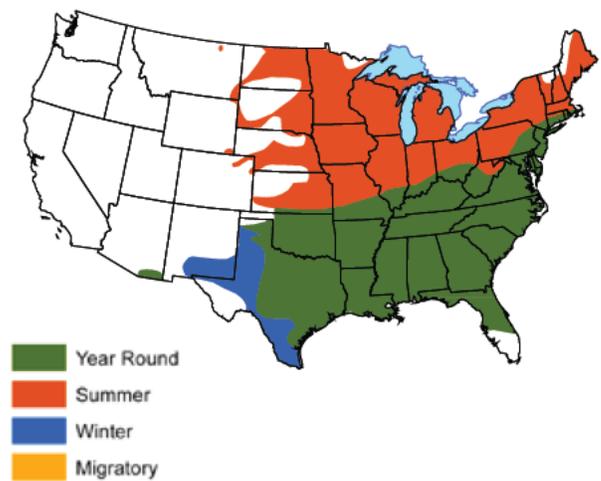
Field Borders: to increase foraging opportunities around crop fields

Livestock Management: livestock must be excluded from recently planted trees and shrubs

Nesting Structures: should be erected where a scarcity of natural cavities may be limiting the population; nest boxes should be approximately 5 feet high with an entrance hole 1½ inches in diameter; nest boxes should be placed no closer than 80 yards apart to limit territorial fighting among males



Dave Menke



Plant Native Grasses and Forbs: to aid in establishing herbaceous groundcover where planting is necessary; forb component is important to attract insects

Plant Shrubs: in relatively large open areas where perching sites or winter foods may be limiting

Plant Trees: in relatively large open areas where perching sites are limiting; may provide potential nest sites in distant future

Set-back Succession: *Prescribed Fire, Disking, Herbicide Applications, Mowing, Chaining, and Drum-chopping* can be used to maintain and rejuvenate early successional areas and prevent them from becoming dominated by young trees and shrubs; *Chainsawing and Root-plowing* can be used to convert forested areas to savannas and early successional communities; *Mowing* may be used to maintain foraging and loafing cover for eastern bluebirds in **Urban** areas

Wildlife or Fish Survey: point counts can be used to monitor bluebird populations; nest boxes should be checked to monitor use and nest success

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 may prefer native grasslands, but will use pastures and fields of nonnative grasses if the vegetation structure is suitable. 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

Conservation Easement: may protect relatively large tracts of grasslands in the eastern U.S. where habitat for eastern meadowlark is declining

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



James W. Arterburn



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*, *Dozer-clearing*, and *Root-plowing* can be used to convert forests to grasslands

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

European starling

General information

European starlings are found throughout North America. They were introduced to the U.S. from Europe and are considered pests. They commonly cause damage to crops and in urban areas. They exclude native species from cavities and deplete food resources for native wildlife. As a consequence, wildlife damage management is necessary to reduce starling populations and exclude them from areas where they are causing damage. Starlings prefer older suburban and urban residential areas with large trees and shrubs interspersed with open areas, but also are abundant in agricultural areas. Starlings are cavity nesters and nest in large trees or old buildings. Starlings feed on the ground and eat a variety of insects, seeds, grain, and soft mast. Practices to attract or benefit starlings should not occur in any situation.

Habitat requirements

Diet: insects, soft mast, seeds, earthworms, grain, human garbage, and even dog and cat food

Water: require freestanding water during warm seasons

Cover: nest in tree cavities, old buildings

Wildlife management practices

Wildlife Damage Management: exclusion practices to prevent access to buildings and other areas where they are not wanted; food, water, and cover available to starlings around buildings should be removed; various harassment practices may be effective; trap and euthanasia are appropriate to reduce starling populations

Wildlife or Fish Survey: observation counts, point counts, and wildlife damage management questionnaires are used to monitor starling populations



Thomas G. Barnes



Golden-winged warbler

General information

The golden-winged warbler is a ground-nesting songbird that requires herbaceous groundcover with scattered shrubs and young trees. They breed during summer in the Appalachian Mountains from north Georgia to southern New York and their winter range is in Central America and northern South America. Golden-winged warbler populations have been declining 2.3 percent per year since the 1960s, which can be attributed to loss of habitat through forest maturation and competition and hybridization with the blue-winged warbler. The USDA-NRCS included golden-winged warblers in its Working Lands for Wildlife Initiative in 2012. Successful recruitment is dependent on habitat above 2,000 feet elevation to avoid areas where blue-winged warblers occur. During the breeding season, golden-winged warblers are found in relatively small areas (1-12 acres) of young regenerating forest, reclaimed mine land, emergent wetlands, and old-fields within a landscape of contiguous forest (>70 percent of the landscape).

Habitat requirements

Diet: insects

Water: necessary water obtained from diet

Cover: forest openings with scattered shrubs and young trees with herbaceous groundcover for nesting and foraging; nests usually located at the base of forbs and brambles (such as goldenrod and blackberry) near thickets of shrubs and young trees; perches are important for males to establish territories through song displays

Wildlife management practices

Conservation Easement: can protect critical habitat from development

Control Nonnative Invasive Vegetation: sod-forming grasses, such as tall fescue, and other invasive species may limit coverage of more desirable forbs

Create Snags: creating snags around an opening may be desirable for temporary song perches, especially if perches are not present in the opening

Edge Feathering: will create a soft edge of forbs, brambles, shrubs, and young trees between openings or agricultural fields and the forest

Forest Management: *Forest Regeneration*, especially *Clearcut*, provides young forest (approximately 3-10 years old) structure desired by golden-winged warblers. Retaining single trees or groups of trees (10-15 trees per acre) for song perches is desirable. The more interspersed the retained trees are, the more breeding territories can be established in the recently harvested stand.



Laurie Smaglick Johnson



Livestock Management: may be necessary where livestock are present to prevent grazing nesting and shrub cover

Plant Shrubs: may be needed where there is a lack of interspersed shrub cover (or developing shrub cover) in an opening

Plant Trees: may be needed where there is a lack of interspersed trees (or young trees developing naturally) in an opening for song perches, or in large open areas where trees are lacking

Set-back Succession: *Prescribed Fire*, *Herbicide Applications*, *Chainsawing*, and *Dozer-clearing* can be used to create and maintain herbaceous groundcover and scattered shrubs and young trees in openings

Wildlife or Fish Survey: point-count surveys can be used to monitor populations

House finch

General information

House finches are native to the western U.S., but were introduced in the eastern U.S. in 1940. Since, they have spread throughout the eastern U.S. and have become one of the most common birds in the U.S. They are found in a wide variety of urban, suburban, and agricultural areas that have trees, shrubs, and some herbaceous openings. They also are found in canyons and semi-arid regions in the western part of the country. House finches nest in a variety of locations and make a nest from weed stems, small branches, and leaves. House finches are vegetarians and eat a variety of seeds, soft mast, and buds, both from the ground and in trees.



Habitat requirements

Diet: soft mast, buds, and weed seeds; in the warm season, house finches eat some insects

Water: free-standing water is needed daily in the warm season

Cover: nest 5 feet to 7 feet aboveground on low branches of trees, branches of bushes, in natural cavities, old holes excavated by woodpeckers, and any projection or ledge they can find on houses and buildings

Wildlife management practices

Plant Native Grasses and Forbs: to provide forb seed in rural areas where forbs are lacking

Plant Shrubs: for nesting and hiding cover adjacent to open areas where shrubs are lacking

Plant Trees: for nesting cover in areas where trees are lacking

Set-back Succession: Mowing may be used to maintain foraging and loafing cover for house finches in **Urban** areas

Water Developments for Wildlife: birdbaths and pans of water can be provided, or a low area in the yard can be filled with water; do not place water in areas where cats can catch birds; cats should be removed

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

Artificial Feeders: may be used to attract finches in **Urban** areas; millet and sunflower seeds are favorites



House sparrow

General information

House sparrows are found throughout the U.S. They are an introduced species from England (they are also called English sparrows) and are found throughout the U.S., and are very common in urban areas. House sparrows also are very common in and around buildings in agricultural areas where grain is available. Because they are a nuisance, management objectives are often needed to reduce the quality and quantity of food and cover. *Wildlife Damage Management* is often needed and commonly implemented. House sparrows are cavity nesters and will frequently occupy buildings and houses to nest within the eaves or other areas with a cavity or opening. House sparrows feed on the ground and in woody vegetation for seeds, insects, and soft mast. House sparrows outcompete bluebirds for cavity nesting space and compete with several other native birds for food and space.

Habitat requirements

Diet: variety of insects, soft mast, buds, forbs, weed seeds, and waste grain

Water: free-standing water is required daily in warm seasons

Cover: nest in natural cavities, low branches of trees, and bushes 5 feet to 7 feet aboveground, and on any projection or ledge they can find on buildings or other structures

Wildlife management practices

House sparrow populations often grow to levels where they cause wildlife damage or will cause detrimental conditions for native wildlife by out competing native species for habitat requirements; therefore, wildlife damage management most likely will be necessary in all situations, especially in suburban/urban and agricultural areas. Habitat management to attract house sparrows should never occur.

Wildlife Damage Management: trap and euthanasia are often appropriate to reduce house sparrow populations; exclusion practices may prevent house sparrows from accessing an area; remove food, water, and cover available to house sparrows; various harassment practices may be effective

Wildlife or Fish Survey: observation counts, call counts, and questionnaires related to wildlife damage management are useful in estimating trends in populations



House wren

General information

House wrens are found throughout the U.S. during the breeding season, and migrate to the Deep South during winter months. In *Urban* areas, house wrens prefer older residential areas with large shrubs and trees. House wrens also are found in forests with herbaceous openings at higher elevations, as well as in aspen stands. House wrens nest in a variety of elevated cavities, as high as 30 feet aboveground. They forage both on the ground and aboveground.

Habitat requirements

Diet: spiders, grasshoppers, crickets, beetles, caterpillars, ants, bees, ticks, earthworms, and millipedes; artificial feeders are usually not used

Water: necessary water is obtained from the diet

Cover: nest in natural cavities in trees old buildings and other structures

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative species begin to compete with native vegetation and degrade habitat for house wrens

Nesting Structures: nest boxes may be provided where adequate nesting sites are lacking; boxes should be placed high on a tree trunk or under the eaves of a house; the hole should be < 1.5 inches in diameter to prevent house sparrows and starlings from entering and excluding house wrens; for specifics on nest box design and placement, visit your local Extension office or state wildlife agency website

Plant Shrubs: where lacking for cover while feeding and for nesting

Plant Trees: where trees are lacking for cover and nesting

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



Dave Menke



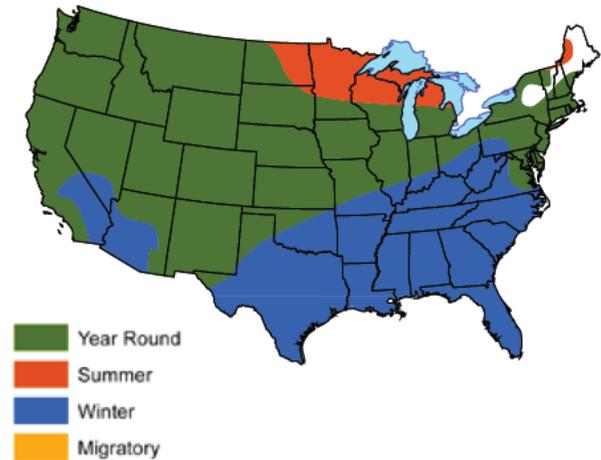
Mallard

General information

The mallard is a migratory waterfowl with one of the most extensive breeding ranges of any duck in North America, extending across the northern one-third of the U.S., and up to the Bering Sea. Mallards winter south of Canada, throughout the U.S. and south to Central America. Mallards nest in tall grasses and forbs or in shrubby cover. They need open water with associated emergent aquatic vegetation to raise young. They may be found in any type of wetland with standing water and also use various upland vegetation types for foraging, especially harvested grain fields. Mallards are dabbling ducks, which means they feed at or near the surface of the water by filtering food items, such as invertebrates, seeds, and other plant material. Dabbling ducks are often seen tipping upside down in the water to reach food at the bottom of a wetland. Unlike diving ducks, they feed in much shallower water and do not dive to obtain food. Mallards have become a nuisance in some areas, particularly urban and suburban parks with ponds where they are fed. Mallards may breed with domestic ducks and with other wild duck species, especially the American black duck.



Donna Dewhurst



Habitat requirements

Diet: aquatic plants, insects and other invertebrates, hard mast (especially acorns), grains and other seed are primary components in the diet; ducklings eat mostly aquatic insects

Water: see cover requirements below

Cover: nest in grass and forbs and sometimes in shrub cover, preferably within one-half mile of a wetland that provides open water with some emergent aquatic vegetation; brooding cover is open water with considerable emergent aquatic vegetation for protection from predators; ideally, wetlands have a minimum of 50 percent open water and 10 to 20 percent emergent vegetation; in wintering areas, mallards often loaf on more open water, such as warm-water sloughs, streams, rivers, and flooded fields

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive species, such as purple loosestrife, water hyacinth, parrotfeather, hydrilla, and reed canarygrass, begin to reduce habitat quality for mallards

Delay Crop Harvest: (in some ecoregions) hay and crop harvest adjacent to wetlands should be conducted after nesting season

Forest Management: (in some ecoregions) *Forest Stand Improvement* can favor mast-producing species, especially oaks, in bottomland hardwoods that can be flooded to increase mast production

Leave Crop Unharvested: unharvested grains, such as corn, to provide a winter food source; this does not apply

to hay forages or soybeans

Livestock Management: livestock should be excluded from nesting areas

Plant Food Plots: shallowly flooded grain plots can provide an important food source for migrating and wintering mallards

Plant Native Grasses and Forbs: (in some ecoregions) where nesting cover is limiting and planting is necessary to increase coverage of native grasses and forbs

Repair Spillway/Levee: if not functioning properly
Set-back Succession: *Prescribed Fire* should be used to rejuvenate dense vegetation in nesting areas and to increase or maintain proper water and vegetation interspersions in emergent wetlands that become dry in summer; *Disking* emergent wetlands and fields that will be flooded later will stimulate annual grasses and forbs that are important food plants; *Herbicide Applications* can be used to control unwanted woody species; *Chainsawing* can be used to create openings in bottomland forests that can be flooded

Tillage Management: eliminating fall tillage can provide waste grain in the winter

Water Control Structures: should be used to control water level in wetlands managed for mallards and other wildlife

Water Developments for Wildlife: shallow impoundments can be used to flood grain fields and bottomland hardwoods in winter to provide a valuable food source and loafing areas

Wildlife or Fish Survey: aerial surveys are commonly used to estimate trends in the mallard population

Mountain bluebird

General information

Mountain bluebirds are found across the western U.S. They use open savannas, pastures, parks, backyards, edges of hayfields and crop fields, and other herbaceous openings with scattered trees, which are used for perching and nesting (where cavities are available). Mountain bluebirds forage in open areas with short vegetation, but typically near trees or a fence that provide perches. Insects dominate the diet during spring and summer, whereas various fruits are most prevalent during fall and winter. Mountain bluebirds nest in cavities, especially old woodpecker cavities, as well as nest boxes. Clutches normally consist of 4-8 eggs.

Habitat requirements

Diet: invertebrates, especially grasshoppers, crickets, beetles, and spiders; various fruits in fall and winter

Water: necessary water obtained from diet

Cover: nest in cavities of trees and fence posts

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to compete with native vegetation and reduces habitat quality for mountain bluebirds

Create Snags: where cavities are limited to provide potential nest sites and to provide perching sites in open areas (not in forests)

Edge Feathering: to increase foraging opportunities, perching sites, and potential cavity trees (if trees are killed and left standing) around fields

Field Borders: to increase foraging opportunities around crop fields

Livestock Management: livestock must be excluded from recently planted trees and shrubs

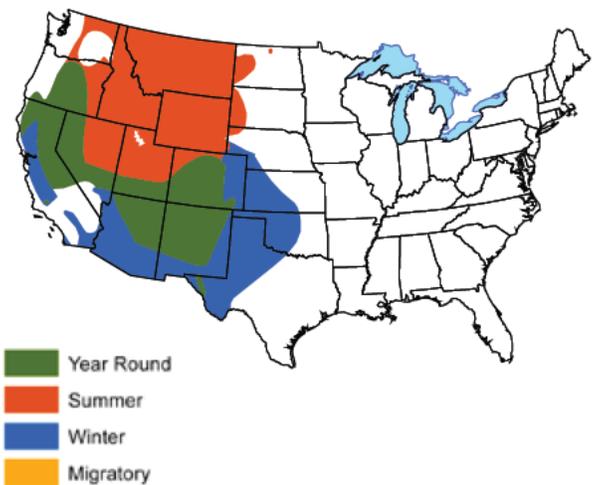
Nesting Structures: may be placed where a scarcity of natural cavities may be limiting the population; nest boxes should be approximately 5 feet high with an entrance hole 1½ inches in diameter; nest boxes should be placed no closer than 80 yards apart to limit territorial fighting among males

Plant Native Grasses and Forbs: to aid in establishing herbaceous groundcover where planting is necessary

Plant Shrubs: in large open areas where perching sites or winter foods may be limiting

Plant Trees: in large open areas where perching sites are limiting; may provide potential nest sites in future

Set-back Succession: *Prescribed Fire, Disking, Herbicide Applications, Mowing, Chaining, and Drum-chopping* can be used to maintain and rejuvenate grasslands and reduce shrub cover where necessary; *Chainsawing,*



Dozer-clearing, and Root-plowing can be used to convert forested or shrub-dominated areas to savannas and early successional communities; *Mowing* may be used to maintain foraging and loafing cover for mountain bluebirds in **Urban** areas

Wildlife or Fish Survey: point counts can be used to monitor bluebird populations; nest boxes should be checked to monitor use and nest success

Mourning dove

General information

Mourning doves may be found throughout much of the lower 48 states. They 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 also may be placed on the ground in areas where trees are generally lacking. 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: freestanding water required daily

Cover: shrubs and trees are used for nesting and loafing; areas with open ground space required for foraging

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 planted 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



Dave Menke



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, Dozer-clearing, 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 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 freestanding 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 gamebird 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 and interspersed shrub cover for foraging, nesting, brooding, and loafing. Ideally, bobwhite habitat consists 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 or forb leaves. 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 ragweed, sumpweed, and horseweed, are commonly used for brooding. Northern bobwhite eat a wide variety of seeds, leaves, and insects. Bobwhite chicks primarily eat insects during the first 6-8 weeks of life. Northern bobwhite populations have been declining precipitously for more than 40 years because of habitat loss and degradation.

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, 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; forbs and grasses for nesting; native forbs for brood rearing

Wildlife management practices

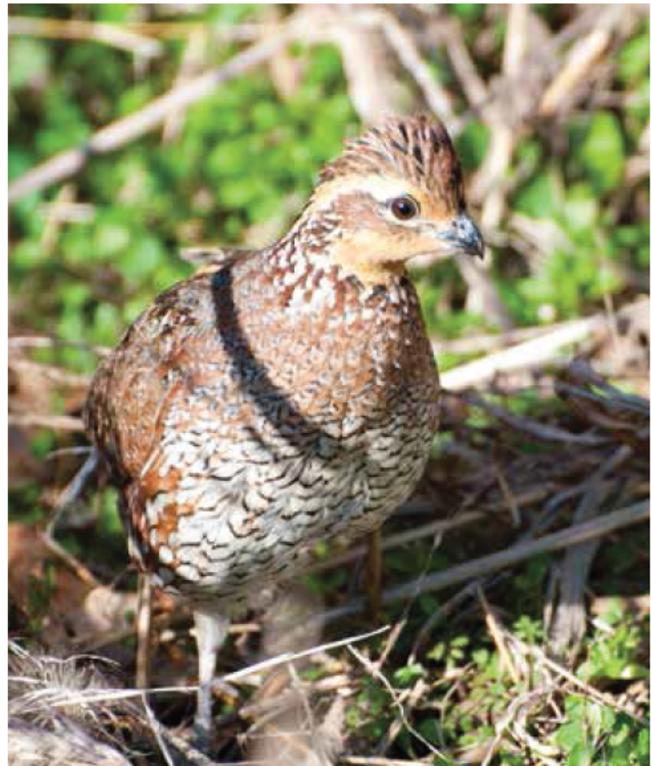
Conservation Easement: can protect critical habitat for this declining species in some ecoregions

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

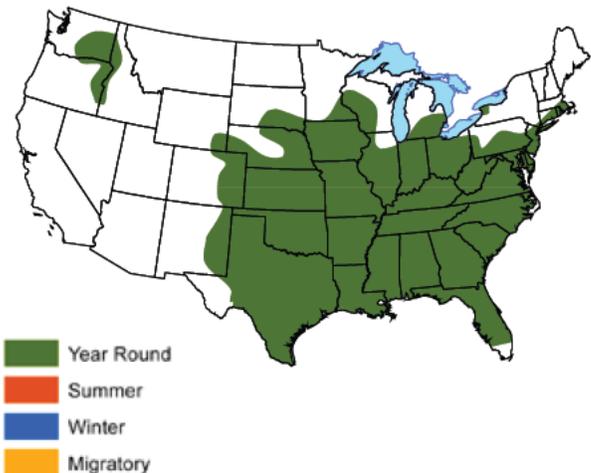
Edge Feathering: to increase usable space and increase escape cover around row-crop fields

Field Borders: to increase usable space around row-crop fields

Forest Management: (in some ecoregions) in pine forests, *Forest Regeneration*, especially *Clearcut* and *Seed Tree*, will enhance habitat for a few years until regenerating pines close canopy; *Forest Stand*



Heather Inman



Improvement can be used to reduce tree density in pine stands and mixed pine-hardwood 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 open structure underneath 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 early successional plant communities, 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 open structure at ground level underneath forb cover; *Chaining* can be used to set-back shrub cover when it becomes too dense and tall; *Chainsawing*, *Dozer-clearing*, 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 data suggest mortality from hunting is additive or limiting population growth

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

Northern flicker

General information

Northern flickers occupy all of North America, and inhabit most of the U.S. year-round. Flickers are found in forests and woodlands interspersed with herbaceous openings. Northern flickers are often found along riparian zones and urban areas. They prefer older urban residential areas with large trees, golf courses, and parks. Flickers create cavities in trees for nesting; these cavities later become nesting and roosting sites for other species. Thus, flickers are considered an important species for biological diversity. Flickers eat insects, especially ants, as well as soft mast and seeds. Flickers can become problematic in urban areas where they may create holes in wood siding on houses or damage ornamental trees. Wildlife damage management may be necessary. European starlings often take-over flicker cavities for their own nests. Appropriate action should be taken to prevent starlings from occupying nesting cavities of flickers and other cavity-nesting wildlife.

Habitat requirements

Diet: ants are a favorite food and make up about 50 percent of the diet; seeds, soft mast, and earthworms are also eaten; flickers are partial to poison ivy fruit and may use artificial feeders

Water: daily water requirements unknown; sufficient water is probably obtained from diet

Cover: tree cavities are used for nesting; old, mature trees that show signs of senescence (old age) or decay are often used; softwood trees, such as yellow poplar, cottonwood, and willow, are preferred; flickers will nest in posts, holes in banks, and holes in houses and structures where trees are unavailable

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative species begin to compete with native vegetation and degrade habitat for flickers

Create Snags: to enhance possible sites for cavities where snags are limiting, especially softwoods, but other species as well

Forest Management: *Forest Regeneration* will provide more open area and possibly snags for a short time; *Forest Stand Improvement* can open the structure of the forest and provide snags; snags should be retained during forest management activities

Plant Shrubs: several soft mast-bearing shrubs can provide additional food resource when limiting in open areas

Plant Trees: in large open areas without trees



Dave Menke



Set-back Succession: *Prescribed Fire* will consume the litter layer and facilitate foraging on the ground; *Chainsawing* may be used to reduce overstory tree density to create woodland conditions and improve tree species composition; *Mowing* may be used to maintain foraging and loafing cover for northern flickers in **Urban** areas

Wildlife Damage Management: may be necessary to prevent damage from foraging, drumming, and excavating wooden buildings; exclusion practices can prevent access to buildings; harassment can repel flickers from an area

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

Artificial Feeders: may be used to attract flickers in urban areas; suet is preferred

Northern pintail

General information

The northern pintail is a large dabbling duck that ranges from 23 to 30 inches in length. Both sexes have blue-gray bills and gray legs and feet. The drake has a thin white stripe running from the back of its chocolate-brown head down its neck to a mostly white undercarriage. He also has gray, brown, and black patterning on his back and sides and long central tail feathers, which give the species its name. The northern pintail female appears to have drab brown feathers, much like those of other female dabbling ducks. Hens make a coarse quack, whereas drakes make a flute-like whistle. Northern pintails prefer open wetlands. They nest on the ground, and nests are hidden among vegetation in a dry location. Nest construction is a simple shallow scrape in the ground lined with plant material and down.

Habitat requirements

Diet: aquatic plant seeds and rhizomes; grain and other seeds found in fields; aquatic insects, mollusks and crustaceans

Water: water is obtained through diet

Cover: open freshwater wetlands and intertidal marshes

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative aquatic weeds reduce or limit space for foraging or loafing, or when nonnative invasive plants degrade quality of nesting cover

Leave Crop Unharvested: to provide additional food for migrating and wintering pintails

Livestock Management: livestock should be excluded from nesting areas, from wetlands managed for waterfowl, and from food plots

Plant Food Plots: shallowly flooded grain food plots can provide a beneficial food source for migrating and wintering northern pintails

Plant Native Grasses and Forbs: where nesting cover is limiting and planting is necessary

Repair Spillway/Levee: if not functioning properly

Set-back Succession: Prescribed Fire should be used to maintain and rejuvenate nesting cover and maintain proper water and vegetation interspersions in wetlands; Chainsawing, Dozer-clearing, and Root-plowing may be used to clear trees where needed

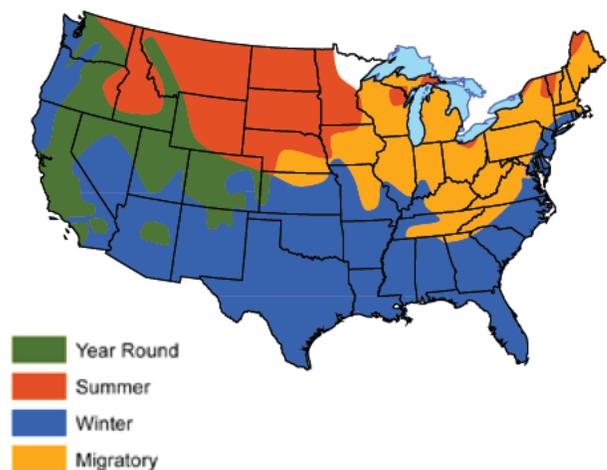
Tillage Management: eliminating fall tillage can provide waste grain in the winter

Water Control Structures: should be installed if not present in managed wetlands to manipulate water levels

Water Developments for Wildlife: shallow impoundments can flood fields and provide important



Dave Menke



foraging and loafing areas for migrating and wintering northern pintails

Wildlife or Fish Survey: observation counts and aerial surveys are used to estimate population trends

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” or “sweet, sweet, sweet” 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 also may 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 leaf litter or 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 (3-6 eggs) 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:

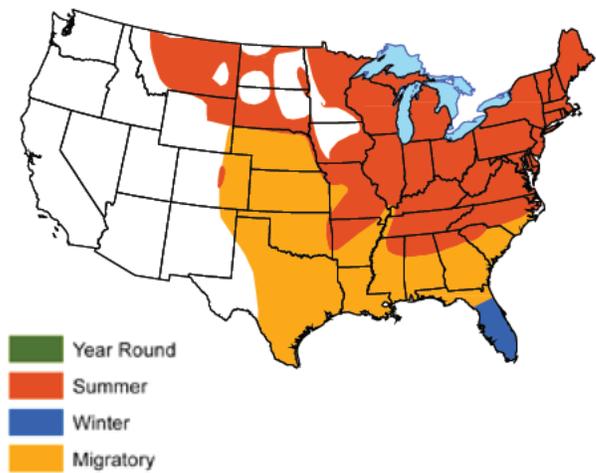
- Diet:** adult beetles and larvae, caterpillars, ants, and flies
- Water:** usually obtain necessary water from diet, but may use free-standing water when available
- Cover:** mature deciduous forest with sufficient leaf litter for nesting and foraging

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*
- 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



Greg Lavaty



Ovenbird nest

Peregrine falcon

General information

Peregrine falcons are found primarily along the coasts and mountain ranges of North America where congregations of shorebirds, songbirds, and waterfowl occur. They also may be found in urban and industrial areas with skyscrapers, smokestacks, bridges, and other tall structures and where abundant rock dove and European starling populations occur. Nests are often located on the ledges of cliffs or buildings from 25 to more than 1,300 feet high. They are one of the fastest birds on the planet, with a cruising speed of 25-34 mph to more than 200 mph in pursuit of prey.



USFWS

Habitat requirements

Diet: mostly birds, but also bats, which falcons catch during flight

Water: requirements largely unknown; likely obtain water needs from foods they consume

Cover: require tall cliffs, buildings, and other tall structures for nesting and perching

Wildlife management practices

Nesting Structures: nesting platforms can be added to cliffs and skyscrapers

Wildlife Damage Management: peregrine falcons can prey upon domestic birds, such as homing pigeons; exclusion practices should be used to discourage damage

Wildlife or Fish Survey: visual surveys near known nesting areas can be used to monitor population trends



Redhead

General information

Redheads are diving ducks found across the U.S. and Mexico. They winter in southern areas of the U.S. and into Mexico. Redheads use open-water wetlands (especially for loafing) as well as those with a mosaic of open water with floating islands of organic material and some emergent vegetation. Redheads do not build nests, but instead use old nests of other ducks and wetland birds that are above water or very near the shore in dense emergent vegetation providing concealment. Like other waterfowl, chicks are precocial. That is, they are feathered with down and are able to swim about and forage upon hatching.

Habitat requirements

Diet: chicks primarily eat aquatic invertebrates (mollusks, snails, crustaceans) during late spring and early summer; during the rest of the year, redheads eat aquatic plants, such as pondweeds, muskgrass, bulrush seeds, wild celery, water lily seeds, and coontail

Water: obtained in diet

Cover: during spring and summer, dense emergent vegetation for nesting; open-water wetlands are used for loafing and foraging; wetlands with a mosaic of open water with submerged and emergent aquatic vegetation are used for foraging

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive aquatic vegetation begins to reduce habitat quality for redheads; this is most common when mats of nonnative species begin to form over the water surface and limit diving and foraging by redheads

Livestock Management: livestock should be excluded from wetlands managed for redheads during the nesting season to prevent deterioration of nesting cover

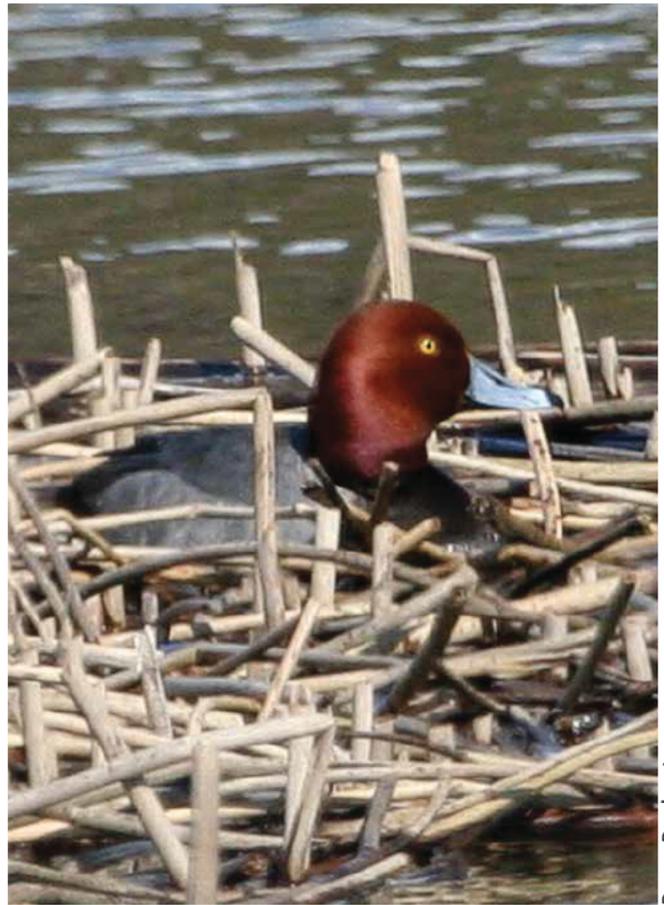
Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate vegetation when wetlands dry sufficiently to burn (most common in ephemeral wetlands or impoundments where water levels can be manipulated);

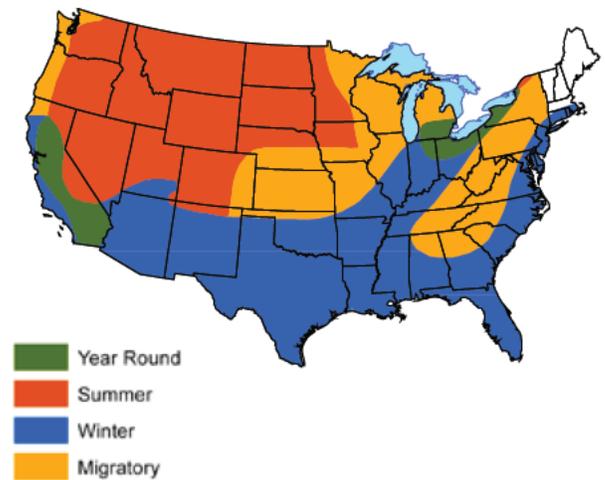
Chainsawing may be used to clear trees where needed

Water Control Structures: should be installed in dams or levees if not present to enable water level manipulation and promote growth of tall emergent aquatic vegetation adjacent to wetlands with an abundance of floating and submerged aquatic vegetation (3 feet to 5 feet deep)

Water Developments for Wildlife: shallow impoundments may be constructed to temporarily flood areas dominated by tall emergent aquatic vegetation during the nesting season



Donna Dewhurst



Wildlife or Fish Survey: observation surveys and aerial surveys are most often used to estimate population trends

Rock pigeon

General information

Rock pigeons (commonly called pigeons) are an introduced species found year-round throughout urban and agricultural areas in the U.S. They are considered pests because they are generally protected in urban areas where they develop dense populations and damage buildings and other structures with accumulations of droppings. They also cause severe problems in agricultural areas by contaminating feed. Pigeons also can carry and spread diseases, including salmonella, encephalitis, Newcastle disease, and others, to people and livestock through their droppings. Droppings of rock pigeons may also contain histoplasmosis, a fungal disease that can cause respiratory problems in humans. Wildlife damage management practices are often required to control overabundant rock pigeon populations. Rock pigeons are regularly found around large buildings, parks, and open areas. They create a shallow nest of sticks, leaves, and other vegetation, and nest aboveground and on or around buildings. Rock pigeons primarily feed on the ground and eat small grains, seeds, crumbs, and garbage.

Habitat requirements

Diet: waste grain and weed seeds; in urban areas, rock pigeons commonly eat human handouts

Water: free-standing water is required frequently during warm seasons

Cover: barn lofts, window ledges, rooftops, bridges, and a variety of other structures

Wildlife management practices

Wildlife Damage Management: shooting (including pellet guns in urban areas), toxicants, and trapping are recommended direct control techniques; exclusion practices prevent access to livestock feed; food, water, and desirable cover should be removed when possible and when it does not impact desirable wildlife species; harassment practices may be effective; habitat management to attract rock pigeons should never occur

Wildlife or Fish Survey: observation counts and questionnaires related to wildlife damage management are used to estimate trends in populations



James W. Arterburn



Ruby-throated hummingbird

General information

There are 18 species of hummingbirds found in North America. The ruby-throated hummingbird is the most widespread species. Other than a couple of exceptions, hummingbirds migrate into Central and South America during winter. Hummingbirds use areas with flowering plants from which they can feed on the nectar. In urban settings, they prefer areas with large trees and nearby flowering plants. A hummingbird's nest is constructed in the shape of a small cup and is built of lichens and other vegetation. Hummingbirds require high-energy foods. Nectar is high in sugars that supply needed energy. Insects are an important source of protein.

Habitat requirements

Diet: nectar from flowers and insects found on flowers

Water: necessary water obtained from diet

Cover: trees and shrubs for nesting; flowers for feeding

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to compete with native vegetation and reduce habitat quality for ruby-throated hummingbirds

Plant Shrubs: flowering shrubs and vines that provide nectar may be planted where nesting sites and food resources are limited; favorites include hibiscus, trumpet vine, and lilac

Plant Trees: where potential nesting sites are limited; flowering dogwood and various fruit trees are favorites

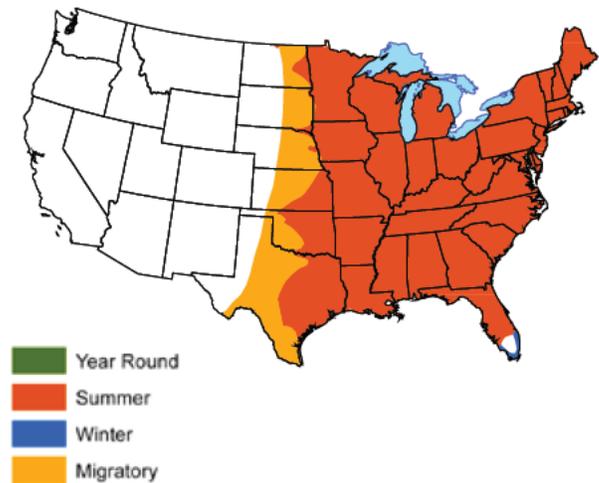
Wildlife or Fish Survey: observation counts, especially visitation at feeders, are used to estimate trends in populations

Artificial Feeders: artificial feeders filled with sugar-water (1 part sugar to 4 parts boiled water) may be used where flowers are limited; multiple feeders may reduce problems with territoriality; never give honey-water to hummingbirds because honey ferments faster than sugar and quickly develops a mold that can kill hummingbirds

Plant Flowers: preferred flowers include petunias, gladiolus, nasturtiums, begonias, morningglory, evening primrose, columbine, and cardinal flower

Rooftop/Balcony Gardens: can provide source of nectar if appropriate flowers are planted

NOTE: *Plant Flowers* should not be recommended to establish *Rooftop/Balcony Gardens*



Song sparrow

General information

Song sparrows are familiar and relatively common and inhabit all of the U.S., but will migrate from extreme northern areas during the colder months of the year. Song sparrows typically use shrubby areas interspersed with herbaceous openings and forest, especially along riparian areas. Song sparrows often nest along forest edges. The nest is made of grass and leaves and in the shape of a cup. Nests are often placed on the ground under a shrub or in thick herbaceous cover. Song sparrows primarily feed on the ground and eat seed, insects, and fruit.

Habitat requirements

Diet: weed seeds, insects, soft mast

Water: freestanding water is required frequently during the warm seasons

Cover: thick shrubs and herbaceous cover for nesting, loafing, and escape

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to compete with native vegetation and degrade habitat for song sparrows

Forest Management: *Forest Stand Improvement* practices can stimulate increased brushy cover where lacking

Plant Native Grasses and Forbs: where lacking and necessary to provide cover for nesting

Plant Shrubs: to provide soft mast where there is little soft mast available

Set-back Succession: *Chainsawing* can create additional brushy cover; *Prescribed Fire* can be used to maintain shrubby cover; *Mowing* may be used to maintain foraging and loafing cover for song sparrows in **Urban** areas

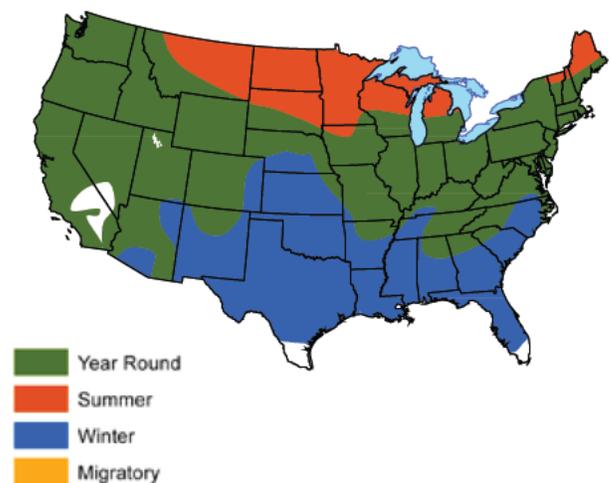
Water Development for Wildlife: drinking water may be provided in birdbaths or pans of water

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

Artificial Feeders: for use in **Urban** areas; millets and sunflower seeds are favorites



Lee Karney



Spotted sandpiper

General information

Spotted sandpipers are medium-sized shorebirds that occur all across North America. During the breeding season, they have pale breasts with brown spots, hence the name. They are found in very shallow water areas and along mudflats where they search for freshwater invertebrates and other foods. They are active foragers and walk in meandering paths, darting for prey. Nests are placed in a small depression on the ground, often under a canopy of vegetation, and lined with fine grasses. Spotted sandpipers exhibit an unusual breeding strategy where the female establishes and defends her territory and may breed with several males. The male incubates the eggs and takes care of the nestlings.

Habitat requirements

Diet: flies and their aquatic larvae (midges),

grasshoppers, beetles, worms, snails, small crustaceans

Water: acquire necessary water while foraging and from diet

Cover: shallow, freshwater wetlands and mudflats; sometimes dense herbaceous vegetation for nesting

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for spotted sandpipers

Livestock Management: should not allow overgrazing to limit herbaceous vegetation that is used for nesting; livestock may be excluded from areas managed for spotted sandpipers

Plant Native Warm-Season Grasses: where groundcover is lacking and planting is necessary

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate herbaceous groundcover around wetlands for nesting cover

Water Control Structures: should be installed if one is not present in a wetland that has a dam or levee to allow the water level to be manipulated

Water Developments for Wildlife: small impoundments and ponds may be constructed if habitat is limiting

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



Beedie Savage



Virginia rail

General information

The Virginia rail is a gamebird of freshwater marshes, but occasionally occurs in saltwater marshes. It prefers to stay hidden in moderately dense emergent vegetation and is more often heard than seen. If wetland vegetation becomes too thick, Virginia rails will not be as abundant. Virginia rails may be found in wetlands of all sizes, but prefer hemi-marsh, which is represented by scattered patches of emergent vegetation with small openings of open water at about a 50:50 ratio. Periodic water level manipulation should be used to favor annual wetland plants and avoid a monoculture of perennial wetland vegetation. Shallow water depths (generally less than 1 foot) are required. Virginia rails will flee quickly on the ground through vegetation if approached and will fly rarely. They typically inhabit shallow water areas and can swim under water if attacked. Virginia rails are migratory and can travel great distances. The Virginia rail is known to build dummy nests around the vicinity of their actual nests.

Habitat requirements

Diet: insects, aquatic invertebrates, snails, small fish, and small amphibians; some seeds and plant material in fall and winter

Water: obtained from food

Cover: moderately dense wetland vegetation, such as cattails, sedges, rushes, smartweeds, and other plants are used for cover; nests are woven into vegetation over shallow water and may have a canopy over them

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to limit open water or otherwise reduce habitat quality for Virginia rail

Livestock Management: livestock should be excluded from wetlands managed for Virginia rail

Repair Spillway/Levee: if not functioning properly

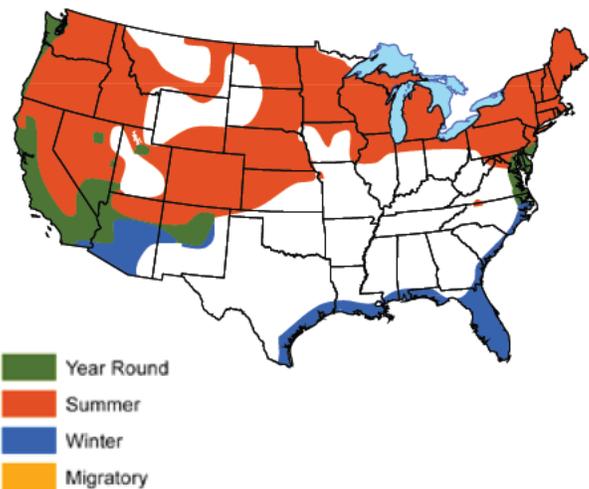
Set-back Succession: *Prescribed Fire*, *Disking*, and *Herbicide Applications* may be used in wetlands dominated by very dense perennial vegetation to encourage a hemi-marsh consisting of openings and annual plants; *Chainsawing* and *Herbicide Applications* may be used to reduce tree cover and create more open marsh

Water Control Structures: should be installed if not present in dikes to allow periodic water drawdowns to maintain a hemi-marsh structure and the appropriate shallow water required by Virginia rails

Water Developments for Wildlife: shallow impoundments can be constructed to provide habitat



Dave Menke



Wildlife or Fish Survey: Call counts are most often used to estimate population trends; playing a tape of their call increases the chance of hearing rails; also, ropes can be dragged across vegetation between two or more observers to flush birds during observation counts

Western bluebird

General information

Western bluebirds occur in portions of the western U.S. and southwestern U.S. and Mexico. They tend to use more wooded areas than eastern or mountain bluebirds. Western bluebirds are usually found in open woodlands, especially ponderosa and pinon pine-juniper. Open deciduous forest, particularly aspen that has been burned, where cavity trees are plentiful, are commonly used. Wooded riparian areas in arid environments also attract western bluebirds. Like other bluebirds, insects dominate the diet during spring and summer, and various fruits are most prevalent during fall and winter. Western bluebirds nest in cavities, especially old woodpecker cavities, as well as nest boxes. Clutches consist of 2-8 eggs. Western bluebirds may have 1-3 broods per year.

Habitat requirements

Diet: invertebrates, especially grasshoppers, crickets, beetles, and spiders; various fruits, such as chokecherry, elderberry, grape, raspberry, sumac, serviceberry, and poison oak, in fall and winter

Water: necessary water obtained from diet

Cover: woodlands; nest in cavities of trees and fence posts

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to compete with native vegetation and reduces habitat quality for western bluebirds

Create Snags: where cavities are limited to provide potential nest sites and perching sites in open areas

Edge Feathering: to increase foraging opportunities, perching sites, and potential cavity trees (if trees are killed and left standing) around fields

Field Borders: to increase foraging opportunities around crop fields

Forest Management: *Forest Regeneration (Seed Tree, Shelterwood)* may be used to enhance habitat in pine forests for a few years, especially if coupled with *Prescribed Fire*; *Forest Stand Improvement* may be used to enhance habitat by reducing tree density in pine forests and woodlands

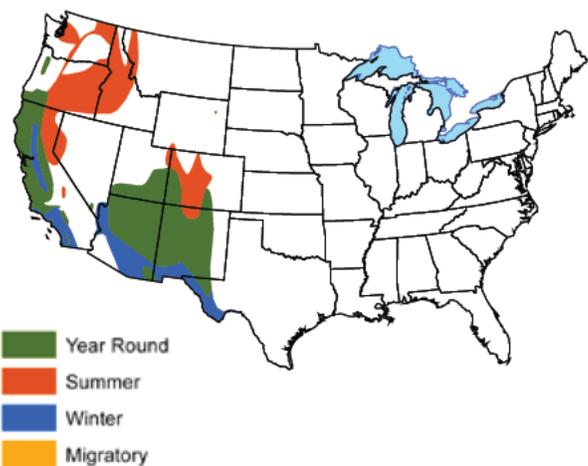
Livestock Management: livestock must be excluded from recently planted trees and shrubs

Nesting Structures: should be erected where a scarcity of natural cavities may be limiting the population; nest boxes should be approximately 5 feet high with an entrance hole 1½ inches in diameter; nest boxes should be placed no closer than 80 yards apart to limit territorial fighting among males

Plant Native Grasses and Forbs: where groundcover is lacking and planting is necessary



Michael Woodruff



Plant Shrubs: in large open areas where perching sites or winter foods may be limiting

Plant Trees: in large open areas where perching sites are limiting; may provide potential nest sites in distant future

Set-back Succession: *Prescribed Fire* is recommended to improve woodland structure and maintain herbaceous openings for western bluebirds; *Herbicide Applications* may be used to reduce tree density; *Chaining* and *Drum-chopping* can be used to reduce shrub cover where necessary; *Chainsawing* can be used to convert forested areas to open woodlands; *Root-plowing* may be used to reduce shrub density and promote herbaceous openings; *Mowing* may be used to maintain foraging and loafing cover for mountain bluebirds in **Urban** areas

Wildlife or Fish Survey: point counts can be used to monitor bluebird populations; nest boxes should be checked to monitor use and nest success

Wild turkey

General information

Wild turkeys are large gamebirds 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 snow depth and persistence to the north, which limits their ability to forage on the ground, and by trees or large shrubs needed for roosting at night in arid regions. Wild turkeys flock together during fall and winter. 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. Although wild turkeys spend most of their time on the ground, except when they 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 predators.

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, young regenerating forest, brushy areas, and old-fields for nesting; mature forest, herbaceous openings, and grain fields for foraging; trees or tall shrubs for roosting

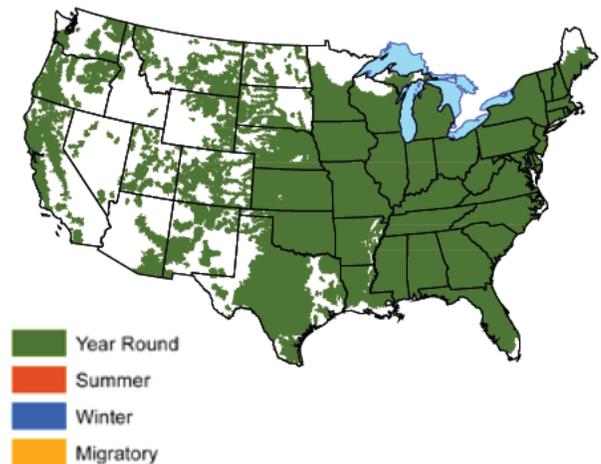
Wildlife management practices

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, orchardgrass, bermudagrass, bahiagrass, smooth brome, 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



Robert Burton



cover around fields

Field Borders: to increase usable space for nesting and brooding around row crop fields

Forest Management: (in some ecoregions) *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; *Forest 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; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

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 and food plots

Plant Food Plots: to provide supplemental foods where food may be limiting; corn, soybeans, wheat, chufa, and clovers are often used

Plant Native Grasses and Forbs: where early successional vegetation 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, Dozer-clearing,* and *Root-plowing* 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 and data suggest mortality from hunting is additive or limiting population growth

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

Wilson's snipe

General information

Named after ornithologist Alexander Wilson, the Wilson's snipe is a ground-dwelling, migratory shorebird of North, Central, and South America that uses a variety of wetlands and riparian areas, especially where mudflats or sandbars are present. They breed, nest, and raise their broods during summer in their northern range and migrate to their southern range in the fall and winter. There are resident populations in the Pacific northwestern United States. High-quality Wilson's snipe habitat will have a marshy area with low herbaceous vegetation, and sparse shrubs, with a mudflat or sandbar nearby. Nests are constructed of grass bowls placed on the ground in herbaceous vegetation near water.



David Ward

Habitat requirements

Diet: invertebrates (insects and larvae)

Water: obtained through diet

Cover: bogs, fens, swamps, and marshy, vegetated edges of ponds, rivers, and streams are used for courtship and nesting; areas with moist soil or mud for insect probing (such as wet fields, marshy edges of water bodies, and exposed muddy banks or sandbars) are used for foraging

Wildlife management practices

Control Nonnative Invasive Vegetation: may be necessary if nonnative plants are degrading habitat

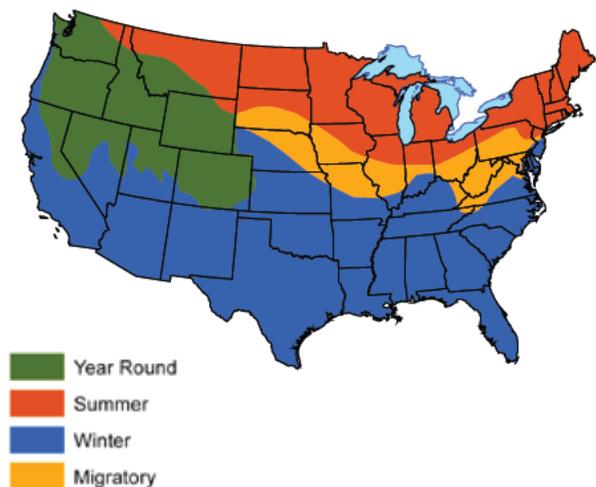
Livestock Management: should not allow overgrazing to limit herbaceous vegetation adjacent to wetlands that is used for nesting; livestock access to wetlands should be restricted

Set-back Succession: *Disking and Herbicide Applications* can provide bare ground; *Prescribed Fire* can maintain herbaceous groundcover; *Chaining* can reduce excessive shrub cover; *Chainsawing, Dozer-clearing, Root-plowing,* and *Herbicide Applications* may be used to remove trees and create wetland openings

Water Control Structures: should be installed in levees if not present to allow manipulation of water levels, expose mudflats, and encourage aquatic vegetation

Water Developments for Wildlife: shallow impoundments should be created where topography allows, providing increased feeding areas for snipe

Wildlife or Fish Survey: flush counts, hunter harvest data, and breeding bird survey data 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 shrub-emergent wetlands and riparian systems (rivers and creeks), but also may 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; *Forest 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 FSI and improve cover in stands that can be flooded

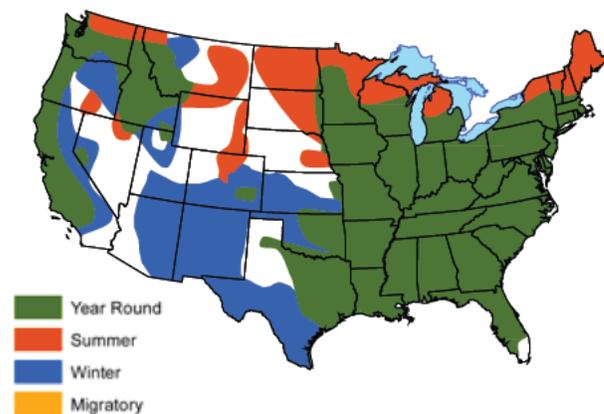
Leave Crop Unharvested: especially corn, to provide high-energy food source during fall and winter; this is especially important in fields that can be flooded and those adjacent to a water source used by wood ducks

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, as well as food plots

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



Thomas G. Barnes



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 all the 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 in woods that can be flooded and create openings where needed to stimulate more herbaceous cover and provide increased food availability

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

Water Control Structures: should be installed in existing dikes if there are none present so water level can be manipulated

Water Developments for Wildlife: shallow impoundments should be created where topography allows, providing 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

Mammals

American beaver

General information

Beavers occur throughout most of North America. They are found in various wetlands that have permanent water with a variety of shrubs and trees adjacent to the water. Beavers build dams from tree branches, shrubs, and mud to form ponds that stabilize water levels, slow water movement, and provide shelter beneath the ice in winter. Beavers also build lodges from sticks and mud and dig burrows in banks of streams and rivers. Beavers eat the inner bark of shrubs and trees and store cuttings in caches (piles of branches) for use during winter. The ecological benefits provided by beavers cannot be overstated. Beavers are responsible for creating habitat for many species of birds, mammals, reptiles, amphibians, fish, and invertebrates. Without beavers, the distribution and abundance of many freshwater wetland-associated species would decline dramatically. Unfortunately, beavers were once such a valuable fur resource that trapping led to their extirpation in many parts of their former range. Today, beavers have rebounded with help from wildlife agency regulations and a lack of available fur market. In some areas, beavers have become a nuisance, as they cut down trees and dam ditches and streams in undesirable places. Their dams often flood crops, destabilize road edges, and kill trees. When beavers construct dams in places that cause problems, removal of the beaver is usually the best solution. If the dam is destroyed and the beavers remain, they will build the dam again.

Habitat requirements

Diet: primarily bark from shrubs and trees; also some forbs and grasses

Water: prefer slow moving or still water at least 5 feet deep (to allow movement under water)

Cover: bottomland riparian areas that can be dammed to provide still water with sufficient depth

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for American beaver

Livestock Management: should prevent livestock access to riparian areas and other wetlands where beaver is a focal species to prevent foraging on shrubs and young trees; this may include developing livestock watering facilities in upland areas beaver may use and maintain good water quality

Plant Shrubs: where beavers are desired, but not present, deciduous shrubs may be planted along riparian areas



Steve Hersey



where there are few trees or shrubs to make the area more attractive to beavers

Plant Trees: where beavers are desired but not present, deciduous trees may be planted along riparian areas where there are few trees or shrubs to make the area more attractive to beavers

Water Control Structures: a Clemson Beaver Pond Leveler or similar device can be installed in beaver dams to maintain water levels

Decrease Harvest: may be necessary where an increased beaver population is desired and trapping pressure has limited growth

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

Wildlife Damage Management: should be implemented where beavers are causing problems for landowners, such as flooding timber, crops, roads, and other areas

Wildlife or Fish Survey: presence and extent of beaver activity (dams, evidence of cutting shrubs and trees) and trapper harvest data are used to estimate population trends over time

Big brown bat

General information

Big brown bats are one of 46 bat species in North America. They inhabit nearly all of the U.S., except south Florida and south-central Texas. They use a variety of vegetation types, from farmland to mature deciduous forest. Big brown bats are common in urban areas, including cities, parks, and suburban neighborhoods. They frequently use buildings and houses for daytime summer roosts and sometimes as winter hibernacula, but most hibernate in caves. Big brown bats are insectivores. Lactating females will eat their weight in insects daily. Males and females may roost individually or in small numbers, but males and females usually roost separately. Females may roost together in a maternal colony when pups are born and nursing. Females usually give birth to one or two pups, often in a hollow tree or attic. Big brown bats, as well as all other bat species, are nocturnal and are the only mammals capable of flying. Big brown bats will drink “on-the-wing” by dipping their lower jaw into a water source. Big brown bats hibernate in the winter in northern latitudes. Therefore, they do not actively feed during winter months, but instead rely on stored fat reserves.

Habitat requirements

Diet: night-flying insects, especially beetles

Water: free-standing water is required daily when they are active

Cover: buildings and hollow trees are often used for daytime roosts; bat houses also may be used for daytime roosting; caves, mines and buildings are used for hibernation

Wildlife management practices

Create Snags: to provide roost sites (only in areas where they pose no danger to human structures or health when they fall) where roost sites may be limiting

Nesting Structures: may provide additional roost sites if natural roost sites are limiting

Plant Trees: in large open areas where few trees are present to promote future old trees that may provide roost sites

Set-back Succession: *Chainsawing, Dozer-clearing, Root-plowing, Herbicide Applications, and Prescribed Fire* (in rural areas) can be used to maintain more than 50 percent open areas for foraging; mowing may be used in **Urban** areas to maintain openings



Don Pfitzer



Water Developments for Wildlife: where available open water is not available, small ponds and shallow impoundments may be constructed for drinking and to attract insects; water developments should be constructed with nothing above the water (such as fencing or bracing) so bats have an unobstructed flight path

Wildlife Damage Management: may be necessary when roosting or hibernating in areas occupied by humans

Wildlife or Fish Survey: observation counts and echolocation surveys are used to estimate population trends

Bobcat

General information

Bobcats are carnivorous predators that occur throughout the U.S. They 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, pronghorns, deer, snakes, and many bird species, including wild turkeys, ruffed grouse, northern bobwhite, domestic poultry, and other livestock

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

Cover: early successional areas, young regenerating forests, mature forest (pine and hardwood), 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; *Forest 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 species

Plant Shrubs: in areas 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 brushy cover, *Herbicide Applications, Chaining, Drum-chopping, and Root-plowing* can be used to reduce or maintain early successional communities, woodlands, and forest understory

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, trapper harvest data, and trail cameras are used to estimate population trends

Common muskrat

General information

Musk rats are large rodents found throughout the U.S., especially in shallow marshes with abundant cattails. They are mainly nocturnal and need water at least 4 feet deep or flowing water that allows free movement under ice during winter. Musk rats prefer water 1 to 2 feet deep during summer, with about 20 percent of the wetland open water, free of emergent aquatic vegetation. Musk rats build lodges of cattails or other herbaceous vegetation, but do not use sticks or limbs. They sometimes nest in a bank burrow along a waterway. Burrowing and denning activities can cause problems in flooded agricultural areas, such as rice fields and waterfowl management areas.

Habitat requirements

Diet: roots, tubers, and green shoots of emergent aquatic vegetation, such as cattails and bulrushes

Water: necessary water obtained from diet

Cover: primarily shallow-water wetlands with a mixture of open water and emergent aquatic vegetation; den in lodges built from cattails and bulrushes; loaf on floating logs or tops of lodges

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive aquatic vegetation is competing with the native aquatic plant community and reduce habitat quality for common muskrat

Livestock Management: livestock should be restricted from riparian areas and other wetlands; this may require development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate old, decadent wetland vegetation

Water Control Structures: should be installed if not present in levees or dams to control water levels and allow cattails and bulrushes to grow

Water Developments for Wildlife: small impoundments can be built in low-lying areas to provide habitat

Decrease Harvest: when trapping efforts have reduced population below desirable levels

Increase Harvest: when populations can sustain additional trapping or where populations need to be lowered

Wildlife Damage Management: may be necessary when muskrats damage dikes in agricultural areas and waterfowl management areas; populations are typically reduced by trapping



Bo Zaremba



Wildlife or Fish Survey: observation surveys, track counts, and presence of lodges are used to estimate population trends

Coyote

General information

Coyotes are found throughout the continental U.S. and have even been observed in large cities and urban areas. Grasslands, shrubland, and farmland provide optimal habitat for coyotes, but they also use forested areas as well. Coyotes den in a variety of places, including brush-covered slopes, steep banks, rock ledges, thickets, and hollow logs. Coyotes are most active at night, during early morning, and around sunset, but they may be active throughout the day. Coyotes live in packs, alone, or in mated pairs, depending on the time of year. Coyotes have an extremely varied diet that fluctuates with the seasons.

Habitat requirements

Diet: rodents, rabbits, and other small mammals, insects, birds, eggs, deer, carrion, and soft mast; livestock and wild ungulates (deer, elk, pronghorn) usually are represented in coyote stomachs as carrion; however, in some cases, coyotes prey heavily on deer and pronghorn fawns, and can limit reproductive success in some situations
Water: requirements are not well documented; necessary water probably is obtained in diet
Cover: grasslands, shrublands, regenerating forest, mature forest; crevices and burrows along river banks, rock ledges, brushpiles, and holes under stumps or abandoned buildings are used as den sites for raising pups

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation reduces habitat quality for coyote prey species

Edge Feathering: (in some ecoregions) to increase cover and food availability for prey species around fields

Field Borders: to increase usable space for prey species around fields

Forest Management: (in some ecoregions) *Forest Regeneration (Clearcutting, Shelterwood, Seed-tree, Group Selection)* and *Forest Stand Improvement* can improve habitat for prey and lead to more abundant prey

Livestock Management: should maintain adequate cover for prey species

Plant Native Grasses and Forbs: where additional early successional cover is needed for prey and planting is necessary

Plant Shrubs: in areas where additional shrub cover is needed to attract prey and provide security cover for coyotes

Set-back Succession: *Prescribed Fire, Disking, Chaining, and Herbicide Applications* are recommended to maintain herbaceous openings; *Prescribed Fire* can be used to enhance forest understory structure and composition;



Steve Thompson



Chainsawing can be used to create additional forest openings where necessary

Decrease Harvest: where hunting or trapping has limited population and additional coyotes are desired to control a prey species that is overburdened

Increase Harvest: through hunting or trapping where coyote populations need to be lowered

Wildlife Damage Management: may be necessary where livestock or pet depredation is a problem, and more rarely where they are suppressing or causing a decline in the population of some species that have been identified as focal species for management, such as white-tailed deer or wild turkey (see *Wildlife Damage Management Techniques*)

Wildlife or Fish Survey: track counts, trapper harvest data, and camera surveys are used to estimate population trends

NOTE: Situations in which landowners would manage for coyotes are exceptionally rare. However, the coyote is a native predator and plays an important role in many ecosystems. Although management is rarely, if ever, implemented to promote coyotes, management for their prey helps both prey populations and coyote populations and promotes a healthy ecosystem.

Desert cottontail

General information

Desert cottontails can be found in woodlands, grasslands, creosote brush, and desert areas from California to Texas and from northern Montana to Mexico. In the *Hot Desert* ecoregion, desert cottontails use thick shrub cover interspersed with open areas. Riparian and urban areas also are used. Because cottontails do not travel far, shelter and food must be close together.

Habitat requirements

Diet: a variety of forbs and grasses spring through fall; in winter, bark and twigs of shrubs are important; buds, grain, seeds, and soft mast also are eaten when available

Water: necessary water obtained from diet

Cover: grassland, shrub vegetation, and ground burrows for hiding and nesting cover

Wildlife management practices

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

Field Borders: to increase usable space around row crop fields

Forest Management: (*Mediterranean* ecoregion only)

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: prevent overgrazing to allow ample amounts of herbaceous vegetation for nesting, cover, and forage; livestock should be excluded from food plots

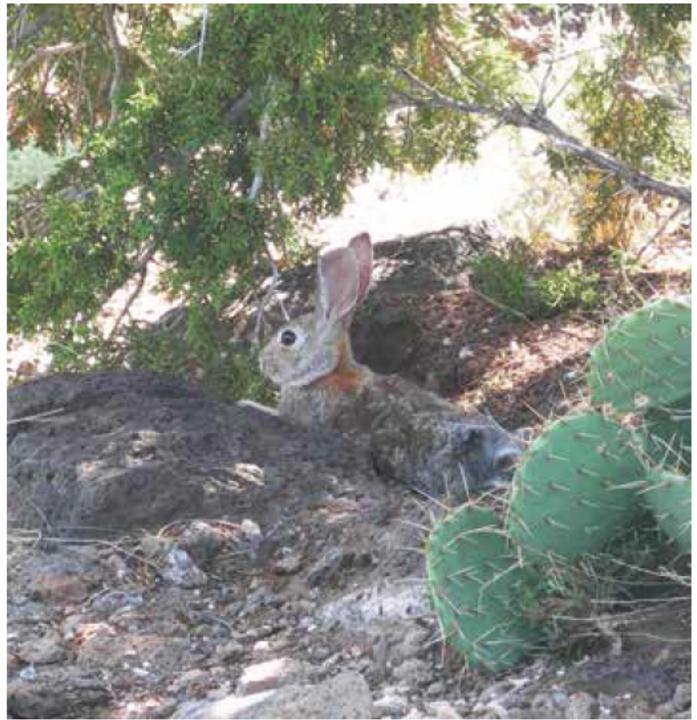
Plant Food Plots: where rainfall is sufficient, forage plots may be planted adjacent to shrub cover

Plant Native Grasses and Forbs: where early successional cover is limited and planting is necessary to provide additional grasses and forbs

Plant Shrubs: in areas where shrub cover is lacking

Set-back Succession: *Prescribed Fire* is recommended to maintain herbaceous openings; *Prescribed Fire* and *Chaining* can rejuvenate decadent shrublands and encourage additional herbaceous groundcover (burning is not recommended in the *Hot Desert* ecoregion unless sufficient precipitation is available); *Mowing* can be used to maintain herbaceous openings in *Urban* areas

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 is limiting growth

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

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, and transect flush counts can be 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 also are 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 and browse

Water: necessary water obtained from diet

Cover: shrub cover, brushpiles, native warm-season grasses and forbs for loafing and escape cover; burrows also are 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; sod grasses, such as tall fescue and bermudagrass, can be especially problematic

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; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

Leave Crop Unharvested: to provide additional food and cover, especially corn, alfalfa, and wheat

Livestock Management: should prevent overgrazing to allow sufficient herbaceous vegetation for nesting, cover, and forage in fields and other early successional areas; exclude livestock from food plots

Plant Food Plots: where additional forage is needed; linear plantings may be situated adjacent to dense 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, fencerows, and other idle land areas may be good places to plant but usually shrubs and brushy cover will develop naturally in most areas through succession

Set-back Succession: *Prescribed Fire*, *Disking*, and *Herbicide Applications* are recommended to maintain early successional areas, especially when litter accumulation or



Aubrey Deck



woody encroachment is excessive; *Chaining*, *Prescribed Fire*, and *Herbicide Applications* can be used to rejuvenate shrublands, especially where herbaceous groundcover is shaded out; *Chainsawing*, *Dozer-clearing*, and *Root-plowing* can be used to convert forest cover to early successional communities; *Mowing* can be used to maintain herbaceous openings in **Urban areas**

Tillage Management: fall tillage may be delayed until spring to allow use of standing stubble for cover and waste grain for food

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

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

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 also may eat bird eggs

Water: necessary water generally is obtained through diet, but free-standing 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 tree-of-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

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; *Forest Stand Improvement* can encourage larger crowns of mast-producing trees and enable oaks, hickories, beech, and others to produce more mast; also can increase soft mast availability and provide snags for potential den sites

Leave Crop Unharvested: (corn) where crop is adjacent to woods or tree line where squirrels can clean grain; especially important during years of poor mast production

Livestock Management: should prevent overgrazing in woodlands and forests; livestock should be excluded from riparian areas in open landscapes where tree cover is largely limited to riparian areas; livestock should be excluded from food plots and from areas where trees have been planted to enhance habitat for eastern gray squirrels



Laura Perlick



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; also may 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 gray 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 to increase viewing opportunities

Gray fox

General information

Gray foxes are common and widespread in North America. They 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 free-standing 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, Single-tree Selection)* in large areas of mature forest and *Forest 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



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additional harvest and increased harvest is desired for recreational trapping or hunting; to promote increased 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, trapper harvest data, and trail cameras may be used to estimate population trends

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 also use free-standing water by drinking while on the fly; bats commonly forage for insects over water bodies

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

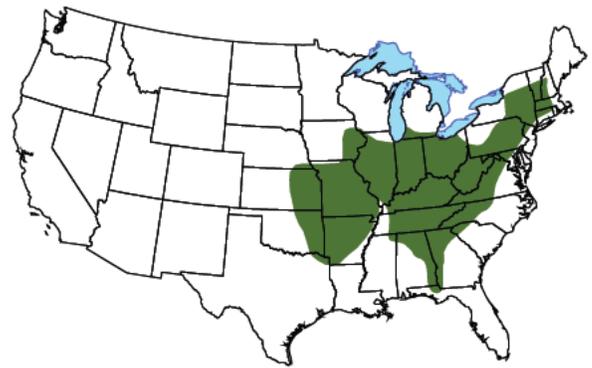
Create Snags: can provide temporary foraging and roosting sites if an adequate number of trees are not already available

Forest Management: *Forest Regeneration (Group Selection)* provides small openings used for foraging; *Forest Stand Improvement* can favor tree species with flaky bark used for roosting and create more open space around tree crowns where Indiana bats forage

Nesting Structures: artificial roosting structures, such as BrandenBark™, may be installed in addition to *Create Snags* for maternal colonies where roost sites are limiting



Susi von Oettingen



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

Set-back Succession: *Prescribed Fire* can be used in mature woods to reduce midstory and facilitate foraging

Water Developments for Wildlife: small impoundments and ponds (<1 ac) may be created in forested areas where surface water is limiting for Indiana bats

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

Mink

General information

Mink occur in Alaska, Canada, and across most of the U.S. They are mainly nocturnal and are found along stream banks, riverbanks, and edges of a variety of wetlands. Mink are strictly carnivorous. Most prey is found in close association with dense vegetation along wetland edges and other riparian areas. Availability of den sites is considered a key factor in how mink use an area. Areas with lots of trees and shrubs and limited livestock grazing near riparian areas usually have more den sites. Mink can eat significant numbers of upland nesting waterfowl or gamebirds, especially in areas where nesting cover is limited.



Bo Zarembo

Habitat requirements

Diet: rabbits, mice, muskrats, crayfish, snakes, and birds

Water: necessary water probably obtained through diet

Cover: closely associated with water; riparian areas and wetland edges; dens often located under log jams and tree roots, old muskrat burrows, and rock piles

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for mink and their prey

Livestock Management: livestock should be excluded from wetlands and riparian areas where mink is a focal species; this may include development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate old decadent wetland vegetation that can improve habitat for prey

Water Control Structures: are necessary to regulate water level and manipulate growth of emergent aquatic vegetation adjacent to an impoundment

Water Developments for Wildlife: shallow impoundments can be developed to increase habitat where needed

Decrease Harvest: may be necessary when trapping pressure is limiting population and an increase in population is desired

Increase Harvest: where populations can sustain additional trapping pressure, and when mink have been identified limiting upland nesting waterfowl or gamebirds

Wildlife Damage Management: mink may occasionally kill domestic poultry, but this is rare and localized. Trapping and exclusion are effective methods to reduce damage.



Wildlife or Fish Survey: track counts and trapper harvest data are often used to estimate population trends

Mountain cottontail

General information

Mountain cottontails occur in the mountainous regions of the western U.S. They use thick shrubs and burrows for nesting and cover, and eat a variety of forbs, grasses, and browse. They have relatively small home ranges and daily movements, so food and cover should be close together.

Habitat requirements

Diet: a variety of forbs, grasses, seeds, and soft mast in spring through fall; in winter, bark and browse is most important; grains and alfalfa are eaten when available

Water: necessary water is obtained from diet

Cover: thick shrubs and burrows for nesting and cover



Lewis Scharpf

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for mountain cottontail

Forest Management: *Forest Regeneration (Clearcut)* will enhance cover and stimulate additional forage for a few years; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

Livestock Management: should prevent overgrazing and maintain sufficient groundcover for rabbits

Plant Food Plots: where additional forage is needed, linear plantings can be situated adjacent to dense cover

Plant Native Grasses and Forbs: where desirable groundcover is lacking and planting is necessary for establishment

Plant Shrubs: where shrub cover is lacking

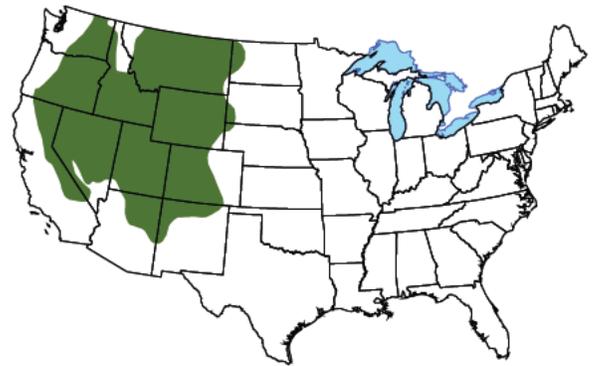
Set-back Succession: *Prescribed Fire* and *Chaining* can be used to rejuvenate and maintain shrubby cover and stimulate forbs and grass interspersed with shrub cover; Mowing may be used in Urban areas to maintain openings

Decease Harvest: may be necessary when additional rabbits are desired and hunting or trapping efforts are limiting growth

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

Wildlife Damage Management: may be necessary to control damage to ornamental and landscaping plants and vegetable gardens

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



New England cottontail

General information

The New England cottontail (NE cottontail) is found in isolated areas of Maine, New Hampshire, New York, Connecticut, Massachusetts, and Rhode Island. The USDA-NRCS included them in its Working Lands for Wildlife Initiative. NE cottontail is often confused with the eastern cottontail, which looks very similar, and because the eastern cottontail is more of a habitat generalist, it has been displacing the NE cottontail since the eastern cottontail was introduced to the New England states in the early 1900s. Because this region has dense human populations, habitat distribution for NE cottontail has declined by 86 percent since 1960. In addition to reduction of habitat distribution, urban sprawl also indirectly reduces habitat quality and quantity because of land-use changes (fire suppression, aesthetic mowing, afforestation, and the reduction of timber harvest). The remaining habitat is largely fragmented and isolates local populations, making them more vulnerable to overall population decline. Early successional cover in at least 25-acre blocks is desirable. Habitat may be provided in old-fields, cleared areas (such as utility and railroad right-of-ways), young regenerating forest, shrubby fringes around swamps and beaver ponds, managed early successional openings, and coastal shrublands. Nests are constructed of fur, grass, and leaves on the ground in a 4-inch depression.

Habitat requirements

Diet: forbs, grasses and soft mast in late spring and summer; grasses, leaves, soft mast, and buds in fall; bark, twigs, buds, and grasses in winter

Water: obtained through diet

Cover: early successional cover consisting of shrubs, forbs, and perennial native grasses; evergreen shrubs and trees are critical for escape and thermal cover in winter

Wildlife management practices

Conservation Easement: can protect critical habitat for this declining species

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for NE cottontail

Edge Feathering: to enhance cover and forage availability between fields and forest

Field Borders: to increase usable space around crop fields

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Seed-tree)* will enhance habitat for a few years; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

Livestock Management: should exclude livestock from



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food plots and prevent overgrazing to allow sufficient herbaceous vegetation for nesting, cover, and forage
Plant Native Grasses and Forbs: where herbaceous vegetation is limiting and planting is necessary to establish desirable cover

Plant Food Plots: where additional forage is needed; linear plantings may be situated adjacent to dense cover

Plant Shrubs: where there is a lack of shrub cover and none is regenerating naturally

Plant Trees: evergreen species may be planted in areas lacking thermal cover in winter

Set-back Succession: *Prescribed Fire, Herbicide Applications, and Disking* can be used to maintain early successional areas; *Prescribed Fire* can be used to rejuvenate and maintain shrub cover; *Chainsawing, Dozer-clearing, and Root-plowing* can be used to convert forest to early successional cover

Decrease Harvest: may be necessary if the local population is declining or cannot withstand harvest.

Wildlife or Fish Survey: because differentiating New England cottontails from Eastern cottontails is very difficult and only reliable under genetic testing or morphological skull identification, wildlife agencies request hunters submit heads of harvested rabbits for identification and analysis of population trends

Raccoon

General information

Raccoons are very common throughout most of the U.S., except in certain parts of the Rocky Mountains, Nevada, Utah, and Arizona. Raccoons are found in a variety of vegetation types, but are usually most abundant near riparian areas and wetlands. They also are found in urban areas. Raccoons den in hollow trees, in burrows under stumps or brush piles, or in chimneys, attics, and crawl spaces of houses and buildings. They are omnivorous and eat a wide variety of foods. Raccoons can become pests in urban areas and in wetlands (depredating waterfowl nests). Raccoons also have been identified as major predators on gamebird nests and young gamebirds.

Habitat requirements

Diet: crayfish, birds, eggs, small mammals, insects, lizards, snakes, worms, fish, carrion, grains, seeds, hard and soft mast, and foods prepared for human and pet consumption

Water: require water frequently during warm seasons

Cover: riparian areas, bottomland hardwoods, and along other wetlands; natural tree cavities are used for denning and daytime loafing; raccoons also den in ground burrows under stumps, brush piles, junk piles, old abandoned buildings, and rocky cliffs and ledges

Wildlife management practices

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

Create Snags: where denning sites are limited

Edge Feathering: to increase usable space for prey around fields

Field Borders: to increase usable space for prey around fields

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection, Single-tree Selection)* and *Forest Stand Improvement* can stimulate soft mast production and cover for prey

Leave Crop Unharvested: especially cornfields adjacent to bottomland hardwoods and riparian areas

Livestock Management: livestock should be excluded from riparian areas and other wetlands; this may include development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas

Plant Food Plots: annual grain food plots, especially corn, may be planted where food is limiting and where an increase in raccoon population is desired (this situation is exceptionally rare)

Plant Shrubs: where soft mast is lacking and to provide corridors across large open areas

Plant Trees: in riparian areas and adjacent to wetlands where few trees are present to maintain riparian corridors; maintain approximately 50 percent deciduous forest cover; also in large open areas where there are few



Dave Menke



trees

Repair Spillway/Levee: if not functioning properly

Set-back Succession: *Prescribed Fire* is recommended to rejuvenate old decadent wetland vegetation; *Prescribed Fire* and *Disking* can maintain herbaceous openings; *Prescribed Fire*, *Herbicide Applications*, and *Chaining* are recommended to rejuvenate decadent shrub cover

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

Water Control Structures: should be installed in existing dikes, dams, or levees if not present, and if needed, to control water levels and provide water less than 2 feet deep and stimulate emergent vegetation and enhance habitat for prey

Water Developments for Wildlife: shallow impoundments can provide a water source and additional habitat for various prey species

Decrease Harvest: if hunting pressure is limiting population growth where an increase is desired (this situation is rare)

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

Wildlife Damage Management: is often necessary when raccoons get into garbage cans, occupy residences or buildings, or prey upon poultry; exclusion is cost-effective; cultural modification, such as using wildlife-proof trash cans, is effective; trap and kill is most effective for problem raccoons

Wildlife or Fish Survey: track counts, camera surveys, and trapper harvest data may be used to monitor population trends

River otter

General information

The river otter is a brownish black semi-aquatic mammal that is a member of the weasel family. River otters are highly social and the group is called a family, which consists of an adult female and her offspring. Adult males form social groups separate from the families except during the breeding season. Adults typically weigh 15 to 25 pounds and are well equipped for aquatic life with short fur, short powerful legs, webbed toes, and long tapered tails. River otters are superb swimmers and divers and can remain underwater for several minutes. They are active year-round, but are mostly nocturnal during spring, summer, and fall. River otters live in a holt, which is a den constructed of burrows of other mammals. They also den along undercut riverbanks, hollow logs near or in the water, rock formations, and flooded debris that provide protection and seclusion with easy access to water. Urbanization and pollution have decreased the range of river otters.

Habitat requirements

Diet: primarily fish, but they also will feed extensively on aquatic insects and crayfish; small mammals and amphibians are eaten occasionally

Water: largely obtained from their diet; clean water is essential for fish populations

Cover: riparian areas along creeks and rivers, as well as freshwater lakes, inland wetlands, coastal shorelines, marshes, and estuaries

Wildlife management practices

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

Livestock Management: livestock should be excluded from forests managed for river otter

Repair Spillway/Levee: if not functioning properly

Water Control Structures: should be installed in levees and dams if not present to manage water levels in impoundments and influence habitat for river otters and prey

Water Developments for Wildlife: impoundments may be created adjacent to riparian areas where additional habitat for river otters is desired

Decrease Harvest: may be necessary if trapping has been excessive and an increase in population is desired

Increase Harvest: may be required if predation is limiting populations of various prey species or when a reduction in population is desired

Wildlife Damage Management: is necessary when recreational or commercial fisheries are being threatened by river otters



Jim Leopold



Wildlife or Fish Survey: track surveys, latrine site surveys, bridge surveys (for latrines), trapper harvest data, and camera surveys can be used to monitor populations

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. 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 areas containing well-interspersed vegetation types and successional stages. White-tailed deer are ruminants and are classified as concentrate selectors, meaning they concentrate their feeding on select plant species and select plant parts. 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, soft mast (such as blackberry and persimmon), 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 drink free-standing water when available

Cover: dense woody vegetation as well as relatively tall early successional vegetation, including native grasses, forbs, and shrubs; at the northern edge of their range white-tailed deer use wintering areas, which are usually dense stands of spruce, fir, cedar, and hemlock to avoid deep snow and cold winds

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 (japangrass) 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



Steve Hillebrand



escape cover; *Forest Stand Improvement* can provide increased browse and soft mast production and stimulate better cover in stands with a poorly developed understory; both methods are often used at the northern edge of their range to manage the quality and vigor of coniferous cover within a deer wintering area; *Forest Road Maintenance* may involve daylighting roads and planting forages where forage may be limiting

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; should prevent overgrazing in woodlands and savannas; livestock should be excluded from food plots

Plant Food Plots: when naturally occurring food sources are limited, food plots may provide additional nutrition

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

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

Plant Trees: (in some ecoregions) 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*, *Dozer-clearing* and *Root-plowing* when converting forest to early successional plant communities to increase forage and enhance fawning cover, and to kill or remove undesirable trees in woodlots and other areas

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

Wildlife or Fish Survey: camera surveys, browse surveys, aerial surveys (in open areas such as South Texas, Kansas, or Oklahoma, and northern portion of range during winter when there is extensive snow cover), pellet surveys, and hunter observation and harvest data are used to estimate population trends

Reptiles

Eastern box turtle

General information

The eastern box turtle occurs throughout much of the eastern United States. It prefers deciduous or mixed woodlands, but also uses 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 or loose soil within small openings with an open structure at ground level; nests may be concentrated in openings where soil temperatures are warmer.

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to compete with native vegetation and reduce habitat quality; sodgrasses in openings is particularly problematic for nesting; japangrass in forests is not a problem for eastern box turtle, but may be a problem for other species. However, japangrass (or Japanese stiltgrass) in forested areas is not a problem for eastern box turtles as they regularly forested areas where japangrass occurs in the understory.

Field Borders: to increase usable space around row crop fields

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

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



Katie A. Harris



Plant Native Grasses and Forbs: where planting is necessary 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, Herbicide Applications, and Disking* are recommended to maintain herbaceous openings and provide open structure at ground level; it is important that *Prescribed Fire* occurs during the inactive season to minimize negative effects on the turtles; *Chainsawing, Dozer-clearing, and Root-planting* can be used to create forest openings where openings for nesting may be limited

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 snapping turtle

General information

The eastern snapping turtle is found across much of the U.S. east of the Rocky Mountains. It occurs in most permanent bodies of water, but prefers soft mud-bottomed ponds, lakes, and slow streams with dense vegetation. It is one of the more aquatic freshwater turtles and spends most of its time lying on the bottom of deep pools or buried in the mud in shallow water with only its eyes and nostrils breaking the surface of the water. The primary nesting season is May-June with the female digging a hole and laying about 30 eggs. Eastern snapping turtles are omnivorous and will consume relatively large invertebrate and small vertebrate prey. If approached, snapping turtles will turn to face the potential predator, lunge forward, and strike quickly with powerful beaked jaws. Eastern snapping turtles grow slowly, but can attain very large sizes (>50 lbs.) They have heavy muscular legs and are often harvested for human consumption.

Habitat requirements

Diet: insects, crayfish, clams, earthworms, fish, frogs, toads, salamanders, snakes, small turtles, birds, and small mammals; also consumes various aquatic plant species

Water: requires permanent bodies of water; obtains water from food

Cover: permanent water bodies with muddy bottoms and thick vegetation; hides underwater beneath submerged stumps, roots, brush, and buried in the mud

Wildlife management practices

Livestock Management: livestock should be excluded from riparian areas and other wetlands; this may include development of livestock watering facilities in uplands to discourage congregation in and overuse of riparian areas

Repair Spillway/Levee: if not functioning properly

Water Control Structure: should be installed in existing levee or dam if one is not present to manipulate water levels as needed

Water Development for Wildlife: ponds and impoundments may be built when permanent bodies of water are not available

Decrease Harvest: may be necessary when harvest pressure limits population growth

Increase Harvest: where populations can sustain additional harvest pressure and if the turtles are limiting other desirable species

Wildlife Damage Management: may be necessary if turtles are found in fish hatcheries

Wildlife or Fish Survey: hoop net traps are used to estimate population trends



Chelsi Hornbaker



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, which means they have a heat-sensing organ behind the nostrils that can detect temperature differences, that allows the snake 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 generally are 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 keratin, which is a protein, 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 free-standing 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

Edge Feathering: may be implemented to enhance habitat for prey species

Forest Management: *Forest Regeneration (Clearcut, Shelterwood, Group Selection)* and *Forest 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* ideally should be



conducted 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: may be necessary to relocate timber rattlesnakes if found in or close to human dwellings or recreational areas, such as parks

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

Amphibians

American bullfrog

General information

American Bullfrogs are relatively large frogs that inhabit permanent bodies of standing or slow-moving water. The American bullfrog's native range extends from the Atlantic Coast to eastern Colorado and eastern Mexico, and from southern Colorado to northeastern Mexico. Bullfrogs are not native west of the Rocky Mountains, but have been successfully introduced in many areas. Bullfrog tadpoles require two years to metamorphose. They prefer shorelines with dense vegetation adjacent to shallow open water dominated by floating and submerged aquatic vegetation. All habitat requirements are usually found in and around a single pond.

Habitat requirements

Diet: insects, crayfish, other frogs, reptiles, snails, fish, and occasionally small mammals and birds

Water: stable water levels are necessary for hibernation and egg development; water levels should be maintained at a constant level

Cover: dense, emergent aquatic and upland herbaceous vegetation adjacent to water for hiding and foraging

Wildlife management practices

Livestock Management: livestock should be excluded from ponds managed for bullfrog; livestock watering facilities should be developed away from pond

Repair Spillway/Levee: if not functioning properly

Water Control Structures: should be installed if none are present in existing dams and levees so water depth can be managed as appropriate

Water Developments for Wildlife: ponds and shallow impoundments can be provided where habitat for bullfrogs is absent or insufficient for desired population

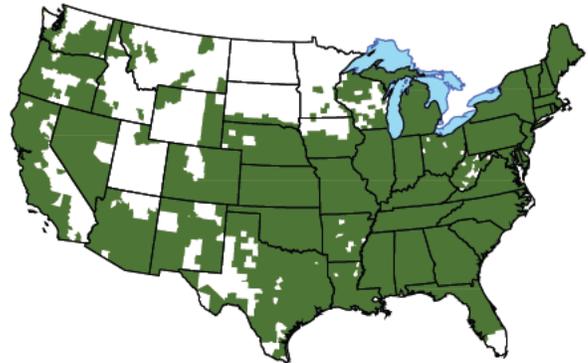
Decrease Harvest: if current hunting pressure is causing population to decline and population growth is desired

Increase Harvest: where populations can sustain additional harvest pressure for hunting recreation

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



Bill Buchanan



Crawfish frog

General information

Crawfish frogs occur from Indiana south to Louisiana, and from eastern Kansas south to the Texas coast. Crawfish frogs are found in a variety of vegetation types ranging from damp wooded valleys, open brushy fields, to tallgrass prairies. Populations are often associated with major river floodplains. Areas with shallow soils and intensive agriculture are avoided. Crawfish frogs are largely fossorial and spend the non-breeding season in crayfish burrows. Adults make annual migrations to temporary, fishless ponds to breed. Eggs hatch within 3-4 days, but tadpoles may take 2 months to transform.



Rick Fridell

Habitat requirements

Diet: adults eat beetles, spiders, crickets, ants, millipedes, and small crayfish; tadpoles filter feed on phytoplankton

Water: breed in ephemeral, fishless ponds with grassy margins

Cover: adults require low, wet areas, including moist meadows, prairies, woodlands, and brushy fields; burrows are required; crayfish burrows are preferred, but any burrow may be used as long as it reaches the water table; tadpoles require ponds that contain some algae, pondweed, and other vegetation to provide food and shelter



Wildlife management practices

Conservation Easement: can protect critical habitat for this declining species

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for crawfish frogs

Livestock Management: livestock should be excluded from ponds that may be used as breeding ponds for crawfish frogs; livestock watering facilities should be developed away from pond

Plant Native Grasses and Forbs: may be necessary to convert fields currently in row-crop agriculture to crawfish frog habitat

Plant Shrubs: in fields that are currently in row-crop agriculture to convert them to crawfish frog habitat, or in large open areas that need additional cover

Water Control Structures: should be installed if not present in ponds with levees that are managed for crawfish frogs to enable the pond to be drained, especially if fish are present

Water Developments for Wildlife: small, fishless ponds and impoundments may be created if additional breeding ponds are needed

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

Tiger salamander

General information

The tiger salamander is a wide-ranging species occurring throughout the Great Plains and much of the eastern U.S. (it is absent from the Appalachian mountain regions). It is one of the largest terrestrial salamanders in North America with adults attaining more than one foot in length. Adults inhabit a wide array of vegetation types including bottomland deciduous forests, conifer forests, woodlands, fallow fields, grasslands, meadows, brushy areas, semideserts, and deserts. Free-standing water must be present for breeding. Adults are terrestrial, but make annual, spring migrations to ephemeral (temporary) ponds to breed. Ephemeral ponds contain water during only a portion of the year. The breeding season is short and eggs develop rapidly. Larvae are top predators in fishless ponds. They often grow quickly and can reach 4-6 inches in length before transforming in late summer.

Habitat requirements

Diet: adults eat worms, snails, insects, and slugs; larvae eat a wide variety of aquatic organisms, including invertebrates and other amphibian eggs and larvae

Water: ephemeral or semi-permanent ponds are necessary for reproduction; ponds should be fishless if successful reproduction is to occur

Cover: adult tiger salamanders live underground in burrows for most of the year; deep leaf litter and large amounts of downed woody debris are most desirable

Wildlife management practices

Control Nonnative Invasive Vegetation: when nonnative invasive vegetation begins to reduce habitat quality for tiger salamanders

Livestock Management: should prevent overgrazing where tiger salamander is a focal species; livestock should be excluded from ponds that may be used as breeding ponds for tiger salamanders; livestock watering facilities should be developed away from pond

Plant Native Grasses and Forbs: when converting fields that are currently in row-crop agriculture to tiger salamander habitat

Plant Shrubs: when converting fields that are currently in row-crop agriculture to tiger salamander habitat, or in relatively large open areas that need additional cover

Plant Trees: where additional forest cover is needed

Water Control Structures: should be installed if not present in ponds or impoundments with levees that are managed for tiger salamanders to enable the pond to be drained, especially if fish are present



Gary M. Stolz



Water Developments for Wildlife: small, fishless ponds or impoundments may be created if additional breeding ponds are needed

Wildlife or Fish Survey: cover boards and pitfall traps along drift fences are used to estimate population trends

Fish

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

Water: basic requirements include dissolved oxygen (minimum of 4 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)

Cover: aquatic environments with submerged rocks, woody debris, and aquatic vegetation where small fish (prey) hide

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 on page 240 for specifics on fish harvest

Increase Harvest: refer to **Wildlife Management**

Practices on page 241 for specifics on fish harvest

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

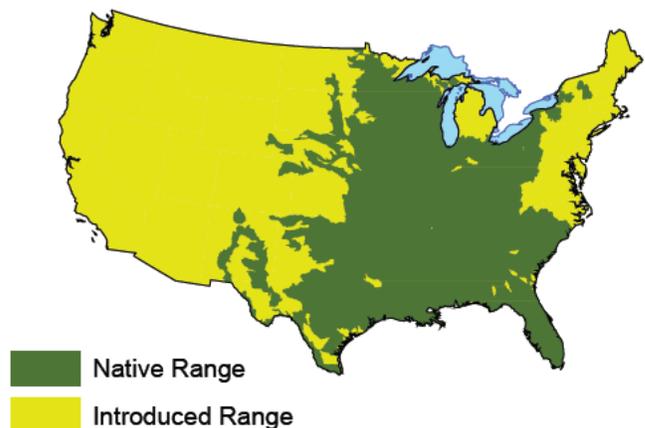
Construct Fish Pond: where no suitable water source is present or where an existing fish pond needs extensive repair, especially to the dike or dam

Control Aquatic Vegetation: when necessary to discourage undesirable 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



Eric Engbretson



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

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. Their native range includes most of the eastern U.S., but largemouth bass have been stocked all over the country successfully.

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: aquatic environments with submerged rocks, woody debris, and aquatic vegetation where small fish (prey) hide

Water: basic requirements include dissolved oxygen (minimum of 4 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* on page 240 for specifics on fish harvest

Increase Harvest: refer to *Wildlife Management Practices* on page 241 for specifics on fish harvest

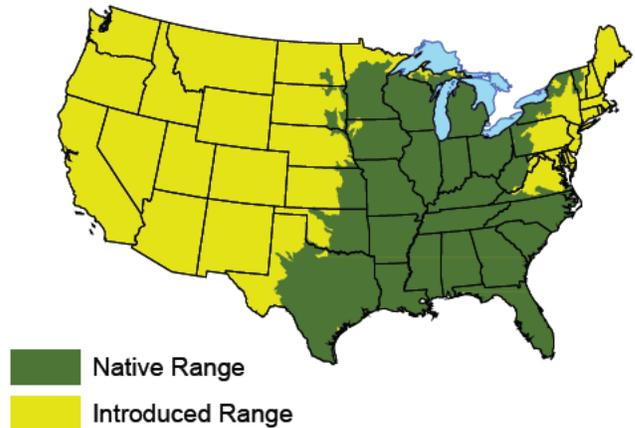
Wildlife or Fish Survey: fishing records, seining, and electro-shocking are used to survey largemouth bass populations

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 undesirable 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