

Herpetology

Unit 15

Texas Master Naturalist Program

El Camino Real Chapter

January 30, 2020

Chris Harper

U.S. Fish & Wildlife Service
Austin Texas Ecological Services Office

512-490-0057 x 245

chris_harper@fws.gov

Objectives

- **Communicate** the characteristics of amphibians and reptiles and how they differ from other vertebrates
- **Understand** the relationships among the major groups of amphibians and reptiles and how they are related to fish, mammals, and birds
- **Demonstrate** basic knowledge of ecology and life history of amphibians and reptiles in Texas
- **Outline and communicate** the challenges confronting conservation of amphibians and reptiles in Texas

“Herps”

- Herptiles, herpetofauna
- Salamanders
- Frogs and Toads
- Snakes and Lizards (Squamates)
- Turtles
- Alligators (Crocodilians)

Herps: 2 Taxonomies

- **Class Amphibia**
 - **Order Caudata**
 - **Order Anura**

>4900 spp. worldwide

- **Class Reptilia**
 - **Order Testudinata**
 - **Order Squamata**
 - **Order Crocodylia**

>7400 spp. worldwide

- “living a double life”
 - Salamanders, etc.
 - Frogs and toads
- “creeping, crawling”
 - Turtles, etc.
 - “scaled”, snakes/lizards
 - Crocodilians

Common Characteristics of Amphibians and Reptiles

- **Jacobson's organ**

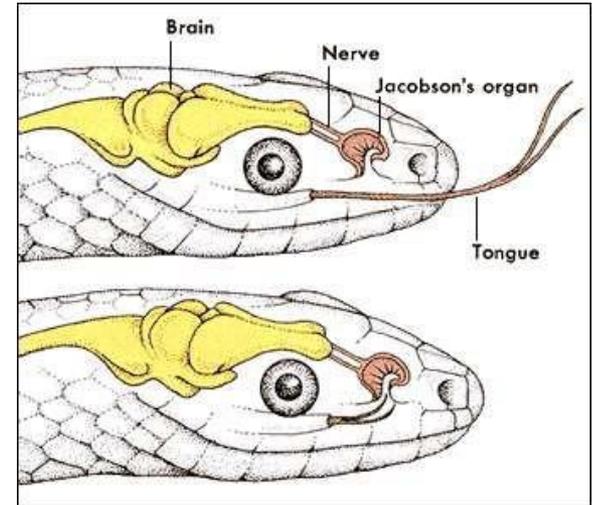
- Vomeronasal organ (front sinus)
- Olfaction (smell)
- Pheromone detection (chemical communication)
- Reduced in humans
- Also cats, dogs, cattle, lemurs, elephants

- **Cloaca**

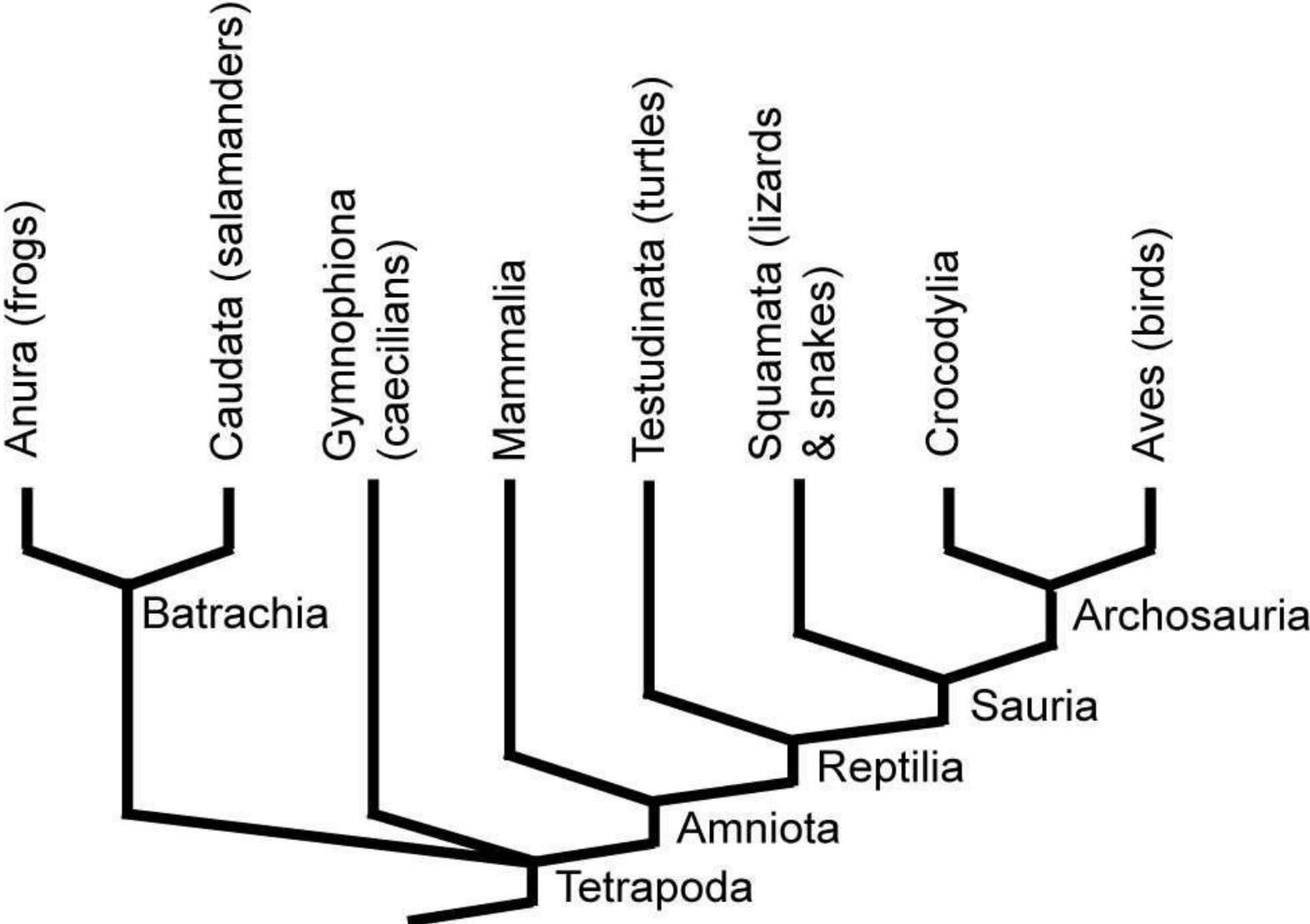
- Common opening for digestive/reproductive systems
- Also birds (vent), fish, some invertebrates

- **Ectotherm**

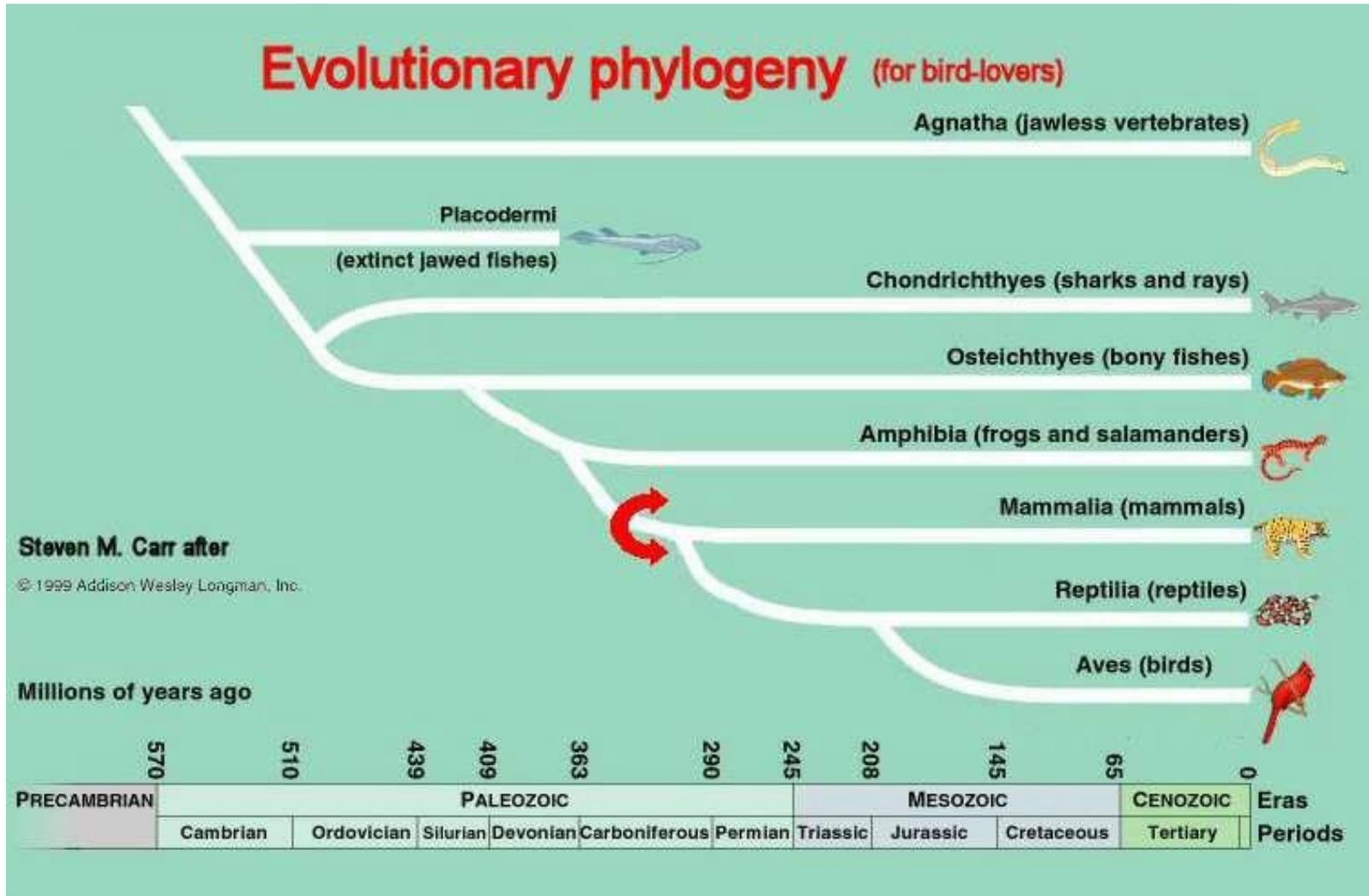
- Cannot regulate body temperature internally (i.e., through basal metabolism), instead rely on external sources
- Also fishes, invertebrates



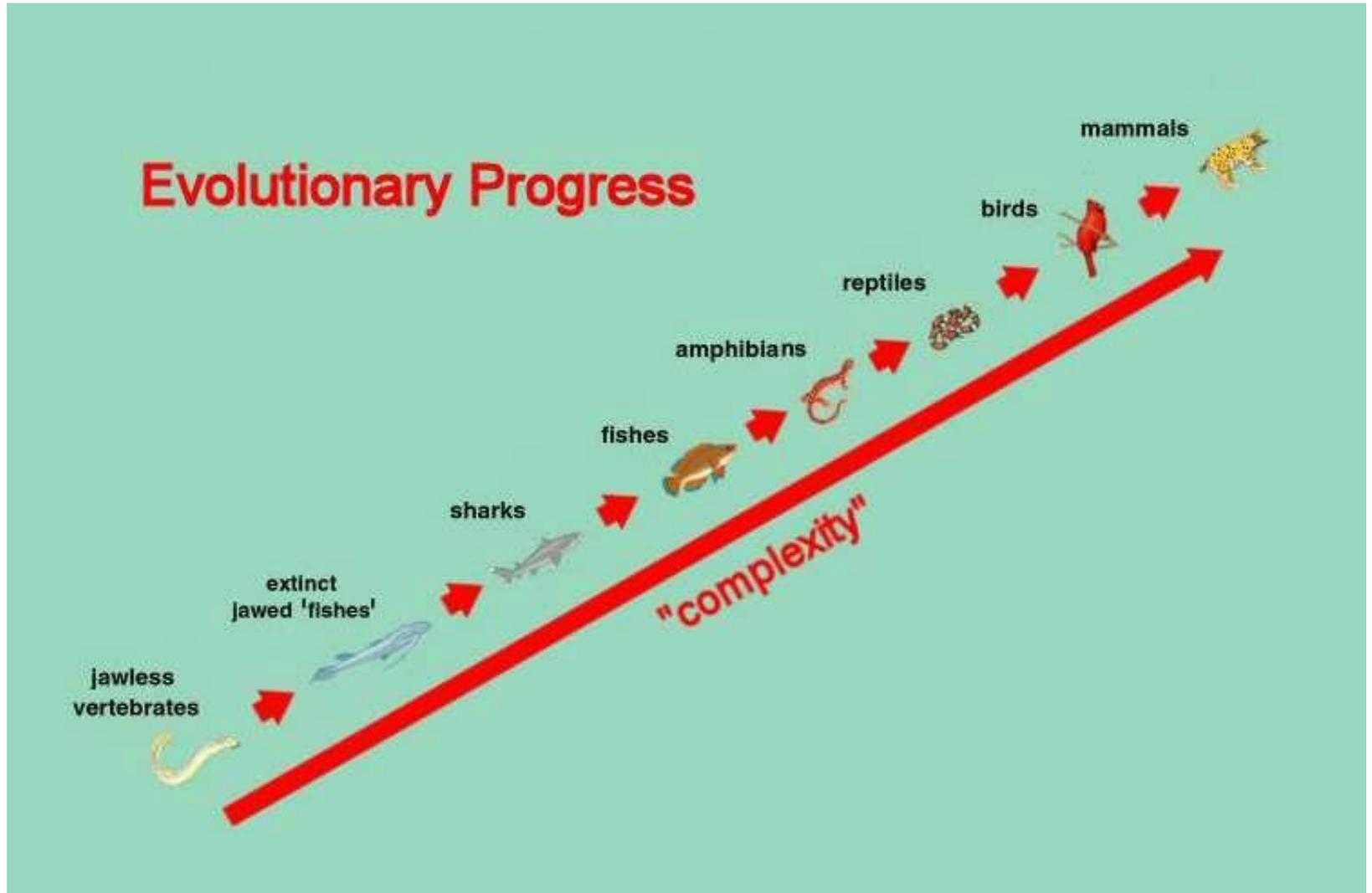
Tetrapod Phylogeny



This:



Not this:



Conservation Concerns

- “global amphibian decline”
- Habitat alteration and destruction
- Invasive species interactions
- Contaminants
- Over-collecting, etc. (pet trade)
- Global change, climactic cycles
- Chytridiomycosis



Eft = immature land phase



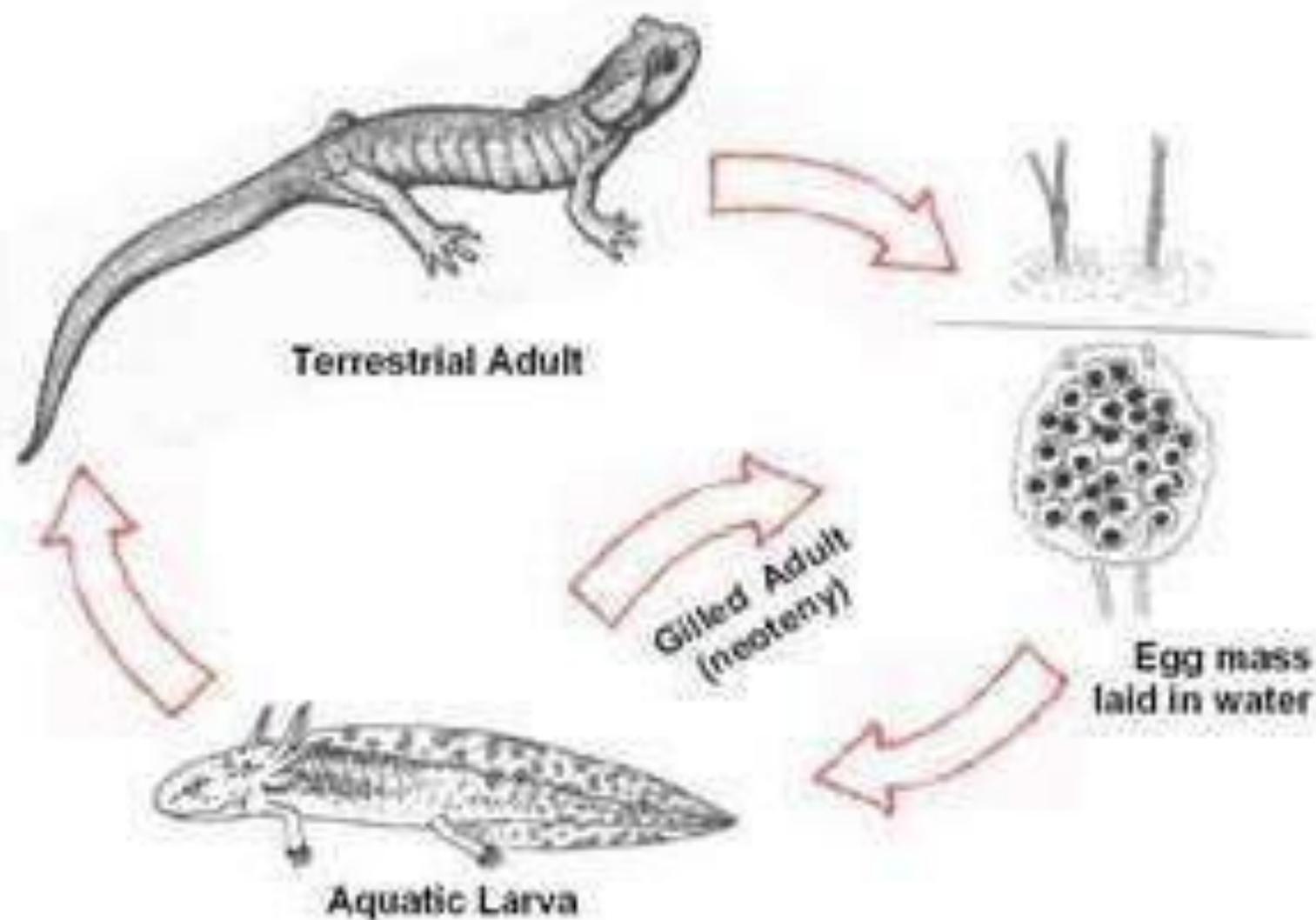
Newt = breeding aquatic adult

Central Newt, *Notophthalmus viridescens v. louisianensis*

Order Caudata, **Family** Salamandridae

The Eft stage may last anywhere from 1-7 years. Sometimes the eft stage is skipped completely and they go directly from the larval to the adult aquatic stage. This is particularly common in populations that live in xeric (dry) environments such as the pine barrens and sand hills found in the eastern coastal plain. The skin of the Eft is toxic and their bright coloration serves as a warning - it is not so rare to find an Eft wandering about in broad daylight after rain. When Efts transform into adults the red background color changes to olive green or brown, but the red spots remain. They also develop a more compressed tail that helps them swim in the aquatic environment into which they move.

Life Cycle of the Northwestern Salamander





Jollyville Salamander



Barton Springs Salamander



Texas Blind Salamander



Edwards Plateau Salamanders (*Eurycea spp.*)

Order Caudata, Family Plethodontidae

Neotenic (does not transform into a terrestrial form)

As neotenic salamanders, they retain external gills and inhabit aquatic habitats (springs, spring-runs, and wet caves) throughout their lives.



Houston toad, *Bufo houstonensis*

Order Anura, Family Bufonidae

1970 – protected by Endangered Species Act

Hibernate in the winter and aestivate in the summer. Deep sands.



Texas toad, *Bufo speciosus*

Order Anura, **Family** Bufonidae

Has no middorsal stripe, widely spaced parotid glands, 2 black tubercles on each of hind feet.



Gulf coast toad, *Bufo valliceps*

Order Anura, **Family** Bufonidae

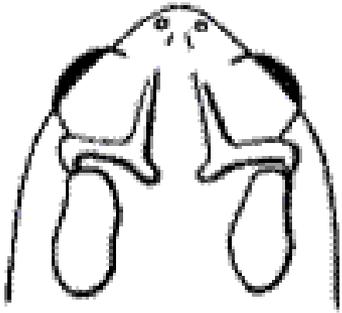
Dark lateral strip running the full length of the toad behind the eye. Light middorsal strip like many other toads.



Woodhouse's toad, *Bufo woodhousii*

Order Anura, Family Bufonidae

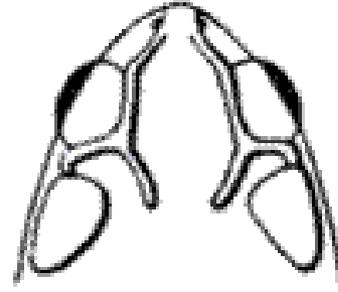
Know your toads! Thanks Houston Zoo!



Houston Toad



Woodhouse's Toad



Coastal Plains Toad



Texas Toad

Houston toad – Cranial crests are thickened, particularly the ones that touch the parotoid glands.

Woodhouse toad – Cranial crests are prominent and the parotoid glands are elongated.

Coastal Plain toad – The cranial crest forms a ridge on the center of the head, parotoid glands are triangular and connect with the cranial crests.

Texas toad – Cranial crests are indistinct or absent, the parotoid glands are oval shaped.

Color and patterns are less reliable characteristics because they can vary over seasons, time of day, and temperature.



Northern cricket frog, *Acris crepitans*

Order Anura, Family Hylidae

Small warty skinned frogs reaching maximum lengths of around 1 1/2 inches, characterized by a triangle on their head between their eyes.



Green Treefrog, *Hyla cinerea*

Order Anura, Family Hylidae

A slender frog, reaching 2.5 inches in length, color is generally a bright green.



Gray Treefrog, *Hyla versicolor*

Order Anura, Family Hylidae

Small to medium sized frogs reaching lengths of about 2 inches. An individual frog can be gray or green or various shades of brown or even nearly white.



Green tree frog with Gray tree frog.



Spotted chorus frog, *Pseudacris clarkii*

Order Anura, Family Hylidae

Small, slender frog with small, round toe pads. 2-3cm in length.



Alexander County; photo by [Mike Redmer](#)

Strecker's chorus frog, *Pseudacris streckeri*

Order Anura, Family Hylidae

Stout toadlike body; no toe pads; robust forearms; dark masklike stripe from snout to shoulder; dark spot under eye; V- or Y-shaped mark between eyes.



Great plains narrowmouth toad, *Gastrophryne olivacea*

Order Anura, Family Hylidae

Small; up to 1.5 inches long; females usually larger than males. Relatively stout body tapers to a narrow, pointed, flattened head. Smooth, tough body skin forms a fold along back of head.



Hurter's spadefoot toad, *Scaphiopus hurterii*

Order Anura, Family Pelobatidae

Stout toad with prominent boss between eyes. Vertical pupils and skin covered with many small warts. Hind limbs have single, sickle-shaped tubercle, or spade on inner surface.



American Bullfrog, *Rana catesbeiana*

Order Anura, Family Ranidae

The Bullfrog is a large frog attaining lengths in excess of 6 inches. The dorsal color is usually a dull green, but may be brownish. Some specimens are dark gray to black. There are usually no markings on the dorsal surface. The ventral surface is often ranges between shades of white to yellow. They have little to no [dorsolateral ridges](#)



Dorsolateral folds

Many frogs have **dorsolateral folds**. These are lines of raised glandular skin in an area between the back and the sides. In North American frogs there are usually two (when present) running parallel to the midline of the body, as in the [Green Frog](#) to the left. The [Bullfrog](#) is an exception in that its dorsolateral folds start behind the eyes and sweep back and down around the ears or tympanic membranes. Knowing this difference can help distinguish adult Green Frogs and Bronze Frogs (*Rana clamitans*) from young Bullfrogs. These two species overlap considerably both in range and habitat.



Southern Leopard Frog, *Rana sphenocephala*

Order Anura, Family Ranidae

can be distinguished by a light marking on the center of the tympanic membrane. It is located in most species directly behind the eye. They function in a similar fashion to our own eardrum.



Three-toed box turtle, *Terrapene carolina triunguis*

Order Testudinata, **Family** Emydidae

These turtles occur in damp grasslands, within and at the edge of open deciduous and coniferous forest, and near permanent and temporary bodies of water.



Ornate box turtle, *Terrapene ornata*

Order Testudinata, **Family** Emydidae

Throughout most of their range ornate box turtles may be active from March to November. Their activity, of course, is largely dictated by weather events and climatic factors. Is most commonly encountered during the spring months after the first heavy thunderstorms. Their springtime activities begin to slow down by June when warmer temperatures and less frequent rains prevail. During the hot months of late June to September ornate box turtles aestivate below the substrate or in other suitable refugia. Ornate box turtles are chiefly carnivorous.



Red Eared Slider, *Trachemys scripta elegans*

Order Testudinata, **Family** Emydidae

Red eared sliders are the most widespread of aquatic turtles in Texas. They are capable of living in a wide variety of habitats including, but not limited to: lakes, ponds, rivers, swamps, bayous, creeks, and even brackish estuaries along the Gulf coast. After hatching, red ear sliders are primarily carnivorous however, their dietary preference shifts towards vegetative matter as they mature. Adults primarily consume aquatic vegetation and are important for keeping waterways clear of excess and sometimes invasive aquatic vegetation. It is an inaccurate notion that this turtle poses a threat to fish populations. Most healthy fish are too fast and wary to be caught by the red ear slider and the removal of any old or sick fish is a manner by which the overall health of the remaining fish population is improved. Sliders will also consume carrion that has fallen into the water.



Yellow mud turtle, *Kinosternon flavescens*

Order Testudinata, Family Kinosternidae

These are small turtles, with the largest species in Texas achieving a maximum length close to 7 inches (17.8 cm). Members of this family are aquatic and sometimes seen patrolling the bottoms of brackish marshes, creeks, flooded fields, lakes, ponds, and rivers. Mud and musk turtles engage in moderate amounts of basking. However, because the turtles' lifestyle causes significant algae growth on their shells, observers occasionally mistake an algae-covered turtle for a rock. Kinosternid turtles are capable of remaining submerged underwater without surfacing for several minutes. Their underwater ability is due in a large part to buccopharyngeal respiration.



Mississippi mud turtle, *Kinosternon subrubrum hippocrepis*

Order Testudinata, **Family** Kinosternidae

An inhabitant of slow moving streams, lakes, lagoons, rivers and swamps with soft bottoms and aquatic vegetation. This species can also be found in undisturbed marshes with brackish water. The Mississippi mud turtle is primarily aquatic but ventures onto land during the morning and on overcast days just before and after rain showers. This species will exude a pungent and smelly musk from glands situated near the edge of the bridge near the point of insertion of the limbs.



Razor back musk turtle, *Sternotherus carinatus*

Order Testudinata, **Family** Kinosternidae

4-5inches (10-12.5 cm) In lateral perspective the carapace is highly domed with each side sharply sloping at an angle from the keeled midline of the carapace. Two barbels are present on the chin. This small turtle inhabits bodies of freshwater with soft bottoms and aquatic vegetation. While common musk turtles seem to prefer still to slow moving bodies of water they have been found in numerous streams with swift currents. Populations from southern localities may remain active throughout most of the year. This species is primarily aquatic but spends more time basking than any other species of musk turtle.



Spiny soft-shelled turtle, *Apalone spinifera*

Order Testudinata, **Family** Trionychidae

Soft-shelled turtles are almost entirely aquatic powerful swimmers, fond of basking and rarely venture far from aquatic margins. However, females seeking suitable nesting locations sometimes wander considerable distances from water in search of ideal nesting locations. Within their geographic distribution spiny soft shell turtles can be found in streams, rivers, oxbows, lakes , lagoons, water filled ditches and coastal areas. Softshell turtles are carnivorous and will hunt down or use ambush tactics to secure prey which includes but is not limited to: insects, crayfish, tadpoles, frogs, fishes and other small vertebrates.



Glossy snake, *Arizona elegans*

Order Squamata, Family Colubridae

Glossy snakes are non-venomous and but like many snakes, they may bite if provoked. Their countersunk lower jaw enables them to burrow into loose soil quickly. They are nocturnal, feeding on small mammals, lizards, and other snakes during evening while remaining in underground burrows during the day. Glossy snakes may often be encountered on roads at night during April - September. Glossy snakes are commonly associated with sandy soils found in a variety of different habitats: creosote flats, grasslands, and sagebrush plains.



Black racer, *Coluber constrictor*

Order Squamata, Family Coluberidae

One of the few truly diurnal snakes in Texas, the slender body and, generally, uniform pattern of *C. constrictor* make it difficult to catch or even seen when moving through underbrush. Non-venomous, these nervous snakes will not hesitate to bite or strike if captured. The prey of *C. constrictor* ranges from small mammals to reptiles and amphibians. Insects may also be taken, especially when the snakes are juvenile.



Cornsnake, *Elaphe guttata*

Order Squamata, Family Coluberidae

Pantherophis guttatus is secretive but active in warm months. Generally a calm species, but it may strike if threatened. This snake feeds on small mammals, birds, frogs, and lizards that are killed by constriction. This snake species is nocturnal and remains under the cover of logs and other debris during the day. In Texas, *Pantherophis guttatus* is seen in wooded areas and along the edge of agricultural areas.



Texas/black rat snake, *Elaphe obsoleta*

Order Squamata, Family Coluberidae

Eastern ratsnakes are the only rat snake in Texas that can be considered arboreal, as they seek food and refuge inside hollow limbs as well as on exposed branches. Being able to access many different habitats, these rat snakes feed on a variety of mammalian, avian, reptilian (mainly lizards) and amphibian (mainly frogs and toads) prey. Van be found associated with human habitations, as snakes may take up residence in barns and associated farm structures. They kill their prey by constriction, immobilizing their prey in coils of their bodies before consuming them. Easily one of the most ill-tempered snakes found in Texas, it is non-venomous but will bite any aggressor voraciously. A common snake that can be found in a variety of habitats, including rivers and streams, heavily wooded areas, and rocky canyons throughout in central and eastern Texas.



Eastern hog-nosed snake, *Heterodon platirhinos*

Order Squamata, Family Coluberidae

Hog-nosed snakes are so named because of their upturned keeled rostral scale. This modification allows them to burrow easily into the soil, either to seek shelter or to seek out their prey. Eastern hog-nosed snakes are rear-fanged, that is they are venomous, though they pose little threat to humans, even when handled, because of this species reluctance to bite. Occasional bites to humans do occur, usually when a person has been handling toads prior to handling a hog-nosed snake. Human reactions to hog-nosed snake bites can include large amounts of swelling, depending on the duration of the bite. Their venom, though mild to human, is highly effective against its usual prey of frogs, toads, and occasionally lizards. Young snakes may ingest crickets and other insects. The venom is delivered to the prey by way of enlarged teeth in the rear of the mouth.



Kingsnake, *Lampropeltis getula*

Order Squamata, Family Coluberidae

Lampropeltis getula is a non-venomous constrictor, feeding primarily on other snakes, lizards, and rodents. Common kingsnakes have also been known to feed on reptile eggs, relying on their sense of smell to find most of its prey, including prey buried underground. These kingsnakes are famous for their ability to be immune to rattlesnake venom and they commonly feed on rattlesnakes as part of their diet. *Lampropeltis getula* may bite hard and vigorously when first handled, but in captivity they often become accustomed to handling and stop biting. Another line of defense is their powerful smelling musk, which they can release from their vent when threatened.



Coachwhip, *Masticophis flagellum*

Order Squamata, Family Coluberidae

Although non-venomous, a captured coachwhip will not hesitate to bite quickly and repeatedly, leaving a series of shallow gashes in its aggressor's flesh. They are extremely quick and agile, moving across open ground and thick brush with equal effort and speed. Diurnal hunters, their large eyes help them see movement across their terrain. An observer may catch a glimpse of a coachwhip "periscoping" as the snake lifts the anterior third of its body perpendicular to the ground, allowing the snake to survey the landscape above for any potential prey movement. They feed on many different types of vertebrate prey, ranging from lizards and other snakes, to small cottontail rabbits and birds. Coachwhips will frequently climb trees to eat nestling birds or to escape predators. They are active from March to November in the warmer parts of its range.



Blotched watersnake, *Nerodia erythrogaster*

Order Squamata, Family Coluberidae

Adults feed primarily on fish and amphibians, whereas juveniles often feed on tadpoles, small fish, and invertebrates. Found foraging both at night and during the day, though it is much more nocturnal in the western part of its range. Though non-venomous, will not hesitate to strike and bite an attacker, and will often release a terrible smelling musk to complement its defense. During the day, can be found basking on branches and vegetation overhanging the water. This allows for a quick escape into the water and a startled snake will frequently drop into the water and swim across to the opposite bank to seek refuge.



Flat-headed snake, *Tantilla gracilis*

Order Squamata, Family Coluberidae

A smallish snake, with adults growing to 18-20 cm (7-8 in). Feeds on arthropods, including centipedes, which also take advantage of the high moisture in such habitats. Not a threat to humans who handle it, and captive snakes will often shove their heads into the folds of a captors hands looking for advantages to escape.



Western ribbon snake, *Thamnophis proximus*

Order Squamata, Family Coluberidae

One of the largest gartersnakes in Texas with adults measuring between 51-76 cm (20-30 in) in length, with exceptional individuals measuring over 91.5 cm (36 in). Foods consumed by ribbonsnakes are primarily amphibians, with tadpoles eaten when available and frogs and toads taken year round. Fish and lizards are also known as potential prey items. Active at dusk and dawn during the spring and fall seasons, *T. proximus* is can be entirely nocturnal in hot habitats during the summer months.



Rough Earthsnake, *Virginia striatula*

Order Squamata, Family Coluberidae

Only reaches a length of 17.5-27.5 cm (7-11 in). A frequently seen snake, especially after rains, *Virginia striatula* poses no threat to humans and is non-venomous. Preferring soft bodied prey (earthworms are the only prey known to be consumed) these snakes often seek refuge in the same places as their prey: under logs, stones, and various piles of debris. Its pointed head comes in handy and works as a spade for the snake as it searches in soft soils for earthworms.



Texas Coralsnake, *Micrurus tener*

Order Squamata, Family Elaphidae

Venomous and should be treated with great respect and viewed only from a distance. Coral snakes are not generally aggressive and will most likely flee any confrontation if given a chance to retreat. A member of the family of snakes which also includes cobras, the venom is much like that of its relatives in that it is neurotoxic. A neurotoxin affects the respiratory and nervous system of an envenomated animal and it allows the coral snake to subdue its prey without worry of an injury during a struggle. Has small fangs in the front of its mouth (fangs which do not hinge like those of a rattlesnake) and will repeatedly strike its prey in order to deliver its venom. Can often be found under boards or large stones during certain times of the year, living in places where other snakes may likely be encountered. Feeds almost exclusively on other snakes, though a few smooth scaled skinks may be eaten from time to time.



Copperhead, *Agkistrodon contortrix*

Order Squamata, **Family** Crotalidae/Viperidae

Venomous, and are therefore highly dangerous if approached or handled. They are not generally aggressive and will most likely flee any confrontation if given a chance to retreat. Called copperheads because of their distinctly colored heads. Hiding in leaf piles beneath trees, or alongside logs and stones in wooded forests, the copperhead is able to elude predators because of its camouflage. This cryptic behavior also allows copperheads to strike out at unsuspecting prey. The light grey or olive colored tail of the copperhead is used to lure prey to within striking distance. Prey includes rodents, birds, lizards, frogs and other amphibian species. Being nocturnal during the hotter summer months is active during the day only during the cooler spring and fall months.



Cottonmouth, *Agkistrodon piscivorus*

Order Squamata, **Family** Crotalidae/Viperidae

Cottonmouths are venomous, and are therefore highly dangerous if approached or handled. They are not generally aggressive and will most likely flee any confrontation if given a chance to retreat. Cottonmouths are dark, faintly patterned snakes, best known for their defensive posture with a gaping, white lined mouth. The specific epithet piscivorus describes the one of the prey species of the cottonmouth fairly accurately: fish. The cottonmouth is also fond of frogs, mammals and other snakes. Although it may be commonly seen in lakes and ponds, areas frequented by humans, few human fatalities are recorded as a result of bites by cottonmouths.



Western Diamondback Rattlesnake, *Crotalus atrox*

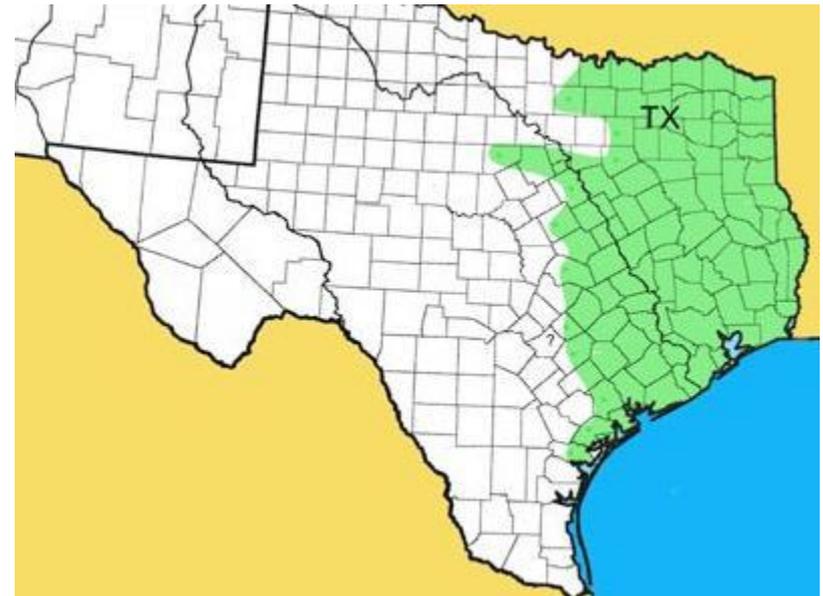
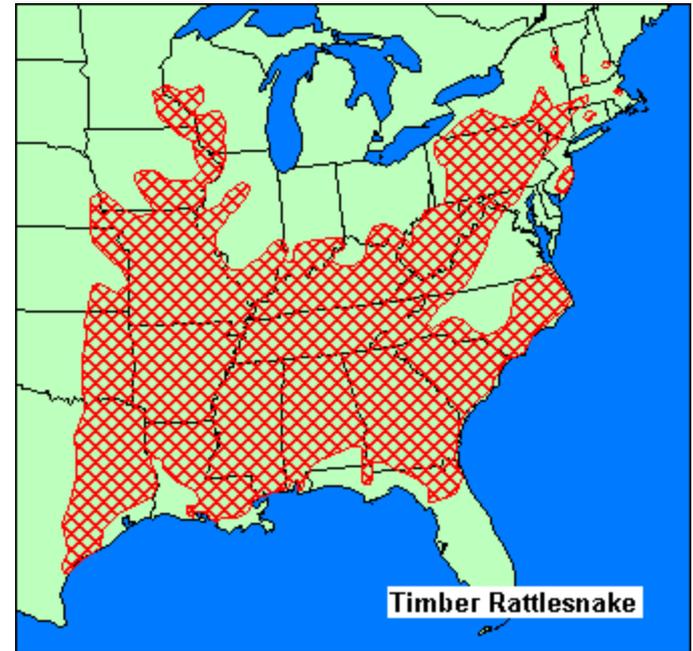
Order Squamata, **Family** Crotalidae/Viperidae

All rattlesnakes are venomous, and therefore potentially dangerous if approached or handled. Rattlesnakes are not generally aggressive and will most likely flee if given a chance to retreat. The western diamond-backed rattlesnake is primarily a nocturnal animal, hunting for its prey on warm summer nights. It is, however, seasonally diurnal, moving between hunting sites during the day during the cooler spring and fall months. The western diamond-backed rattlesnake is usually inactive between late October and early March, though an occasional rattlesnake may be seen sunning itself on warm winter days.

The timber rattlesnake is the only protected species of venomous snake in Texas and can not be collected without a scientific collecting permit.

Timber rattlesnake

Crotalus horridus





Texas Horned Lizard, *Phrynosoma cornutum*

Order Squamata, **Family** Phrynosomatidae

This diurnal lizard is quick, seeking shelter among the brush or in animal burrows. The Texas horned lizard may also cover itself in loose sand. This species is typically seen on warm days of late spring or summer, particularly in the first few hours after dawn and the hours just before dusk; hibernation is from late summer to the following spring. This species of horned lizard feeds on large ants and may squirt blood from its eyes under stress. Prefers warm, sandy, arid environments and is typically found in flat, open areas with little vegetation. The Texas horned lizard is considered an threatened species by the Texas Parks and Wildlife Department and is fully protected by the state.

San Antonio Zoo Texas Horned Lizard Reintroduction Project





Texas Spiny Lizard, *Sceloporus olivaceus*

Order Squamata, **Family** Phrynosomatidae

This diurnal lizard will retreat up a tree when threatened. *Sceloporus olivaceus* is adept at climbing and is well camouflaged on tree trunks and limbs. This lizard species primarily eats insects, though some small vertebrates may be consumed. Is arboreal and prefers mesquite trees, but may be observed on other tree species (such as oak, pecan, and cedar) as well as along fences, walls, and poles.



Eastern spotted whiptail, *Aspidoscelis gularis*

Order Squamata, Family Teiidae

Maximum total length ranges from 16-28 cm (6.5-11 in). This diurnal lizard actively forages for termites, caterpillars, and large insects in sand and debris. Will run if threatened, but generally it is not as wary as other whiptails. Can be seen in a variety of habitats ranging from rocky slopes near floodplains to prairies to canyons and is almost always near a watercourse.



Six-lined racerunner, *Aspidoscelis sexlineatus*

Order Squamata, Family Teiidae

Can reach 15-26 cm (6-10.5 in) in total length as an adult. Diurnal lizards are especially active in the morning. They forage for insects and are wary of being approached. They quickly retreat under vegetation or rocks if approached. They burrow in the soil in cooler temperatures. Prefers open areas with loose soil. It is also seen near wooded areas, on floodplains, and in rocky outcrops.



Little Brown Skink, *Scincella lateralis*

Order Squamata, Family Scincidae

One of the smallest skink species in Texas, only growing to a total adult length of 7.5-12.5 cm (3-5 in). This diurnal skink is wary and quickly retreats when approached. This species forages for insects in leaf litter and has snake-like movements. Often observed in moist, humid, wooded environments among the leaf litter or other debris, but is also common in urban gardens.



American Alligator – *Alligator mississippiensis*

1969 – protected by state of Texas (unregulated harvesting for hides)

1973 – protected by the Endangered Species Act, delisted 1985

Now a protected game species in Texas, special permits are required.

References



- <http://www.npwrc.usgs.gov/resource/herps/amphibid/index.htm#contents>
- Herpsoftexas.org
- Texasturtles.org