# Texas Stock Show Wildlife Contest Study Resource

**This study resource is designed to provide the procedures and information to prepare for the Wildlife Contests at the State Fair of Texas, Fort Worth Stock Show and Rodeo, and Houston Livestock Show and Rodeo.**

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# Contest Procedures

This contest will follow the procedures as described below. The wildlife species to study are described in the study resource with each description containing habitat requirements and more. Contestants should study information within all sections to be successful in the contest; Ecoregion Descriptions, Wildlife Species, and Habitat Management Practices (HMP).

Each contestant will complete both parts of this contest independently. The contestant group will be divided in half with a team's members being represented in each half. The contest parts will run concurrently with half of the group working on Part A and the other half working on Part B. Groups will rotate in approximately one hour or sooner if all contestants have turned in their answer sheet.

**Part A: Wildlife Habitat Management**

This part of the contest requires the contestant **to evaluate a habitat and select the HMPs** necessary for the current habitat condition specific to **15 of the wildlife species** in the study resource. The 15 wildlife species will be provided on the answer sheet at the contest. A habitat depicting an example of the ecoregion will be presented to the contestants for evaluation. This habitat will be described in a scenario and landowner objectives provided at the contest. In addition, depending on contest location and current circumstances contestants will see the habitat either firsthand and walking through it or virtually through photos or video. Contestants will choose the necessary HMPs by bubbling in A (Yes) or B (No) on the scantron for each practice under each wildlife species. HMPs should be recommended based on the current condition of the habitat and the landowner objectives. Each answer will be worth 2 points. Contestants will be given 1 hour to complete this part of the contest.

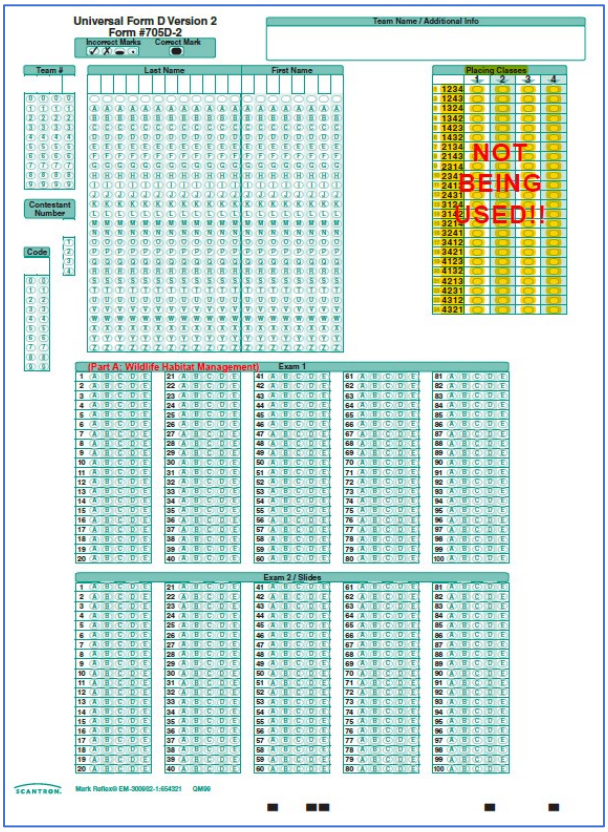
**Part B: Identification and Knowledge**

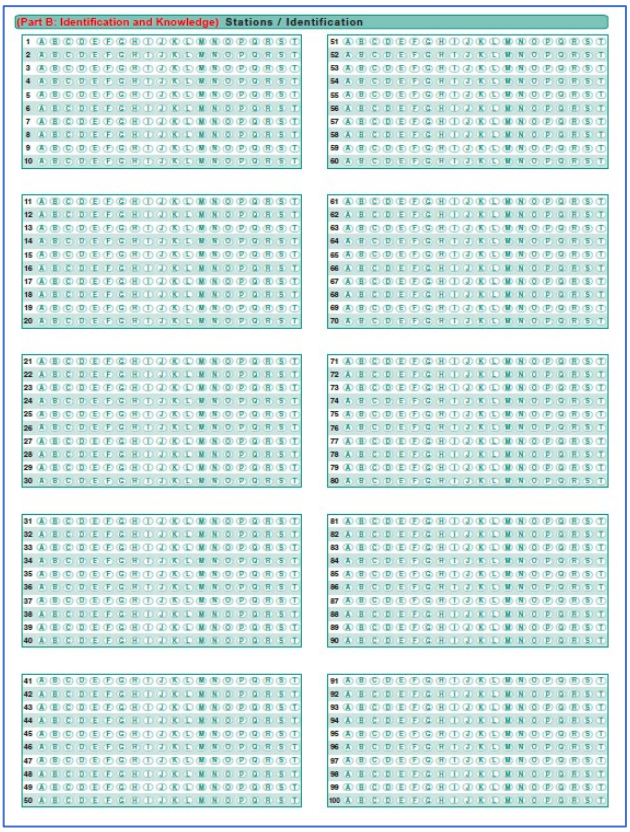
This part of the contest consists of **20 identification items** and **20 multiple-choice, 'True or False', or 'Yes or No' knowledge questions for each item**. Identification items can consist of the listed ecoregion specifics, wildlife species, and HMP related items. Wildlife species can be presented as photos or drawings, mounted specimen, external body parts (pelts, wings, feet, antlers, etc.), tracks, or calls. HMP related items can be presented as photos or drawings, actual items representing the practice, or a resulting effect in a habitat (ex: photo of a white-tailed deer spotlight survey, an actual herbicide spray rig used to control non-native plants, a resulting effect in a habitat [disked or burned ground], etc.). Knowledge questions will be developed from any portion of the study resource. Contestants will rotate through the stations as directed by a contest official keeping time. Typically, 45 seconds will be allowed at each station. Each Identification item and Knowledge question will be worth 2 points.

**Scantron Answer Sheets**

Scantron Answer Sheets will be used for this contest at all stock show locations. Scantrons will be provided by the contest.

The following images provide a view of the two-sided scantron answer sheet that will be used. This contest will use only certain parts of the scantron as marked with red titles. A discussion about the scantron and how to use it will be held prior to the contest with all contestants. All erasures must be complete using a good eraser. Contest officials will also carry erasers to assist with a complete erasure.




In Part A: Wildlife Habitat Management, each numbered line represents a HMP choice below a specific wildlife species. Each contestant will be given a handout with all 15 wildlife species represented in the contest and their corresponding HMP options. See the example below.

## Habitat Management Practices

**Bubble in A (Yes) or B (No) for whether or not the HMP is needed for the specific species**

**All numbers correspond with the answer scantron**

**American woodcock**

1. Control Nonnative Invasive Vegetation
2. Conduct Forest Management
3. Conduct Wildlife or Fish Survey

barred owl

4. Control Nonnative Invasive Vegetation
5. Create Snags
6. Conduct Forest Management
7. Conduct Livestock Management
8. Provide Nesting Structures
9. Plants Trees
10. Set-back Succession
11. Conduct Wildlife Damage Management
12. Conduct Wildlife or Fish Survey

black-bellied whistling duck

13. Control Nonnative Invasive Vegetation
14. Create Snags
15. Conduct Wildlife or Fish Survey

The contestant will bubble either A (Yes) HMP recommended or B (No) HMP not recommended.

In Part B: Identification and Knowledge, all odd numbers (1, 3, 5, so on) on the scantron in that section represent an identification station. There will be 20 options to choose from labeled A – T. The contestant will bubble their letter of choice on the proper line.

**Example** Identification Species List Which Will Be At Each Station

**A.** American woodcock
**B.** Barred owl
**C.** Black-bellied whistling duck
**D.** Blue-winged teal
**E.** Dickcissel
**F.** Eastern bluebird
**G.** Eastern meadowlark
**H.** European starling
**I.** Grasshopper sparrow
**J.** Loggerhead shrike
**K.** Mourning dove
**L.** Northern bobwhite
**M.** Prothonotary warbler
**N.** Red-eyed vireo
**O.** Ring-necked pheasant
**P.** Western kingbird
**Q.** White-winged dove
**R.** Wild turkey
**S.** Wood duck
**T.** American beaver

All even numbers (2, 4, 6, so on) on the scantron in that section represent a knowledge question station. Each knowledge question station will represent the previous identification station. Knowledge questions can be multiple choice (A, B, C, or D), True or False (A or B), or Yes or No (A or B).

**Example** Knowledge Questions

True or False? This species is a ground-dwelling, migratory shorebird of the eastern United States.

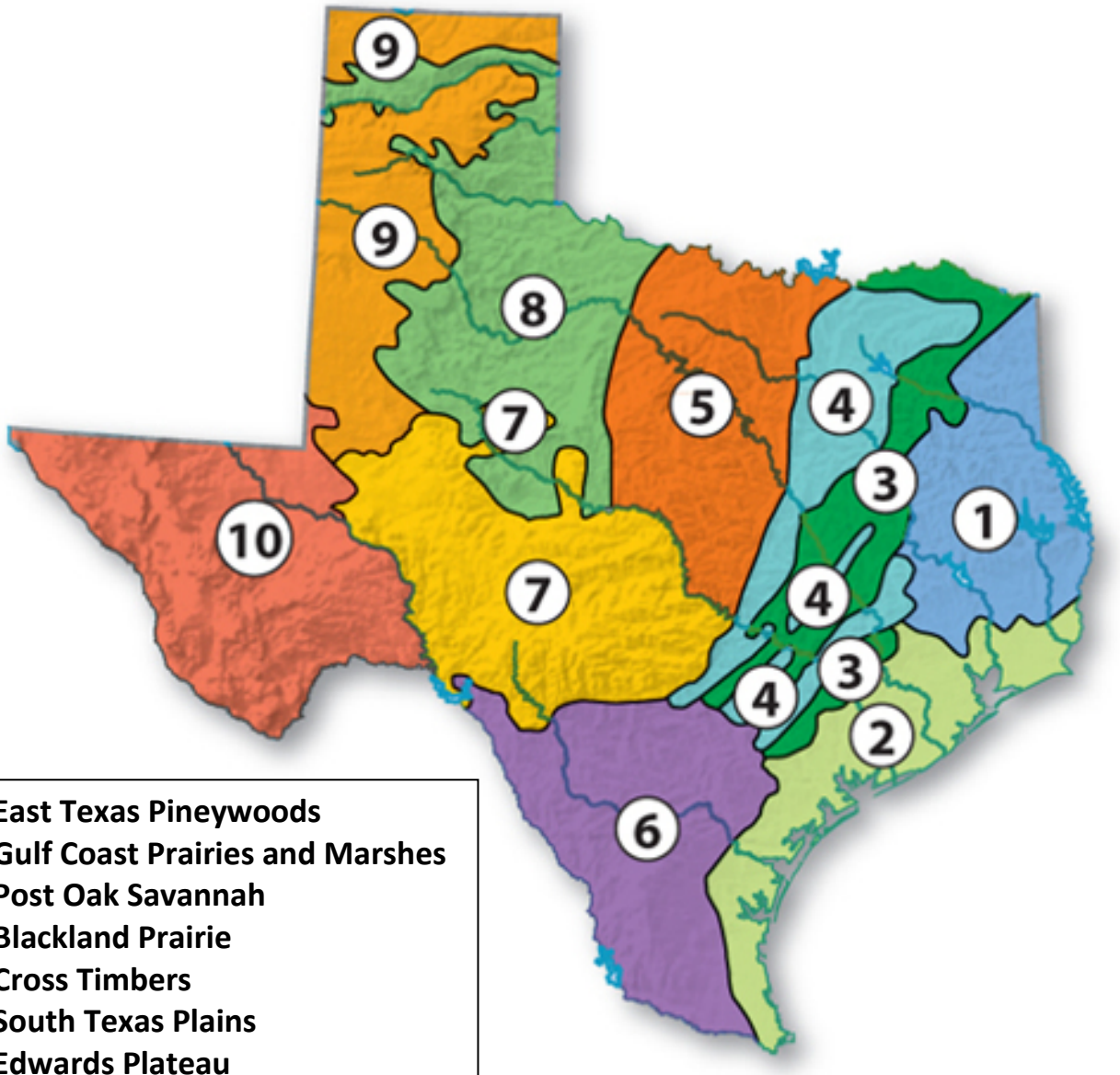
A. True
B. False

What is the call of this species?
A. "Coo-coooo, coo-coooo"
B. "Who cooks for you? Who cooks for you all?"
C. "hoo-h'HOO-hoo-hoo"
D. "ka-ka-ka-ka-ka-ka"

Young for this species hatch blind and featherless in 13-14 days.
A. Yes
B. No

# Texas Ecoregions

Texas is rich in ecoregions across the state providing a vast diversity of land types, topography, watersheds, habitat, climate, and wildlife species. Knowing and understanding the ecoregions is essential to evaluating and managing habitat for wildlife use. Each contest will feature an ecoregion typical to the general location of the contest. One identification item and knowledge question could be devoted to an ecoregion. A general understanding of the location of each ecoregion and the details of the ecoregions on the following pages should be studied to be successful.




1. **East Texas Pineywoods**
2. **Gulf Coast Prairies and Marshes**
3. **Post Oak Savannah**
4. **Blackland Prairie**
5. **Cross Timbers**
6. **South Texas Plains**
7. **Edwards Plateau**
8. **Rolling Plains**
9. **High Plains**
10. **Trans Pecos**

1. **East Texas Pineywoods:** Rolling terrain covered with pines and oaks, and rich bottomlands with tall hardwoods, characterize this forested region. It is part of a much larger area of pine/hardwood forest that extends into Louisiana, Arkansas, and Oklahoma. The average annual rainfall of 36 to 50 inches is uniformly distributed throughout the year, and humidity and temperatures are typically high. The soils of the region are generally acidic and mostly pale to dark gray sands or sandy loams. Elevations range from 200 to 500 feet above sea level.

2. **Gulf Coast Prairies and Marshes:** This region is a near level, slowly drained plain less than 150 feet in elevation, dissected by streams and rivers flowing into the Gulf of Mexico. It includes barrier islands along the coast, salt grass marshes surrounding bays and estuaries, remnant tallgrass prairies, oak savannahs, and live oak mottes scattered along the coast, and tall woodlands in the river bottomlands. Average annual rainfall varies from 30 to 50 inches per year distributed fairly uniformly throughout the year. The growing season is usually more than 300 days, with high humidity and warm temperatures. Soils are acidic sands and sandy loams, with clays occurring primarily in the river bottoms. Native vegetation consists of tallgrass prairies and live oak woodlands. Brush species such as mesquite and acacias are more common now than in the past. Although much of the native habitat has been lost to urbanization, the region still provides important habitat for migratory birds and spawning areas for fish and shrimp.

3. **Post Oak Savannah:** This region is a transitional area for many plants and animals whose ranges extend northward into the Great Plains or eastward into the forests. Average annual rainfall ranges from 28 to 40 inches per year. May or June usually brings a peak in monthly rainfall. Upland soils are light colored, acidic sandy loam or sands. Bottomland soils may be light brown to dark gray and acidic with textures ranging from sandy loams to clays. The landscape of the region is gently rolling to hilly with elevations ranging from 300 to 800 feet above sea level. The region can be described as oak savannah, where patches of oak woodland are interspersed with grassland.

4. **Blackland Prairie:** This region is named for the deep, fertile black soils that characterize the area. The soils once supported a tallgrass prairie dominated by tall-growing grasses such as big bluestem, little bluestem, Indiangrass, and switchgrass. Because of the fertile soils, much of the original prairie has been plowed to produce food and forage crops. The average annual rainfall ranges from 28 to 40 inches. May is the peak rainfall month for the northern end of the region; however, the south-central part has a fairly uniform rainfall distribution throughout the year. Typically, soils are uniformly dark-colored alkaline clays, interspersed with some gray acidic sandy loams. The landscape is gently rolling to nearly level, and elevations range from 300 to 800 feet above sea level.

5. **Cross Timbers:** Early travelers through north Texas coined the name "Cross Timbers" by their repeated crossings of these timbered areas that proved to be a barrier to their travel between the open prairies to the east and west. This area in north and central Texas includes areas with high density of trees and irregular plains and prairies. Soils are primarily sandy to loamy. Rainfall can be moderate, but somewhat erratic, therefore moisture is often limiting during part of the growing season. Also known as the Osage Plains, it is the southernmost of three tallgrass prairies. It varies from savannah and woodland to the east and south, into shorter mixed-grass prairie to the west. As in the rest of the

Great Plains before being permanently settled, fire, topography, and drought maintained the prairie system and established the location of woodlands mainly as riparian areas.

6. **South Texas Plains:** This region is characterized by plains of thorny shrubs and trees and scattered patches of palms and subtropical woodlands found in the Rio Grande Valley. The plains were once covered with open grasslands and a scattering of trees, and the valley woodlands were more extensive. Today, the primary vegetation consists of thorny brush such as mesquite, acacia, and prickly pear mixed with areas of grassland. The average annual rainfall of 20 to 32 inches increases from west to east. Average monthly rainfall is lowest during winter, and highest during spring (May or June) and fall (September). Summer temperatures are high, with very high evaporation rates. Soils of the region are alkaline to slightly acidic clays and clay loams. The deeper soils support taller brush, such as mesquite and spiny hackberry, whereas short, dense brush characterizes the shallow caliche soils. Although many land changes have occurred in this region, the Brush Country remains rich in wildlife and a haven for many rare species of plants and animals. It is home for semi-tropical plant species that occur in Mexico, grassland species that range northward, and desert species commonly found in the Trans-Pecos ecoregion.

7. **Edwards Plateau:** Commonly known as the Texas Hill Country, it is a land of many springs, stony hills, and steep canyons. The region is home to a host of rare plants and animals found nowhere else on earth. Average annual rainfall ranges from 15 to 34 inches. Rainfall is highest in May or June and September. Soils are usually shallow with a variety of surface textures. They are underlain by limestone honeycombed with thousands of caves. Elevations range from slightly less than 100 feet to over 3,000 feet above sea level. Several river systems dissect the surface, creating a rough and well-drained landscape. Beneath the eastern edge of the Plateau lies a hidden world of underground lakes known as the Edwards Aquifer. This precious water resource also is home to several curious creatures, such as the blind salamander. Today, the Edwards Plateau is characterized by grasslands, juniper/oak woodlands, and plateau live oak or mesquite savannah. Open grasslands and savannahs were more common in pre-settlement times than they are today.

8. **Rolling Plains:** Several Texas rivers begin in the gently rolling hills and broad flats of this region. These rivers and their numerous tributaries are responsible for the rolling character of the land. The rivers have cut canyons that shelter some plants and animals typical of the Rocky Mountains. Average annual rainfall is 20 to 28 inches, with peaks in May and September. A summer dry period with high temperatures and high evaporation rates is typical. Soils vary from coarse sands along outwash terraces adjacent to streams, to tight clays and shales. Soil pH is neutral to slightly alkaline. Elevations vary from 800 to 3,000 feet above sea level. The original prairie grasslands included tall and mid-grasses such as bluestems and gramas. After being settled, buffalo grass and other short grasses have increased under heavy, uncontrolled grazing. Mesquite is a common invader on all soils. Much of the Rolling Plains today can be described as a mesquite-shortgrass savannah. Stream floodplains are dominated by various hardwood species, and juniper is common on steep slopes along rivers. Steep slopes, cliffs, and canyons occurring just below the edge of the High Plains Caprock comprise the Escarpment Breaks area of the Rolling Plains. The Breaks are an ecotone or transition zone between the High Plains grasslands and the mesquite savannah of the Rolling Plains.

9. **High Plains:** This region, together with the Rolling Plains comprise the southern end of the Great Plains of the central United States. The High Plains is a relatively level high plateau, separated from the Rolling Plains by the Caprock Escarpment. Elevations range from 3,000 to 4,500 feet above sea level.

Average annual rainfall is 15 to 22 inches. Rainfall is lowest in winter and mid-summer and highest in April or May and September or October. Extended droughts have occurred here several times. Surface texture of soils ranges from clays on hard land sites in the north to sands in the southern portion of the region. Caliche generally underlies these surface soils at depths of two to five feet. Native vegetation of the High Plains is shortgrass prairie dominated by buffalo grass. Although historically a grassland, mesquite and yucca have invaded parts of the region. Shinnery oak and sand sage are common invaders on sandy lands, and juniper has spread from the breaks onto the plains in some areas. Immense herds of buffalo and pronghorn once roamed across vast prairies of blue grama and buffalo grass. Today, the plains are mostly irrigated cropland, and the native vegetation includes more mesquite and juniper. Although much of the shortgrass prairie and the vast prairie dog towns are gone, pronghorn are still abundant and large flocks of wintering waterfowl still migrate to the playa lakes.

10. **Trans Pecos:** This region is perhaps the most complex of all the regions. It occupies the extreme western part of the state eastward generally to the Pecos River. This is a region of diverse habitats and vegetation, varying from the desert valleys and plateaus to wooded mountain slopes. Elevations range from 2,500 feet to 8,751 feet at Guadalupe Peak. Over most of the area average annual rainfall is less than 12 inches but varies greatly from year to year and from lower to higher elevations. July and August are usually the higher rainfall months. Soil surface textures and profile characteristics are varied which generally react alkaline. Due to the diversity of soils and elevations, many vegetation types exist in the region. The principal plant communities are creosote-tarbush desert scrub, desert grassland, yucca and juniper savannahs, and mountain forests of pinon pine and oak. The various subregions reflect the diversity of the Trans Pecos. The Sand Hills area consists of shin oak and mesquite on wind-blown dunes. Flat-topped mesas and plateaus are intersected by steep-walled canyons and dry washes that comprise the Stockton Plateau. Soils with high salt content and gypsum dunes are typical of the Salt Basin area. The Desert Scrub subregion is an area of low rainfall and rapid drainage. Creosote bush flats with yucca, Lechuguilla, and various small-leafed plants are common. The Desert Grassland area occurs in the central part of the region and is characterized by deeper soils with high clay content. Finally, the Mountain Ranges have higher rainfall and woody vegetation such as junipers, oaks, pinon pine, ponderosa pine, and Douglas fir.

# Wildlife Species

**This section contains information on wildlife species featured in this contest. A general description, characteristics, habitat requirements, and applicable Habitat Management Practices (HMPs) are provided for each species.**

**The species descriptions contain all the information that will be asked in this contest pertaining to wildlife species. Field guides to North American wildlife are good sources for identification characteristics and pictures of the species listed. There also are many internet resources available as study guides for wildlife species identification by sight and sound. Be sure to use reputable internet sites that provide accurate information.**

**It is important to understand that when assessing habitat for a wildlife species and considering various habitat management practices for recommendation, current habitat conditions should be evaluated. These conditions will be provided at the contest by actually viewing the habitat, in the scenario describing the habitat, or by accompanying photos.**

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# Birds

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# American woodcock

**Size:** 9.8-12” long; weigh average 6.9 oz

**Habitat:** 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.

**Range:** 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.

**Diet:** invertebrates (earthworms represent 60 percent of diet) water is obtained through diet

**Nesting:** March to June

**Nest:** Nests are located in slight depressions among dead leaves on the forest floor; openings with sparse herbaceous groundcover and scattered shrubs and/or young trees for courtship and roosting; young hardwood forest 2- to 25-year-old or shrub cover on moist sites, for foraging, nesting, and brood rearing

**Eggs:** 4, sometimes 1-3; rarely 5 or more; pinkish-buff, blotched with brown and gray

**Young:** Downy young leave nest a few hours after hatching; female tends young and feeds them; young can make short flights at age 2 weeks, fly fairly well at 3 weeks, independent at about 5 weeks

**Predators:** domestic dogs and cats, snakes, skunks, opossums, raccoons, and crow

**Migration:** They migrate to their southern range in the fall through winter

**Description/Characteristics:** 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.

**HMP(s):** Control Nonnative Vegetation, Conduct Livestock Management, Manage Shrubs/Brush, Set Back Succession, Conduct Wildlife/Fish Survey

# Barred owl


**Size:** body 17-24" long; 40-50" wingspan; 12-23 oz.

**Habitat:** mature forests of all types with an abundance of relatively large trees and cavities, often near water

**Range:** throughout eastern North America and the Pacific Northwest.

**Diet:** primarily small mammals, birds, amphibians, reptiles, fish, and invertebrates; water requirements are largely unknown, likely obtained from the foods consumed

**Nesting:** February to April

**Nest:** They roost on limbs and cavities during the day. They nest in cavities of large trees and snags and will readily use man-made nesting structures for nesting and roosting. They also may nest on old platform nests built by other owls, hawks, crows, and squirrels.

**Eggs:** average clutch 2-4; white; 1 brood per year

**Young:** hatch blind and covered with fine white down in 28-33 days; eyes open at 1 week; flight feathers develop at 6-9 weeks; leave nest at 12-16 weeks

**Predators:** Great Horned Owl; harassed by crows

**Migration:** present year-round

**Description/Characteristics:** The barred owl is grayish brown with dark rings around the eyes and face. It has a white and brown barred collar and a brown streaked underside. It relies on its keen senses of hearing and sight to find prey. They hunt primarily at night, scanning for prey with keen vision and hearing and flying silently from tall perches. Their hooting call of *"Who cooks for you?* Who cooks for you all?" can be heard all year and is a common night sound where they occur. Barred owl populations have increased and spread since the mid-1960s.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Conduct Livestock Management, Provide Nesting Structures, Set Back Succession, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Black-bellied whistling duck

**Size:** medium-sized duck that ranges in body length from 19 to 22 inches

**Habitat:** tree-lined bodies of water, prefer shallow freshwater ponds, lakes, marshes, cultivated fields, and reservoirs with plentiful vegetation.

**Range:** Central and South America

**Diet:** aquatic plants, grass, grain, insects, and mollusks, obtains water through diet

**Nesting:** May to August

**Nest:** primarily cavity nesters and will use nesting boxes, but may nest on the ground if no cavities are present; tree cavity or broken-off stub, 4-20' above ground or water

**Eggs:** 12-16 eggs; Whitish; Females may lay eggs in each other's nests; such "dump nests" may have 50-60 or more eggs; Incubation is by both sexes, 25-30 days

**Young:** fledge at about 2 months

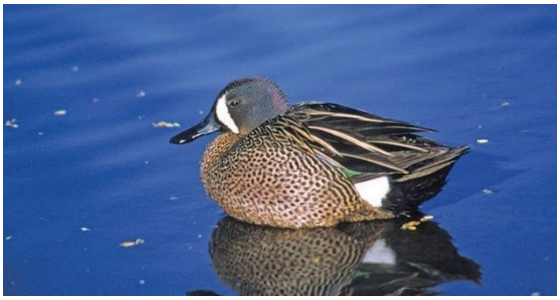
**Predators:** raccoons, opossums, and snakes' prey on eggs

**Migration:** mainly non-migratory with only birds living in the extreme northern portion of their range moving south in winter

**Description/Characteristics:** The males and females look alike. They have a long red bill, long gray head with a gray face and long pink legs. The belly and tail are black, and the body, back of neck and cap are chestnut brown. The black-bellied whistling duck has a distinctive white wing bar that is unique among whistling ducks. Their call is a high-pitched, soft wheezy whistle of four to six notes, accented on the second or third syllable. The black-bellied whistling duck is unique among ducks in that they exhibit a strong bond between pairs, often staying together for many years.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Leave Crop Unharvested, Conduct Livestock Management, Provide Nesting Structures, Plant Food Plots, Repair Spillway/Dam/Levee/Shorelines, Conduct Tillage Management, Provide Water Developments for Wildlife, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey

# Blue-winged teal



**Size:** relatively small dabbling duck, 16” length, 23” wingspan, 13 oz. weight

**Habitat:** Shallow wetlands, ephemeral wetlands, inland marshes, lakes, and ponds

**Range:** wetlands in the prairie pothole ecoregion of the northern Great Plains; winter along the Gulf Coast in the Deep South and in Central and South America

**Diet:** aquatic vegetation, seeds, and aquatic insects; primarily confined to shallow wetlands for brood rearing, feeding, and loafing; surface feeders and prefer to feed on mud flats or in shallow water where floating and shallowly submerged vegetation is available, along with abundant small aquatic animal life

**Nesting:** April to May

**Nest:** found primarily in dense grassland cover; hayfields sometimes will be used for nesting if adequate grass stubble remains

**Eggs:** 9-13 eggs, sometimes 6-15; dull white or tinged olive

**Young:** Leave nest within 24 hours after hatching; young find their own food, are tended by female for first few weeks, but broods of young often left alone before old enough to fly; young capable of flight 38-49 days after hatching

**Predators:** humans, snakes, snapping turtles, domestic dogs and cats, raccoons, red and gray foxes

**Migration:** Blue-winged teal begin fall migration before any other waterfowl. During spring and fall migration, shallow wetlands and flooded fields are used for loafing and feeding.

**Description/Characteristics:** males are brown-bodied with dark speckling on the breast, slate-blue head with a white crescent behind the bill, and a small white flank patch in front of their black rear. Females and eclipse males are a cold, patterned brown. In flight, they reveal a bold powder-blue patch on their upper wing coverts.

**HMP(s):** Control Nonnative Vegetation, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Repair Spillway/Dam/Levee/Shorelines, Set Back Succession, Conduct Tillage Management, Provide Water Developments for Wildlife, Conduct Wildlife/Fish Survey

# Dickcissel

**Size:** 5.5-6.3” length; .9-1.4 oz. weight; 9.8-10.2” wingspan

**Habitat:** native grasslands and savanna, agricultural areas during winter

**Range:** central one-third of the U.S.

**Diet:** insects and grass seeds are eaten year-round; agricultural crops are eaten more during migration and on wintering grounds; water obtained from food

**Nesting:** April to August

**Nest:** placed above ground in tall grasses, forbs, or shrubs.

**Eggs:** 3-5 eggs; pale blue, unmarked; 1-2 broods per year

**Young:** Nestlings are fed by female only. Young leave the nest about 7-10 days after hatching, are unable to fly for several more days.

**Predators:** hawks, falcons, owls, and domestic cats

**Migration:** long distance migrants, southeastern U.S., and Mexico

**Description/Characteristics:** Adult males are grayish on the head with a yellow face and chest, crossed with a bold black V. The back is brown and gray, with warm reddish-brown shoulders. Females have a similar but more subdued pattern and lack the black V on the throat. Immatures are browner, without the cool gray or bright yellow tones; note the broad eyebrow stripe and neat dark malar (mustache) stripe.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Leave Crop Unharvested, Conduct Livestock Management, Promote Native Grasses and Forbs, Set Back Succession, Conduct Tillage Management, Conduct Wildlife/Fish Survey

# Eastern bluebird

**Size:** 6.3-8.3” length; average 1.1 oz. weight

**Habitat:** herbaceous openings, savannas, pastures, parks, backyards, edges of hayfields and crop fields, and other early successional communities well-interspersed with trees and shrubs

**Range:** eastern U.S.

**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, black gum, hollies, dogwoods, pokeweed, and hackberry, water obtained from diet, but may use free-standing water when available

**Nesting:** February to July

**Nest:** Cavities, especially old woodpecker cavities or fence posts, and nest boxes

**Eggs:** normally 3-6 eggs, pale blue, unmarked; sometimes white, 1-3 broods per year

**Young:** Both parents bring food to the nestlings, and young from a previous brood also help to feed them in some cases; young leave the nest at about 18-19 days on average

**Predators:** rat snakes, racers, American kestrels, and domestic cats

**Migration:** migrate to southeastern U.S. or Mexico in winter, present in Texas year-round

**Description/Characteristics:** Bluebirds forage in open areas, but typically near trees, shrubs, or a fence that provide perches. Nest box programs have had a major impact in restoring eastern bluebird populations. Nest boxes for bluebirds should not be placed any closer than 80 yards apart to prevent territorial fighting between males

**HMP(s):** Control Nonnative Vegetation, Create Snags, Develop Field Borders, Conduct Livestock Management, Provide Nesting Structures, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Wildlife/Fish Survey

# Eastern meadowlark

**Size:** 7.5-10” length; 3.3 oz. weight

**Habitat:** grassland obligates; that is, they require and are only found in grasslands of at least 6 acres in size, will use pastures and hayfields of nonnative grasses if the vegetation structure is suitable

**Range:** eastern U.S. Eastern

**Diet:** insects, especially grasshoppers, crickets, and caterpillars (moth larvae) and grubs (beetle larvae); various seed and grain in winter; water obtained in diet

**Nesting:** March to August

**Nest:** nest on the ground and the female builds the nest of dead grass leaves, will abandon nests if they are disturbed while incubating

**Eggs:** 2-7 eggs; white, heavily spotted with brown and purple; may have 2 broods per year

**Young:** Both parents feed nestlings (but female does more); young leave nest after 11-12 days, when still unable to fly, and are tended by parents for at least 2 more weeks

**Predators:** skunks, foxes, hawks, coyotes, raccoons, and domestic cats and dogs

**Migration:** short distance migrant

**Description/Characteristics:** Eastern meadowlarks are medium-sized songbirds that 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. 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. Although males boldly sing in the spring, eastern meadowlarks are relatively shy, slinking away from intruders within the grass cover. 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.

**HMP(s):** Develop Conservation Easement, Control Nonnative Vegetation, Conduct Livestock Management, Promote Native Grasses and Forbs, Set Back Succession, Conduct Wildlife/Fish Survey

# European starling

Thomas G. Barnes

**Size:** 8.5” length; 2-3.6 oz. weight

**Habitat:** older suburban and urban residential areas with large trees and shrubs interspersed with open areas, abundant in agricultural areas

**Range:** throughout North America

**Diet:** insects, soft mast, seeds, earthworms, grain, human garbage, and even dog and cat food; require freestanding water during warm seasons

**Nesting:** April to June

**Nest:** cavity nesters and nest in large trees or old buildings

**Eggs:** 3-6 eggs; bluish or greenish white; 2 broods per year

**Young:** Both parents feed nestlings. Young leave nest about 21 days after hatching

**Predators:** owls, raccoons, rats, domestic cats’ prey on nestlings

**Migration:** present year-round

**Description/Characteristics:** They were introduced to the U.S. from Europe and are considered pests. They commonly cause damage to crop 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. Practices to attract or benefit starlings should not occur in any situation.

**HMP(s):** Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Grasshopper sparrow

**Size:** 4.3-4.5” length; .5-.71 oz. weight

**Habitat:** grasslands that may contain scattered shrubs and bare ground (more than 35 percent shrubby cover constitute poor habitat)

**Range:** throughout the Great Plains, Midwest, and Mid-South during the breeding season; winter in the Deep South, Mexico, and Caribbean

**Diet:** shifts dramatically through the year; in spring and summer (breeding season) insects comprise 60 percent of the diet; grasshoppers account for 30 to 40 percent of the diet during breeding season; during fall and winter, diet shifts to 70 percent seeds; water requirements are unknown but probably obtained through diet

**Nesting:** July to September

**Nest:** constructed of dead grass leaves in the shape of a cup on the ground with overhanging grasses and a side entrance

**Eggs:** 3-6 eggs, White with light reddish brown speckles; 2-4 broods per year

**Young:** Both parents feed the nestlings; young leave the nest about 9 days after hatching, before they are able to fly well

**Predators:** Loggerhead shrikes

**Migration:** present year-round, some migrate to Caribbean and Central America for winter

**Description/Characteristics:** Grasshopper sparrows are aptly named with their insect-like song and a diet dominated by grasshoppers. Grasshopper sparrows are declining throughout their range because of habitat loss and fragmentation of once-contiguous grasslands. Grasshopper sparrows forage on the ground, making bare ground within native grass cover important for mobility and searching for prey (grasshoppers).

**HMP(s):** Develop Conservation Easement, Control Nonnative Vegetation, Conduct Livestock Management, Promote Native Grasses and Forbs, Set Back Succession, Conduct Wildlife/Fish Survey

# Loggerhead shrike

Dave Menke

**Size:** 9” length; 1.6 oz. weight; 3.82-3.87 wingspan

**Habitat:** grasslands and shrublands

**Range:** southern tier of the U.S.

**Diet:** insects and spiders, small mammals, small birds, reptiles, and amphibians, water is obtained through diet

**Nesting:** March to September

**Nest:** dense, thorny shrubs, and trees, honey locust, shrubby areas less than 16 feet tall but prefer taller trees for perching during courtship, evergreens may be used in winter

**Eggs:** 4-8 eggs; Grayish white to pale buff, with spots of brown and gray often concentrated at large end, 1-2 broods per year

**Young:** Both parents feed nestlings; young leave nest at about 17-21 days, are tended by parents for another 3-4 weeks

**Predators:** Magpies, Crows, snakes, domestic cats, and weasels

**Migration:** migrate from as far south as northern Mexico to southern Canada to breed

**Description/Characteristics:** The loggerhead shrike is a migratory bird of prey that requires relatively large openings or fields to hunt prey. The loggerhead shrike population is declining because of habitat degradation and loss from conversion of grasslands and shrublands to row-crop agriculture or overgrazed, nonnative grass pastures, and aesthetic mowing. Loggerhead shrikes uniquely utilize thorns, barbs, and barbed wire fences to impale prey.

**HMP(s):** Develop Conservation Easement, Control Nonnative Vegetation, Develop Field Borders, Conduct Livestock Management, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Wildlife/Fish Survey

# Mourning dove

Dave Menke

**Size:** 10-12” long; 18” wingspan; 3-6 oz. weight

**Habitat:** dry uplands, desert chaparrals and grain fields

**Range:** throughout much of the lower 48 states and all across the state of Texas

**Diet:** a variety of annual and perennial grasses 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; freestanding water required daily

**Nesting:** March to September

**Nest:** made of twigs and placed on branches of shrubs or trees; may be placed on the ground in areas where trees are generally lacking

**Eggs:** average clutch of 2; white unmarked; 2-3 broods per year

**Young:** hatch blind and featherless in 13-14 days; eyes open at 1 week; feathers develop within 10 days; the male and female provide the young with pigeon milk (regurgitated liquid); leave the nest at 12-14 days

**Predators:** hawk, owl, and domestic cat; squirrel and Greater Roadrunner prey on eggs and nestlings

**Migration:** present year-round

**Description/Characteristics:** The mourning dove is grayish brown with light, pinkish brown head, chest, and undersides. It has a light blue ring around its eye, a black bill, red legs, and a long pointed tail edged with white.

**HMP(s):** Control Nonnative Vegetation, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Repair Spillway/Dam/Levee/Shorelines, Set Back Succession, Conduct Tillage Management, Provide Water Developments for Wildlife, Conduct Wildlife/Fish Survey

# Northern bobwhite

**Size:** body 8-10” long; 13” wingspan; 17 oz. weight

**Habitat:** shrubland obligates, grasslands, fallow fields, and savannas and woodlands with well-developed groundcover

**Range:** throughout eastern Texas

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

**Nesting:** May to August

**Nest:** on the ground, usually made of dead grass leaves, and often located at the base of a clump of native warm-season grasses, such as broom sedge and little bluestem

**Eggs:** 12-15 eggs; buff colored; 1 brood per year

**Young:** hatch in 23 days covered with feathers and able to feed themselves; young stay with female for up to 4 months

**Predators:** Red-tailed hawk, sharp-shinned hawk, fox, coyote, owl, and hawk

**Migration:** present year-round

**Description/Characteristics:** male northern bobwhites are dark reddish brown with a white throat, a black collar, and a stripe near the eyes that extends to the base of the neck. Females are similar but have a buff-colored throat and no black collar. Early successional areas dominated by forbs, such as ragweed’s, are commonly used for brooding. Northern bobwhite populations have been declining precipitously for more than 40 years. Habitat loss and degradation is the primary reason for the decline.

**HMP(s):** Develop Conservation Easement, Control Nonnative Vegetation, Develop Field Borders, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Tillage Management, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey

# Prothonotary warbler

**Size:** 5.1” long; .44 oz. weight

**Habitat:** found in forested wetlands, such as cypress swamps, and along blackwater creeks and rivers; mature bottomland hardwood forests near water, sweetgum, tupelo gum, willow, and bald cypress trees

**Range:** southern U.S., winter in Central and South America

**Diet:** insects, especially ants, beetles, butterflies, moths, mayflies, aquatic larvae; snails and isopods; occasionally various seeds and fruits; water is obtained through the diet

**Nesting:** April to June

**Nest:** cavity nesters; old cavities excavated by downy woodpeckers, snags, nest boxes, even those designed for wood ducks

**Eggs:** 3-7 eggs; Creamy or pink, with spots of brown; 1-3 broods per year

**Young:** Fed by both parents; leave nest 10-11 days after hatching; can swim at fledging

**Predators:** snakes and raccoons eat eggs and nestlings

**Migration:** across the Gulf of Mexico to Mexico where it follows the Atlantic slope south

**Description/Characteristics:** They are bright golden yellow with blue-gray wings and tail and a yellow-olive back. Prothonotary Warblers hop on branches in the understory of swampy woodlands. Often called a "swamp warbler" in the southeast, its population is declining, due to loss of forested wetlands in the U.S. and mangroves on its wintering grounds.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Conduct Livestock Management, Provide Nesting Structures, Repair Spillway/Dam/Levee/Shorelines, Provide Water Developments for Wildlife, Conduct Wildlife/Fish Survey

# Red-eyed vireo

Greg Lavaty

**Size:** 5-5.5” long; .5-.6 oz. weight; lifespan of up to 10 years

**Habitat:** mature deciduous forests, forested urban parks

**Range:** eastern North America and the upper Midwest

**Diet:** mostly insects and spiders during spring and summer; more soft mast during winter; water is obtained from diet

**Nesting:** April to August

**Nest:** made of twigs, bark, and grasses, usually in an open cup shape and suspended from a branch in the understory or mid-story

**Eggs:** 1-5 eggs; white with brown or black spots near large end; incubation is by female only, 11-14 days; frequently parasitized by cowbirds; rarely deters cowbirds by burying their eggs under a second floor of nest; 1-2 broods per year

**Young:** Nestlings are fed by both parents; young leave the nest 10-12 days after hatching

**Predators:** hawks, crows, blue jays, common grackles, eastern chipmunks, red squirrels

**Migration:** leave the U.S. and Canada each fall to spend winters in the Amazon basin of South America

**Description/Characteristics:** The red-eyed vireo is a common migratory songbird. Red-eyed vireos have olive-green backs with a pale breast and dark red eyes. They are more often heard than seen, with their persistent song that sounds like they are saying *“where-are-you, here-I-am, over-here.”*

**HMP(s):** Control Nonnative Vegetation, Conduct Wildlife/Fish Survey

# Ring-necked pheasant

**Size:** 2-2.9’ (male), 20-25” (female) length

**Habitat:** dense grasslands, cattail marshes, and shrub cover adjacent to agricultural fields, woodlands, wetlands, and along ditches with dense vegetation.

**Range:** northern Great Plains; portions of the Intermountain West and northeastern U.S.

**Diet:** various seeds, grains, grasses, leaves, fruits, and nuts; grains are used heavily in agricultural areas; insects constitute an important food item for females during the breeding season and young pheasants during the first several weeks after hatching; water is obtained in the diet

**Nesting:** April to June

**Nest:** Nest (built by female) is shallow depression lined with grass, leaves, weeds

**Eggs:** 6-15 eggs; plain olive-buff, rarely pale blue

**Young:** Young capable of short flights at about 12 days, but stay with female for 10-12 weeks

**Predators:** coyotes, red fox, striped skunk, and raccoon

**Migration:** present year-round

**Description/Characteristics:** Ring-necked pheasants are nonnative gamebirds introduced into North America from Asia.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Tillage Management, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey

# Western kingbird

**Size:** 8-9.3” long; 1.4 oz. weight; 15.5” wingspan

**Habitat:** grasslands, pastures, cultivated fields, desert shrub areas, savannas, and urban areas

**Range:** western U.S.; winter in southern Mexico and Central America

**Diet:** insects; soft mast from various plants is occasionally eaten

**Nesting:** May to June

**Nest:** trees and shrubs; may be placed on buildings, windmills, utility poles, and antennas

**Eggs:** 2-7 eggs; White, creamy, or pinkish with heavy blotches of brown, black, or lavender, 1-2 broods per year

**Young:** nestlings for 13-19 days

**Predators:** nest predators include snakes, squirrels, woodrats, owls, hawks, falcons, ravens, crows, magpies, and shrikes

**Migration:** medium to long distant migrants, to Mexico and Central America in winter

**Description/Characteristics:** Western kingbirds are large flycatchers that have gray heads, yellow bellies, white throats, and a square-tipped tail.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Develop Field Borders, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Wildlife/Fish Survey

# White-winged dove

**Size:** 12” long; average 5.4 oz. weight

**Habitat:** agriculture open areas, shrubs, trees, urban and riparian areas

**Range:** southern borders of the United States

**Diet:** a variety of grass and forb seeds (such as spurge, bristlegrass, saguaro cactus, and brasil), waste grain from cropland and livestock feedlots; small areas of bare ground are beneficial for obtaining grit (small gravel) to help digest food; free-standing water is required daily

**Nesting:** March to September

**Nest:** made of twigs placed on branches of shrubs or trees; may also be placed on the ground

**Eggs:** 1 or 2 eggs; white to creamy buff eggs, incubate eggs by both male and female for about 14 days

**Young:** nestlings mature by 13-18 days and remain in territory for 14 days after leaving nest

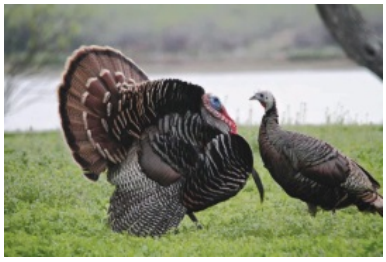
**Predators:** raptors; grackles, jays, and crow take eggs

**Migration:** present year-round

**Description/Characteristics:** White-winged doves are light brown with a black mark on the cheek and a white band on the edge of their wing, for which they are named. Both the male and female will produce crop milk to feed their young, often eating snails or bone to increase calcium content. They often roost, forage, or migrate as flocks.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Tillage Management, Provide Water Developments for Wildlife, Conduct Wildlife/Fish Survey

# Wild turkey



**Size:** body 3-4’ long; 5’ wingspan; males 18-20 lbs.; females 9-11 lbs.

**Habitat:** deciduous forest, desert shrub, grassland interspersed with tree-lined riparian areas mature forest, young regenerating forest, brushy areas, and old fields for nesting; mature forest; herbaceous openings; grain fields for foraging; trees or tall shrubs for roosting

**Range:** found across the U.S.

**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; obtain water from diet, but may use free-standing water when available

**Nesting:** March to May

**Nest:** lined with leaves and other vegetation in slight depression on the ground, usually placed adjacent to a log, shrub, or some other structure to aid in concealment

**Eggs:** average clutch 7-13 eggs; buff with tan markings; 1 brood per year

**Young:** (Poults) hatch in 28 days covered with feathers and able to feed themselves; able to fly at 2-4 weeks; remain with female e for up to 4 months

**Predators:** mountain lion, bear, coyote, bobcat, domestic dog, gray fox, hawk and owl, raccoon, and skunk prey on eggs and young

**Migration:** present year-round

**Description/Characteristics:** Wild turkeys are large, dark brown and black gamebirds with fan tail. Males have wattles (fleshy growths that hang beneath chin), spurs (bony projections on the back of each leg), a snood (a flap of skin that drapes over the bill), and a hair like chest beard. Females are drabber. They are strong short distance flyers to escape predators. Wild turkeys flock together during fall and winter. Breeding occurs in spring when males gobble to attract females.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Tillage Management, Provide Water Developments for Wildlife, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Wood duck

**Size:** body 18.5” long; 30” wingspan; 1.5 lbs.

**Habitat:** shallowly flooded bottomland hardwoods, emergent wetlands, swamps, and marshes; 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

**Range:** throughout most of the U.S

**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

**Nesting:** March to July

**Nest:** tree cavities, nesting boxes 20-50’ above ground; lined with down; adults often return to same nesting site each year

**Eggs:** average clutch 8-15; white; 1 brood each year; egg-dumping is common (egg-dumping means a female lays one or more eggs in another nest where they are cared for)

**Young:** hatch in 27-30 days; jump from the nest within 24 hours of hatching; can feed themselves immediately; able to fly at 8-9 weeks

**Predators:** raccoon preys on eggs; snake, fish, hawk, snapping turtle, muskrat, and otter prey on young

**Migration:** migrates in early fall to southern states

**Description/Characteristics:** the male wood duck has red eyes and a distinct crest on its head and is brilliantly colored with iridescent shades of chestnut, purple, and green. Female is grayish brown, which camouflages her from predators. Wood ducks are spectacularly colored ducks.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Leave Crop Unharvested, Conduct Livestock Management, Provide Nesting Structures, Plant Food Plots, Manage Shrubs/Brush, Repair Spillway/Dam/Levee/Shorelines, Set Back Succession, Conduct Tillage Management, Provide Water Developments for Wildlife, Conduct Wildlife/Fish Survey

# Mammals

**(*NOTE: Ctrl-click to go to page*)**

# American beaver

Steve Hersey

**Size:** body 27-35” long; tail 15” long, 7” wide; weighs 28-75 lbs.

**Habitat:** various wetlands that have permanent water with a variety of shrubs and trees adjacent to the water

**Range:** throughout most of North America

**Diet:** inner bark of shrubs and trees and store cuttings in caches (piles of branches) for use during winter; primarily bark from shrubs and trees; also, some forbs and grasses; water prefer slow moving or still water at least 5 feet deep

**Den:** 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.

**Young:** 1 litter per year; 1-4 kits born with thick dark fur between April and May after a gestation of 100-110 days; 1lb each; able to swim soon after birth; nurse 8-10 weeks; fully independent at 2 years

**Predators:** coyote and bobcat

**Tracks:** often erased by tail as it drags behind

**Description/Characteristics:** The beaver is a large rodent with prominent orange teeth and a large, flat, paddle shaped tail. Look for tree cuttings near the shoreline and mud mounds marked with scent. Listen for tail slaps on the water. 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.

**HMP(s):** Control Nonnative Vegetation, Conduct Livestock Management, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Bobcat

**Ecoregion:** East Texas Pineywoods

**Size:** body 26-36” long; tail 4-7” long; stands 20-30” high at shoulder; weighs 15-40 lbs.

**Habitat:** broken country with rocky outcrops mixed with grasslands, woodlands, desert scrubland, swamplands, and chaparrals

**Range:** throughout the U.S.

**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; free- standing water is used

**Den:** early successional areas, young regenerating forests, mature forest (pine and hardwood), rocky outcrops and ledges, hollow logs, and other sheltered spots

**Young:** 2-7 kittens born blind after a gestation of 50-70 days; 10” long; 12oz. each; eyes open a few days after birth; nurse for 8 weeks; begin to eat meat at 4 weeks; fully independent at 5 months

**Predators:** coyote; Great Horned Owl and mountain lion prey on young

**Tracks:** large, cat-like with 4 toes and a larger rear pad

**Description/Characteristics:** The bobcat has a yellowish gray coat with reddish brown streaks and a sprinkling of black and a soft beige underside. It is mostly gray during winter months. Signs may include scratch marks on trees and shredded bark. bobcats are carnivorous predators who 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.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Conduct Livestock Management, Manage Shrubs/Brush, Set Back Succession, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Coyote

**Size:** body 32-40” long; tail 12-15” long; stands 15-20” high at shoulder; weighs 18-40 lbs.

**Habitat:** Grasslands, shrubland, forested areas, and farmland

**Range:** throughout the continental U.S.

**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; necessary water probably is obtained in diet

**Den:** brush- covered slopes, steep banks, rock ledges, thickets, and hollow logs

**Young:** 1 litter per year; 5-10 pups born blind and grayish between March and June; 8oz. each; eyes open at 8-14 days; nurse for several weeks; later both adults feed pips regurgitated food; independent at 6-9 months

**Predators:** great horned owl, golden eagle, and mountain lion may take pups

**Tracks:** similar to medium sized dog tracks with 4 toes and a rear pad

**Description/Characteristics:** Coyotes are light brown to gray with reddish sides, pale undersides, and a bushy black tipped tail. 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.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Conduct Livestock Management, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Eastern cottontail

**Ecoregion:** East Texas Pineywoods

**Size:** body 14-18” long; tail 2” long; weighs 2-4lbs.

**Habitat:** bottomlands, chaparrals, cultivated fields, pastures, gardens, brushy cover interspersed with herbaceous openings, suburban areas, parks, golf courses, and stream corridors

**Range:** occur in the eastern half of the country, throughout Texas, including some areas of the Trans-Pecos region

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

**Nest Site:** 5” deep depression (burrow) lined with plant material and fur; usually found in meadows or at the base of trees

**Young:** 4-5 litters per year; 4-7 kittens born hairless and blind after gestation of 28 days; 4” long; 1oz. each; eyes open at 1 week; nurse for 4 week; fully independent at 5 weeks, this reproductive rate is required to perpetuate populations because 70 to 80 percent of all rabbits die each year

**Predators:** almost every flesh eating animal including hawk, eagle, owl, coyote, and fox

**Tracks:** individual toes do not show clearly, because of thick fur covering the feet

**Description/Characteristics:** The eastern cottontail is a grayish brown rabbit with rusty colored fur behind its ears. It has a fluffy cotton white tail.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Tillage Management, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey

# Eastern gray squirrel

Laura Perlick

**Ecoregion:** East Texas Pineywoods

**Size:** 9.1-12” length, .88-1.3lbs weight

**Habitat:** edge of crop fields, especially mature cornfields, mature deciduous forests and woodlands, parks, and other urban areas

**Range:** Eastern and Midwestern U.S.

**Diet:** a variety of hard and soft mast, miscellaneous seeds, grains, bark, buds, and mushrooms, bird eggs; necessary water generally is obtained through diet, but free-standing water is also used

**Den:** cavities of mature trees and also build nests of leaves and twigs, generally 30 feet or more aboveground, will use nest boxes

**Young:** 1- 9 kittens, average 2 or 3; Breeding occurs in December-February and May-June and is slightly delayed in more northern latitudes; gestation period of 40-44 days; weaning beings in the seventh week and is completed by the tenth; adult size and mass is reached at 9 months

**Predators:** rattlesnakes, skunks, red foxes

**Tracks:** four toes showing on the front feet and five on the hind feet

**Description/Characteristics:** The Eastern gray squirrel is a tree squirrel of medium size, and both males and females are of the same size and color. Its fur is mainly black or gray, the gray color being grizzled and often banded with gray and black guard hairs, tinged white, with the underside being white. Its tail is quite bushy and sometimes is reddish in color, and is used for maintaining balance while it leaps between branches. The overall fur color may change with different seasons, with the grayish fur being tawnier during summer, and the tail whiter.

**HMP(s):** Control Nonnative Vegetation, Conduct Livestock Management, Plant Food Plots, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Gray fox


USFWS

**Ecoregion:** East Texas Pineywoods

**Size:** body 21-45” long; tail 11-16” long; stands 14” high at shoulder; weighs 7-13lbs.

**Habitat:** open woodlands, arid rocky areas, desert, chaparral, canyon country, deciduous forests, thickets, and brushy areas, or rocky crevices

**Range:** throughout North America

**Diet:** small mammals, birds, bird eggs, insects, hard and soft mast, and occasionally carrion; likely drink free-standing water or from foods they consume

**Den:** brushy or wooded areas, hollow trees, or logs, under large rocks, or in underground burrows; dens used primarily during the breeding season

**Young:** 1 litter per year; 3-7 dark brown pups born blind between February and May after a gestation of 51-63 days; 3.5 oz each; eyes open 9-12 days; weaned at 8-10 weeks; male helps care for the young

**Predators:** mountain lion, coyote, domestic dog, and eagle

**Tracks:** small, dog-like prints show four toes and nails

**Description/Characteristics:** the fur of the gray fox is gray and tipped with black. Its sides and neck are reddish, and its undersides are white. It has large, pointed ears, short legs, and a furry tail tipped with black. They are most active at night or near dawn and dusk. Gray foxes are unique among canids (species in the family that includes dogs) because of their ability to climb trees.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Conduct Livestock Management, Manage Shrubs/Brush, Set Back Succession, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Javelina

**Size:** body 29-39” long; tail 2” long; stands17-23” high at shoulder; weighs 35-60lbs

**Habitat:** desert, arid woodlands, chaparrals, scrub oak, rocky canyons, along cliffs; near water

**Range:** throughout southwestern U.S

**Diet:** cacti, mesquite beans, Lechuguilla and other succulent vegetation, fruit, mast, insects, and small lizards; free-standing water is required unless prickly pear is abundant

**Den:** caves, hollow logs, abandoned burrows, thickets of brush, prickly pear, scrub oak, or rocky canyons

**Young:** 1-4 young born fully mobile after gestation of 140-145 days; reddish brown to yellow with dark dorsal stripe; 1lb each; weaned at 6-8 weeks; independent in 2-3 months; 1-2 litters per year

**Predators:** black bear, mountain lion, bobcat; coyote and eagle prey on young

**Tracks:** heart shaped hooves; 1-1.5 long

**Description/Characteristics:** The javelina (collared peccary) is dark gray with a white collar circling its neck. The male has spear-like tusks that measure 1” in length. The average lifespan is 7-8 years. Although similar in appearance to pigs, the javelina is not in the same taxonomic family as pigs. They have a smaller body size than pigs with 4-toed hooves on their front feet and 3 toes on their back feet. The javelina large head and long snout are capped off by sharp tusks pointing toward the ground. Their black, bristly coats include a white collar around their neck. Javelinas have a strong-smelling musk gland on the top portion of their rump, which they use to mark their home range. They run in herds of a few to several dozen within fairly small home ranges and usually can be found cooling off near water or resting in the shade during the heat of the day. Javelinas may be aggressive, increasing unnecessary fear among humans, but will not attack unless they are defending themselves. Often confused with pigs, they push dirt around, but do not root-up the ground.

**HMP(s):** Control Nonnative Vegetation, Manage Shrubs/Brush, Set Back Succession, Provide Water Developments for Wildlife, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey

# Raccoon

**Size:** body 16-28” long; tail 8-12” long; stands 12” high at shoulder; weighs 15-40lbs.

**Habitat:** woodlands, urban areas, semi-arid deserts, riparian areas, and wetlands

**Range:** common throughout most of the U.S., except in certain parts of the Rocky Mountains, Nevada, Utah, and Arizona

**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; require water frequently during warm seasons

**Den:** hollow trees, in burrows under stumps or brush piles, rocky cliffs and ledges, or in chimneys, attics, and crawl spaces of houses and buildings

**Young:** 1 litter per year; 2-7 young born blind between April and October after a gestation of 63 days, with a light fur covering, a faint mask, and ringed tail; 4” long; 2oz each; eyes open at 21 days; nurse for several weeks; leave den at 10 weeks; fully independent at 4-6 months

**Predators:** coyote, fox, bobcat, great horned owl, and domestic dog

**Tracks:** small, hand-like prints

**Description/Characteristics:** The raccoon has heavy fur streaked brown, black and gray with a distinctive black face mask and a bushy ringed tail. 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.

**HMP(s):** Control Nonnative Vegetation, Create Snags, Develop Field Borders, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Manage Shrubs/Brush, Repair Spillway/Dam/Levee/Shorelines, Set Back Succession, Conduct Tillage Management, Provide Water Developments for Wildlife, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Red fox

**Size:** 18-35” without tail length, 4.9-31lbs weight

**Habitat:** grasslands, shrublands, woodlands, farmlands, cities, and brushy areas in winter

**Range:** throughout North America

**Diet:** primarily small mammals, birds, insects, hard and soft mast, and occasionally carrion; red foxes will store food and are very good at relocating these caches; they drink free-standing water and get some water from the foods they consume

**Den:** brushy areas and in hollow logs, under large brush piles, under large rocks, or in underground burrows often under roots of blown-over trees

**Young:** 2-12 kits, 1 litter yearly; young are born blind and aren’t able to open their eyes until they’re about two weeks old; kits are weaned off their mother’s milk and start eating pre-chewed food at one month; at seven months, young red foxes are able to hunt on their own and leave their parents in search of their own territory

**Predators:** humans, eagles, coyotes, wolves, bears, mountain lions

**Tracks:** usually two and a half inches on the front foot and two inches on the rear foot; they are a diagonal walker, just like deer and dogs, and foxes usually place their rear feet in the front footprints

**Description/Characteristics:** Red foxes are solitary animals and are mostly nocturnal. They can be seen sometimes during the early morning and early evening. Red foxes have a characteristic manner of hunting small mammals by standing motionless, listening, and watching intently. When a red fox locates prey, it often leaps high and brings the forelimbs straight down, pinning the prey to the ground.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Conduct Livestock Management, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# River otter


Jim Leopold

**Ecoregions:** East Texas Pineywoods

**Size:** Length including tail 3-4ft, weighs 12-30lbs

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

**Range:** throughout most of North American

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

**Den:** holts (which is a den constructed of burrows of other mammals), 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

**Young:** 1-6 young born in March to April, independent by next early spring

**Predators:** bobcats, alligators, coyotes, raptors, and other large predators will sometimes prey

**Tracks:** 3 1/4" (80 mm) wide or more, about 4" long, and often show only heel pad and claws; toes fan out widely, but webbing rarely prints, except in mud

**Description/Characteristics:** The river otter is a brownish black semi-aquatic mammal that is a member of the weasel family. Otters 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. 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. They are active year-round, but are mostly nocturnal during spring, summer, and fall. Urbanization and pollution have decreased the range of river otters.

**HMP(s):** Control Nonnative Vegetation, Conduct Livestock Management, Repair Spillway/Dam/Levee/Shorelines, Provide Water Developments for Wildlife, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# White-tailed deer

**Ecoregions:** East Texas Pineywoods

**Size:** body 4-6’ long; tail 6-13” long; stands 2-3’ high at shoulder; weigh 65-100lbs.

**Habitat:** deciduous and coniferous forests, tropical evergreen forest, dry grasslands, and shrub desert, suburban areas

**Range:** throughout the U.S. and southern Canada, except for California and Nevada

**Diet:** forbs, browse, acorns, beechnuts, grains, grasses, and mushrooms; in the northern parts of the range, coniferous browse is important in winter; obtain most of their water from diet

**Den:** dense woody vegetation as well as relatively tall early successional cover, 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

**Young:** 1 or 2 fawns born with white spots for camouflage between April and July after a gestation of 7 months; 8 lbs. each; spots remain for 3-4 months; nurse for several months; males independent at 1 year, females at 2 years

**Predators:** coyote, mountain lion, and bobcat

**Tracks:** narrow, heart-shaped with split hoof

**Description/Characteristics:** white tailed deer have a reddish brown coat in summer, grayish brown in winter. In spring, males grow forward-facing antlers with points that erupt from the main antler base. The antlers are shed in winter. 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. White-tailed deer are ruminants and are classified as browsers but have distinct dietary preferences through the seasons. Where overabundant, they can cause significant damage to ornamental plantings and row crops and can be hazardous for motor vehicles.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Leave Crop Unharvested, Conduct Livestock Management, Plant Food Plots, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Tillage Management, Provide Water Developments for Wildlife, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Wild pig

**Size:** 3-6.6’ length, without tail; 170-220lbs male, 130-180lbs female

**Habitat:** heavy understory or thick shrubs and grasslands, near or in riparian areas that reduce opportunity for human contact; pig family groups (called sounders) often use streams, rivers, creeks, and associated wetlands as travel corridors to move as they seek food sources

**Range:** Most of Texas and some southern states, Florida

**Diet:** wild pigs are perhaps the perfect example of an omnivore; approximately 85 percent of their diet is vegetation, but they also prey upon small animals and often scavenge animal carcasses; they especially prefer crops, such as corn and peanuts, and aggressively out-compete native wildlife species for hard and soft mast whenever those food items are available; wild pigs must have access to free-standing water for drinking and thermoregulation

**Den:** often makes a shelter by cutting long grass and crawling under it to lift it so that it becomes entangled with the tall plants around to form canopies

**Young:** average 4-6 piglets; mother remains for the first couple of weeks, lose camouflage stripes between 3-4 months old, independent by 7 months

**Predators:** wolves, bears, humans

**Tracks:** appear more round in overall shape than deer tracks

**Description/Characteristics:** Wild pigs (feral hogs) were first introduced into Tampa Bay, Florida by the explorer Hernando De Soto in 1539. In addition, early settlers throughout the southeastern United States also raised domesticated swine, some of which escaped and became feral, leading to their establishment throughout the South and California. Today, 36 states have wild pig populations estimated between 5 and 8 million nationwide. Many of these populations became established because of indiscriminate and illegal stockings for hunting purposes. As an invasive nonnative species, wild pigs cause ecological damage via their rooting behavior and competition for food and space with several native wildlife species and predate upon many small amphibian and reptile species. Wild pigs also cause considerable agricultural damage to crop, pastures, livestock, and environmental damage to riparian areas, often resulting in water quality degradation as a result of their rooting and wallowing behavior.

**HMP(s):** Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Fish

**(*NOTE: Ctrl-click to go to page*)**

# Bluegill


Eric Engbretson

**Size:** 7.5” (maximum reported length being 16”) typically weigh less than 1lbs.

**Habitat:** freshwater lakes, ponds, slow-moving streams, brackish waters of coastal areas; submerged rocks, woody debris, and aquatic vegetation

**Range:** eastern U.S.; southern Canada to Florida and Texas, but they have been successfully introduced throughout the U.S.

**Diet:** 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

**Eggs:** can spawn three times in one summer releasing 2,300 to 81,100 eggs per spawn; spawning season is May-August

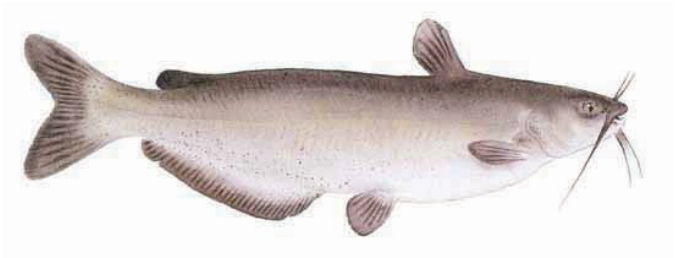
**Young:** the female drops the eggs, the male chases her out of the nest and guards the eggs staying there until they hatch (5 days) and can swim on their own

**Predators:** largemouth bass, walleye, striped bass, white bass

**Description/Characteristics:** The bluegill is one of the most abundant Sunfish species. The fish’s body is dark green in color and oval shaped with dark bars running vertically down their sides. Behind their eyes is a black ear flap. The belly of a female bluegill is yellow, while the belly of a breeding male is a rusty red color. The bluegill has two dorsal fins and a small mouth. The body of the bluegill is very condensed.

**HMP(s):** Conduct Livestock Management, Repair Spillway/Dam/Levee/Shorelines, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Construct Fish Pond, Control Aquatic Vegetation, Reduce Turbidity in Fish Pond

# Channel catfish



**Size:** average 2 – 3 pounds but may grow to 50 pounds

**Habitat:** streams, rivers, reservoirs, lakes

**Range:** Gulf coast states and the Mississippi River valley, but they have been introduced to most regions of the United States

**Diet:** young catfish feed mostly on aquatic insects; adults eat crawfish, aquatic insects, plant material including algae, snails, small fish, and even seeds; commercially prepared rations have been formulated and are used to feed channel catfish in aquaculture (fish farming) operations as well as in farm ponds and other impoundments

**Eggs:** lay eggs in dark holes or under logs or rocks, females will lay up to 50,000 eggs for fertilization, eggs hatch within a week, spawning season is once a year May-July

**Young:** male guards them from the female because she will eat them if she is let near; baby catfish will hatch within a week and then remain in the nest for another week; "fries" stay in a school and eat small insects until they are ready to venture out on their own (about 2-3 weeks); mature at 12"

**Predators:** largemouth bass and bluegill

**Description/Characteristics:** They have smooth skin (no scales), a deeply forked tail, and sharp dorsal (top) and pectoral (side) fins that can inflict a nasty cut if the fish is handled improperly. They also have barbels (often called "whiskers") around the mouth. Coloration depends largely on water clarity— they are drab green to blue on the back, shading to white on the belly, but they can appear almost black in clear waters, and yellowish in muddy waters. Young channel catfish have irregular spots on their sides that disappear as they mature. In small impoundments managed for multiple fish species, stocking fingerling channel catfish is the best way to maintain a population. Channel catfish is the most widely cultured (farmed) warmwater fish species in the United States. Each year, several hundred million pounds are raised and harvested as food in grocery stores and restaurants. It is also widely sought by anglers on public and private waters for its recreational value as well as its fantastic flavor.

**HMP(s):** Conduct Livestock Management, Repair Spillway/Dam/Levee/Shorelines, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Construct Fishing Pond, Control Aquatic Vegetation, Reduce Turbidity in Fishing Pond

# Largemouth bass


Robert H. Pos

**Size:** up to 3’ length; up to 22lbs.

**Habitat:** freshwater lakes, rivers, large streams, farm ponds, and brackish marshes; submerged rocks, woody debris, and aquatic vegetation where small fish (prey) hide

**Range:** most of the eastern U.S., but largemouth bass have been stocked all over the country successfully

**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

**Eggs:** 2000-12000 eggs, hatching time is based off water temperatures,

**Young:** The male guards the nest, fanning the eggs with his tail to keep off silt and debris; 2,000 to 12,000 fry hatches from each nest; only 5 to 10 are likely to survive to reach a size of 10 in

**Predators:** walleye, muskie, northern pike

**Description/Characteristics:** 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.

**HMP(s):** Conduct Livestock Management, Repair Spillway/Dam/Levee/Shorelines, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey, Construct Fishing Pond, Control Aquatic Vegetation, Reduce Turbidity in Fishing Pond

# Amphibians

**(*NOTE: Ctrl-click to go to page*)**

# American bullfrog

Bill Buchanan

**Ecoregion:** East Texas Pineywoods

**Size:** 3.5-7” long; up to 1.5lbs

**Habitat:** shorelines with dense vegetation adjacent to shallow open water dominated by floating and submerged aquatic vegetation; dense, emergent aquatic and upland herbaceous vegetation adjacent to water for hiding and foraging

**Range:** Atlantic Coast to eastern Colorado and eastern Mexico, and from southern Colorado to northeastern Mexico; not native west of the Rocky Mountains but have been successfully introduced

**Diet:** insects, crayfish, other frogs, reptiles, snails, fish, and occasionally small mammals and birds; stable water levels are necessary for hibernation and egg development

**Eggs:** lay masses of up to 20,000 eggs in a film on the water's surface

**Young:** tadpoles take 2 years to metamorphose into frogs, young frogs mature at 2-3 years

**Predators:** aquatic insects, crayfish, fishes, other bullfrogs, aquatic turtles, snakes, birds and mammals, including humans

**Description/Characteristics:** American Bullfrogs are relatively large frogs that inhabit permanent bodies of standing or slow-moving water. Bullfrog tadpoles require two years to metamorphose

**HMP(s):** Conduct Livestock Management, Repair Spillway/Dam/Levee/Shorelines, Provide Water Developments for Wildlife, Decrease/Eliminate Hunting/Fishing, Conduct Wildlife/Fish Survey

# Eastern box turtle


Chelsi Hornbaker

**Size:** 4” by 6”, 2lbs average

**Habitat:** deciduous or mixed woodlands, but also uses thickets, old-fields, pastures, and wetlands; 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

**Range:** throughout much of the eastern United States

**Diet:** omnivorous; earthworms, snails, slugs, insects, mushrooms, numerous leafy greens, and soft mast (fruit); requires water to soak during the hot, dry months of the active season

**Eggs:** 4-5 eggs, females will lay one or more clutches yearly

**Young:** hatch in 70-80 days in late spring or summer and hibernate in nest or emerge and hibernate in another place

**Predators:** Raccoons, chipmunks, skunks, coyotes, foxes, snakes and owls prey on young box turtles or box turtle eggs

**Description/Characteristics:** 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.

**HMP(s):** Control Nonnative Vegetation, Develop Field Borders, Conduct Livestock Management, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Provide Water Developments for Wildlife, Conduct Wildlife/Fish Survey

# Reptiles

**(*NOTE: Ctrl-click to go to page*)**

# Plains hog-nosed snake


Gary M. Stolz

**Size:** 2-3’ long

**Habitat:** grasslands and shrubland; shrubby flat or gently rolling prairies with loose, sandy soil.

**Range:** central United States

**Diet:** mostly toads, but also other reptiles, birds, mice, and eggs; water obtained from diet

**Eggs:** 4-23 eggs, eggs laid June-August

**Young:** eggs hatch in 52-64 days, young are 6.7-7.5” long at hatching

**Predators:** foxes, coyotes, raccoons, hawks, American crows

**Description/Characteristics:** Plains hog-nosed snakes are characterized with dark blotches down a pale tan or yellowish back with a strongly upturned, pointed snout. They are relatively thick, heavy-bodied snakes. They use their snouts to burrow into loose soil to find food and spend the winter. Often these sandy sites are characterized by sparse vegetation in most years. Plains hog-nosed snakes have slightly toxic saliva that is not dangerous to humans, but it helps hog-nosed snakes subdue prey. Hog-nosed snakes are masters at bluff behavior. When threatened, they will flatten their heads, giving a hood appearance, similar to a cobra. Then, they often inflate themselves with air and slowly release the air with a hissing noise, similar to a rattlesnake. They may strike, but usually with a closed mouth! It is actually difficult to get a plains hog- nosed snake to bite in self-defense. It will turn over on its back, thrash back and forth, open its mouth and stick its tongue out, and feign death, while upside down.

**HMP(s):** Control Nonnative Vegetation, Conduct Livestock Management, Promote Native Grasses and Forbs, Set Back Succession, Conduct Wildlife/Fish Survey

# Timber rattlesnake

**Size:** 2.5-5’ length; 1.1-3.3lbs

**Habitat:** forests, particularly those with rock outcrops, ledges, and steep slopes; 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

**Range:** throughout much of the eastern U.S.

**Diet:** small to moderate-sized mammals; chipmunks, mice, voles, and squirrels; occasionally small birds; receives necessary water from diet, but will drink free-standing water if available

**Young:** 5-20 young, 10-17” long, females’ mate once every 2 to 3 years, estimated incubation of 6 months; young remain near mother for 7-10 days but require no parental care

**Predators:** Coyotes, bobcats, skunks, foxes, hawks and owls

**Description/Characteristics:** 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 are venomous and should not be handled. 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 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.

**HMP(s):** Control Nonnative Vegetation, Conduct Livestock Management, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Western diamond-backed rattlesnake

**Size:** average 3-6’ long; 15lbs.

**Habitat:** deserts, grasslands, shrublands, and woodlands; grass, forbs, cactus, or scattered shrubs; areas with sandy to rocky soils may provide animal burrows and rocky crevices used for cover

**Range:** southwestern United States

**Diet:** mostly mammals (rabbits, squirrels, mice, and rats), but also lizards and birds; will consume their body weight in free-standing water annually; they also get water from their food and some is absorbed during shedding

**Eggs:** none laid; female bears live young (viviparous)

**Young:** an average number of 10-20 live young are born in late summer; measure 10-14”; can deliver a venomous bite hours after being born and require no care from parents

**Predators:** hawks, owls, eagles, roadrunner, wild turkey, coyote, badger, and fox take young

**Description/Characteristics:** Varies in color from brown, gray or yellowish red depending on its habitat. It is named for the light-edged, dark diamond shaped blotches along its back. It has a spade shaped head and two light diagonal stripes on its face. Its tail is ringed with a series of black and white bands. They are pit vipers, which means they have a heat-sensing organ beneath the nostrils that can detect temperature differences that allows the snake to determine if another animal is a predator or prey. Western diamond-backed rattlesnakes are venomous and should not be handled. Western diamond-backed rattlesnakes usually spend daylight hours in the shade of low- growing shrubs, debris piles, or rocks. They are most active around sunrise and sunset, and at night during summer. The rattle is made of the keratin, which is a protein, and a new segment is added each time the snake sheds. 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. To rattle, rattlesnakes move the rattle back and forth as much as 40-60 times per second.

**HMP(s):** Control Nonnative Vegetation, Promote Native Grasses and Forbs, Manage Shrubs/Brush, Set Back Succession, Conduct Wildlife/Fish Survey, Conduct Wildlife Damage Management

# Habitat Management Practices

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# Habitat Management Practices (HMPs)

**Various Habitat Management Practices (HMPs) are used to manage wildlife and their habitat. This section describes HMPs and the potential effect they can have on wildlife habitat and populations.**

**Contestants should be familiar with the HMPs and be able to identify which HMPs might be recommended to improve habitat or adjust populations in the habitat presented for the contest. Contestants will evaluate the habitat by sight and by using the landowner objectives provided at the contest. Following the evaluations, contestants will make recommendations. It is beneficial to learn all information provided about any HMP before recommending it.**

**In addition, management recommendations of each wildlife species in the contest should be conducted independently from the other wildlife species. Assume the recommendation of a HMP for one wildlife species will not conflict with another species.**

**Contestants will recommend HMPs that are necessary for the habitat or wildlife species immediately. Current conditions should be considered when deciding if an HMP needs to be applied immediately. However, it is ok if the benefits of an HMP may not be realized for years. For example, constructing a fish pond to provide habitat may be an immediate need but the benefit will not be realized until water fills the pond. In this contest, costs and budgets are not considerations when recommending HMPs.**

**The 'NOTES:' section after each HMP are hints for specific use in the contest.**

# Key Words for Understanding

## Stocking Rate
– the number of livestock on a given piece of land typically based on the condition and abundance of forage

## Carrying Capacity
–the maximum population size of a biological species that can be sustained by that specific environment, given the food, habitat, water, and other resources available

## Succession
– the process by which a plant or animal community successively gives way to another until a stable climax is reached or a disturbance occurs such as fire, flood, grazing/browsing, or some type of human activity

## Successional Stages
– Bare ground/Soil → Grasses & Forbs → Shrubs → Immature trees → Mature trees

## Conservation
– wise use of natural resources and of wildlife

## Nonnative Vegetation
– a plant introduced with human help (intentionally or accidentally) to a new place or new type of habitat where it was not previously found

## Natural Seedbank
– natural storage of seeds in the leaf litter, on the soil surface, or in the soil, to secure the production of native plants and to enable their survival in the future

## Riparian Areas
– the areas bordering rivers and other bodies of surface water containing plants typically requiring more water than upland types of plants

## Turbidity
– the cloudy or murky appearance of water caused by suspended solids due to sediment washing into the water, disturbance of the bottom of the water body, or an imbalance of clay particles in the water

## Focal/Target Species
– wildlife species selected for specific management

## Browse
– (Noun) woody vegetation, such as twigs, leaves, and young shoots of brush, tree, and vine species eaten by animals

– (Verb) to feed on twigs, leaves, and young shoots of brush, tree, and vine species

# Develop Conservation Easement

## HMP description

A conservation easement is a legal agreement between a landowner and a land conservation organization (or "land trust") or government agency placing permanent restrictions on what can be done on a property.

However, conservation easements offer flexibility. For example, if existing farmland is entered into a conservation easement, continued farming may be allowed while various vegetation types or habitat features are protected. Conservation easements do not transfer ownership of the property. The property can be sold, but the restrictions are maintained from owner to owner, in perpetuity.

## Effect of practice

- Maintain land in a natural state and protect it from real estate development.
- Protect land in areas of rapid expanding urban and suburban development.
- Protect rare vegetation types and habitat features, such as grasslands, wetlands, caves, and large forested tracts.
- Protect habitat for declining, threatened, or endangered wildlife species.
- Maintain corridors for migrating wildlife.
- Protect water quality, especially if riparian areas are included or if watersheds are protected.
- Provides restrictions that limit or prohibits new structures or roads that can be built on a property.

**NOTE:** Conservation easements can benefit any wildlife species, according to the area protected. However, for purposes of this contest, Conservation Easement should be considered when evaluating property that is under threat of real estate development or some other major land-use change, such as surface mining or wind farming with turbines, which would degrade or alter its current natural resource value.

# Control Nonnative Vegetation

## HMP description

Some nonnative plant species were introduced accidentally, but most were brought intentionally to provide livestock forage or to be used as ornamentals. This invasion has been detrimental to native plant communities because many nonnative plant species do not provide suitable cover, structure, or food for wildlife. As usable space for wildlife decreases, so does the carrying capacity for that area.

Without management, nonnative species continue to spread, limit plant species diversity, and degrade wildlife habitat. Nonnative species should never be planted. When evaluating an area, consider the impact nonnative species are having on the native plant community and associated wildlife.

## Effect of practice

- Killing nonnative plants where they limit growth of native plants can improve cover and increase foods for many wildlife species.
- Controlling nonnative species often leads to increased plant species diversity, which can provide more types of cover and food for various wildlife species.
- Eliminating nonnative grasses that produce a dense structure at ground level will allow the seedbank to respond and result in better cover for nesting and brood rearing for several bird species, and also increase food availability for many wildlife species as various plants are stimulated and grow from the seedbank.
- Killing nonnative trees and shrubs can increase space for desirable tree and shrub species, which can lead to increased mast production.
- Nonnative species in ponds and wetlands may outcompete native plant species (such as phytoplankton) for nutrients
- Certain nonnative species (such as giant salvinia) may effectively block sunlight and reduce oxygen content in ponds and other wetlands

**NOTE:** When this HMP is recommended, it is implied that necessary action will be taken to implement the practice. For example, if this HMP is recommended to control nonnative grasses, such as tall fescue or bermudagrass, in a field to improve habitat for various wildlife species that might use the field, do not also recommend ***Set Back Succession***. **Control Nonnative Vegetation** includes both upland and aquatic plants. For this contest, this practice is applicable to terrestrial and wetland areas. However, it is not applicable to fishing ponds. If aquatic vegetation is problematic in fishing ponds, ***Control Aquatic Vegetation*** should be recommended. In a contest, a participant will not be expected to identify nonnative plant species. Comments about nonnative species will be in the written landowner objectives provided at the contest. Contest participants will be expected to use those comments to determine whether or not to recommend **Control Nonnative Vegetation.**

# Create Snags

## HMP description

The presence of dying, dead, and down (laying vertical on the ground) trees is critically important for many wildlife species.

Standing dead trees are called snags. Usable snags can also be present in live standing trees. This may be a single large branch or one of multiple trunks. Woodpeckers are attracted to snags to feed on the invertebrates under the bark and to excavate cavities for nesting. Fungi aid woodpeckers by softening dead wood through decomposition. After woodpeckers' nest and leave the cavity, other species may move in and use the cavity. These species are called secondary cavity users. Most of the secondary cavity users are birds (such as prothonotary warblers and wood ducks), but there is a wide variety of secondary cavity users, from bats and squirrels, to various salamanders and snakes. Other wildlife species, such as salamanders, shrews, mice, and snakes, are closely associated with down woody material.

In mature forests, snags and down woody material are usually available. However, if snags are limiting species that require cavities or down woody material, snags and down woody material may be created by killing some trees and leaving them standing. Softwood species (such as conifers, poplars, willows, and maples) and trees that already have signs of injury and decay are good candidates because the wood is more easily excavated by woodpeckers and rotting in the interior of the tree trunk may have already begun.

Size of the snag is important. Larger diameter snags (>12 inches diameter) are suitable and used more often by a wider variety of wildlife species than smaller stems. Snags may be distributed throughout a stand and may occur as individuals or as small clusters. Information on the number of snags per area is somewhat limited, but estimates suggest 5 - 15 snags per acre in forested areas will sustain populations of primary and secondary cavity users. Snags also are used in non-forested areas by other wildlife species, such as bluebirds and American kestrels.

## Effect of practice

- Snags provide roosting and perching sites for many bird species.
- Provide perching sites and foraging opportunities for many bird species, such as red-tailed hawks, American kestrels, and bluebirds.
- Provide animals that serve important ecosystem functions, such as nutrient recycling and prey for various predators.
- Snags and downed woody material presence strongly influences the food web.
- Snags provide insects as food for woodpeckers and other birds.
- Snags provide woodpeckers with sites for cavity construction.

- Secondary cavity species (such as bluebirds, owls, wood ducks, hawks, raccoons) may use old woodpecker cavities for nesting, roosting, or denning.
- When snags fall, they provide sites for denning, reproduction, foraging, and escape for various wildlife species.
- Creating snags in forested areas allows additional sunlight to reach the forest floor, which stimulates additional groundcover that may provide forage, soft mast, and nesting cover for various wildlife species.

# Develop Field Borders

## HMP description

Field borders are uncropped areas around crop fields or uncut areas around hay fields designed to provide nesting, brooding, and escape cover as well as additional food sources, for many wildlife species. Most consist of native grasses and forbs, but may include brambles and shrubs (such as dewberries) depending on landowner objectives and focal wildlife species. Field borders may be established by allowing natural succession from the seedbank or by planting.

## Effect of practice

- Provides increased usable space for many wildlife species
- Provides nesting and/or brooding cover for many songbirds, bobwhites, and wild turkeys
- Can provide increased forage and seed availability if desirable forbs are established
- Can prevent sedimentation and nutrient runoff

**NOTE:** ***Promote Native Grasses and Forbs*** or ***Manage Shrubs/Brush*** should not be recommended in order to ***Develop Field Borders***. However, if there are existing field borders of nonnative species, such as tall fescue or bermudagrass, ***Control Nonnative Vegetation*** should be recommended to control those plants. Additional field borders should be recommended only if there are crop fields or hay fields without field borders, if additional field borders are needed around a field.

# Leave Crop Unharvested

## HMP description

Strips or blocks of crops, such as corn, milo, soybeans, or other crops that left unharvested may provide a supplemental food source for targeted wildlife species. This practice is especially valuable if the strips are left adjacent to cover.

## Effect of practice

- Provides additional food for many species, which can be particularly important when naturally occurring foods are in low supply, especially in winter months.

**NOTES:** This practice should be recommended only if there is an unharvested crop present. It is not applicable to food plots.

# Conduct Livestock Management

## HMP description

The intensity and duration of livestock grazing directly impacts the structure (height and density) and composition of the vegetation community and, consequently, habitat quality for various wildlife species. Stocking rates can be adjusted to manipulate the structure of vegetation to favor various wildlife species habitats. Stocking rates are relative to different ecoregions, due to climate and soil differences. The use of livestock grazing in wildlife habitats should be considered a tool for the habitat manager.

## Effect of practice

- Livestock may be excluded from areas where advanced successional stages (such as shrub/brush cover) and increased vegetation structure is desirable for various wildlife species.
- Livestock may be increased in areas to help maintain or lower a successional stage of vegetation.
- Excluding livestock from riparian areas can help reduce siltation, turbidity and stream bank erosion, and reduce stream and pond pollution from livestock waste.
- Excluding livestock from riparian areas may improve habitat structure and composition for various wildlife species that use these areas.

**NOTES:** This practice should be recommended when evidence of livestock is present or information on livestock use is provided by contest officials.

# Provide Nesting Structures

## HMP description

Some species den, nest, or roost in cavities they don't create themselves (such as bluebirds, wood ducks, squirrels, raccoons, and owls). If natural cavities are not available, artificial cavities (nest boxes) can be used. Many species need a specific type (diameter of hole, depth, internal size), location (field, woods, or near water), and distance above ground for their cavity. Nest boxes should be monitored to ensure use by targeted species.

## Effect of practice

- Nesting structures provide the necessary cover/shelter when none is available for target species.
- In open areas, nest boxes are useful for bluebirds unless an abundance of nesting cavities are available in trees or fence posts.
- Nesting structures near water sources provide secure nesting sites for wood ducks where trees with cavities suitable for nesting are limiting.

# Plant Food Plots

## HMP description

Food plots can be planted to provide a supplemental food source for many wildlife species when naturally occurring food is a limiting factor.

Food plots are often planted to provide grains, such as corn, grain sorghum, and millets, and other plants with large energy-rich seed, such as sunflowers. Leafy forages, such as clovers, chicory, vetch, and winter peas, are also commonly planted. Some plantings may provide both forage and grain or seed, such as soybeans, cowpeas, buckwheat, wheat, and oats. Food plots benefit upland wildlife (such as deer, and wild turkey) and waterfowl. Geese and ducks often feed in warm-season grain food plots and in winter wheat for the forage.

The size and shape of food plots and their distribution is largely determined by the focal species and habitat quality. Regardless, if food is a limiting factor for a particular species, food plots should be distributed throughout the property in accordance with the minimum daily movement distances of that species. Further, if food is a limiting factor, it is critical to realize additional habitat management practices should be implemented to provide additional naturally occurring foods. Food plots should be considered temporary and supplemental.

## Effect of practice

- Grain food plots can supply a high-energy food source through fall and into late winter. Such a food source can influence winter survival for several wildlife species, especially during relatively cold winters.
- In areas and seasons where nutritious forage is limiting, forage plots can supply highly digestible forage.

# Promote Native Grasses and Forbs

## HMP description

Native grasses and forbs are important for cover and food for many wildlife species. Native grasses and forbs represent early successional stages in all ecoregions and may represent the climax successional stage in some areas where shrub and tree growth are limited. The planting of native grasses and forbs is one way to promote growth, but the more preferred way is to allow the natural seedbank from natural succession to take its place.

## Effect of practice

- Native grasses and forbs provide nesting, bedding, roosting, and/or escape cover for many wildlife species, especially those that require early successional cover.
- Ground-nesting birds usually build their nests at the base of native bunchgrasses, such as brooms edge bluestem, little bluestem, or sideoats grama (state grass of Texas).
- Although some wildlife eat native grasses, forbs provide a greater food source for more species.
- Many forbs provide forage (leafy material) as well as a seed source.
- Forbs also provide optimal cover for many small wildlife species, including young upland gamebirds and cottontail.

**NOTES:** Native grasses and forbs should not be recommended for planting if desirable native grasses and forbs are present and likely to provide adequate cover and food resources. Undesirable nonnative plants may be selectively removed through ***Control Nonnative Vegetation*** and thus release additional native grasses and forbs.

***Promote Native Grasses and Forbs*** should not necessarily be recommended where additional early successional cover is needed. For example, in large, forested areas where additional early successional cover might be required to provide habitat for some wildlife species, it is likely that desirable native grasses, forbs, brambles, and other plants will establish from the seedbank after the forest is cleared by ***Set Back Succession***.

# Manage Shrubs/Brush

## HMP description

Many shrubs/brush species provide cover and soft mast that benefit many wildlife species. Shrubs/brush may be planted or allowed to grow to create riparian buffers along streams and ponds. To maintain bank stability as the roots help hold the soil in place.

## Effect of practice

- Can provide additional food and cover for many wildlife species in areas where specific species of shrubs/brush are lacking.
- In large open areas, planting blocks or multiple rows of shrubs/brush is beneficial for those species requiring cover for nesting, loafing, or escape.
- Shrubs are an important component of travel corridors, which allow wildlife to move safely across open fields between two areas of habitat.
- Establishing hedgerows with shrubs may be used to increase interspersion of cover types and create smaller fields in proximity that can be managed differently to meet the various food and cover requirements for different wildlife species.
- Shrub management/sculpting may be useful in some urban settings where desirable cover or soft mast is lacking.
- Shrubs sculpted to develop a riparian buffer may reduce erosion and sedimentation, as well as provide cover and travel corridors for wildlife.
- Fruiting shrubs are beneficial for many species and can be planted in fencerows, hedgerows, field or woods borders, odd areas (such as field corners and gullies), riparian areas, and any other areas where soft mast may be lacking.

# Repair Spillway/Dam/Levee/Shorelines

## HMP description

Low water levels can cause significant problems in ponds and impounded wetlands. Improperly constructed or damaged spillways can lead to excessive dam or levee erosion and excessive aquatic vegetation along fish pond shorelines. These should be repaired if eroding or otherwise damaged. Trees should not be allowed to grow on dams or levees because tree roots can fracture the dam and eventually cause it to leak and break. However, if there is a large, mature tree on a dam, and the dam is not leaking, it should be left alone. Killing or felling the tree will cause the roots to rot and decay and thereby create airspace, which will more likely lead to the dam leaking or breaking.

## Effect of practice

- Eliminates erosion and sedimentation
- Enables pond or impounded wetland to fill to appropriate level

# Set back Succession

## HMP description

Succession is the series of changes in plant species composition through time and occurs in all-natural communities. Habitat for many wildlife species is managed by setting back succession to retain the successional stage(s) beneficial for focal wildlife species. The four primary techniques used by wildlife managers to Set Back Succession are **prescribed fire, mechanical applications, herbicide applications,** and **livestock grazing/browsing**. One or more may be recommended over another depending on the situation. In some cases, more than one technique may be applied.

## 4 Primary Techniques

**Prescribed Fire**

- Prescribed fire sets-back the successional process by burning existing cover and stimulating fresh plant growth.

**Mechanical Applications**

- Disking
- Chain sawing
- Dozer-clearing/Rot-plowing/Chaining/Drum-chopping
- Mowing/Mulching

**Herbicide Applications**

**Livestock Grazing/Browsing**

## Effect of practice

**All Types**

- Reduces tree density and encourages earlier successional plant communities.
- Reduces dominance of small trees and shrubs, and promotes grasses, forbs, and brambles.
- Increases the availability and quality of forage.
- Soft mast and seed production may be increased.
- Helps maintain perennial grasses and forbs and reduces height of encroaching woody species.
- Helps remove competition from various shrubs and small trees, allowing grasses and forbs to grow better.
- Maintains low brushy cover of various shrubs and small trees by encouraging resprouting.
- Can improve and maintain nesting cover for some bird species if conducted outside the nesting season.
- Can control unwanted woody growth and encourage more herbaceous groundcover. Can be used to maintain grasses, forbs, and shrub cover, and thus increase foods and enhance cover for some wildlife species.

**Burning**

- Burning during the growing season may more effectively kill small trees and shrubs and thus encourage more herbaceous cover.
- Burning early successional cover provides an open structure at ground level in the following growing season, which is desirable for several small wildlife species, including young upland gamebirds.
- Consumes litter layer and understory fuels (such as dead leaves and grass), which reduces chance of wildfire and enables the seedbank to germinate.
- Improves seed and invertebrate availability for many species (because of the open structure at ground level).
- Scarifies (breaks down outside coating) some seeds so they can germinate.
- May release nutrients (from ashes) into the soil.

**Mechanical Applications**

- Mowing can cause thatch build-up, which reduces availability of invertebrates and seed to young quail, grouse, wild turkeys, and other ground-feeding birds. Thatch build-up also reduces the ability of these animals to move through the field and suppresses the seedbank, which can lead to decreased vegetation diversity.
- Disking can be used to provide bare ground area adjacent to edge of water source, such as pond, to enable mourning dove access to water.
- Chain sawing can be used to thin tree stands to allow increased sunlight to reach the ground and stimulate herbaceous plants.

**NOTE:** Implementing ***Set Back Succession*** implies the intention is to increase and maintain an earlier successional community. ***Promote Native Grasses and Forbs*** should not necessarily be recommended when using **Set Back Succession** because herbaceous groundcover should establish naturally from the seedbank after tree removal.

Do not also recommend ***Create Snags*** when killing trees in an effort to increase early successional cover.

# Conduct Tillage Management

## HMP description

No-till agriculture is recommended over any tillage method. No-till agriculture uses drills and planters that do not overturn the soil. Additionally, the use of cover crops, such as annual clovers, wheat, and leafy greens, such as kale, turnips, and radishes, is recommended along with no-till agriculture.

## Effect of Practice

- No-till agriculture conserves soil moisture and reduces soil erosion and sedimentation into creeks and rivers. Thus, water quality is improved, which benefits aquatic organisms.
- Cover crops help improve soil health by increasing organic material and detritivores in the upper soil layers. Cover crops provide forage for various wildlife species.
- No-till agriculture and delayed tillage increases supply of waste grain, which is eaten by many wildlife species, and may increase nesting success.
- Cover crops scavenge and secure nutrients to prevent loss to leaching, increase water infiltration, increase soil-water holding capacity, and help improve soil health by encouraging more organisms, such as earthworms and microbes, in the upper soil layers, which facilitate decomposition and lead to increased nutrient availability.

**NOTE:** In this contest this practice should be recommended only if a warm-season grain crop, such as corn, soybeans, or grain sorghum, is present.

# Provide Water Developments for Wildlife

## HMP description

Water is a critical habitat component. Some wildlife species obtain necessary water from their diet, whereas others require free-standing water for drinking or for an aquatic habitat. Many species require a water source for obtaining food, reproduction, loafing, or escaping predators. Developing a source of water is a critical consideration for many wildlife species when little or no water is available.

**Small ponds** designed to collect water from runoff and/or precipitation but may be created where there is an existing spring or seep to facilitate water collection and a reliable water supply to be accessed directly by wildlife.

**Shallow impoundments** created by constructing earthen dikes to retain water in natural drainage areas or wetlands. Impoundments for waterfowl could include a water-control device which allows the water to be removed from the field or woods prior to spring after migration so the field can be planted again or so the trees will not die.

**Guzzlers and windmills** Guzzlers catch and store rain water to be distributed in a trough. Windmills pump ground water to surface collection tank and distributed in a trough.

**Small backyard ponds** constructed in suburban backyards to provide water for a variety of wildlife.

**Birdbaths** useful for providing water in urban settings.

## Effect of practice

- Can provide drinking water and wetland habitat.
- Grain fields or mature bottomland hardwoods flooded in fall/winter can provide important migrating and wintering areas with abundant food resources for waterfowl.
- Temporary flooding can improve existing open wetlands for nesting and brooding for some waterfowl, such as blue-winged teal and other species.
- Temporary flooding can improve wooded and brushy areas for nesting and brooding wood ducks and other species.
- Can attract prey for many predators.
- Provide water where it is relatively scarce and habitat for several wildlife species.
- Can collect water from runoff and/or precipitation but may be created where there is an existing spring or seep, which facilitates water collection and helps ensure a reliable water supply.

- Some can be constructed in suburban backyards to provide water for a variety of wildlife.

**NOTE:** ***Water Developments for Wildlife*** can be recommended when an additional water source is needed or when an existing water development for wildlife is essentially not functioning because it is in serious need of repair. This HMP should not be recommended when a fishing pond is needed.

# Decrease/Eliminate Hunting/Fishing

## HMP description

Regulated hunting and fishing regulations are primary tools used to manage many wildlife and fish species. State and federal wildlife agencies set regulations for hunting and fishing seasons and daily possession limits on all game species.

Landowners can choose to take less than the maximum allowed and limit or eliminate hunting/fishing, depending on local populations and personal management objectives.

## Effect of practice

- In some cases, this can help increase the population of a particular species to be managed if hunting or fishing pressure is high.
- The practice can also be used temporarily for population management purposes.

# Conduct Wildlife/Fish Survey

## HMP description

## Wildlife surveys

Monitoring trends of wildlife populations and physical attributes (such as body weight) are important for wildlife managers. Data on various species are routinely collected. The data is used to prescribe future hunting or land management strategies.

***Survey Techniques:***

***Observation counts:*** species and number of animals are recorded as they are seen. Counts may be made while conducting other activities or during official observations, such as counting ducks on a wetland

***Roadside counts:*** usually involve driving a predetermined route and counting the number of individuals of a species while driving the route

***Call counts:*** recording the number of individuals or groups (such as a northern bobwhite covey) of a species while waiting and listening at a specific location

***Point counts:*** recording the numbers of a species observed or heard at specific, predetermined points along a transect

***Check-in station:*** data is collected from game animals when hunters bring the animals to an official check-in station

***Trail cameras:*** are placed in areas where animals frequent and the pictures are used to estimate population density, sex ratio, age structure, etc.

***Transects:*** predetermined routes are used to collect observation data, point counts, dropping ("pellet") counts, call counts, etc.

***Questionnaires:*** groups of people are asked about their observations of animals

***Hunting Trends:*** if hunting efforts remain relatively constant, trends in annual harvest rates can be used to estimate trends in populations.

## Fish surveys

Pond balance should be checked during early summer by seining at intervals around the pond. Balance is determined by comparing age groups, condition, and numbers of predator and prey fish caught in the seine and from year-round fishing records. ~~If~~ fishing efforts remain relatively constant, trends in annual harvest rates can be used to estimate trends in populations.

**NOTE:** Although information from wildlife and fish surveys is always important, surveys should not be recommended if information is provided at the contest that indicate a survey is ongoing or has been completed recently.

# Conduct Wildlife Damage Management

## HMP description

Wildlife damage management is most common in urban and suburban areas where wildlife and humans frequently interact. However, wildlife damage is not uncommon in rural areas as well. Examples of wildlife damage includes bats or squirrels in the attic, deer eating ornamental plants in the yard or depredating crops, bobcats, racoons, and owls preying on livestock or pets, rabbits and raccoons eating vegetable gardens, red-winged blackbirds eating crops, bird collisions at airports, rock pigeons and other bird species nesting and defecating on buildings and commercial signs, starlings roosting in urban trees and defecating on sidewalks, and wild pigs rooting up fields, crops, golf courses, or yards. There are many more possible scenarios for wildlife damage. Wildlife managers use both lethal and nonlethal methods to control these problems.

### ***Nonlethal Methods***

**Fencing and other exclusion devices**

**Habitat Modifications**

**Harassment Techniques and Scare Tactics**

- Propane Cannons
- Dogs, where legal
- Electronic Predator Sounds

**Taste and Odor Repellents**

**Changing Human Activity**

- Removing pet food from deck
- Removing bird feeder from deck

*Advantage:*

- the public accepts them better versus lethal methods and can be more easily used in areas with high human density.

*Disadvantage:*

- the animal(s) causing the problem may relocate and cause the same problem at a different location.

### ***Lethal Methods***

**Body-gripping Traps**

**Live Traps**

**Euthanization**

**Shooting**

**Poisoning**

*Advantage:*

- can immediately decrease the numbers of animals in a population that are causing

damage or health hazards, thereby immediately reducing the damage or hazard.
- if only one or a few animals are causing the problem, lethal methods can then eliminate the damage by eliminating the individual(s) causing the damage.

*Disadvantage:*

- the public is not as accepting of them as nonlethal methods and they are not able to be easily used in areas with high human density.

Often, nonlethal methods do not work, and lethal methods are required. Education can help the public understand the efficacy and sensibility of nonlethal and lethal methods. Regardless of the method used, there are some general guidelines that can increase the success of a wildlife damage management program. It is important to identify the species causing the damage. An integrated wildlife damage management program that employs two or more methods is strongly recommended, especially when using nonlethal methods. It is imperative to know all the local, state, and federal laws related to the species causing the problem and the wildlife damage management method(s).

# Construct Fishing Pond

## HMP description

Fishing Ponds can be created using dams, dikes, and levees to provide relatively permanent water for fish, or an existing old pond that has been filled in with sediment can be dug out and refurbished. Pond design varies, depending on the purpose for constructing the pond and the ecoregion where it is constructed.

## Effect of practice

- Fishing ponds provide habitat for fish species and fishing access for humans.
- Fishing ponds with a high-shoreline length to surface-area ratio provide maximum access to the pond by anglers.
- Fishing ponds provide secondary use as water source for many other wildlife species

**NOTE:** Although many wildlife species may use ponds for various reasons, this practice is intended primarily for fish habitat. For the purposes of this contest, when additional water or wetland habitat is needed for wildlife species not related to fishing, ***Provide Water Developments for Wildlife*** should be recommended. This distinction avoids management conflicts when both fish and wildlife species are managed on the same property. For example, steep-sloping sides help reduce aquatic vegetation and favor balanced fish populations, whereas gentle-sloping banks with abundant emergent aquatic vegetation benefit various wildlife species, such as mourning dove, American bittern, or wood duck.

# Control Aquatic Vegetation

## HMP description

Aquatic vegetation should be controlled when it begins to limit use of a fishing pond for recreation or interferes with access. Prevention of rooted aquatic vegetation growth can be accomplished two ways: 1) deepening the edges of the pond with steep side slopes, which minimizes shallow water areas exposed to sunlight. 2) initiating a spring-through-fall fertility program, which reduces light transmission and prevents rooted submerged plants from becoming established. Existing aquatic vegetation can be controlled chemically, biologically, or mechanically. Vegetation can be controlled on a portion of a pond bank while leaving some parts of the bank vegetated for specific wildlife use.

## Effect of practice

- Reduces aquatic vegetation within and around the edge of a fishing pond, making prey more easily available to predator fish and improving fishing access.

**NOTE:** ***Control Aquatic Vegetation*** includes nonnative vegetation. Thus, ***Control Nonnative Vegetation*** is not applicable for fish ponds.

# Reduce Turbidity in Fishing Pond

## HMP description

Turbid or muddy water limits fish production because natural food organisms need sunlight to grow. Turbidity can be caused by sediment being washed in from the pond banks or watershed, livestock using the pond, feeding activities of bottom-dwelling fish, such as carp or buffalo fish, or negatively charged clay particles suspended in the water column.

Turbidity is most often caused by sedimentation (erosion) from the watershed or the pond bottom (livestock or fish) and will usually clear in a relatively short period of time. Reducing erosion in the watershed is best accomplished by reseeding relatively large bare areas of soil around the pond where there is evidence of erosion. Turbidity from pond sediments can be controlled by restricting livestock to a small area of the pond or another watering source and eliminating bottom-dwelling fish. Ponds managed for channel catfish may be turbid because of action from the catfish.

Turbidity from suspension of negatively charged clay particles is a more difficult problem. The addition of positively charged compounds, such as limestone, gypsum, or alum crystals, can cause the clay particles to settle.

## Effect of practice

- Improves water quality by removing or settling silt.
- Allows sunlight to stimulate phytoplankton.

**NOTE:** If livestock are causing turbid water, ***Conduct Livestock Management*** should also be recommended in addition to ***Reduce Turbidity in Fishing Pond***. This practice should be recommended for catfish ponds only when it is obvious that erosion and sedimentation are causing or contributing to turbidity.