

## Red squirrel

### General information

Red squirrels are relatively small tree squirrels that occur in the Rocky Mountains, Great Lakes, and New England regions, and down the Appalachians. As their name implies, they are reddish or yellowish on back and sides with a white belly. They are found primarily in boreal coniferous forest and mixed deciduous-coniferous forest. Red squirrels den in tree cavities, but will make ball nests on large tree limbs close to the trunk or in underground burrows if cavities are not available. They will tunnel in snow and store conifer seeds in caches. Red squirrels often eat from the same stump or downed log where hulls of nuts and cones accumulate. Young are born in spring and late summer.

### Habitat requirements

**Diet:** wide variety of seeds (especially pine seeds), eggs, and mushrooms

**Water:** freestanding water required regularly

**Cover:** coniferous and mixed deciduous-coniferous forest; nest in tree cavities and build nests of shredded bark, grass, leaves, twigs

### Wildlife management practices

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

**Forest Management:** *Forest Stand Improvement* can improve species composition and help increase mast production; snags should be retained for possible cavities

**Livestock Management:** livestock should be excluded from forests managed for red squirrel

**Plant Trees:** in large open areas to provide future habitat for red squirrels

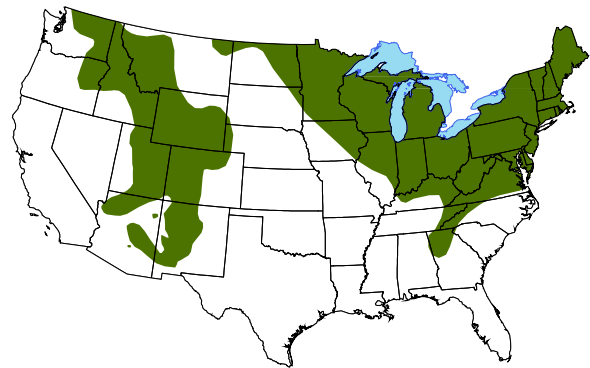
**Decrease Harvest:** if hunting pressure is limiting population growth where an increase is desired

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

**Wildlife or Fish Survey:** observation surveys can be used to estimate population trends



Gilles Gonthier



## River otter

### General information

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

### Habitat requirements

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

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

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

### Wildlife management practices

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

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

**Repair Spillway/Levee:** if not functioning properly

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

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

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

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

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



Jim Leopold



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



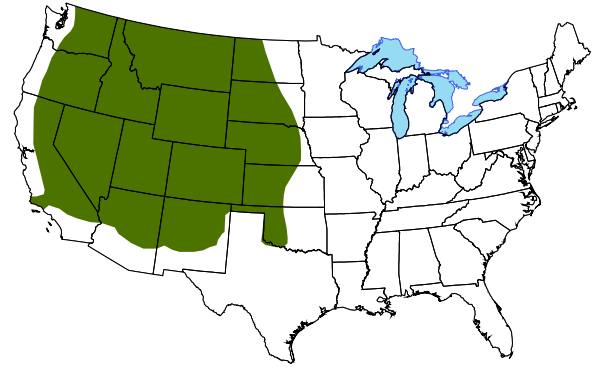
## Rocky Mountain mule deer

### General information

Rocky Mountain mule deer, a subspecies of mule deer, occur in western North America (from Oklahoma to California and northward to Northern Canada), just north of the range of the desert mule deer. They are adapted to a wide range of



Tupper Ansel Blake



western plant communities from prairie to alpine to semi-desert, but prefer a mixture of early successional areas with scattered shrubs and mature forest. Mule deer are ruminants (animals with a four-chambered stomach) and are adapted to eat higher-quality forages, more often than other ruminants (such as elk or cattle). Rocky Mountain mule deer that occupy ranges with high elevations migrate to lower elevations in winter for access to preferred forage, avoidance of deep snow cover, and protection from cold winds. Mule deer can cause significant damage (ornamental plantings, forest crops, and row crops) when overabundant and can be hazardous for motor vehicles.

### Habitat requirements

**Diet:** forbs, browse, soft mast, grains, and grasses

**Water:** free-standing water is required nearly daily in dry ecoregions and during summer; water should be available within one mile

**Cover:** dense woody vegetation and relatively tall early successional cover, including native grasses, forbs, and shrubs; rock outcrops and ravines for loafing cover; in the **Intermountain** ecoregion, 50 percent young and mature forest, well interspersed with herbaceous and shrubby cover is optimal

### Wildlife management practices

**Control Nonnative Invasive Vegetation:** if nonnative invasive plants are competing with native vegetation and reducing habitat quality for Rocky Mountain mule deer

**Edge Feathering:** (in some ecoregions) to create an ecotone between openings and forest that will provide increased browse and enhance fawning cover

**Field Borders:** (in some ecoregions) to increase fawning cover and forage availability around row-crop fields

**Forest Management:** (in some ecoregions) *Forest Regeneration (Clearcut, Shelterwood, Seed-tree, Group Selection)* can stimulate herbaceous cover and provide additional brushy cover for a few years; *Forest Stand Improvement* can stimulate additional herbaceous cover and browse in the understory where needed

**Leave Crop Unharvested:** (in some ecoregions) to provide additional food resource, especially near cover

**Livestock Management:** grazing intensity should be managed to maintain forbs for forage, adequate cover for fawning, and shrubs and young trees for browse and cover;

livestock should be excluded from forests to prevent destruction of the understory where mule deer is a focal species; livestock watering facilities may be necessary in uplands to discourage congregation in and overuse of riparian areas; livestock should be excluded from food plots

**Plant Food Plots:** (in some ecoregions) where naturally occurring food resources are limited; food plots may provide additional nutrition, particularly during late summer and winter in some areas

**Plant Native Grasses and Forbs:** where planting is necessary to increase grasses and forbs for forage and cover

**Plant Shrubs:** where additional shrub cover and browse is needed

**Plant Trees:** (in some ecoregions) where additional forest cover is needed

**Set-back Succession:** *Prescribed Fire, Disking, and Herbicide Applications* is recommended to maintain herbaceous cover and revert shrubby areas and young forest back to herbaceous vegetation; *Prescribed Fire* also to stimulate the understory for increased forage and soft mast in young and mature forests; *Chainsawing, Dozer-clearing* and *Root-plowing* may be used to create additional open areas

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

**Water Developments for Wildlife:** where water is limited or absent (within one mile), ponds and shallow impoundments can provide an external water source for drinking

**Decrease Harvest:** if hunting pressure is limiting population growth where an increase is desired

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

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

**Wildlife or Fish Survey:** spotlight surveys, camera surveys, and hunter harvest data help assess population trends

## Snowshoe hare

### General information

Snowshoe hares are found in the northern U.S., the Rocky Mountains, the Sierra Nevada, and the Appalachians. They have large feet but smallish ears for a hare. Their summer coat is dark brown and their winter coat is white. They are commonly found in both young and mature coniferous and deciduous forest, but prefer dense cover, especially near low wet areas. They forage in recently regenerated forest and forest openings. Snowshoe hares do not use dens. Home range is about 10 acres. They have 2-3 litters of 2-4 young, which are born April-August.



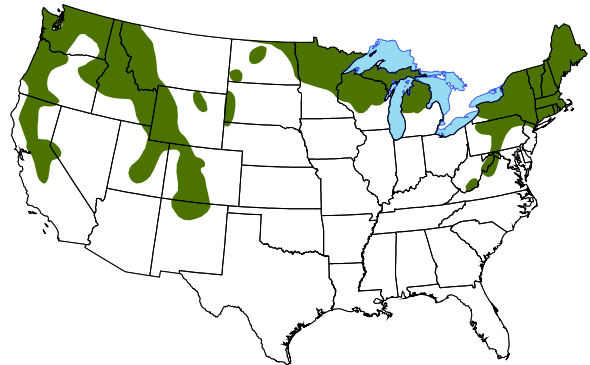
USFWS

### Habitat requirements

**Diet:** forbs, grasses, soft mast in spring and summer; browse and bark in winter (as well as forbs and grasses when available)

**Water:** probably obtain necessary water through diet

**Cover:** dense thickets and young forest cover; mature forest with dense understory; seldom far from dense cover; forest openings and riparian areas; give birth under a shrub or fallen log



### Wildlife management practices

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

**Forest Management:** *Forest Regeneration (Clearcut, Shelterwood, Seed-tree)* will provide dense cover and increased soft mast for several years after harvest; *Forest Stand Improvement* can enhance understory development and soft mast production; *Forest Road Maintenance* may involve daylighting roads and planting clovers where forage may be limited

**Livestock Management:** livestock should be excluded for forests managed for snowshoe hare; should prevent overgrazing in forest openings to maintain sufficient cover and forage for snowshoe hares

**Plant Food Plots:** (in some ecoregions) forest openings may be planted in forages where food may be lacking

**Plant Shrubs:** where dense shrub cover is lacking and planting is necessary

**Plant Trees:** in relatively large open areas to maintain at least 80 percent forest cover

**Set-back Succession:** *Prescribed Fire* is recommended to maintain herbaceous openings and stimulate forest understory for increased cover, forage, and soft mast; *Chainsawing* may be used to reduce trees and enhance dense cover; *Chainsawing, Dozer-clearing,* and *Root-plowing* may be used to convert forest to early successional plant communities; *Herbicide applications*

may be used to improve plant composition

**Decrease Harvest:** if hunting pressure is limiting population growth where an increase is desired

**Increase Harvest:** when populations can sustain additional hunting pressure for recreation and when population reduction is desired

**Wildlife Damage Management:** when snowshoe hare populations eat the bark of commercially valuable trees during winter

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



## White-tailed deer

### General information

The white-tailed deer is the most important game animal in North America. There are more than 30 subspecies of white-tailed deer that occur throughout the U.S. and southern Canada. They are extremely adaptable and are found in a wide variety of areas including deciduous and coniferous forests, tropical evergreen forest, dry grasslands, and shrub desert. They are adaptable to humans and exploit suburban areas very well. Whitetails thrive in areas with fragmented areas containing well-interspersed vegetation types and successional stages. White-tailed deer are ruminants and are classified as concentrate selectors, meaning they concentrate their feeding on select plant species and select plant parts. Where overabundant, they can cause significant damage to ornamental plantings and row crops and can be hazardous for motor vehicles.

### Habitat requirements

**Diet:** forbs, browse, acorns, beechnuts, soft mast (such as blackberry and persimmon), grains, and mushrooms; in the northern parts of the range, coniferous browse is important in winter; annual grains, such as wheat, oats, and rye, are eaten as well as young sprouts of a few perennial grasses in late winter

**Water:** obtain most of their water from diet, but drink free-standing water when available

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

### Wildlife management practices

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

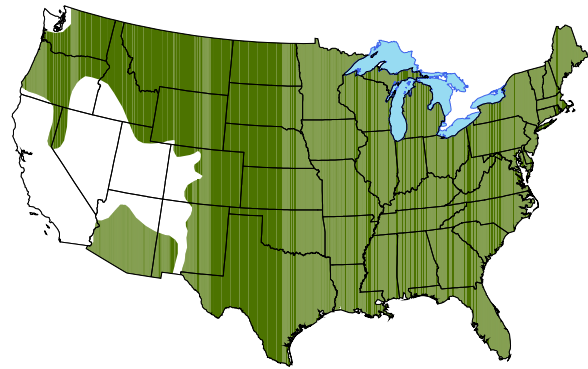
**Edge Feathering:** to increase forage availability around fields and enhance fawning cover

**Field Borders:** to increase forage availability (forbs and brambles) around crop fields

**Forest Management:** *Forest Regeneration (Clearcut,*



Steve Hillebrand



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

**Leave Crop Unharvested:** to provide additional food resource, especially near escape cover

**Livestock Management:** livestock should be excluded from forests managed for deer to avoid destruction of the forest understory; livestock should be excluded from riparian areas; should prevent overgrazing in woodlands and savannas; livestock should be excluded from food plots

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

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

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

areas to provide travel corridors

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

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

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

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

**Decrease Harvest:** if hunting pressure is limiting population growth where an increase is desired

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

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

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



## Wild pig

### General information

Wild pigs (also called feral hogs) were first introduced into what is now the United States at 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 a number of native wildlife species and predate upon many small amphibian and reptile species. Wild pigs also cause considerable agricultural damage to crops, pastures, livestock, and environmental damage to riparian areas, often resulting in water quality degradation as a result of their rooting and wallowing behavior.

### Habitat requirements

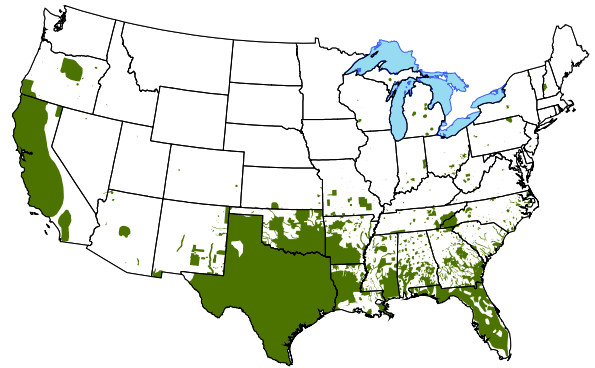
**Diet:** wild pigs are perhaps the perfect example of an omnivore; approximately 85 percent of their diet is vegetation, but they also prey upon small animals and often scavenge animal carcasses; they especially prefer crops, such as corn and peanuts, and aggressively out-compete native wildlife species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

**Water:** wild pigs must have access to free-standing water for drinking and thermoregulation

**Cover:** wild pigs seek dense cover, such as 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, streams, and associated wetlands as travel corridors to move as they seek food sources

### Wildlife management practices

**Increase Harvest:** the wild pig is an invasive nonnative species that competes with native wildlife for food and, in some instances, preys directly upon many small vertebrate species, including birds, mammals, reptiles, and amphibians; whenever wild pigs are observed or their sign is documented, control methods, such as trapping, snaring, shooting, and dogging, should be used with an ultimate goal of eradication



**Wildlife Damage Management:** may be necessary if wild pigs negatively impact crops, forages, or livestock; fencing high-value crops and other areas may be used as a non-lethal method for reducing wild pig damage, but it does not decrease the population

**Wildlife or Fish Survey:** camera surveys, track counts, and evidence of rooting are used to estimate population trends

## Reptiles

### American alligator

#### General information

The American alligator occurs along the Atlantic coast from the Florida Everglades to North Carolina and along the Gulf Coast as far west as Texas and into Oklahoma and Arkansas. Alligators are dark gray to almost black with rows of bony scutes that armor the back with a cream-colored underside. Eyes are green to brown with vertical pupils. They have a large, broad, U-shaped snout and an overbite that conceals the bottom row of conical-shaped teeth. Alligators have short legs and webbed feet with sharp claws they use to dig “gator holes” that benefit a variety of wildlife species, especially during periods of drought. Male alligators average 11 feet in length, whereas females average 8 feet. Mating occurs in May/June and nesting peaks June/July. Alligators nest near permanent water and construct a dome-shaped nest that is a mound of soil and plant material. The female digs a conical chamber in the center of the mound and deposits 20-60 eggs. Several layers of mixed mud and vegetation are added on top of the egg chamber. Sunlight and decomposition of the nesting material keeps the eggs at an almost constant temperature. The temperature of the developing eggs determines the sex of offspring. Females are produced at the coolest and warmest temperatures, whereas males are produced around 89.6°F. Temperature variation inside the nest can produce both sexes. Incubation averages 65 days. Juvenile alligators will often remain together in a group called a pod for 2-3 years. The female provides parental care and may protect young for more than one year. Alligators may be hunted in all southeastern states. However, harvest is determined and closely monitored by state wildlife agencies typically through quota permits and reporting. Therefore, Increase Harvest and Decrease Harvest are not WMP options. Wildlife Damage Management may be recommended where alligators are overabundant or a nuisance.

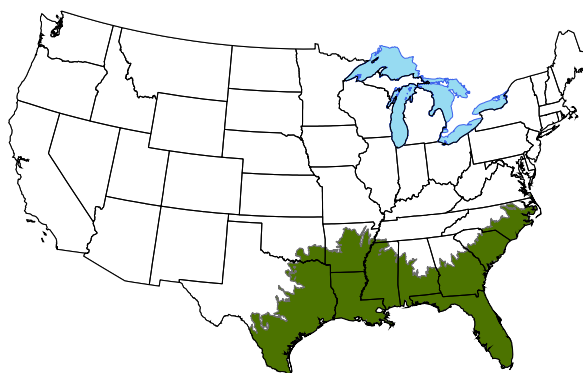
#### Habitat requirements

**Diet:** invertebrates, such as insects, crustaceans, and snails, fish, frogs, snakes, turtles, crabs, birds, mammals, and carrion

**Water:** alligators are more aquatic than terrestrial; they occur in marshes, swamps, streams, rivers, lakes, ponds, impoundments, and canals. Although primarily a freshwater species, alligators occasionally move into both brackish and saltwater environments for periods of time



Cindy Larson



#### Wildlife management practices

**Repair Spillway/Levee:** if not functioning properly

**Water Control Structures:** should be installed if none are present in existing dams or levees to allow water level manipulation

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

**Wildlife Damage Management:** necessary when alligators have become overabundant or exhibit nuisance behavior such as lack of fear and interest in human activity

**Wildlife or Fish Survey:** spotlight surveys are used to estimate populations and track size classes. 3 Size Classes: 1-4ft Small; 4-9ft Medium; Over 9ft Large



## Eastern box turtle

### General information

The eastern box turtle occurs throughout much of the eastern United States. It prefers deciduous or mixed woodlands, but also uses thickets, old-fields, pastures, and wetlands. The species is named for its high, domed-shaped shell that closes tightly into a “box” when the turtle is alarmed. The eastern box turtle is active throughout spring, summer, and fall. During the hot, dry summer months, it is often found soaking around the edges of ponds, streams, or wetlands. When temperatures begin to drop in late fall, it burrows into the leaf litter and loose soil to overwinter (for up to six months of the year). It burrows deeper into the ground as the soil temperature drops. The same overwintering location may be used year after year. Eastern box turtles are long-lived reptiles. They have been recorded to live more than 100 years in the wild. Most box turtles will live their lives within an area of 25 acres.



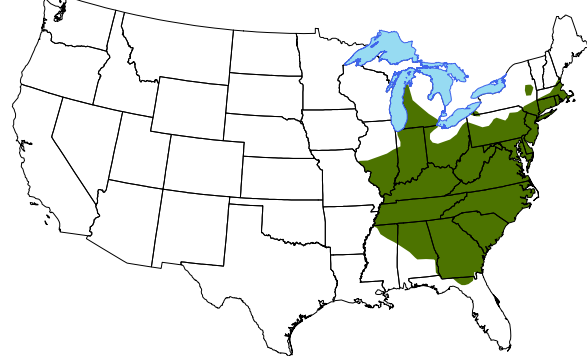
Katie A. Harris

### Habitat requirements

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

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

**Cover:** moist, forested areas with a diverse understory and abundant leaf litter; nesting cover found in moist or loose soil within small openings with an open structure at ground level; nests may be concentrated in openings where soil temperatures are warmer; box turtles may travel >150 years to seek openings for nesting.



### Wildlife management practices

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

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

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

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

**Plant Native Grasses and Forbs:** where planting is necessary to provide cover in open areas where there is little to no vegetation

**Plant Shrubs:** where adequate cover is lacking in large open areas

**Plant Trees:** where additional forest cover is needed

**Set-back Succession:** *Prescribed Fire* can stimulate and maintain herbaceous groundcover in forests, woodlands, and savannas; *Prescribed Fire*, *Herbicide Applications*, and *Disking* are recommended to maintain herbaceous openings and provide open structure at ground level; it is important that *Prescribed Fire* occurs during the inactive season to minimize negative effects on the turtles; *Chainsawing*, *Dozer-clearing*, and *Root-plowing* can be used to create forest openings where openings for nesting may be limited

**Water Development for Wildlife:** small ponds should be provided if a water source is not present within about a 25-acre area

**Wildlife or Fish Survey:** transect counts and dogs are used to estimate population trends

## Eastern indigo snake

### General information

Eastern indigo snakes are found primarily in Florida and southern Georgia and have been listed as federally endangered since 1971. They are the largest snakes in the United States, reaching lengths of 60-84 inches. Although they prefer wetland areas, they also may be found in pine and shrubby flatwoods, grasslands, tropical hammocks, agricultural fields, and coastal dunes. They use abandoned gopher tortoise burrows and other burrows for reproduction and cover. Eastern indigo snakes have a docile, non-aggressive nature and can live near humans without negative interactions. They are important predators of rodents and venomous snakes.

### Habitat requirements

**Diet:** small mammals, frogs, lizards, fish, eggs, birds, and other snakes

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

**Cover:** sandy soils with an abundance of animal burrows and stump holes in areas dominated by pine and hardwood forests, woodlands, and savanna; they also use hammocks, palmetto flats, and brushy areas near riparian areas and wetlands

### Wildlife management practices

**Conservation Easement:** can protect longleaf pine systems for this declining species

**Control Nonnative Invasive Vegetation:** when nonnative invasive vegetation begins to decrease habitat quality for eastern indigo snakes

**Forest Management:** *Forest Regeneration*, especially *Seedtree* and *Single-tree Selection*, in pine forests and woodlands can enhance cover for prey and provide stump holes and down woody debris; *Group Selection* and *Forest Stand Improvement* can enhance understory cover for eastern indigo snakes and their prey in hardwood stands

**Plant Native Grasses and Forbs:** may be necessary in open areas with insufficient groundcover

**Plant Trees:** in large open areas where additional forest cover is needed

**Set-back Succession:** *Prescribed Fire* is recommended to maintain herbaceous groundcover in longleaf pine savanna and woodland, and maintain an early successional stage in old-fields and grasslands

**Water Developments for Wildlife:** where lacking, small ponds and shallow impoundments can increase habitat suitability

**Wildlife or Fish Survey:** transect surveys and drift fences with snake traps may be used to estimate population trends



Daniel Dye





## Eastern snapping turtle

### General information

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

### Habitat requirements

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

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

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

### Wildlife management practices

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

**Repair Spillway/Levee:** if not functioning properly

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

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

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

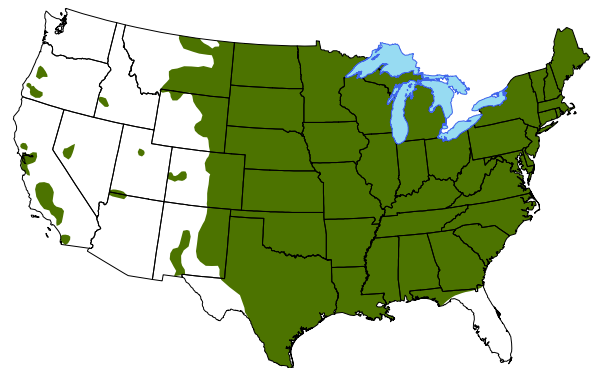
**Increase Harvest:** where populations can sustain additional harvest pressure and if the turtles are limiting other desirable species

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

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



Chelsi Hornbaker



## Gila monster

### General information

The Gila monster is the largest lizard native to the U.S., and one of only a few venomous lizard species in the world. Most of the Gila monster's teeth have two grooves that allow its venom, a nerve toxin, to flow into the wound as the lizard holds its prey. Gila monster venom is not fatal to humans. Furthermore, the Gila monster is not aggressive and prefers to avoid people. It is restricted to the arid regions of the desert southwest. It is most active during the spring and summer months, but spends more than 95 percent of the active season in burrows or under rocks emerging mainly to bask and feed. The Gila monster is a carnivore that feeds on nestling mammals and birds, eggs of birds and reptiles, lizards, and carrion. They are able to go months between meals and store fat reserves in their stout tails.

### Habitat requirements

**Diet:** young of small mammals and birds, eggs of lizards and ground nesting birds, carrion

**Water:** receives necessary water from diet

**Cover:** typically found in desert grasslands, Mojave and Sonoran desert scrub, and thorn scrub (Sonora); less often oak or pine-oak woodland; sub-surface shelters are important components of its habitat

### Wildlife management practices

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

**Plant Shrubs:** where cover is lacking for prey species

**Water Developments for Wildlife:** in certain areas, it may be possible to create standing water to attract prey species

**Wildlife or Fish Survey:** transect surveys are used to estimate population trends



Gary M. Stolz





## Gopher tortoise

### General information

The gopher tortoise occurs in the southeastern Coastal Plain from southeastern South Carolina to extreme southeastern Louisiana. It inhabits open uplands, especially those with relatively well-drained, sandy soils. The gopher tortoise prefers longleaf pine and oak sandhills with open canopies, but also occurs in dry prairie, coastal grasslands and dunes, and mixed hardwood-pine stands. Gopher tortoises dig burrows up to 20 feet long and 6 feet deep. These burrows, from which the species was named, provide it protection from high and low temperatures extremes, moisture loss, and predators. These burrows also serve as a refuge for nearly 400 other species (including the federally endangered indigo snake). Gopher tortoises require a diverse understory of plants close by as most feeding occurs within 150 feet of their burrow entrance.



Dwayne Elmore

### Habitat requirements

**Diet:** grasses, legumes, and fruits

**Water:** necessary water obtained from diet

**Cover:** burrows provide necessary cover

### Wildlife management practices

**Conservation Easement:** can protect longleaf pine systems for this declining species

**Control Nonnative Invasive Vegetation:** when nonnative invasive vegetation begins to reduce habitat quality for gopher tortoises, especially by limiting herbaceous diversity

**Forest Management:** *Forest Regeneration (Single-tree Selection)* is recommended to regenerate and maintain mature stands of longleaf pine; *Forest Stand Improvement* can remove undesirable species

**Plant Native Grasses and Forbs:** may be necessary in open areas with insufficient groundcover

**Plant Trees:** where additional forest cover is needed (maintain 20-60 percent canopy cover)

**Set-back Succession:** *Prescribed Fire* is recommended to maintain a diverse herbaceous understory; *Chainsawing* is recommended to maintain <60 percent canopy cover and to maintain a diverse herbaceous understory; *Herbicide Applications* may be used with fire; *Forest Stand Improvement* may be implemented to control undesirable species and help maintain diverse understory

**Wildlife or Fish Survey:** observations and use of gopher tortoise burrows are used to estimate population trends



## Plains hog-nosed snake

### General information

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, reaching 2-3 feet in length. Plains hog-nosed snakes prefer shrubby flat or gently rolling prairies with loose, sandy soil. 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.

### Habitat requirements

**Diet:** mostly toads, but also other reptiles, birds, mice, and eggs

**Cover:** shrublands and grasslands

**Water:** necessary water obtained from diet

### Wildlife management practices

**Control Nonnative Invasive Vegetation:** when nonnative invasive vegetation begins to reduce habitat quality for plains hog-nosed snakes

**Livestock Management:** should prevent overgrazing and leave adequate cover for prey

**Plant Native Grasses and Forbs:** in open areas where groundcover is lacking and planting is necessary

**Set-back Succession:** *Prescribed Fire* and *Chaining* are recommended to reduce woody vegetation where needed and maintain native shortgrass prairie; it is important these practices occur during the inactive season to minimize negative effects on snakes

**Wildlife or Fish Survey:** transect surveys are used to estimate population trends



Gary M. Stoiz





## Texas horned lizard

### General information

Texas horned lizards are spiny lizards with a wide body. They are found in deserts, grasslands, and shrublands of the southwestern United States. They regulate their body temperature by basking and burrowing. When a predator approaches, Texas horned lizards will inflate themselves. If the lizard is further frightened, it is capable of squirting nearly one third of its blood volume through a pore near the eye. They also “rain harvest.” During heavy rain, they stand high on their feet, flatten the body, and lower the head. This behavior funnels rain to the mouth through specialized scales. Daily activities often are timed around highest ant activities.

### Habitat requirements

**Diet:** mostly ants, but also other invertebrates

**Water:** known to drink using specialized scales to harvest rainwater during heavy rains

**Cover:** sandy to rocky soils with sparse vegetation of grass, cactus, or scattered shrubs

### Wildlife management practices

**Control Nonnative Invasive Vegetation:** when nonnative vegetation reduces habitat quality; in particular, dense sod grasses planted as livestock forage should be eradicated where possible when the Texas horned lizard is a focal species.

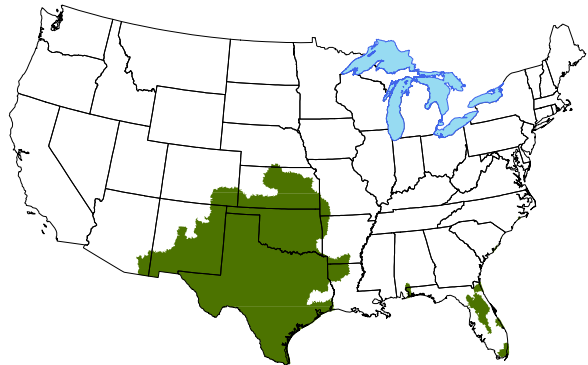
**Plant Shrubs:** where shrub cover is lacking

**Set-back Succession:** *Prescribed Fire* is recommended to maintain diverse grasslands and shrublands; *Drum-chopping* and *Chainsawing* can rejuvenate shrublands; it is important that these practices occur during the inactive season to minimize negative effects on the lizards

**Wildlife or Fish Survey:** transect surveys are used to estimate population trends



Robert Burton



## Timber rattlesnake

### General information

Timber rattlesnakes are found throughout much of the eastern U.S. They are most often found in forests, particularly those with rock outcrops, ledges, and steep slopes. Timber rattlesnakes are long-lived reptiles, capable of reaching 25 years of age or older. They are pit vipers, which means they have a heat-sensing organ behind the nostrils that can detect temperature differences, that allows the snake to determine if another animal is a predator or prey. Timber rattlesnakes spend approximately six months of the year hibernating underground (fall-spring) and will re-use a den for many years. They emerge in spring and are primarily active during the daylight hours. Timber rattlesnakes are sit-and-wait predators. They rely on their camouflage patterns as they ambush prey along runways, at the base of tree trunks, and adjacent woody debris. Timber rattlesnakes generally are shy and unaggressive. When approached, they will normally “freeze” or retreat to thick cover, but if cornered they will form a loose coil, raise their heads, rattle their tails, and may strike. The rattle is made of keratin, which is a protein, and a new segment is added each time the snake sheds. To rattle, rattlesnakes move the rattle back and forth as much as 40-60 times per second. A rattlesnake cannot be aged by counting the rattle segments because snakes shed at varying rates, often multiple times in one year, and rattle segments commonly break-off. Timber rattlesnakes are venomous and should not be handled.

### Habitat requirements

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

**Water:** receives necessary water from diet, but will drink free-standing water if available

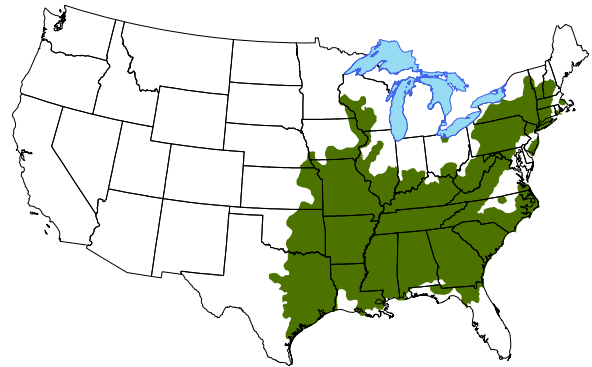
**Cover:** upland forests with deep leaf litter and large amounts of downed woody debris; winter cover is necessary for hibernation in the form of rock crevices, rodent burrows, and root systems

### Wildlife management practices

**Control Nonnative Invasive Vegetation:** when nonnative invasive vegetation begins to reduce habitat quality for timber rattlesnakes; in particular, nonnative sod grasses should be eradicated

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

**Forest Management:** *Forest Regeneration (Clearcut, Shelterwood, Group Selection)* and *Forest Stand Improvement* will provide dense groundcover that may support increased prey for several years and increased large woody debris for ambush sites and loafing cover; timing of *Forest Management* ideally should be



conducted during the inactive season, especially around denning sites

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

**Plant Trees:** in relatively large open areas where additional forest cover is needed

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

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



## Western diamond-backed rattlesnake

### General information

Western diamond-backed rattlesnakes are found in deserts, grasslands, shrublands, and woodlands of the southwestern United States. 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 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. Western diamond-backed rattlesnakes are venomous and should not be handled.

### Habitat requirements

**Diet:** mostly mammals (rabbits, squirrels, mice, and rats), but also lizards and birds

**Water:** will consume their body weight in free-standing water annually; they also get water from their food and some is absorbed during shedding.

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

### Wildlife management practices

**Control Nonnative Invasive Vegetation:** when nonnative invasive vegetation begins to reduce habitat quality for western diamond-backed rattlesnakes; in particular, nonnative sod grasses should be eradicated

**Plant Native Grasses and Forbs:** when grass/forb cover is limiting and planting is necessary

**Plant Shrubs:** in large open areas where additional shrub cover is needed to provide daytime loafing areas and attract prey

**Set-back Succession:** *Prescribed Fire* is recommended to maintain diverse grasslands and rejuvenate shrublands that have become too dense to allow sufficient herbaceous groundcover; *Drum-chopping* and *Chaining* also can be used to rejuvenate shrublands; it is important these practices occur during the inactive season to minimize negative effects on snakes

**Wildlife Damage Management:** it may be necessary to remove western diamond-backed rattlesnakes from around human dwellings; debris piles attract prey, and thus snakes, making it desirable to keep such debris away from houses and buildings

**Wildlife or Fish Survey:** transect surveys are used to estimate population trends

