Bronze Frog

Rana clamitans clamitans

PHOTO BY TERRY HIBBITTS

Named for its body color, the bronze frog is a secretive species, hiding under vegetation near ponds, creeks and rivers. It may be difficult to find until warm, humid evenings when its mating call is heard.

NORTHERN PINEYWOODS

Bronze Frog

Rana clamitans clamitans

APPEARANCE

Length: 2 to 4 inches (5.4 to10.2 cm)

Distinguishing Characteristics

- Bronze to brownish body
- White belly with dark, irregular blotches
- Bright green upper lip and nose
- Males may have yellowish throats.
- Smooth skinned, like all true frogs
- Long hind legs with webbed toes
- Fold of skin, called a lateral line, begins behind the eye runs two-thirds the length of body.
- *Tympanum* (ear disc) is larger in males.

LIFE HISTORY

Range: Southeastern portion of the United States, from North Carolina to the eastern third of Texas

Diet: Small frogs, worms, insects, and other small invertebrates

Predators: Birds, fish and small *carnivores* (meat eaters)

Sexual maturity: First full summer after metamorphosis

Breeding season: Early spring through summer

Eggs: 2,000 to 4,000 eggs in small masses attached to underwater vegetation. Eggs are 1.5 mm when laid, but grow to 6 mm as cells divide.

Incubation: 1 to 2 weeks

Young: Tadpoles are green with small, dark spots. They grow 1 to 1.5 inches (28 to 33 mm) before they *metamorphose* (change from tadpoles to frogs).

Life span: 7 to 10 years

HABITAT

Bronze frogs prefer shallow streams, ponds, marshes, springs, and swamps with plenty of vegetation.

BEHAVIOR

Bronze frogs are nocturnal and solitary. They remain under cover, in logs and crevices, most of the time. Male bronze frogs court females with a distinct call. Researchers agree that the love song of the bronze frog sounds like someone plucking a loose banjo string. In fact, another common name for the bronze frog is the "banjo frog."

NOW YOU KNOW!

- *Rana* is the Latin word for "frog." *Clamitans*, the species and subspecies name, means "noisy" and refers to the call of the male.
- The bronze frog is a member of the true frog family, the Ranidae family.
- The moist, permeable skin of the bronze frog (like other frog species) makes it very sensitive to pollution, a good indicator of water quality for people.

BRONZE FROGS AND PEOPLE

There is concern about the decline in amphibian populations worldwide, although there is not enough information about most amphibians (bronze frogs included) in Texas to determine whether there is cause for concern here. Worldwide, scientists are investigating a number of possible causes for amphibian decline: acid rain, herbicides, insecticides, fertilizers, industrial waste, habitat destruction, introduced species, bacteria, ozone depletion and global warming. It could be a combination of any or several of these suspected causes. In Texas, citizens can join Texas Amphibian Watch to help scientists keep an eye on the health of Texas amphibian populations.
www.tpwd.state.tx.us/nature or call 512-912-7011

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Bald Cypress

Taxodium distichum

Bald cypress trees add grace and beauty to many of Texas' most cherished waterways. A member of the Redwood family, they are among the first trees in Texas to loose their leaves in the fall (hence the name "*bald* cypress") and the last to bud in the spring.

NORTHERN PINEYWOODS

Bald Cypress

Taxodium distichum

APPEARANCE

Height: Up to 120 feet (15.2 to 36.6m)

Distinguishing Characteristics

- Needle-like leaves grow individually from the twig.
- Leaves are soft and feathery in appearance.
- Dull light green above, whitish underneath
- Cone-shaped "knees" project from submerged roots.
- Is a *deciduous* (looses its leaves in fall) *conifer* (cone bearing tree)
- Brown or gray bark with long fiber-like or scaly ridges that peel off in strips
- Cones are made up of several four-angled, flattened scales.
- Limbs are often draped with Spanish moss (*Tillandsia usneoides*).

LIFE HISTORY

Range: Eastern states and west as far as central Texas

Flowers: Flower buds appear in late December or early January and bloom in March and April. Pollen is shed, or released, when the flowers bloom.

Fruit: Seeds are produced inside the female cone. The cones ripen from October to December, changing from green to brownish purple, before dropping from parent tree.

Seeds: Cones can contain anywhere from two to 34 seeds, but generally average 16. Sprouts can form from the cut trunk of bald cypress trees as old as 60 years.

Life span: Most live up to 600 years, but some individuals have survived 1,200 years.

HABITAT

Bald cypress are most abundant in wet, swampy soils of floodplain lakes and along *riparian* (streamside) corridors.

BALD CYPRESS AND THE ENVIRONMENT

- Wild turkey, wood ducks, evening grosbeak and squirrels eat the seeds.
- Branches provide nesting places for bald eagles and osprey.
- Rotting knees are used as nesting cavities by warblers.
- Catfish spawn beneath cypress logs.
- Bald cypress diffuse and slow floodwaters, reducing flood damage. They also trap sediments and pollutants.

BALD CYPRESS AND PEOPLE

The bald cypress is known by other names in parts of its range – Gulf cypress, red cypress, southern cypress, swamp cypress, white cypress and yellow cypress. *Taxodium* is Greek for "yew-like," which refers to a family of generally small trees prized for hard wood. The species name, *distichum*, means "two-ranked" and refers to the two rows in which the leaves grow. Cypress is also called the "wood eternal" because the heartwood is resistant to decay. Bald cypress is used for heavy construction, including docks, warehouses, boats and bridges, and was heavily logged in much of Texas.

The Choctaw Indians used the bark for string and rope. The Seminoles found bald cypress useful for making houses, canoes, and ceremonial objects.

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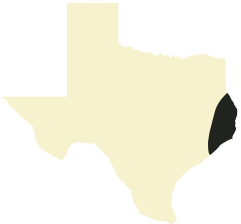
Flier

Centrarchus macropterus

PHOTO BY KONRAD SCHMIDT

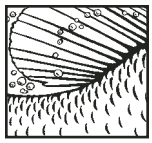


Fliers live in the quiet, acidic and dark-stained waters of East Texas. These little sunfish can put up a great fight when caught on an angler's line.

NORTHERN PINEYWOODS

Flier

Centrarchus macropterus



APPEARANCE

Length: 5 inches (12.7 cm), but can grow to 7 inches (17.8 cm)
Weight: 3 ounces (85g)

Distinguishing Characteristics

- Olive-green back
- Greenish-yellow to cream-colored sides with several rows of brown spots
- Dark streak below each eye
- Deep, round body
- Wing-like fins, hence the common name "flier"
- *Anal fin* (underside of fish in front of tail fin) almost equal in size to *dorsal* (back) fin

HABITAT

Fliers prefer clear, acidic waters such as swamp ponds, sloughs, oxbows, slow-moving creeks and steams, with heavy vegetation and an average water temperature of 75º to 85º F (23º to 29º C).

BEHAVIOR

Males guard eggs and newly hatched fry from intruders. When frightened or alarmed, fliers seek refuge in aquatic vegetation, submerged tree roots or mats of floating vegetation. This reaction is part of what makes them such fighters, and why anglers sometimes like to fish for them.

LIFE HISTORY

Range: Southeastern United States and extreme East Texas
Diet: Insects, snails, worms, leeches, small fish and phytoplankton
Predators: Larger fish, turtles, snakes and wading birds
Sexual maturity: At one year
Spawning season: In March, when water temperatures reach 62º to 68º F (16º to 20º C)
Nests: Males construct disc-shaped nests by fanning their tails and removing silt and debris from nest sites.
Eggs: 20,000 to 35,000 eggs
Young: Males guard the nest until the young hatch. Juvenile fliers have a large dark spot encircled in orange on the soft rays of the dorsal fin. The spot vanishes with age.
Life span: Up to five years

NOW YOU KNOW!

- Fliers are sometimes confused with black crappie because the size and shapes of small crappie are similar.
- The flier is one of 174 freshwater fish species in Texas and one of 18 species of sunfish.

FLIERS AND PEOPLE

Some people like to fish for fliers because their meat is sweet and good to eat while others like to keep fliers in large aquariums because of their beauty. It is speculated that fliers have been accidentally introduced into small lakes and ponds outside their native habitat when people release them from aquariums. Generally this is not a good practice, however scientists are watching to see how these fish compete with native fish for available resources. In time, they will determine whether or not introduced fliers will cause problems in their new habitats.

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Common Green Darner

Anax junius

Dragonflies haven't changed much over the last 300 million years. Today they are one of the most easily recognized of all insects. The common green darner is the largest, most abundant and widespread dragonfly species in North America.

NORTHERN PINEYWOODS

Common Green Darner

Anax junius

APPEARANCE

Length: 3 inches (7.6cm)
Wingspan: 4.5 inches (11.4cm)

Distinguishing Characteristics

- Green head and thorax
- Abdomen is yellow and brown on females; long, slender and bluish on males
- Large compound eyes
- Strong jaws
- Spiny legs
- Wings clear with yellowish tint toward tips and strongly veined with net-like pattern

LIFE HISTORY

Range: North America, the West Indies and South America

Diet: Larvae eat fish eggs, tadpoles and other small aquatic animals. Adults eat wasps, butterflies, mosquitoes and other flying insects (including other dragonflies).

Predators: Larvae are eaten by fish, turtles, frogs and wading birds. Adults are eaten by birds, fish and frogs.

Sexual maturity: Two to three months after emerging as adult dragonflies

Eggs: Laid one at a time in aquatic vegetation

Incubation: The eggs hatch in the spring.

Young: During the larval stages, generally lasting two to three years, the *nymphs* (aquatic larvae) pass through 11 to 12 larval stages before metamorphosing into dragonflies. Once they emerge as adults, they immediately begin the cycle again.

Life span: A few years in larval form, only four to seven weeks as adults

HABITAT

Common green darners prefer permanent and temporary ponds, lakes, bays, estuaries and slow-moving streams and *riparian areas* (land adjacent to a body of water).

BEHAVIOR

During the reproductive stage, the common green darner seeks fresh water ponds. Males return first, then females who have already developed a batch of eggs. If the female is receptive, mating begins. They often mate in flight. Immediately after mating, common green darner females lay their eggs, one at a time, in tiny slits in submerged aquatic plants. Males work hard to protect their territories. Some have been clocked chasing intruders away at 35 miles per hour. Common green darners are one of the few dragonflies that migrate in the spring and fall. Scientists believe that they migrate with seasonal warm fronts.

NOW YOU KNOW!

- Most of a dragonfly's brain is dedicated to processing and responding to what they see. Their complex eyes provide nearly 360-degree vision.
- Dragonflies can hover like a helicopter.
- They can exchange oxygen through specially adapted anal chambers.

COMMON GREEN DARNERS AND PEOPLE

Common green darners are called "mosquito hawks" because they eat mosquitoes, providing an important service to humans. As an animal that lives in both freshwater and *terrestrial* (land) habitats, having healthy green darner populations indicates a balanced and healthy ecosystem.

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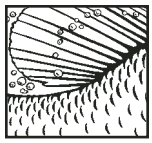
Flathead Catfish

Pylodictis olivaris

As the common name suggests, this catfish has a flat head, but other than that, it looks like any other catfish: it has smooth, scaleless skin, whisker-like ***barbels*** around the mouth, and long, sharp spines on the ***dorsal*** (back) fin and one on each side of the ***pectoral*** (shoulder) fin.

Flathead Catfish

Pylodictis olivaris



APPEARANCE

Length: 3 to 4 feet (0.9 to 1.2 m)
Weight: Can exceed 100 pounds (45 kg)

Distinguishing Characteristics

- Olive-yellow to light brown body sometimes marked with dark specks or blotches
- Belly is paler than the body.
- Large mouth with protruding lower jaw
- Eight barbels surround the mouth – four below the mouth, two above the mouth and one on each side of the mouth.
- Square *caudal* (tail) fin

LIFE HISTORY

Range: From the lower Great Lakes through the Mississippi River watershed to the Gulf states

Diet: Young feed mostly on invertebrates such as worms, insects and crayfish. When 10 inches or larger, their diet consists entirely of fish–shad, carp, suckers, sunfish, largemouth bass and other catfish (including their own kind).

Predators: Alligators, water snakes, turtles, larger fish, and humans

Sexual maturity: Between the third and sixth year

Spawning season: Late May through August when the water temperature is between 75º and 80º F

Nests: Males select hollow logs, caves or areas beneath the banks for their nest sites. Males may even improve their selected sites by creating shallow depressions for the females to lay their eggs.

Eggs: Number varies greatly depending on female size, but average is up to 100,000 eggs at a time.

Incubation: Four to six days

Young: The *fry* (very young fish) will school together at the nest for several days after hatching; afterwards they will seek shelter beneath rocks, roots and other cover and begin their independent lives.

Life span: Average is 12 to 14 years, but one recorded flathead catfish lived 24 years.

HABITAT

Flathead catfish prefer deep pools of streams, rivers, canals, lakes and reservoirs, where the water is *turbid* (cloudy) and the currents are slow.

BEHAVIOR

Adults are usually solitary, each staking out a favorite spot under a tree or in a cove, in deep water. At night, they move into shallow areas to feed. Males defend their nest and eggs aggressively. They will fan the nest with their tails to keep the eggs clean and provide them with oxygenated water. If females have been eating poorly, their bodies may conserve resources by not releasing eggs. Poor overall health and certain environmental conditions such as drought or flood can reduce flatheads' ability to spawn. In healthy times, clutches can reach 100,000 eggs, but only a small number will survive.

NOW YOU KNOW!

- Catfish have long, sharp spines on the front edges of their dorsal fins that are connected to venomous glands. Although the spines can tear skin, the glands excrete venom. The venom is irritating and some people have had serious problems with infection afterward. (If you are "stung" by a catfish and are worried about it, please call your doctor.)
- Scientists estimate that a female will lay 1200 eggs for every pound she weighs. A female flathead that weights 50 pounds might release 60,000 eggs at a time.
- *Pylodicitis* is Greek for "mud fish." *Olivaris* is Latin for "olive-colored." Flathead catfish are known by other names as well–yellow cat, opelousa cat, pied cat and Mississippi cat.
- Unlike other catfish which are scavengers, flatheads prey only on live fish.

FLATHEAD CATFISH AND PEOPLE

In size, flatheads are the second largest sport fish in Texas after their cousin, the blue catfish. Among those who selectively fish for catfish, flatheads fall just behind channel catfish as a prized species. Because of their popularity with anglers, they have been introduced in many other states where they have adapted well. In some cases, however, they have out-competed the native fish species, causing those native fish populations to decline sharply, disrupting some natural ecological processes.

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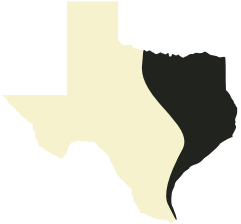
Louisiana Milk Snake

Lampropeltis triangulum amaura

PHOTO BY TERRY HIBBITTS



The Louisiana milk snake is one of four coral snake-pretenders in Texas. Although non-venomous, Louisiana milk snakes look like highly venomous coral snakes—they both have bands of black, red, and yellow.

NORTHERN PINEYWOODS

Louisiana Milk Snake

Lampropeltis triangulum amaura

APPEARANCE

Length: 16 to 24 inches (40 to 69 cm)

Distinguishing Characteristics

- Alternating bands, in order, of black-red-black-yellow-black. The red bands are solidly colored and are wider than the yellow or black bands.
- Black head is slightly pointed.
- Scales are shiny.

LIFE HISTORY

Range:	Southwest Arkansas to southeast Oklahoma and south through Louisiana and Texas
Diet:	Small snakes, small lizards and newborn mice
Predators:	Other snakes, bullfrogs, hawks and owls, skunks, raccoons and other mammals
Sexual maturity:	At two to three years
Mating season:	Spring
Eggs:	Two to 16, with an average clutch of nine
Nests:	From early June through mid-July, the female lays her eggs inside a rotting log, beneath piles of plant material or in sandy, well-drained soil.
Incubation:	62 days
Young:	5.5 to 8 inches (14 to 20 cm) and are patterned and colored like their parents
Life span:	One specimen lived for 20 years and 7 months in captivity; the life span is shorter in the wild.

HABITAT

Louisiana milk snakes prefer moist, sandy, low-lying wooded areas or beneath driftwood and other cover on the Gulf Coast barrier islands.

BEHAVIOR

Milk snakes are secretive burrowers, hiding by day in loose, sandy soil, beneath objects on the ground or under the bark of tree trunks or logs. They are *nocturnal*, or move above ground at night. The snakes' coloring camouflages them particularly well at night. Because they are cool-weather reptiles, they suffer less from chilly temperatures. Unlike other snakes that become lethargic at night and during the cool days of spring and fall, Louisiana milk snakes move quickly and easily in cool temperatures.

NOW YOU KNOW!

- It is important to know the difference between Louisiana milk snakes and coral snakes. Coral snakes have red bands bordered by yellow; milk snakes have red bands bordered by black. It might be easier to remember this rhyme: ***Red to yellow, kill a fellow; Red to black, friend of Jack.***
- It was once believed that milk snakes mimicked, or looked like, coral snakes to avoid predators. But most snake-eating mammals are colorblind and many predatory birds can probably see color. The best explanation is that the body rings serve to break up or disguise the body shape of the snake.

LOUISIANA MILK SNAKES AND PEOPLE

In the old days, farmers often believed that milk snakes were responsible for cows drying up. They thought that these snakes would sneak into the barns under the cover of darkness and suckle the cows dry. The discovery of a snake in the barn the following day led to the farmer's "logical" conclusion: the snake was the guilty party. But, of course, snakes don't drink cow's milk. They eat small reptiles and mammals. Besides, snakes have teeth. Just imagine the cow's reaction to a snake biting her udder! The commotion would surely have alerted the farmer to the problem.

In reality, Louisiana milk snakes are members of the king snake family, and as such, they seldom bite, although they may nip. Generally speaking, you should never disturb snakes in the wild, especially if you are unsure whether the snake in front of you is a coral snake or a Louisiana milk snake.

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Largemouth Bass

Micropterus salmoides

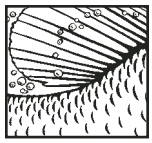
TPWD PHOTO

Two subspecies of largemouth bass exist in Texas: the native ***Micropterus salmoides salmoides*** and the Florida largemouth bass, ***Micropterus salmoides floridanus***, which has been introduced into many Texas lakes.

NORTHERN PINEYWOODS

Largemouth Bass

Micropterus salmoides



APPEARANCE

Length: Adult average around 14 inches (35.5 cm)
Weight: Adult average around 4 or 5 pounds (2.3 kg)

Distinguishing Characteristics

- Greenish with dark blotches forming a horizontal stripe along the middle of the fish on either side
- Underside ranges in color from light green to almost white.
- Nearly divided dorsal fin with the anterior portion containing nine spines and the posterior portion containing 12 to13 soft rays
- Upper jaw reaches far beyond the rear margin of the eye.

LIFE HISTORY

Range: Native to the mid-west and southeast United States and north central Mexico, including many rivers and lakes in Texas

Diet: *Fry* (young) feed primarily on zooplankton and insect larvae. Adults feed almost exclusively on other fish and large invertebrates such as crayfish.

Predators: Larger fish prey upon smaller bass. Except for humans, adult largemouth bass are the top predators in the aquatic ecosystem.

Sexual maturity: At two to three years

Spawning season: Between February and May, depending on location

Nests: Males build the nests in two to eight feet of water. They prefer to nest in quieter, more vegetated water than other black bass, but will use any substrate besides soft mud, including submerged logs.

Eggs: 2,000 to 43,000

Incubation: Five to ten days

Young: Fry remain in a group or "school" near the nest and under the male's watch for several days after hatching.

Life span: Average 16 years

HABITAT

Largemouth bass seek protective cover such as logs, rock ledges, vegetation, and man-made structures. They prefer clear quiet water, but will survive quite well in a variety of habitats.

BEHAVIOR

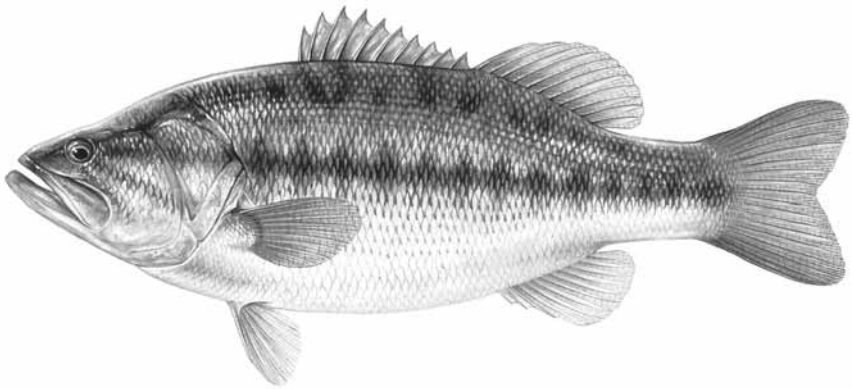
Immature largemouth bass may tend to congregate in schools, but adults are usually solitary. Sometimes several bass will gather in a very small area, but they do not interact. After breeding, males will chase the females away and guard the eggs and the fry himself. Largemouth bass hide among plants, roots or limbs to strike their prey.

NOW YOU KNOW!

- At about two inches in length, largemouth bass become active predators.
- Largemouth bass grow 4 to 6 inches (10 to 15 cm) during their first year, 8 to 12 inches (20 to 30 cm) in two years, 16 inches (40 cm) in three years.

LARGEMOUTH BASS AND PEOPLE

The largemouth bass is by far the most sought-after fish in Texas. Because of the strong interest in largemouth bass fishing, there are hundreds of bass angling clubs in Texas devoted to fishing and conservation. Bass fishing adds greatly to the Texas economy each year and largemouth bass are highly prized for their value as food. Because of the species' popularity, it has been introduced into many waters in which it did not originally occur. As with nearly all aquatic species, pollution and drought are the biggest threats to the largemouth bass population.



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Flowering Dogwood

Cornus florida

The beautiful white bloom of the dogwood is one of the first signs of spring in East Texas forests. While pretty to look at, the flowering dogwood provides food for many Pineywoods animals.

NORTHERN PINEYWOODS

Flowering Dogwood

Cornus florida

APPEARANCE

Height: 35 to 40 feet (10 to 12 m)

Distinguishing Characteristics

- Oval or ovate leaves, about 3 to 6 inches (7.6 to 15.2 cm) long and 1 to 3 inches (2.5 to 7.6 cm) wide
- Shrub or small, low-branched tree usually with a flat-topped crown
- Creamy-white flowers with 4 petals each and blooms in early spring
- Most often found growing in forested, shady areas under other hardwoods and pines.
- *Deciduous* (looses its leaves in fall)

LIFE HISTORY

Range: Eastern deciduous forests as far north as Maine, extending west to eastern Texas and Missouri

Flowers: Early spring

Fruit: Red fruits develop in fall. Mammals, from squirrels to deer, and at least 28 bird species, eat the fruit.

Seeds: Dispersed through animal droppings; germinate the following spring

Life span: Up to about 80 years

HABITAT

Flowering dogwood grows best in moist soils, but will grow in drier habitats. They like to grow in the shade of larger trees as understory plants.

FLOWERING DOGWOODS AND THE ENVIRONMENT

Flowering dogwood is seriously threatened by a powerful fungus, *Discula destructiva*, or dogwood anthracnose. This fungus is spreading rapidly throughout the range of dogwood. The disease, whose origin is unknown, kills trees within two to three years of initial infection. Trees in moist sites on lower slopes and bottomlands are most susceptible. Some scientists feel that the blight is so widespread that they hold little hope of saving flowering dogwood in the wild.

FLOWERING DOGWOODS AND PEOPLE

The common name, dogwood, comes from England. Years ago, people there used the bark of the bloodtwig dogwood (*Cornus sanguinea*) to bathe mangy dogs. On this continent, flowering dogwood has been used by Native Americans to make scarlet dyes and tinctures.

Although the fruits are poisonous to humans, in the late 1700s, colonists made a tea from dogwood bark to reduce fevers and soothe colds. The wood of the dogwood tree is used today to make small tools and ornaments. It has been under cultivation in North America since the 1730s.

Today, flowering dogwoods are popular landscaping trees. They are slow growing (often only a few centimeters per year in dense shade), resilient, and beautiful as an accent plant.

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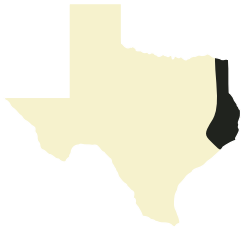
Rafinesque's Big-eared Bat

Plecotus rafinesquii

PHOTO BY
BAT CONSERVATION INTERNATIONAL



Rafinesque's big-eared bats are one of the least known bats in the southeastern United States. Like all bats, big-eared bats help make our lives more comfortable by eating millions of bugs, especially mosquitoes, every night. This bat uses its big ears and echolocation to help it find food.

N O R T H E R N P I N E Y W O O D S

Rafinesque's Big-eared Bat

Plecotus rafinesquii

APPEARANCE

Length: 4 inches (10 cm)
Wingspan: 11 inches (27 cm)

Distinguishing Characteristics

- Grayish-brown fur on the back
- Pale fur on the belly and breast
- Long hairs projecting beyond their toes
- Rabbit-like ears, about an inch-and-a-half long
- Two large glands on either side the nose

LIFE HISTORY

Range: Southern Indiana, Illinois, and Ohio through southeastern United States and from North Carolina west to Central Texas; most common in the coastal plain

Diet: Mostly moths, but mosquitoes, beetles and flies as well

Predators: Snakes, raccoons, opossums and cats

Sexual maturity: At nine months

Mating season: Fall

Young: Adult females have one pup each year, born in late May or early June. The pups are able to fly three weeks after birth. They shed their milk teeth by mid-July, and reach adult size in about three months.

Life span: Up to ten years in the wild for males and females

HABITAT

Rafinesque's big-eared bats roost in cave entrances, hollow trees, abandoned buildings and under bridges in the forests of southeastern United States.

BEHAVIOR

While other bat species are *crepuscular* (become active during twilight hours), Rafinesque's big-eared bats are *nocturnal* (become active when it is completely dark). Like others in the order Chioptera, these bats are *insectivores* (eat only insects). They also hibernate during the winter. When hibernating, the males and the females share sleeping quarters. During the late spring, however, pregnant females leave the males and non-reproductive females and establish nursery colonies to give birth and raise their young.

NOW YOU KNOW!

- You've probably heard the expression "blind as a bat." This mistaken idea is probably due to the fact that bats rely on *echolocation* to find prey. Bats listen for the echoes of high-frequency sound waves that they emit, bouncing off insects and other objects, to tell the size, shape and distance of the object. Echolocation helps them eat millions of insects every night.
- When Rafinesque's big-eared bats rest or hibernate, they coil their ears against their heads like rams' horns to reduce their ears' surface area and conserve body moisture. When disturbed, they unfold their ears.
- Biologists age bats by looking at the finger bones in their outstretched wings over a bright light. Juvenile bats' bones have clear spaces between the joints; adult bats have *ossified* joints; they have turned to bone.
- Rafinesque's big-eared bats are also known as southeastern big-eared bats, eastern big-eared bats, eastern lump-nosed bats and eastern long-eared bats. Their scientific name, *Plecotus*, is derived from the Greek words for "twist" and "ear."

RAFINESQUE'S BIG-EARED BATS AND PEOPLE

Because Rafinesque's big-eared bats feed on insects that can be harmful to agriculture, people should treasure this animal. However, their numbers seem to be declining and they have been listed as threatened since 1977. As people learn more about the role bats play in managing insect populations, perhaps they will understand the importance of protecting bat roosts.

Like all mammals, bats can contract rabies, but they are no more susceptible to the disease than raccoons, skunks or even dogs. Just like other animals, bats will bite if they feel threatened. If you find a bat on the ground (rabies immobilizes the animal sometimes), don't try to help it. Leave it alone and call a game warden. The warden will be able to take care of the animal appropriately.

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Pine Warbler

Dendroica pinus

PHOTO BY VIREO

Pine warblers remain almost entirely within pine forests, both during the breeding season and through the winter. It is the only bird in the forest with a bright yellow throat and white wing bars.

NORTHERN PINEYWOODS

Pine Warbler

Dendroica pinus

APPEARANCE

Length: 4.75 to 5.5 inches (12 to 14 cm)
Wingspan: 9 inches (22 cm)

Distinguishing Characteristics

- Olive-colored back and upper wings
- White wing bars
- Yellow throat and breast
- Small, active bird
- Thin, pointed bills

LIFE HISTORY

Range: Eastern United States, especially in pine forests, riparian areas and oak woodlands

Diet: Insects, fruits and seeds

Predators: Hawks and other birds of prey

Sexual maturity: At one year

Mating season: Mid-March through early June

Nests: Cup-shaped and made of bark strips, pine needles, twigs and other fine material 25 to 40 feet (7.5 to 12.5 m) above ground near the branch tips of pine trees

Eggs: Three to five eggs, white with brown spots

Incubation: About ten days

Young: The young are *altricial* (born with their eyes closed and bald), but they open their eyes, grow feathers and fledge all within about ten days of hatching.

Life span: Less than five years

HABITAT

Pine warblers prefer mature jack pine and pitch pine woodlands, mixed with hardwoods.

BEHAVIOR

Pine warblers spend most of their time in pine forests, overwintering in the southern United States with a relatively short migration in the spring to more northern states. However, some pine warblers are permanent Texas residents.

NOW YOU KNOW!

- The scientific name for this species describes its habitat: *dendron* (a tree); *oicos* (inhabitants); and *pinus* (a pine tree).
- Pine warblers are among the most abundant warblers in the forest, able to adapt to different types of food available at different times of year.
- Their more subdued coloring makes them more difficult to see than some of the more brightly colored warblers.

PINE WARBLERS AND PEOPLE

Although not endangered now, good forest management will insure that pine warblers will survive into the future. Pine warblers will need forests with groups of pine trees and hardwoods and minimal human disturbance.

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Northern Flicker

Colaptes auratus

PHOTO BY VIREO

The northern flicker is the only member of the woodpecker species with a brown-colored back. It is the only woodpecker that feeds on the ground.

NORTHERN PINEYWOODS

Northern Flicker

Colaptes auratus

APPEARANCE

Height: 12 to 13 inches (30 to 33 cm)
Wingspan: 18 to 21 inches (45 to 53 cm)

Distinguishing Characteristics

- Gray-brown back with dark spots and a red crescent at the nape of the neck
- Pale breast with black spots
- Crescent-shaped patch at the base of the throat
- White rump
- Yellow breast and undersides of their wings (but red in western populations)
- Downward curving bill
- White rump patch flashes as it flies, hence, "flicker."
- Feeds on the ground

LIFE HISTORY

Range: The "yellow-shafted flicker" (yellow under wings) migrates from Alaska to Nicaragua. In parts of Texas, they are year-round residents. The "red-shafted flicker" (red under wings) migrates shorter distances.

Diet: Ants and other insects, nuts, fruit and seeds

Predators: Raccoons, feral cats, hawks

Sexual maturity: One year

Mating season: February through July

Nests: Excavated in dead trees or dead portions of living trees, generally 6 to 20 feet (1.8 to 6 m) above the ground, but as high as 100 feet (30 m); entrance to the nest is 2.75 inches (7 cm) in diameter.

Eggs: Usually five to eight

Incubation: 11 to 16 days

Young: Young leave the nest about four weeks after hatching. Under ideal conditions, two broods may be raised in one season.

Life span: Up to 12 years

HABITAT

Flickers like woodlands, especially where dead or partially dead trees for nesting sites can be found. Northern flickers tend to avoid unbroken or dense forests, preferring to forage for food in open areas.

BEHAVIOR

Northern flickers are *diurnal* (most active during the daylight hours). Although diurnal, these birds tend to migrate at night, with weather determining both migration rates and departure dates. When mating, the males flash their bright bellies, breasts and rump patches, flap their wings, and swing their heads back and forth. Northern flickers will take advantage of an existing nest site or man-made nest boxes. Both parents contribute to nest construction and incubation.

NOW YOU KNOW!

- The genus name *Colaptes* is from the Greek word *colapt* and means "peck," which is, after all, what woodpeckers do best.
- The species, *auratus*, is from the Latin root *aurat*, meaning "gold" or "golden" and refers to its underwing.

NORTHERN FLICKERS AND PEOPLE

In the Civil War (1860-1865), Confederate soldiers from Alabama were called "Yellowhammers" because of the yellow cloth on their uniforms. It apparently reminded other soldiers of the underwings of "yellowhammers" or northern flickers.

Once common across much of the United States, northern flicker populations appear to be falling. Loss of suitable feeding and nesting sites due to logging and development are no doubt making an impact on this species. Northern flickers' fondness of ants has created another problem—a number of them have died after consuming ants contaminated with insecticides. One northern flicker's stomach contained almost 2,000 ants.

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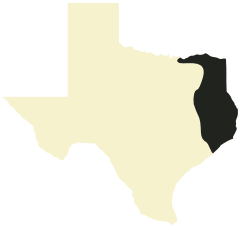
Marbled Salamander

Ambystoma opacum

PHOTO BY PAUL FREED



The marbled salamander is a lizard-like amphibian that is seldom seen by people. One reason is that they are *nocturnal* (active at night), and hide by day under vegetation and rotten logs. Like all amphibians, they require water to complete their life cycle, surviving dry times by burrowing deep into the soil.

NORTHERN PINEYWOODS

Marbled Salamander

Ambystoma opacum

APPEARANCE

Length: 4 to 5 inches (10 to 12.7 cm) head and body

Distinguishing Characteristics

- Dark gray to black or even deep purple above with a gray belly
- Light silver to white markings on back
- Stocky body with short, broad head
- Relatively short tail for a salamander – tail 40% total length
- Short legs with four toes on forelegs and five toes on hind legs

LIFE HISTORY

Range: Eastern half of the United States and throughout East Texas from Red River south to the Gulf of Mexico

Diet: Earthworms and small insects; during the larval stages they feed on zooplankton, but as they grow, they gradually begin to feed on small insects (including mosquitoes), tadpoles and other larvae.

Predators: Snakes, raccoons, ducks and wading birds

Mating season: Throughout fall

Nests: Shallow, dry depressions in pond or stream banks

Eggs: 50 to 200 eggs

Incubation: Eggs hatch as soon as they are covered with water, but may delay until spring if rainfall is insufficient to cover them.

Young: Larvae are about 0.75 inch (2 cm) long when hatched and *metamorphose* (change from larvae to adult) in four to six months.

Life span: Four years

HABITAT

Marbled salamanders prefer *riparian areas* (land adjacent to water) or swampy areas with slow moving water. They can usually be found under rotting logs and other vegetation.

BEHAVIOR

Male marbled salamanders breed near water. They emerge during winter rains and enter shallow pools to deposit sperm packets. The females arrive later, pick up the packets and fertilize their eggs internally, storing them until it is time to lay their *clutch* (group of eggs). The females select a point between the shallowest and deepest area of the ponds. Then they lay their eggs one at a time in a shallow depression under vegetation, encircling the eggs until the depression fills with water from spring rains. This behavior is called *brooding* the eggs.

NOW YOU KNOW!

- Young are generally brown to black with light spots or mottling *dorsally* (on top) and *laterally* (on sides). Marbled salamanders darken as they mature.
- There are 24 salamander species in Texas.
- Salamanders are often mistaken for lizards, but they have smooth or warty skin instead of scales and have no claws on their feet.

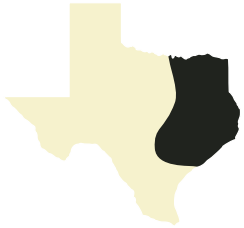
MARBLED SALAMANDERS AND PEOPLE

Worldwide, many amphibian populations are declining or have disappeared completely. There are many possible causes for this decline—acid rain, herbicides, insecticides, fertilizers, industrial waste, habitat destruction, introduced species, bacteria, ozone depletion, and global warming. Although the exact cause or combination of causes for decline is still a mystery, scientists are working to discover how to save the marbled salamander and other amphibians. People can help by recognizing and conserving salamander habitat where possible and by supporting the study of local and global environmental change.

PWD LF K0700-848L (2/03) NOTICE: Texas Parks and Wildlife Department receives federal financial assistance from the U.S. Fish and Wildlife Service. Under Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972, the U.S. Department of the Interior and its bureaus prohibit discrimination on the basis of race, color, national origin, age, disability or sex (in educational programs). If you believe that you have been discriminated against in any Texas Parks and Wildlife Department program, activity, or facility, or if you desire further information, please call or write: The U.S. Fish and Wildlife Service, Office for Diversity and Civil Rights Programs - External Programs, 4040 N. Fairfax Drive, Webb 300, Arlington, VA 22203, (703) 358-1724.

Spotted Gar

Lepisosteus oculatus

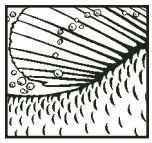


The spotted gar is one of three gar species native to Texas. Gar are long and cylindrical with elongated mouths. They are primitive fish and date back to the Cretaceous period, some 65 to 100 million years ago. The ancestors of spotted gar swam with the dinosaurs!

NORTHERN PINEYWOODS

Spotted Gar

Lepisosteus oculatus



APPEARANCE

Length: 3 feet (0.9 m)
Weight: 8 pounds (3.6 kg)

Distinguishing Characteristics

- Upper body brown to olive
- Silver-white sides
- Head, body, and fins have olive-brown to black spots that help camouflage the fish.
- Broad, dark stripe on the sides of immature fish
- Long, snout-like mouth lined with strong, sharp teeth
- Thick, *ganoid* (diamond-shaped) scales

LIFE HISTORY

Range: From central Texas east into western Florida; extends north through Mississippi River drainage into Illinois, lower Ohio River, and the Lake Erie drainage

Diet: Fry feed primarily on insect larvae and tiny crustaceans, but fish appear on the diet of young gar very early. Prey is usually swallowed headfirst.

Predators: Larger fish, alligators, herons, cottonmouth snakes

Sexual maturity: Males mature in two to three years. Females mature when three to four years old.

Spawning season: From April to May

Eggs: The number varies greatly, but up to about 20,000 green, adhesive eggs are attached to aquatic plants.

Incubation: Ten to 14 days

Young: Young gar have specialized pads on their upper jaws that allow them to adhere to vegetation. They remain attached to plants until they are about 0.75 inches (2cm) long. The pad is lost when last of the yolk sac is absorbed.

Life span: Up to 18 years

HABITAT

Spotted gar prefer quiet, vegetated waters of streams, swamps and lakes. They sometimes enter brackish waters along the Gulf Coast.

BEHAVIOR

Gar move slowly unless trying to catch food, which it grabs in its jaws in a quick sideways lunge. They often bask near the water's surface on warm days. They spawn in shallow water with low flow and heavy vegetation. Several males court a single larger female at the same time.

NOW YOU KNOW!

- Gar have a specialized swim bladder which allows them to gulp air and live in the poorly oxygenated back waters of Texas' streams, swamps and lakes.
- *Lepisosteus* is Greek and means "bony scale," referring to the large ganoid scales. *Oculatus* means "provided with eyes" in Latin and refers to the dark spots on head, body, and fins.
- The common name, *gar*, is rooted in the Anglo-Saxon language and means "spear."
- The *roe* (or egg mass) is highly toxic to humans, animals and birds.

SPOTTED GAR AND PEOPLE

A large gar can eat a lot of fish, including catfish, causing them to compete with some anglers. Because of the competition and because many people think gar are difficult to clean, gar are sometimes called a "trash" fish. This term may not be warranted when you consider that spotted gar, like all native species, have an important role to play in their ecosystem.

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Southern Leopard Frog

Rana sphenocephala

Southern leopard frogs are very adaptable and are comfortable in many habitats—they just need cover and moisture. These frogs are great jumpers, traveling high and far in just a few jumps.

NORTHERN PINEYWOODS

Southern Leopard Frog

Rana sphenocephala

APPEARANCE

Length: 2 to 3.5 inches (about 5 to 9 cm)

Distinguishing Characteristics

- Color varies from tan to several shades of brown to green.
- *Dorsum* (back) is usually covered with irregular dark brown spots between distinct light colored areas.
- Large dark spots on legs may create the effect of bands.
- Light line along upper jaw
- Light spot on *tympanum* (ear)
- Slender with narrow, pointed head
- Long hind legs and toes
- Males are smaller than females, but with enlarged forearms and thumbs and paired vocal sacs that look like balloons when inflated.

LIFE HISTORY

Range:	Eastern United States, from New Jersey east as far as Nebraska and Oklahoma and south into the eastern third of Texas
Diet:	Insects and small invertebrates
Predators:	Fish, raccoons, skunks and aquatic snakes
Sexual maturity:	First spring after hatching
Breeding:	In Texas, breeding takes place year round depending on temperature and moisture.
Eggs:	Several hundred eggs are laid in a cluster just below the water's surface.
Incubation:	Seven to ten days
Young:	Newly hatched tadpoles are only about 20 to 25 mm long. They grow to 65 to 70 mm before metamorphosing into frogs, generally between 60 to 90 days.
Life span:	3 years

HABITAT

Southern leopard frogs prefer shallow freshwater areas, but may be seen some distance from water if there is enough vegetation and moisture to provide protection. Southern leopard frogs are also able to live in brackish marshes along the coast.

BEHAVIOR

Southern leopard frogs elude predators by jumping into nearby water and swimming underwater for some distance, while the predator continues looking near the point of entry into the water. They are primarily nocturnal, hiding during the day in vegetation at the water's edge. During wet months, a leopard frog may wander some distance from water, but stays in moist vegetation. They will sometimes wander to colonize.

NOW YOU KNOW!

- The mating call is a series of abrupt, deep croaks, creating a guttural trill. The trill rate may be as many as 13 per second.
- Males call from shore or while floating in shallow water.
- A leopard frog's mottled coloration helps camouflage it.
- Southern leopard frogs are often used for teaching dissecting in science classes.

SOUTHERN LEOPARD FROGS AND PEOPLE

The name of the genus comes from the Latin *rana* (frog). The species name combines the Greek words *sphenos* (wedge-shaped) and *kephale* (head) to describe its triangular head. The mating calls of southern leopard frogs are a familiar background sound to many Texans living near ponds, streams and wetlands. To obtain a tape of the calls of frogs and toads of Texas, contact Texas Parks and Wildlife Department, Wildlife Diversity Branch, 512-912-7011.

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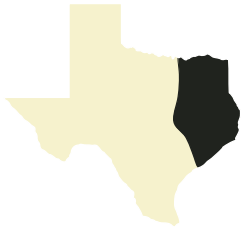
Southern Copperhead

Agkistrodon contortrix contortrix

TPWD PHOTO



Lying motionless on a bed of dead leaves, the pale-brown and chestnut-colored southern copperhead is all but invisible—a regular *stealth* viper! These are venomous snakes, but they are slow-movers, and depending on the season, they often share habitats with their prey.

NORTHERN PINEYWOODS

Southern Copperhead

Agkistrodon contortrix contortrix

APPEARANCE

Length: 24 to 26 inches (60 to 66 cm)

Distinguishing Characteristics

- Pale brown to light tan body, often with a pinkish tint
- Yellow eyes with elliptical or cat-like pupils
- Dark, hour glass-shaped cross bands, wider at their base and narrow across the back
- Heat-sensing "pits" located between the eyes and nostrils, hence the name "pit viper"
- Rough scales

LIFE HISTORY

Range: Eastern United States to central and southern states, and in the eastern third of Texas

Diet: Baby cottontails, swamp rabbits, rats, mice, birds, snakes, lizards, baby turtles, frogs, toads and insects, especially grasshoppers and cicadas

Predators: Other snakes and *raptors* (birds of prey)

Sexual maturity: Males within two years, females in three

Mating season: Spring (February to early May), shortly after leaving winter dens; and fall (August to October) with fertilization delayed until following spring

Eggs: Copperheads, like other pit vipers, do not lay eggs. Instead the eggs are kept inside the female's body until the eggs are ready to "hatch."

Incubation: 105 to 110 days

Young: The four to eight young, 7 to 10 inches (17 to 25 cm) long, weigh less than an ounce (28 g) at birth. Although duller in color, they look much like adults with yellowish tail-tips. (Tail-tips fade after third or fourth year.) Females provide no parental care after birth.

Life span: One animal lived 23 years and 2 months in captivity, but in the wild, the average is probably 6 to 8 years.

HABITAT

Southern copperheads prefer mixed pasture and wooded lowlands, usually within a river bottom, where leaf litter, logs and branches provide places to hide. They are sometimes present in wooded suburbs, adapting to the presence of humans.

BEHAVIOR

Southern copperheads are *diurnal* (active during daylight hours) during early spring and late fall, at which time they will generally depend on the ability of their bodies to blend in with their environment to obtain prey and avoid enemies. They are nocturnal during the summer heat, actively hunting for prey during the cooler evening hours. Southern copperheads often eat one single meal every three weeks—even during their most active months. Copperheads sometimes nest with other snake species during hibernation.

NOW YOU KNOW!

- Some people believe that the bite of a baby venomous snake is more powerful than that of an adult. Actually, there is no difference in the venom's potency, regardless of the age of the snake. Snake venom's most important function is to kill animals to be eaten. Defense is only a secondary function.
- Like all vipers, they use the "heat seeking pits" behind their eyes to help locate their prey.

SOUTHERN COPPERHEADS AND PEOPLE

The bite of a copperhead is seldom fatal because of its short fangs (1.2 to 7.2 mm in length) and small amount of venom. Taking some simple safety precautions, however, can keep you from harm. Be careful where you put your hands and feet—don't reach or step until you can see the bottom. Never step over a log without first seeing what is on the other side. If you must move a log, use a long stick or garden tool first to ensure snakes are neither under, on or around these favored habitats. Use a flashlight when moving about at night, even in your home yard. Animal burrows make excellent habitat for snakes—don't reach in without first checking. Wear protective clothing if working in areas where you suspect snakes nearby. Heavy footwear, snake proof trousers and/or leggings will help reduce your risk. Freeze when snakes are known to be nearby until you know where they are. Allow the snake to retreat. If you must move, back slowly and carefully away from the snake.

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Redfin Shiner

Lythrurus umbratilis

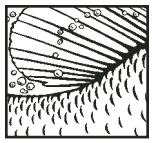
PHOTO BY KONRAD SCHMIDT

The redfin shiner is a member of the minnow family (Cyprinidae). Like other minnows, it is an important link in the food web of freshwater ecosystems, eating small insects and algae, then being eaten by larger fish, wading birds and turtles.

NORTHERN PINEYWOODS

Redfin Shiner

Lythrurus umbratilis



APPEARANCE

Length: 3.5 inches (8.9 cm) for average adult

Distinguishing Characteristics

- Light olive to steel blue body with silvery sides and an occasional reddish tint in breeding males
- Small dark spot at the base of the *dorsal* (back) fin
- Large eyes
- Blunt snout

LIFE HISTORY

Range:	Great Lakes and Mississippi River basins, west New York to Minnesota and south to Louisiana and the Gulf drainages west to the San Jacinto River in Texas
Diet:	Aquatic and terrestrial insects and other small animal life, occasionally algae and other plants
Predators:	Larger fish, wading birds and humans
Sexual maturity:	Between the second and third summer
Spawning season:	Late April through August
Nesting:	Use nests previously used by sunfish
Eggs:	Data not available
Incubation:	Data not available
Life span:	Up to 3 years

HABITAT

Redfin shiners prefer pools and streams with sand and gravel bottoms and some vegetation.

BEHAVIOR

Redfin shiners congregate in large schools near the water's surface. They are attracted to sunfish nests and are stimulated to spawn by the scent of fluids released from the sunfish during spawning. A male redfin shiner will defend territory above a sunfish nest until a female redfin comes along, then spawning occurs.

NOW YOU KNOW!

- Redfin shiners can survive in water that is somewhat *turbid* (laden with silt) except during the breeding season, when clear water is needed.
- The term "minnow" is often used for any small fish, however, only members of the family "Cyprinidae" are true minnows.
- Members of the Cyprinidae family include fish with common names such as minnow, shiner, chub, dace and stoneroller.
- Goldfish and carp, both native to Asia, are also members of this family.
- Texas has 56 native species in the Cyprinidae family, while North America as a whole has 231 species.

REDFIN SHINERS AND PEOPLE

People often use redfin shiners as bait to catch sportfish such as crappie and bass. They can also be used as a freshwater aquarium fish.

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Red-shouldered Hawk

Buteo lineatus

Red-shouldered hawks are medium-sized raptors with sharp eyes, broad strong wings and long legs. They are effective hunters, helping to maintain a balance of predators and prey in woodland and grassland areas.

NORTHERN PINEYWOODS

Red-shouldered Hawk

Buteo lineatus

APPEARANCE

Length: 17 to 24 inches (43 to 61 cm)
Females are slightly larger than males.
Wingspan: 36 to 40 inches (91 to 101 cm)

Distinguishing Characteristics

- Reddish shoulders, rust-colored breast with white and dark streaks
- Long, narrow and blackish-brown wings with black and white stripes on the undersides
- Long tails with narrow black and white bands and white tips
- Translucent "window" patch on each wing at base of primary feathers

LIFE HISTORY

Range:	Southeastern Canada and eastern United States south to central Mexico. Some are permanent residents in the eastern third of Texas.
Diet:	Rabbits, rodents and other small mammals, as well as small birds, snakes, lizards, frogs, fish, insects and crayfish
Predators:	Nest-raiding birds, snakes and mammals; humans
Mating season:	Late January to June, peaking in March and early April
Nests:	Cup-shaped and made of sticks, lined with dried leaves, strips of bark, Spanish moss, lichens, feathers and down; generally built between 20 and 60 feet (6 to 18 m) above ground
Eggs:	Two or three (occasionally one to six), white eggs marked with brown or yellowish-brown blotches
Incubation:	28 to 33 days
Chicks:	*Altricial* (born blind and helpless), but leave the nest after 39 to 45 days
Life span:	One banded specimen lived almost 20 years.

HABITAT

Red-shouldered hawks prefer moist woodlands, such a bottomland hardwood forests or deciduous or mixed forests bordering lakes, streams or other wetlands.

BEHAVIOR

Red-shouldered hawks are *diurnal* (active during the day) and rest at night. They watch for prey from low perches 6 to 15 feet (2 to 4.5 m) above the ground or by soaring above fields and meadows near wooded areas. Perch sites are generally found in trees, but may also include utility poles, fence posts and hay bales. Once prey is spotted, the hawks drop directly onto it from above. The red-shouldered hawk hunts by sight and smell, but not by hearing. Nesting and hunting territories are usually 0.25 to 1 mile (0.4 to 1.61 km) in size. The birds aggressively defend these areas during the spring when eggs are in the nest. The females incubate the eggs while the males hunt for them. Once the eggs have hatched, both parents hunt. The females are larger and hunt slower prey. The males are smaller and more agile, hunting smaller and faster prey.

NOW YOU KNOW!

- The hawk's eyes are situated to look forward. They have binocular vision, which helps them measure depth and distance—and makes the bird a precise hunter.
- Because of their wing structures, red-shouldered hawks can soar for extended periods without tiring.
- Their call is a repeated *kee-yeer*. Red-shouldered and other hawks are often used to lip-sync the cry of bald eagles in the movies and on television because their calls are more distinctive than the eagle's call.

RED-SHOULDERED HAWKS AND PEOPLE

Federal law protects all hawks and other birds of prey, which include eagles, osprey, falcons, owls and vultures. It is illegal to harm or kill them or to own any parts of their bodies, such as talons (claws), feathers or nests. Nonetheless, humans often target hawks as potential predators of chickens and other domestic fowl.

Before its use was outlawed in the United States, red-shouldered hawks and other raptors suffered from exposure to DDT, a pesticide. The DDT would cause their eggs to have thin, breakable shells, reducing their ability to reproduce. Accidental encounters with power lines and automobiles also take a toll on hawks. In spite of these dangers, habitat loss remains the biggest threat to red-shouldered hawks.

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Yellow-billed Cuckoo

Coccyzus americanus

TPWD PHOTO

This shy, slender bird gets its name from the soft *coo-coo-coo-coo* call of the male seeking mates. In some places, it is called the "rain crow" or the "storm crow" because it begins calling right before the summer rains begin.

NORTHERN PINEYWOODS

Yellow-billed Cuckoo

Coccyzus americanus

APPEARANCE

Length: 10.5 to 12.5 inches (26 to 32 cm)
Wingspan: 17 inches (43 cm)

Distinguishing Characteristics

- Lower *mandible* (bill) is yellow
- Black upper bill that curves slightly downward
- Head, neck, back and upper wings brown
- Chin, breast and belly white
- Two columns of large white spots on the under side of the tail
- Long, slender tail
- Two toes point forward, the other two point backward.

LIFE HISTORY

Range: North, Central and South America; migrates to North America throughout the summer months, but winters in South America; in Texas from April through November

Diet: Insects (especially hairy caterpillars and cicadas) bird eggs, snails, small frogs, lizards, berries and some fruit

Predators: Egg predators such as raccoons and jays; fledglings sometimes eaten by raptors

Sexual maturity: Spring

Mating season: Mid-April through mid-September, peaking in May

Nests: Saucer-shaped and flimsy, nests are made of twigs and lined with roots and dried leaves, 4 to 8 feet (1 to 2.5 m) above the ground.

Eggs: Two to four light blue eggs, about 1.2 inches (31mm) long

Incubation: Nine to 11 days

Chicks: The chicks are *altricial* (they hatch helpless, blind, and featherless). Within a week of hatching, the chicks can climb into branches and within three weeks, they can fly.

HABITAT

Yellow-billed cuckoos prefer open woodlands with dense undergrowth, overgrown orchards and pastures, moist thickets and willow groves along stream banks.

BEHAVIOR

Because they spend winters in mature tropical forests in South America, they are one of the last migratory bird species to arrive in North America. They arrive so late that they have little time to build a nest, select a mate, lay eggs and raise their young. Cuckoos mate with one partner a year. The male courts the female by offering her sticks and other nest building materials. If the female seems receptive, the male will land on her shoulders and place a piece of food in her mouth. Egg laying is timed to occur when caterpillars and other invertebrate prey are most abundant. If food is abundant, the cuckoos will lay more eggs, and they will sometimes use other birds' nests. This is called "nest parasitism." The male takes care of the first fledgling and the female cares for the rest.

NOW YOU KNOW!

- The bellow-billed cuckoo's closest relative is the roadrunner.
- Feathers account for almost half of the yellow-billed cuckoo's body weight.
- *Coccyz* is Greek for a "cuckoo" and *americanus* is the Latin form meaning "of America." Its scientific name means "cuckoo of America."

YELLOW-BILLED CUCKOOS AND PEOPLE

Some destruction of both its breeding grounds in North America and its wintering habitat in South America is limiting the yellow-billed cuckoo. Each year, it has fewer safe places to raise young and to rest and rebuild energy for the long migration to and from its breeding grounds. Few species can survive this double threat. Planting willow and cottonwood saplings, increasing woodland density, could revitalize feeding and nesting sites of the yellow-billed cuckoo.

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White-tailed Deer

Odocoileus virginianus

By the late 1930s, deer populations in many areas of the Pineywoods had disappeared, with remnant herds in a few remote bottomlands. Now, because of deer-stocking, enforcement of game laws and good habitat management on private lands, the population has rebounded.

NORTHERN PINEYWOODS

White-tailed Deer

Odocoileus virginianus

APPEARANCE

Height: 32 inches to 36 inches (81.4 cm to 91.4 cm) at the shoulder
Weight: Females: 80 to140 pounds (36 to 63 kg)
Males: 100 to 250 pounds (45.3 to 112.5 kg)

Distinguishing Characteristics

- Small to medium-sized deer; size somewhat dependent on availability of food
- Gray-brown with a reddish cast in the summer for both male and female
- Fawns have white spots on their backs and sides to help camouflage them.
- Underside of the tail is white.
- Four toes that are "fused" or modified into a hoof creating a two-toed hoof print

LIFE HISTORY

Range:	Most of the United States, except in the Southwest, Alaska and Hawaii
Diet:	Acorns, pecans, western persimmons, live oak twigs and leaves, yaupon, some types of grasses and various flowering plants
Predators:	Coyotes, mountain lions, bobcats and uncontrolled dogs
Sexual maturity:	About 2 years old
Mating season:	September through December
Gestation:	6.5 to 7 months
Number of young:	The first baby is usually a single fawn. After that, most does tend to have twins. About 60% of a deer's body growth takes place the first year of its life. Long bone growth is complete at about 3 years of age.
Life span:	Average life span of males is about 6 years. Females live about 8 years. The record white-tailed deer was a doe in Georgia that lived 22 years.

HABITAT

White-tailed deer are found in the deep woods and river bottoms of East Texas, the live oak and cedar thickets of Central Texas, the brushy canyons of west and north-central Texas, and the mesquite thickets and rangelands of South Texas. Deer require cover for safety from predators as well as open areas for browsing.

BEHAVIOR

White-tailed deer do not migrate, but will remain in an area about 1 square kilometer in size year round. When threatened, deer will often remain motionless or will quickly escape if necessary. Deer hold up their tails like a flag, showing the white underside when frightened. They are very quiet animals, except when bucks call to does during the mating season and when does call to their fawns.

NOW YOU KNOW!

- Male deer begin growing their first set of antlers at about one year of age. When antlers first appear in spring, they are covered with a soft fuzzy skin called velvet that protects the growing bone and is rubbed off by the deer when the growth is complete. They will grow a new set of antlers yearly. With proper nutrition, antlers will get larger each year until about 6 years of age.
- It is impossible to tell the age of deer by the size of their antlers or the number of their points.
- White-tailed deer are *ruminants* (have four stomachs) and can pass food from one stomach to the next to get the maximum nutritional benefit from everything they eat.
- White-tailed deer can make vertical leaps of up to 8.5 feet (2.6 m)

WHITE-TAILED DEER AND PEOPLE

White-tailed deer have adapted to living close to human development and at times create traffic hazards in suburban neighborhoods. Some people like to feed deer and watch them browse in their yards, while others see them as pests who eat their shrubbery and flowers. By allowing, encouraging and regulating hunting of white-tailed deer, we are able to minimize the overpopulation of deer thereby preventing thousands of animals from starving and reducing hazards to humans.

White-tailed deer are North American's most popular and abundant game animal. Many ranchers in Texas lease out land to hunters during deer hunting season. Hunting helps ranchers manage the deer population and adds income to their ranch operation.

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Western Cottonmouth

Agkistrodon piscivorus leucostoma

TPWD PHOTO

The cottonmouth is a dark, stout, thick-bodied venomous snake. When frightened, the cottonmouth will pop its mouth open. The skin inside its mouth is bright white—and the reason it is called "cottonmouth."

NORTHERN PINEYWOODS

Western Cottonmouth

Agkistrodon piscivorus leucostoma

APPEARANCE

Length: Most adults average 30-42 inches (76-106.7 cm)

Distinguishing Characteristics

- Dark, grayish-brown with little or no markings; very old cottonmouths may be entirely black
- White skin inside their mouth
- Broad, flat head distinctly wider than neck
- Elliptical (cat-like) pupil. By day the pupil appears as a narrow slit; at night the pupil is wide and may even look round.

LIFE HISTORY

Range: Southern Illinois south to Alabama, west to Oklahoma and Central Texas

Diet: Frogs, fish, smaller snakes (including other cottonmouths), small water birds and small mammals, carrion and sometimes fish on stringers

Predators: Other snakes and humans

Sexual maturity: Females at three years; males at two years

Mating season: Spring

Eggs: Cottonmouths, like other pit vipers, do not lay eggs. Instead the eggs are kept inside the female's body until the eggs are ready to "hatch."

Incubation: Because fertilization and pregnancy are based on the female's physical condition, gestation periods vary from snake to snake and season to season. Cottonmouths are born from early August until early October.

Young: Females bear only three to 12 offspring per litter. Newborn cottonmouths are 6 to 11 inches (15.2 to 28 cm) long. They have brownish or reddish bodies with lines that are wide on the sides and narrow across the back. Cottonmouths are born with yellow or greenish-gray tail tips and come complete with functional fangs and a full supply of venom. DO NOT TOUCH a young cottonmouth!

Life span: Less than ten years

HABITAT

Western cottonmouths prefer lowland swamps, lakes, rivers, sloughs, irrigation ditches, rice fields and salt marshes, but are not confined to living in moist habitats.

BEHAVIOR

- When swimming, the cottonmouth holds its head above water with most of its body barely touching the surface.
- Cottonmouths are *nocturnal*, most active at night.
- The young wiggle their tails so that the tip appears to be a small worm. When small frogs and lizards see the wriggling tail, they think it's something to eat and rush forward to eat it, only to be eaten by the baby cottonmouth.
- Cottonmouths eat other snakes, including their own kind. The only time more than one cottonmouth would be in the same place at the same time is: 1) mating season, 2) female giving birth, or 3) one cottonmouth is eating another.

NOW YOU KNOW!

- Also called 'water moccasin," cottonmouths CAN bite underwater, but their prey is fish. If they could not bite underwater, they would starve.
- Cottonmouths avoid contact with humans or any other possible predator. (All those stories about swarming cottonmouths attacking people are myths!) But like any animal, when threatened, cottonmouths will attack to protect themselves.
- In some places, especially around woodland ponds, you can find western cottonmouths every few yards. Sometimes, you can smell their musky odor in the air.
- Heat sensors on either side of the snake's face detect heat and help the cottonmouth to find food.

WESTERN COTTONMOUTHS AND PEOPLE

Only 7% of all Texas snakebite cases involve cottonmouths. Throughout the United States, less than 1% of all deaths by snakebite have been caused by cottonmouths. While the odds make it seem unlikely to die from a cottonmouth bite, nonetheless, their venom can still cause severe bleeding and considerable damage to tissue. DO NOT TOUCH and if bitten, seek immediate medical attention!

As our population continues to grow, and wildlife habitat is developed, encounters with venomous snakes are going to occur. Many of these encounters occur around the home, with the result that incidents of bites close to home are statistically high. Keep wood and brush piles, trash dumps and livestock pens as far as possible from the residence. When working in these areas, exercise caution. Never put an arm or leg into something if you cannot see the bottom. Use a flashlight when moving about at night, even in your home yard. Animal burrows make excellent habitat for snakes—don't reach in without first checking.

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Warmouth

Lepomis gulosus

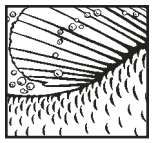
PHOTO BY KONRAD SCHMIDT

Warmouth are members of the sunfish family, which includes the largemouth bass. They are also known by more colorful local names such as redeye, goggle-eye, red-eyed bream, stump knocker, mudgapper, mo-mouth, morgan, molly, rock bass, open mouth, weed bass, wood bass, strawberry "perch" and mud bass.

NORTHERN PINEYWOODS

Warmouth

Lepomis gulosus



APPEARANCE

Length: 4 to10 inches (10.2 to 25 cm), but can grow to more than 12 inches (31 cm)
Weight: Up to 2.25 pounds (1 kg)

Distinguishing Characteristics

- Brownish back with pale sides marked with vertical bars, greenish yellow abdomen, and black spots mark the pelvic fin
- Three to five reddish-brown streaks radiate from eyes, and gill flaps are often red.
- "Ear flap" on gill cover is not extended
- Jaw extends to mid-point of eye
- Small patch of teeth on the tongue
- Three spines on the anal fin rays

LIFE HISTORY

Range:	Great Lakes and Mississippi River basins from western Pennsylvania to Minnesota, south to the Gulf of Mexico; Atlantic and Gulf drainages from the Rappahannock River in Virginia to the Rio Grande in Texas and New Mexico
Diet:	Young feed on zooplankton and small insects. Adults feed on insects, mollusks, and small fish.
Predators:	Larger fish, water snakes, turtles, and herons
Sexual maturity:	At 3 to 4 inches (7.5 to 10cm)
Spawning season:	In spring, when water temperatures reach 71° F (21.5° C), and continuing through the summer
Nests:	Males construct a disc-shaped nest by fanning their tails and removing silt and debris over nesting site. Nests are made in 1.5 to 4 feet (0.45 to 1.23 m) of water near a stump, clump of vegetation or other large, submerged object.
Eggs:	4,000-63,000 eggs
Incubation:	Three days
Young:	The fry leave the nest five to six days after hatching and grow to 1 to 2 inches (25.4 to 50.8 mm) by the fall.
Life span:	Not known

HABITAT

Warmouth prefer lakes, ponds, swamps and quiet areas of streams with muddy bottoms and vegetation.

BEHAVIOR

Warmouth are quite secretive. They seek cover in rocky banks, stumps or weeds, or near other large objects, where they can hide and wait for food. They are sight feeders. When in breeding condition, the males' eyes turn red. After the female lays her eggs, the male fertilizes the eggs and aggressively defends the nest, eggs and fry from any intruder—including other females.

NOW YOU KNOW!

- Warmouth *hybridize* (crossbreed) with bluegill and green sunfish.
- They can survive in polluted, low oxygenated waters where other sunfish cannot.
- Warmouth are often confused with rock bass. The difference between the two is in the anal fin: warmouth have three spines on the anal fin ray and rock bass have six spines.

WARMOUTH AND PEOPLE

Because warmouth hit hard and are easily caught, they are popular with some anglers. Their relatively small size keeps them from being more actively sought by most anglers.

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Timber Rattlesnake

Crotalus horridus

Timber rattlesnakes have wide heads and narrow necks—a typical distinction of all venomous snakes except coral snakes (*Micrurus fulvius*). Timber rattlers are the second largest venomous snake in Texas and third largest in the United States.

NORTHERN PINEYWOODS

Timber Rattlesnake

Crotalus horridus

APPEARANCE

Length: 36 to 40 inches (91 to 101 cm)
Weight: 1.3 to 2 pounds (0.58 to 0.9 kg)

Distinguishing Characteristics

- Heavy, light yellow, gray or greenish-white body
- Rust-colored strip along length of back
- Black tail tipped with rattles
- Yellow eyes with elliptical or cat-like pupils
- Marked with 20-29 dark, V-shaped crossbars with jagged edges across back

LIFE HISTORY

Range: Upland woods and rocky ridges in the eastern United States; the eastern third of Texas

Diet: Rabbits, squirrels, rats, mice and occasionally birds, other snakes, lizards and frogs

Predators: Coyotes, bobcats, skunks, foxes, hawks and owls and snake-eating snakes such as king snakes, indigo snakes and cottonmouths

Sexual maturity: At three years for males and up to four years for females

Mating season: In early spring; only once every two to three years for females

Eggs: Timber rattlers, like other pit vipers, do not lay eggs. Instead the eggs are kept inside the female's body until the eggs are ready to "hatch."

Incubation: Estimated six months

Young: Litters consist of between five and 20 young, which are 10 to17 inches long (25 to 43 cm). Young may remain near their mother for seven to ten days after birth, but no parental care is provided.

Life span: Up to ten years

HABITAT

Timber rattlesnakes prefer moist lowland forests and hilly woodlands or thickets near permanent water sources such as rivers, lakes, ponds, streams and swamps where tree stumps, logs and branches provide refuge.

BEHAVIOR

Although *diurnal* (active during the day) during spring and fall, timber rattlesnakes become *nocturnal* (active at night) during the oppressive heat of the summer. They will coil beside a fallen tree or log and wait for their quick-moving prey to pass. Pit vipers can develop an appetite for certain prey—some spend their lives eating only birds or chipmunks while others will eat a variety of foods. Their interest and appetite seems to be shaped by killing a particular prey early in life.

Highly venomous, timber rattlesnakes are sometimes slow to defend themselves and rely on their ability to blend into their surroundings to avoid confrontation. They seek to escape rather than risking danger and will remain silent, and if possible, will hide before revealing their position to a predator. Despite their large size and reputation, they are difficult to provoke into rattling or biting. Still, it does happen. It is best not to take any chances with such a potentially deadly snake. If one is bitten, seek immediate medical attention.

NOW YOU KNOW!

- According to legend, one can tell the age of a rattlesnake by the number of rattles present at the end of its tail. A baby rattlesnake is born with the first segment of its rattle, called a "button." As the snake grows (and with each molting of its outer skin) an additional segment is added to its rattle. Younger snakes shed more often than older snakes, but on average, free-ranging snakes may molt three to six times a year. Another clue to a snake's age is its color: timber rattlers darken as they age, and the darkest are old males.
- The scientific name, *Crotalus horridus*, is formed from two Latin words: *crotalum*, meaning "bell or rattle," and *horridus*, for "dreadful"–which makes reference to its venom.

TIMBER RATTLESNAKES AND PEOPLE

Although many timber rattlers meet their deaths at the hands of people or by automobiles, the fastest way to kill timber rattlesnake populations is by destroying or altering the places they need to hunt, hibernate and live. Today, every state inhabited by timber rattlesnakes has laws protecting the species, including Texas. In Texas, it is listed as a threatened species. This means that people cannot take, transport, have in their possession or sell timber rattlesnakes.

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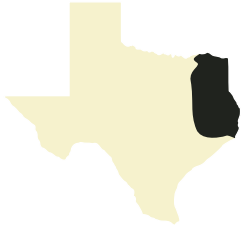
Sweetgum

Liquidambar styraciflua

PHOTO BY BRENT HOLUBEC



As one of the most common hardwoods in southern forests, sun-loving sweetgum provides shade for smaller understory plants and animals, while its leaves provide brilliant fall colors. It occurs naturally in the East Texas Pineywoods ecosystem, but has been introduced as a landscape tree in other parts of the state.

NORTHERN PINEYWOODS

Sweetgum

Liquidambar styraciflua

APPEARANCE

Height: 80 to120 feet (24 to 36 m)

Distinguishing Characteristics

- Star-shaped leaf with 5 to 7 lobes
- Dark green in spring and summer
- Brilliant gold and orange in autumn
- Thick, gray-brown, deeply furrowed bark
- Conical shape in young trees and oval shape in mature trees

LIFE HISTORY

Range: Texas east to Florida and north to New York

Growth habit: Early growth is very rapid, but the tree often falls behind other species after maturity.

Flowers: March through May; very small green blossoms

Fruit: Fruit are shaped like horny globes. At least 25 species of birds, various squirrels and chipmunks eat the fruit.

Seeds: Trees begin to produce seeds after 20 or 30 years and continue to bear seeds until about 150 years old. Seed balls, under the best conditions, may hold up to 56 seeds. Sweetgum stumps and roots sprout easily, especially after the stem is killed, cut or heavily damaged.

HABITAT

Sweetgum are found in bottomland hardwood and *riparian* (streamside) areas. Although it prefers moist soil, it is extremely adaptable and will grow in dryer areas.

SWEETGUM AND THE ENVIRONMENT

The genus, *Liquidambar*, can be found here and there all over the Northern Hemisphere. There are more than 20 species of sweetgum identified. A *Liquidambar* fossil found in Greenland is more than 55 million years old. Sweetgum often grow in mixed stands with maple, box elder, and pine trees. Because sweetgum is a fast growing, fairly disease resistant species, it adapts well to areas that have been disturbed and is sometimes used in reforestation projects.

SWEETGUM AND PEOPLE

Native Americans used to chew the hardened resin from the bark of sweetgum trees obtained by peeling the bark and scraping off the resin-like solid. This gum was used medicinally as well as for chewing gum. They also made various teas and medicines to treat dysentery and diarrhea from bark and roots of sweetgum. It is reported to be excellent for healing wounds.

The wood of the sweetgum is second only to oak in being used for furniture, wooden boxes, musical instruments, flooring, and composite products. It has been cultivated in North America since the 1680s.

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Giant Floater

Anodonta grandis

Giant floaters are freshwater mussels, or *bivalves* (invertebrates with two shells) that live on the bottom of freshwater streams, rivers, lakes and ponds. As one of more than 50 species of freshwater mussels found in Texas, giant floaters are very widespread.

Giant Floater

Anodonta grandis

APPEARANCE

Shell length: (from anterior to posterior ends) up to 6 inches (17 cm)

Distinguishing Characteristics

- Outside color of shell varies from tan to light brown, greenish-brown and dark brown.
- Inside color is pearly white, with a bluish, light pink or salmon tint.
- Concentric growth lines on outside of smooth shell
- Toothless hinge
- Prominent beak (raised area near the hinge)

LIFE HISTORY

Range: Widespread across North America. In Texas, giant floaters occur in all major river drainage basins.

Diet: Tiny aquatic plants and animals

Predators: Raccoons, turtles, water birds and fish species such as freshwater drum

Sexual maturity: Not known

Spawning season: From August to April or May

Eggs: Number varies depending on age and habitat conditions. Males release sperm directly into the water. Females take the sperm in through their siphons.

Incubation: Eggs located on a female's gills are fertilized and develop in a brood pouch until large enough to be released into the water.

Young: The free-floating larval stage of development is called the *glochidia* stage. When the glochidia come in contact with a particular fish species such as longnose gar, redfin shiners, or common carp, they attach to the gills of the fish and live as parasites for several months without harming the fish. When large enough, the juveniles drop off of the fish host, find a good place to dig in, and begin growing into adult mussels.

Life span: Four to ten years

HABITAT

Giant floaters settle in slow-moving steams or rivers and large ponds or lakes with a muddy or somewhat sandy bottom.

BEHAVIOR

Giant floaters are *filter feeders* (eat tiny plants and animals that they filter out of the water taken in through their siphons). Although they remain fairly stationary, partly buried in the muddy or sandy bottoms of quiet streams and ponds, some biologists speculate that giant floaters can generate gasses or trap air bubbles inside their shells and float from one location to another.

NOW YOU KNOW!

- Giant floaters have thin shells. Even large specimens are light weight.
- Some scientists speculate that mussel glochidia, which live as parasites on fish hosts, actually keep the fish from getting other more harmful parasites.
- Freshwater mussels are often the first species to vanish when environmental conditions change or decline. Drought, floods, or pollutants can have an immediate and sometimes long-lasting effect on mussel populations. Finding healthy mussel populations can mean a healthy aquatic environment for people and animals.

GIANT FLOATERS AND PEOPLE

As filter feeders, giant floaters will concentrate in their tissues anything dissolved in the water, including chemicals, heavy metals and other contaminants. Scientists can examine mussel tissue to check for many toxic chemical pollutants that are harmful to aquatic habitats and to people.

Humans have harvested giant floaters and other freshwater mussels to use as fish bait.

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Hellgrammite (Dobsonfly larvae)

Corydalus cornutus

Hellgrammites are the aquatic larvae of dobsonflies, spending almost all of their lives in larval form. Although the winged adult form looks very different from the larval form, they both have pincer-like jaws.

NORTHERN PINEYWOODS

Hellgrammite (Dobsonfly larvae)

Corydalus cornutus

APPEARANCE

Length: 2.75 inches (7 cm)

Distinguishing Characteristics

- Yellowish to brown
- Stout, segmented, caterpillar-like bodies
- Large pinching mandibles
- Six legs on the thorax
- Eight feathery appendages on the abdomen
- Four claws at the rear of their abdomen

LIFE HISTORY

Range: North America

Diet: Aquatic insects and small invertebrates

Predators: Fish, frogs, other aquatic predators

Sexual maturity: Up to three years

Mating: Immediately after emergence from pupae stage as dobsonflies, from April through May

Eggs: Up to 3,000 in each egg mass. Eggs are produced from May through August. Females lay circular egg masses at night on rocks, leaves, trees, bridges and other suitable sites that hang over water. When the egg masses dry, they look chalky and white. Each female lays two egg masses during her two-week long adult life.

Incubation: Two weeks

Young: After hatching, the larvae, hellgrammites, drop into water. Hellgrammites hide under rocks in streams. They can stay in this larval stage as long as four years, but usually only two to three years. Hellgrammites may shed their exoskeletons as many as 12 times before they emerge as pupae. The pupae crawl several feet onto land and burrow 2 to 4 inches (5 to 10 cm) into wet soils, moss, decaying vegetation or beneath rocks and logs. They emerge as dobsonflies two weeks later.

Life span: As hellgrammites, larvae live two to three years. As dobsonflies, adults live about two weeks.

HABITAT

Hellgrammites are aquatic and live in the shallow, fast flowing portions of streams, creeks, and small rivers, hiding beneath rocks and logs.

BEHAVIOR

Hellgrammites are *nocturnal* (active at night). Hellgrammites are also poor swimmers, but voracious predators. To catch prey, they hide under large rocks and other shelter in fast flowing stretches of streams, creeks and small rivers and attack prey as it swims or crawls past.

NOW YOU KNOW!

- The short-lived adult dobsonflies are among the largest flying insects in Texas.
- Dobsonflies are reddish to grayish brown with strongly veined wings and small white spots on their forewings. They have long, thin antennae. Their bodies are about 5 inches (13 cm) long with a wingspan of 4 to 5 inches (10 to 13 cm).
- Male dobsonflies have long, sickle-shaped, pincer-like jaws up to 1 inch (2.54cm) which are used to grasp females during mating. Adult dobsonflies are terrestrial and seek shelter in tree canopies near water. They hide by day under leaves, are weak fliers and are attracted to lights. They are nocturnal.
- Adult dobsonflies don't eat, and after mating, they die.

HELLGRAMMITES AND PEOPLE

Hellgrammites make excellent fish bait and are often used as such, especially for largemouth bass. But be extremely cautious when handling hellgrammites because they bite. For that reason, they are also called "toe biters."

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