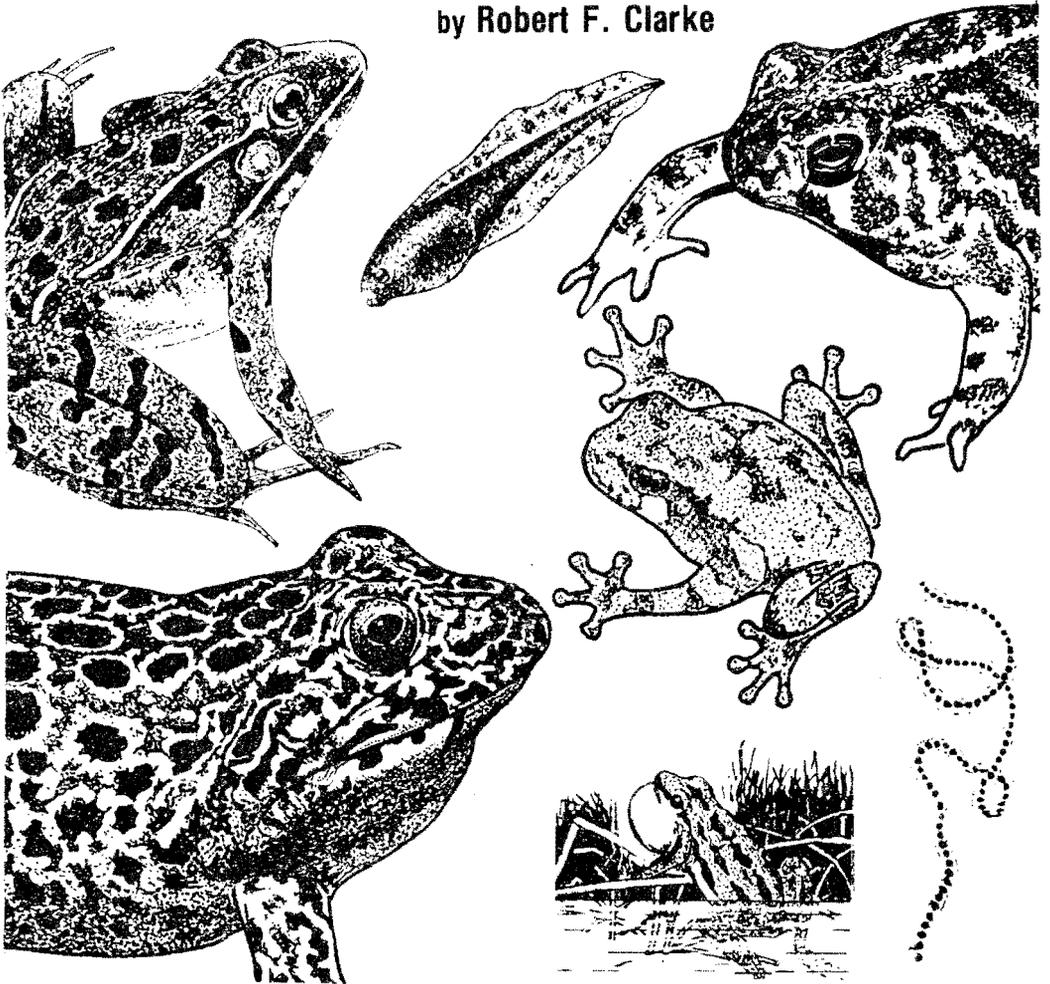


FROGS AND TOADS IN KANSAS

by Robert F. Clarke



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FROGS AND TOADS IN KANSAS

by Robert F. Clarke

I don't suppose that there is anyone who reads this issue of the *Naturalist* who doesn't know what a frog or a toad looks like, but popular literature, childrens' books, cartoons, and other characterizations depict "frogs" as fitting the general description of members of the genus **Rana**, and "toads" the genus, **Bufo**. But there are many other frogs and toads in the world having physical appearances which are at variance with both of these general types — and none of the frogs turn into princes and none of the toads "give warts." The objective of this issue of the *Naturalist* is to give a hasty overview of the Kansas frogs and toads, their habits, habitats, and distribution; and to describe the 20 forms that occur in the state in such a way that, hopefully, most can be identified. For those seeking more information or better guides, a short list of pertinent publications is given at the end of this issue.

Frogs and toads are members of the classification of vertebrate animals — **Amphibia** — which also includes salamanders and a tropical, legless group of burrowing forms known as Caecillians. All of these animals share common characteristics which differ them from other groups, such as bony fishes or reptiles. Among these

characteristics are the type of egg that must be laid in water or in a moist location, a glandular skin that lacks scales, toes (when present) without claws, three-chambered heart, skull and skeletal bones that are unique, a peculiar voice mechanism, and a number of other morphological, physiological, and behavioral differences.

The names "frog" and "toad" are used throughout this issue in order to use popular names for two generalized groups, but other than the **Rana/Bufo** stereotypes mentioned above, the names do not apply well, and in some cases are not only misleading, but also both names may be applied to the same species. So, "What is the difference between a frog and a toad?" is not a good question, and we must resort to other names that have more meaning. Each "kind" has been given a "scientific name" — which is made up of a **genus** name and a **species** name. Thus, **Rana blairi**, indicates that the individual belongs to a group that does not freely interbreed with other closely-related groups, the **species** (**blairi**), and that, in addition, it belongs to a larger, more inclusive group, the **genus** (**Rana**). The genus includes several to many species, and several genera (plural for genus) are

Dr. Robert F. Clarke is Professor of Biology at Emporia State University. He is editor of *The Kansas School Naturalist*, as well as author of numerous papers on herpetology. This issue completes coverage of all of the amphibians and reptiles in Kansas, which he has written and illustrated in past issues of the *Naturalist*.

grouped together into a **family**. Therefore, it would be most correct to use the scientific name when speaking or writing of an individual animal. However, somehow we like to attach a common names to "kinds" of animals, although these common names may change from one locality to another. In this booklet, the "accepted" common name is given for each form, as well as the scientific name. Family names are supplied to show relationship at a higher level.

LIFE HISTORY

A generalized, "typical" life cycle can be described for all of the Kansas frogs and toads, for all conform to the same pattern, with only minor variations. Adults are terrestrial, and most spend their lives in close proximity to open water or in an extremely moist habitat, the thick-skinned toads being an exception. Each species has seasonal or precipitational preferences for mating, from early March through most of the summer. When the proper time arrives, males travel to selected sites where water

is present and begin to vocalize. These calls apparently are species-specific and attract other males to the vicinity, where they begin to call. Females are attracted to the association of males of their species by the clamor, where the pairs are formed that deposit eggs in the water. Each egg eventually hatches into a tiny larval stage that has external gills and is confined within the egg membrane. Very quickly, changes take place that modify the appearance of the larva: skin of the head grows back, covering the gills, and a spiracle tube is formed to transport water from the now-internal gills to the outside; a jawless mouth opening with "scrapers" forms, and a finned tail appears. The larva leaves the egg, as a tadpole larva, swimming freely. After the appointed amount of time for each species, hind legs appear and later the front legs. Major changes, described later, fit the tadpole for existence on land, and it leaves the water with strong legs, a tail that has been mostly resorbed, breathing air, and feeding on animal prey rather than its past plant diet.

EGGS

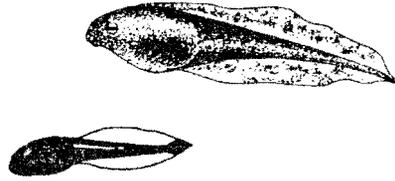
All Kansas frogs and toads practice external fertilization; that is, the female lays the unfertilized eggs into the water and the male immediately deposits sperm over the eggs as they are laid. The eggs consist of a tiny ovum, or egg cell, with a large amount of yolk material, surrounded by a transparent, gelatinous envelope. Each egg is pigmented with brown or black.

Some frogs, such as the Chorus Frog or Cricket Frog, lay eggs singly or in small clusters and attach them to underwater objects - plant stems, twigs, or other debris; whereas the Leopard Frog and the Bullfrog produce large masses of eggs that float on the surface. In contrast to these, toads lay long strings of eggs, with the individual eggs neatly spaced along the string. The number of eggs that comprise one laying event varies considerably, from one to two or several in smaller species up to 20,000 in the Bullfrog. Eggs are laid in still water of small ponds and woodland pools or in temporary habitats, such as ditches or rainpools in flooded fields.

LARVAE

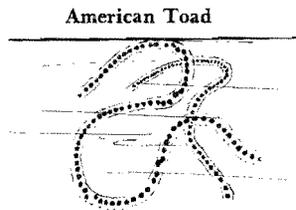
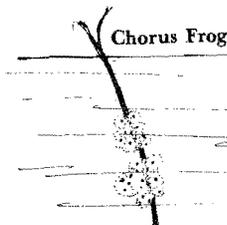
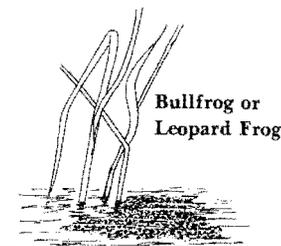
The transitional stage from egg to adult in Kansas frogs and toads is the aquatic larva generally known as "tadpole" or "polywog." They differ from the adult in a number of important ways: (1) tadpoles are herbivores, scraping algae from sticks and rocks, whereas the adults are generally insectivorous; (2) a moveable mouth with jaws is present in the adult, but larvae have small, horny beaks surrounded by several rows of horny, file-like teeth, and lack jaws; (3) a tail is present in the larval stage, but absent in the adult; (4) oxygen is taken from the water which enters the mouth and passes over internal gills and out through a spiracle in the tadpole, whereas the adult respire by utilizing atmospheric oxygen with lungs and through the skin; (5) no eyelids in the larva, but present in the adult; and (6) the gut is much shorter in the adult. This wonderful transformation, metamorphosis, creates a land-dwelling form from an aquatic one.

Duration of the tadpole stage varie, from less than two weeks in some toads to more than two years in the Bullfrog. Local conditions often cause variation in the time occupied in the larval stage. Size of the transformed individual depends in part on the length of the larval period.



VOCALIZATIONS

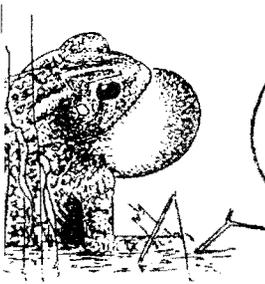
One of the times that we are aware of the presence of frogs and toads is when they are vocalizing. Sometimes these sounds are referred to as "songs," but many hardly rate that title, for they are merely grunts, or chirps, or screams. The term "calls" is also applied — and is better — for it implies that the individual making the sound is calling to another individual, and this is the case most of the time. Only males call, gathering other males and females together into a breeding congress when conditions are appropriate. Often, large numbers of individuals are calling at the same time from the same general area, and the result of this "chorus" can be a terrific din, particularly in southern swamps when a number of different species are at the same breeding site. Whereas most vocalizations are made to attract mates, calls may be stimulated by changes in humidity, declaration of territory, fright screams, or sometimes apparently "just because they feel like it."



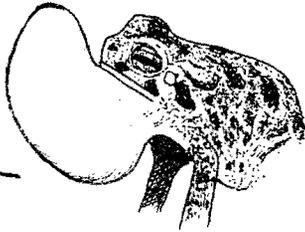
The sound is made by air shuttled back and forth over vocal cords between the mouth cavity and lungs. Lowering and raising the floor of the mouth cavity with the mouth and nostrils closed accomplishes this. In most cases, the sound is amplified by a resonating chamber known as the **vocal sac**. There may be a single external sac, which swells under the chin, and is sometimes quite prominent, as in **Bufo** toads; or a single internal sac, as in the **Bullfrog**; or in a double internal sac, as in the **Leopard Frog**.

Calls of the various species are different from one another and it is easy to learn to recognize the identity of the caller. One that should be familiar to most is the "jug o' rum" call of the

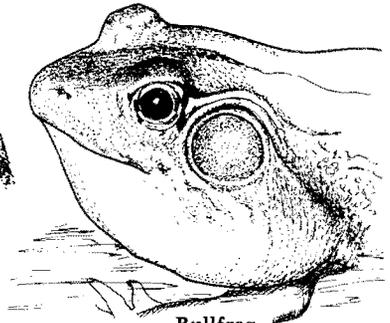
Bullfrog, heard in late spring and summer. When the mid-March rains fill ditches, the **Chorus Frog** begins; its sound is a series of notes ascending the scale, somewhat like the sound you get by running a fingernail along the points of the teeth of a comb. At this same time that **Chorus Frogs** are calling, the **Leopard Frogs** also begin; the call is not very loud, and is said to resemble the low clucking of a hen or fingers dragged across a blown-up balloon. **Cricket Frogs** get their common name from the cricket-like "chik-chik-chik" sound they produce almost constantly along the edge of creeks, ponds, and lakes. **Spring Peepers** have a single, high-pitched "peep;" **Tree Frogs**, a short, loud trill; **Green Frogs** sound like the plucking of



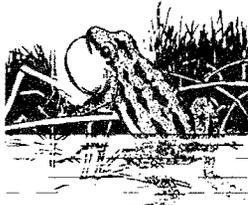
American Toad



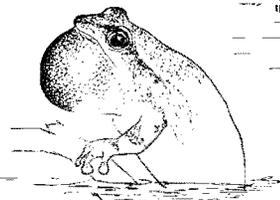
Great Plains Toad



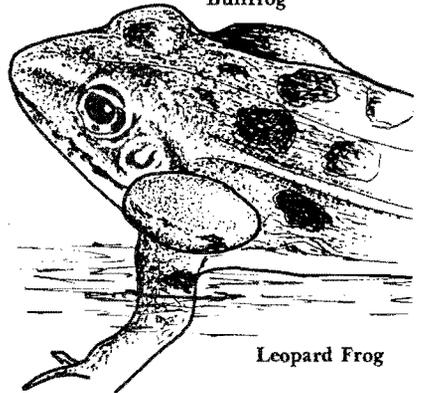
Bullfrog



Chorus Frog



Spring Peeper



Leopard Frog

the low string of a banjo; Woodhouse's Toad has a startling scream; the Narrow-mouth Toad sounds like a muffled door buzzer; and the American Toad has a beautiful, high-pitched trill that may last for 30 seconds.

Although most of the mating call choruses are conducted at night, a considerable amount is heard during the daytime at the height of the season, specially after rains. Other types of calls may be heard at any time.

FAMILIES

PELOBATIDAE. Known as "Spadefoot Toads" because of the hard tubercle on the hind foot that is used in digging. These toads live where the soil texture is such that they can easily dig in, and they spend considerable part of the year underground. Apparently they evolved in the desert Southwest, breeding when the opportunity was afforded by the infrequent rains.

BUFONIDAE. These are "true" toads — ones that come to mind when the name is used. They are characterized by thick, dry skin that is covered with glandular "warts," the paired parotoid glands behind the eyes are used as diagnostic features in identifying species.

HYLIDAE. This family consists of "tree frogs," which have toes expanded at the tips to form suction pads used in climbing. They call frequently during warm weather when there is increasing or high humidity; thus, they are said to be able to predict storms. Tree frogs have some of the prettiest members of the frogs and toads, not only in coloration and pattern, but also in body form. Not all members of the family have the ability to climb and the toe pads are reduced or absent. Cricket Frogs and Chorus Frogs are examples of Kansas forms that do not climb.

RANIDAE. This family consists of "true" frogs — the type that you think of when the word "frog" is mentioned. In general shape, they are all pretty much alike, but there are many species worldwide which vary in pattern, coloration, and behavior. In Kansas, the Leopard Frog and Bullfrog are well-known examples of this family.

MICROHYLIDAE. Ant-eating, or Narrowmouth, Frogs are strange-looking little creatures with flat, swollen bodies and pointed heads. They spend most of their time concealed under rocks or other surface cover, often next to an ant path, for ants form almost the entire diet of these frogs.

FAMILY PELOBATIDAE

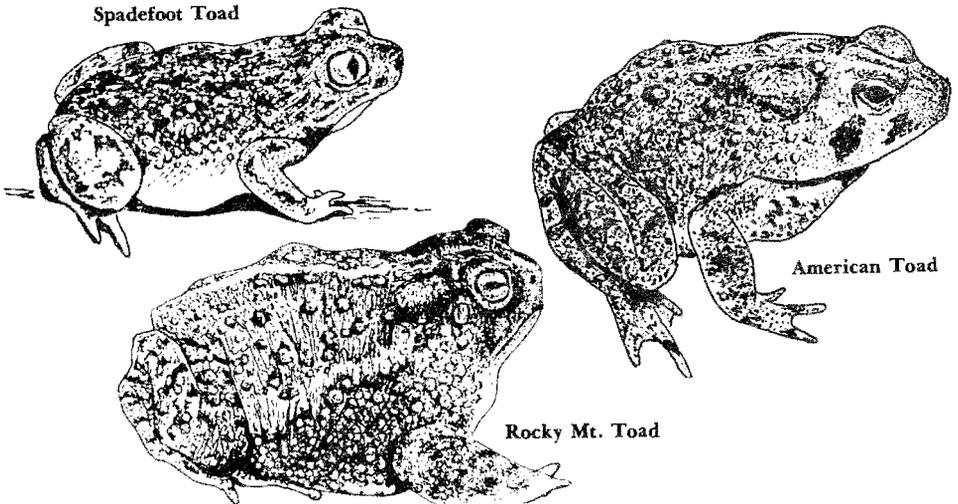
PLAINS SPADEFOOT (*Scaphiopus bombifrons*)

Size: 1½ to 2 inches (35-50 mm)

Distribution: All of Kansas, except southeast quarter; occurs more frequently in western half of state.

Identification: (1) eye pupils are cat-like, (2) snout round, (3) moist skin, (4) mottled gray pattern, (5) a black, sharp-edged, hard "spade" at base of each hind foot, (6) parotoid glands indistinct or absent.

Notes: Spadefoot Toads spend a large amount of time burrowed into the soil, the "spade" being utilized as a digging tool.



FAMILY BUFONIDAE

AMERICAN TOAD (*Bufo americanus*)

Size: 2 to 3½ inches (50-58 mm)

Distribution: Eastern one-fourth of Kansas

Identification: (1) round snouth, (2) dry skin, (3) bony crests between and behind eyes, (4) prominent parotoids that are closer than the length of one, (5) crests behind eyes usually separated from parotoids, but connected to tympanum, (6) belly is generally darkly spotted.

Notes: Some individuals are difficult to distinguish from some Woodhouse's Toads.

Voice is a long, high trill, extremely different from the short scream of the latter. American Toads are essentially woodland species.

WOODHOUSE'S (ROCKY MT.) TOAD (*Bufo woodhousei*)

Size: Large, 2½ to 4 inches (60-100 mm)

Distribution: Entire state, less frequent in southeast corner.

Identification: Much like American Toad, with the following exceptions (1) parotoids narrow and generally separated by more than the length of one, (2) bony ridge behind eyes does not contact tympanum, but is in contact with parotoids, (3) belly with no spots or a single spot in mid-breast, (4) a light stripe down center of back.

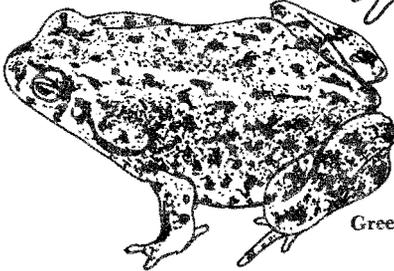
Notes: Voice is a short, harsh trill that sounds like a scream. These toads may be found anywhere, but are especially common along sandy stream bottoms; less frequent in wooded areas.

GREAT PLAINS TOAD (*Bufo cognatus*)

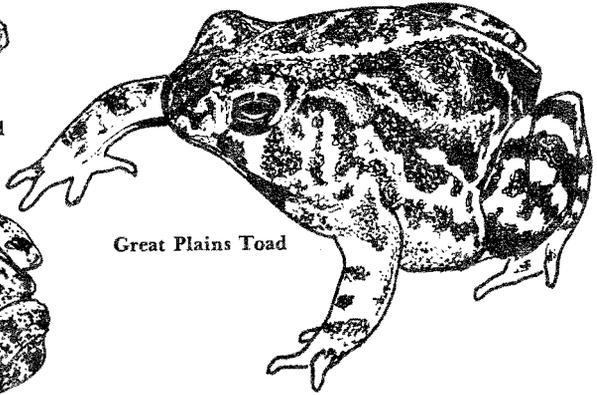
Size: 2 to 3½ inches (50-87 mm)



Red-spotted Toad



Green Toad



Great Plains Toad

Distribution: Western three-fourths of Kansas.

Identification: Like the preceding two species in general size and shape, but different in (1) bony crests join on front top of head to form a raised, flat platform - a "boss", (2) parotoid glands are oval and situated far apart, (3) large, paired dark blotches present on both sides of a light middorsal line, with light areas between the dark blotches, (4) belly light with few or no dark spots.

Notes: Found mostly in short and mixed-grass prairies and along floodplains; rarely in woodlands. The vocal sac is extremely elongated and balloon-like when inflated for calling.

WESTERN GREEN TOAD (*Bufo debilis*)

Size: Small, 1½ to 2 inches (37-50 mm)

Distribution: Extreme western Kansas on High Plains.

Identification: (1) dry skin, (2) round snout, (3) no bony crests between or behind eyes, (4) parotoids long, oval-shaped, may touch tympanum, (5) color is distinctive - green, with network of black spots or streaks.

Notes: Secretive and usually active at night; may be active in daytime when breeding. Opportunistic breeder in spring or summer during and following rains.

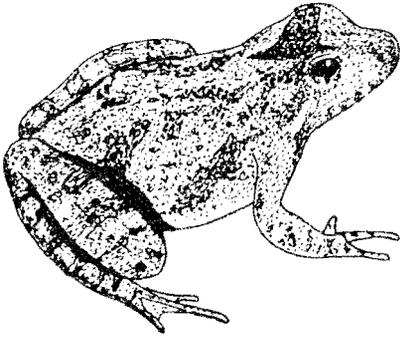
RED-SPOTTED TOAD (*Bufo punctatus*)

Size: Small, 1 to 2½ inches (25-62 mm)

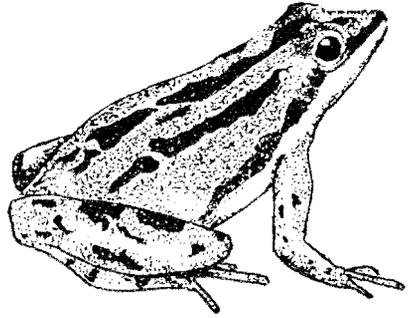
Distribution: Extreme south-central Kansas (Red Hills) and southwest corner.

Identification: (1) dry skin, (2) round snout, (3) no bony crests between or behind eyes, (4) parotoids are small and oval, (5) color is distinctive - brown or gray, usually with red spots or red or yellow tips on warts, belly yellow or white with dark spots.

Notes: Found in rocky canyon areas, active on surface during rains.



Cricket Frog



Western Chorus Frog

FAMILY HYLIDAE**BLANCHARD'S CRICKET FROG (*Acris crepitans*)**

Size: Small, $\frac{3}{4}$ to $1\frac{1}{4}$ inches (18-30 mm)

Distribution: Entire state, but less in extreme west.

Identification: (1) moist skin, (2) skin with many, scattered bumps, (3) dark and light vertical stipes on lips, (4) dark triangle between eyes with one point to rear, (5) white, green, or reddish stripe down back.

Notes: May be found on warm days of any month, except coldest. Prefers muddy edges of streams and ponds. Often jumps into water when disturbed, but usually swims back to the bank on the surface.

WESTERN CHORUS FROG (*Pseudacris triseriata*)

Size: Small, 1 to $1\frac{1}{2}$ inches (25-38 mm)

Distribution: Entire state, except southwest corner.

Identification: (1) moist skin, (2) skin is granular, (3) color light gray with three dark stipes on back - stripes may be broken into several parts, (4) belly white, (5) dark stripe through eye from snouth along lower sides, (6) lips white.

Notes: Begins calling mid-March. The call is distinctive (see Vocalizations).

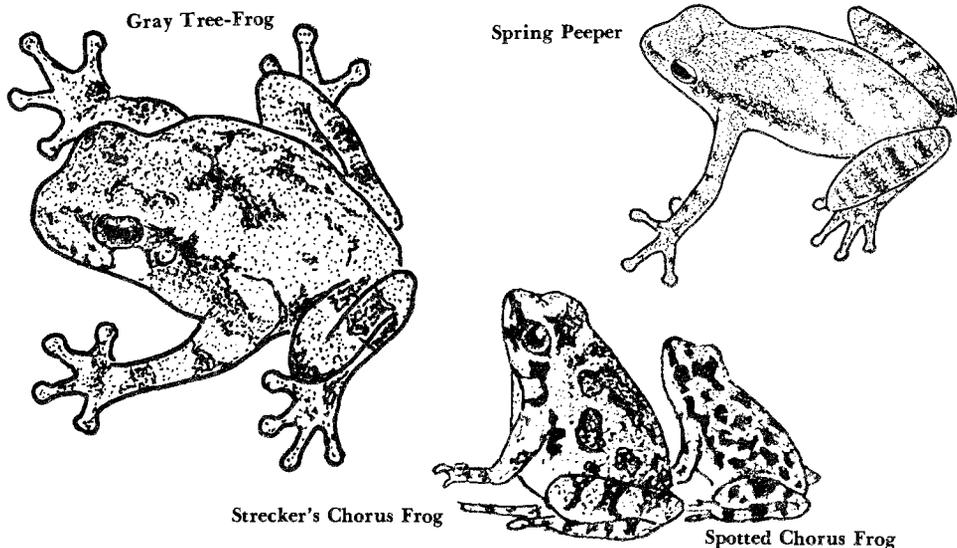
SPOTTED CHORUS FROG (*Pseudacris clarki*)

Size: Small, $\frac{3}{4}$ to $1\frac{1}{4}$ inches (18-30 mm)

Distribution: South-central Kansas, extending northward three-fourths up the state; not quite reaching either corner along Oklahoma line.

Identification: Very much like the Western Chorus Frog, but with scattered, dark-edged, light green spots instead of stripes. Sometimes there is a dark triangle between eyes.

Notes: Lives in grassland and woodland edges.



STRECKER'S CHORUS FROG (*Pseudacris streckeri*)

Size: 1 to 1¼ inches (25-43 mm)

Distribution: Rare in Kansas, found only along Oklahoma line in south-central Kansas.

Identification: (1) moist skin, (2) scattered dark spots that are light-edged, (3) dark stripe through eye that ends before front legs, (4) dark spot below front of eye.

Notes: Not much is known about this frog in Kansas.

GRAY TREEFROG (*Hyla versicolor*; *Hyla chrysoscelis*)

Size: 1½ to 2 inches (38-50 mm)

Distribution: Kansas east of the Flint Hills.

Identification: (1) moist, granular skin, (2) square, white spot below eye, (3) all toes have enlarged tips, (4) backside of hind legs is yellow-orange.

Notes: As name implies, color change can be pronounced, from plain green to gray with dark markings on back. Fine climber. Apparently two species in Kansas that are difficult to tell apart.

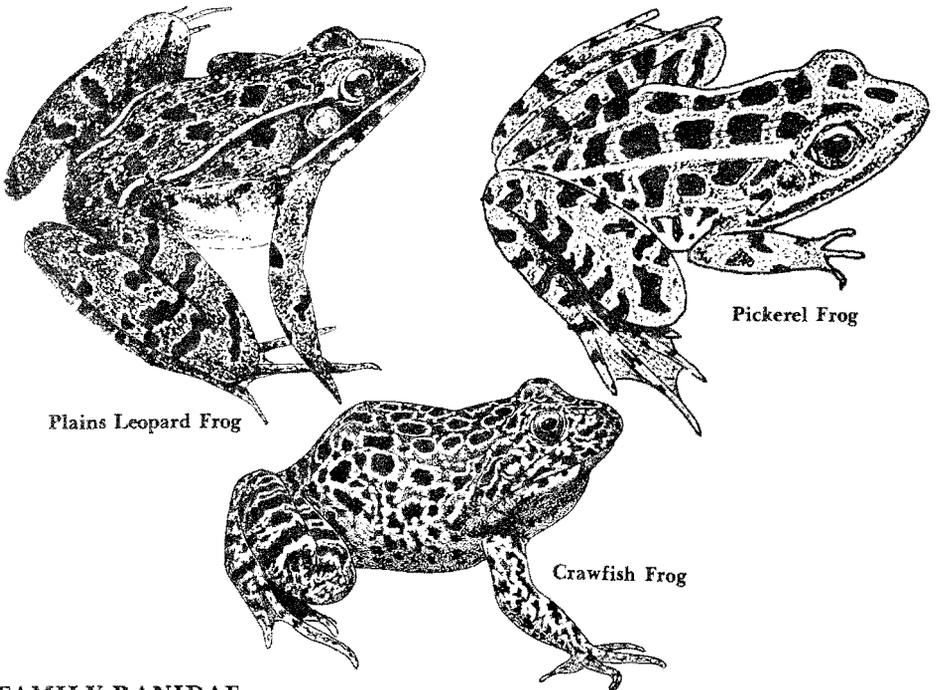
NORTHERN SPRING PEEPER (*Hyla crucifer*)

Size: Small, ¾ to 1¼ inches (18-30 mm)

Distribution: Only in counties adjacent to Missouri south of Kansas City.

Identification: (1) moist skin, (2) dark X-shaped pattern on back, (3) tips of all toes are enlarged.

Notes: This is a woodland frog which spends most of its time climbing in vegetation. Its call is a single, high, "peep" note.



Plains Leopard Frog

Pickerel Frog

Crawfish Frog

FAMILY RANIDAE**PLAINS LEOPARD FROG (*Rana blairi*)**

Size: 2 to 4 inches (50-100 mm)

Distribution: Statewide.

Identification: (1) moist skin, (2) a green frog with a yellow-green stripe on each side of back, this line is on a ridge which is broken near rear leg, (3) large, dark scattered spots on back and sides; stripes on hind legs, (4) hidden surface of hind legs white.

SOUTHERN LEOPARD FROG (*Rana utricularia*)

Size: 2 to 4 inches (50-100 mm)

Distribution: Southeastern quarter of the state.

Identification: Very similar to the Plains Leopard Frog, except that the yellow ridge along each side of the back is unbroken.

Notes: Hybridizes with Plains Leopard Frog.

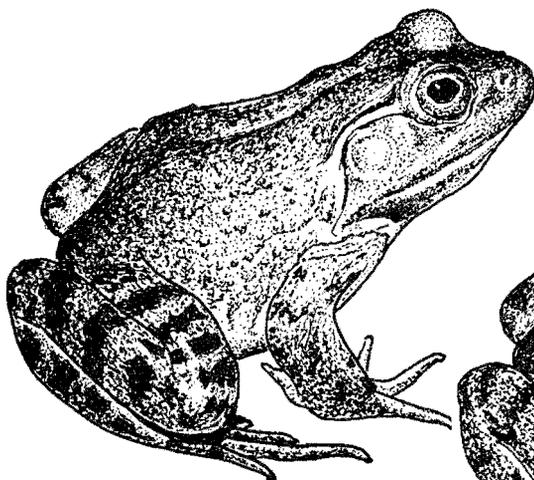
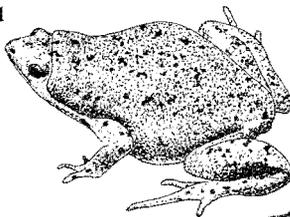
NORTHERN CRAWFISH FROG (*Rana areolata*)

Size: 2½ to 3½ inches (62-87 mm)

Distribution: East of the Flint Hills and south of the Kansas River.

Identification: General shape much like Leopard Frog, but pattern is quite different - head, back, and sides are covered with round, dark spots, each outlined broadly with white. Dark lines form a reticulate pattern between the spots.

Plains Narrowmouth Toad



Bullfrog



Green Frog

Notes: This frog live in crawfish (crawdad) burrows and is very secretive. It has been designated a "Threatened Species" and is protected by law.

PICKEREL FROG (*Rana palustris*)

Size: 2 to 3 inches (50-75 mm)

Distribution: Found only in extreme southeastern corner of Kansas.

Identification: Shape and general markings are like Leopard Frog, except that spots on back are squarish and are arranged in two rows, and underside of hind legs is yellow.

Notes: Skin glands produce a toxic, irritating substance. This frog is common southeast of Kansas, but rare in our state.

BULLFROG (*Rana catesbeiana*)

Size: Large, 5 to 6 inches (125-150 mm)

Distribution: Statewide, but less common in western part of state.

Identification: (1) moist skin, (2) color is uniform brown or green, with varied darker markings that generally are indistinct. Usually numerous tiny dark spots; stripes on hind legs, (3) raised fold of skin from rear of eye over and behind tympanum which does not continue along side of back.

Notes: Tympanum of male conspicuously larger than that of female. This frog is a game species with limits and seasons placed on its capture — also a fishing license is required.

GREEN FROG (*Rana clamator*)

Size: 2½ to 3½ inches (63-88 mm)

Distribution: Rare in Kansas. It has been taken only along Missouri line south of Kansas City to southeast corner of state.

Identification: Much like a small Bullfrog in color and pattern, except that the raised ridge from rear of eye extends along the sides of the back to near hind legs.

Notes: So few of these frogs have been found in Kansas that not much is known about them in the state, but they are abundant throughout the southeastern USA. The banjo-like call is quite distinctive.

FAMILY MICROHYLIDAE**EASTERN NARROWMOUTH TOAD (*Gastrophryne carolinensis*)**

Size: ¾ to 1¼ inches (18-21 mm)

Distribution: Found only in the extreme southeastern corner of Kansas.

Identification: (1) moist skin, (2) body fat, with small, pointed head, (3) fold of skin across back of head, (4) dorsal color brown with scattered darker spots; there may be a light line down the back, (5) belly whitish, with network of dark markings.

Notes: Not much known of this species in Kansas, but it is common to the southeast, where it lives under surface cover in moist places. Food is exclusively ants.

PLAINS NARROWMOUTH TOAD (*Gastrophryne olivacea*)

Size: ¾ to 1½ inches (18-38 mm)

Distribution: Eastern two-thirds of Kansas.

Identification: Just like the Eastern Narrowmouth Toad, except that the color is olive or tan with scattered tiny dark spots (if present) and belly is whitish and without markings.

Notes: Most of the time spent under rocks in soil that has some moisture, in open areas or woodland edge. Food is almost exclusively ants.

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Help Kansas' Nongame Wildlife

Have you ever thought of a future world without a robin's morning song? or a walk in the field under a hawkless sky? perhaps a picnic in a woods where no wild sounds of nature exist?

Our lives would surely be poorer.

Now, we can all help a future richer for wildlife, and ourselves as well. An act by the 1980 Kansas Legislature has provided a small space on your state income tax form so that you can help. You may designate \$1, \$5, \$10, or any amount you choose for the new Nongame Wildlife Fund. Your designated share will either come out of your tax refund, or be added to the taxes you owe. Either way, it is an opportunity for you to help support nongame wildlife conservation in Kansas.

Until now, it has been the license dollars of hunters and fishermen and the excise tax on their equipment that has been the sole source of funds to pay for wildlife management in Kansas. The sportsman's money has gone toward game species. Nongame wildlife has not had any sponsors. But because all Kansans benefit from nongame wildlife, we all now have the opportunity to help these critters, and by doing so, assure a quality life for our future, too.

REMEMBER — your contribution is tax deductible for the following year.

How Your Contribution Will Be Used

The Nongame Wildlife Fund will be under the jurisdiction of the Kansas Fish and Game Commission. Additionally, a Citizen's Advisory Committee — independent of Fish and Game — has been established to assist as a public "sounding board" and to help set priorities for nongame conservation projects. Members of the citizen's committee are representative of nearly all nongame interests in Kansas.

Some preliminary long-range plans call for:

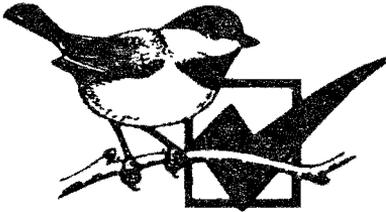
- development of urban wildlife improvement programs for city parks and your own back yard
- identification and acquisition of unique or critical habitat areas for nongame species and public enjoyment
- stepped up participation in national studies for endangered species which occur in Kansas such as the bald eagle, whooping crane, and peregrine falcon
- determining population status and life history profiles of Kansas' own species considered rare or endangered
- dissemination of educational materials to schools and the interested public on Kansas' nongame wildlife resources
- development of observation areas and nature walks for more public use of our nongame resources.

For more information on the Nongame Wildlife Fund contact the Fish and Game Commission, RR 2, Box 54A, Pratt, Kansas 67124.

Kansas School Naturalist
Emporia State University
1200 Commercial Street
Emporia, Kansas 66801

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DO SOMETHING WILD!



**Make your mark
on your
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for
Nongame Wildlife
Conservation in Kansas**

What is nongame wildlife?

Any species of wild animal life that is not considered as a sport, or game species typically sought by hunters or fishermen, is nongame wildlife. Rare and endangered species are nongame wildlife, but so are the more common animals among the almost 700 species found in Kansas, from chickadee to herons, from minnows to tree frogs. Along with our game species such as pheasant and deer, each has a vital role in the interacting web of life.