

US EPA ARCHIVE DOCUMENT

## **APPENDIX C**

# **OXYCHEM SENSITIVE SNAKE EDUCATION AND MANAGEMENT PLAN**

**OCCIDENTAL CHEMICAL CORPORATION ETHANE CRACKER AND MARKHAM  
ETHYLENE PIPELINE PROJECT  
SENSITIVE SNAKE EDUCATION AND MANAGEMENT PLAN**

This document outlines the protection guidelines that will be implemented during clearing operations for threatened and endangered (T&E) state-listed snakes and state-listed rare snakes which may be encountered during construction of the Project, inclusive of the Occidental Chemical Corporation (OxyChem) Ethane Cracker Facility, Markham Ethylene Pipeline (MEP) Corridor, and the San Patricio Pipeline (SPP) Corridor Project. It identifies the role of a qualified biologist during clearing activity and provides educational material and guidelines for construction personnel to follow in case they encounter a listed or non-listed snake. The plan has been prepared in accordance with US Fish and Wildlife Service's request to ensure the Project avoids impacts to listed snakes and reduces non-listed snake fatalities during construction.

**ON-SITE EDUCATION MATERIALS**

Information pamphlets will be provided to individuals in charge of the clearing operation for distribution to all construction crews. The pamphlets will provide listed snake photographs, and brief background information on identification, habitats, and protection of such listed snakes. The pamphlets will state actions to take if a listed snake is sighted and the names and numbers of contact persons.

## PAMPHLET INFORMATION

### ACTIONS TO TAKE IF A LISTED SNAKE IS SIGHTED DURING CONSTRUCTION

If a federally or state-listed snake is observed during construction, do not disturb it. Any disturbance of the snake's activity is prohibited. If such a snake is sighted, construction should cease and the Project biologist should immediately be contacted. The snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the federally or state-listed snake. Construction can resume after the snake has moved from the construction area or has been relocated by a qualified wildlife biologist.

Sightings of listed snakes should be reported immediately to the following:

1. **Tetra Tech, Inc. Project Biologist**  
Phone: \_\_\_\_\_
2. The qualified biologist will contact the following agency personnel

#### **U.S. Fish and Wildlife Service**

Ms. Mary Orms  
Corpus Christi Ecological Services Field Office  
6300 Ocean Drive, Unit 5837  
Corpus Christ, Texas 78412-5837  
Office Telephone: (361) 994-9005

#### **Texas Parks and Wildlife Department**

Mr. Russell Hooten  
NRC Building, Suite 2501  
6300 Ocean Drive, Unit 5846  
Corpus Christi, Texas, 78412  
Office Telephone: (361) 825-3240

### ACTIONS TO TAKE IF A DEAD LISTED SNAKE IS SIGHTED DURING CONSTRUCTION ACTIVITY

1. Promptly notify the Project's biologist:  
**Tetra Tech, Inc.**  
Phone: \_\_\_\_\_
2. The qualified biologist will contact the following agency personnel:

#### **U.S. Fish and Wildlife Service**

Ms. Mary Orms  
Corpus Christi Ecological Services Field Office  
6300 Ocean Drive, Unit 5837  
Corpus Christ, Texas 78412-5837  
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Corpus Christi, Texas, 78412  
Office Telephone: (361) 825-3240

The snake specimen should be thoroughly soaked in water and frozen immediately and provided to TPWD.

### ACTIONS TO TAKE IF OTHER SNAKES ARE SIGHTED DURING CONSTRUCTION

Many species of snakes will bite (both venomous and non-venomous snakes), but usually only in circumstances in which they are threatened. This includes when they are handled, or cornered, or both. **The best way to avoid snake bites is to watch where you step and to not handle them.** Keeping a distance from snakes is recommended so they are allowed to leave the construction area where they are out of harm's way.

Additionally, snakes are known to rest on low hanging (at eye level) limbs/branches of trees or low branches of shrubs. If such features are encountered during construction, limbs and branches should be examined for presence of snakes.

A common myth is that juvenile venomous snakes aren't able to control their bites and are therefore more dangerous than adults. There are two things to consider in venomous snake bites: the potency of the venom and the amount of venom injected. Juveniles are small and produce very little venom. The components of a snake's venom can change from juvenile to adult, so a juvenile's venom has the potential to be more toxic, but the amount of venom injected is still small (personal communication with Curtis Schmidt, Zoologist at the Sternberg Museum in Hays, Kansas).

If you think you have been bitten by a venomous snake, it is best to remain calm and at rest to slow the spread of venom throughout your body. Also, not all venomous snake bites contain venom. Sometimes a venomous snake will bite in warning without injecting any venom. Bites that include venom are sometimes referred to as "hot" bites. Regardless, have someone transfer you to the nearest medical facility as soon as possible. You will have a few hours of buffer time before the wound becomes critical. If possible, identify the venomous snake that has bitten you to ensure quick administration of the most appropriate anti-venom.

### DISCLAIMER

The pictures provided in this guide are illustrative of the snakes you might encounter, but keep in mind that **the appearance of these snakes can vary throughout their range.** Sometimes these variances are small changes in color or pattern, while other times the variances are quite noticeable. If you or a coworker is bitten but not sure of the identity of the snake, try and provide as complete of a description as possible to the doctor. This information could be very important at ensuring the most appropriate anti-venom is administered.

## TEXAS LISTED SNAKES

State-listed T&E snakes with the potential to be encountered during construction of the Project include: the Smooth Green Snake, Texas Indigo Snake, the Texas Scarlet Snake, and the Timber (Canebrake) Rattlesnake. These snakes are protected under Title 5 Sections 67.001 – 68.021, Texas Threatened and Endangered (T&E) Species Regulations (amended 1977), Parks and Wildlife Code. **It is unlawful for anyone to injure, harm, harass, or kill these species. Persons who knowingly violate provisions of the Regulations that afford these species protection may be subject to fine and/or imprisonment.** Only the Project's qualified biologists may come in contact with or relocate listed snakes.

The Gulf Salt Marsh Snake, a state-listed rare species, may also be encountered during Project construction. A species is considered rare when it is at serious risk of becoming threatened or endangered. In the case of the Gulf Saltmarsh Snake, the main threat that could cause this species to become listed as a T&E species is loss of its coastal wetland habitat.

The below information provides a description/characteristics of each listed snake and the habitat in which it is typically found.

### SMOOTH GREEN SNAKE

#### Description

The **smooth green snake** (*Liochlorophis vernalis*) is a **non-venomous** state-listed threatened species. This species is a slender, bright green snake and is small to medium in size, reaching lengths of 11 to 26 in (27.9 to 66 cm). It has smooth dorsal (back) scales (15 rows at mid-body) and it has a white to yellowish ventral (belly) surface. Some regions will occasionally contain tan, light brown, or olive-colored individuals. Juveniles are dark olive grey above and hatchlings are grey or brown above. Adults will turn blue or grey after death. The head is slightly wider than the rest of the body. Each nostril is located in the center of a single scale and the anal scale is divided. The smooth green snake has a single anterior temporal scale on each side of its head.



Photographs of the non-venomous smooth green snake.

### Habitat/Behavior

The smooth green snake can be found in meadows, mountain shrublands, bogs, marshes, moist grassy fields near forest edges, stream borders, open moist woodland, vacant lots, and abandoned farmland. It can be found hibernating in abandoned ant mounds. They are mostly found either climbing low bushes or on the ground, but they can be found basking on or hiding under rocks, logs, and debris.

This snake is typically active throughout its range from April through October and they tend to be solitary. In the northern reaches of its range, the smooth green snake will hibernate with other smooth green snakes as well as other snake species. Anthills and abandoned rodent burrows are preferred hibernacula. This species is most active during the day, but it is more active in the morning and evening during hot weather months.

Smooth green snakes mate in spring and early summer. The female will lay three to 13 cylindrical eggs under rocks or logs, in rotting vegetation, or in shallow burrows. The species is known to share nest sites, with each female laying her eggs in a single nest. The eggs are laid from June through September and they hatch from August to September, taking four to 30 days to hatch, depending on the ability of the females to retain the eggs and incubate them in their body. This species reaches sexual maturity at two years of age.

### Threat

Habitat loss and degradation is a major cause of this snake's decline. The smooth green snake is insectivorous (feeds on insects) and is highly vulnerable to insecticides that are widely sprayed in agricultural areas. If a smooth green snake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated by a qualified biologist.

## **TEXAS INDIGO SNAKE**

### Description

The **Texas indigo snake** (*Drymarchon corais erebennus*) is a **non-venomous** state-listed threatened species. This species is predominantly black in color, with a high sheen which gives the scales a noticeable iridescence. The underside is often a salmon pink color. Texas indigo snakes are large, regularly attaining lengths beyond 6 feet (1.8 m), with specimens known up to 8 feet (2.4 m) long.



Photographs of the non-venomous Texas Indigo Snake.

#### Habitat/Behavior

Texas indigo snakes prefer lightly vegetated areas not far from permanent water sources, but are also found in mesquite savannah, thornbrush-chaparral woodlands, open grassland areas, coastal sand dunes, and in suburban and irrigated croplands. They den in burrows left by other animals.

The Texas indigo snake is active during the day and spends most of its time actively foraging for prey. Because of its aggressive attacks on rattlesnakes, many farmers in southern Texas consider it a useful ally. The Texas Indigo Snake is not typically aggressive toward humans; however, it may bite or release a foul smelling musk if handled or harassed. Although not a rattlesnake, the snake is known to shake its tail as a warning even though it does not possess a rattle.

Breeding takes place, generally yearly, in the winter. Clutches that average 10-12 eggs are laid in the spring, and hatch around 80 days later. Hatchlings can be up to 26 inches (66 centimeters) long.

#### Threat

During construction, Texas indigo snakes may be found in created brush piles, under rocks or logs, or on equipment in early morning hours where they sought a warm location upon shut-down of equipment the night before. If a Texas indigo snake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated by a qualified biologist.

### TEXAS SCARLET SNAKE

#### Description

The **Texas scarlet snake** (*Cemophora coccinea linei*) is a **non-venomous** state-listed threatened species. The species **resembles the venomous coral snake** (*Micrurus fulvius*), but it has a red snout, whereas the coral snake's snout is black. Its color is about the same as the coral snake; however the pattern of color is different. The Texas scarlet snake pattern is yellow adjacent to black instead of yellow adjacent to red as is true for coral snakes (hence the saying "when red meets yellow, you're a dead fellow" regarding the venomous coral snake). The Texas scarlet snake's pattern is similar to



the Louisiana milk snake (*Lampropeltis triangulum amaura*), red-black-yellow-black. It has a gray or white background color, with distinct red blotches that have black borders. Unlike other subspecies, the black borders do not join on the sides. Its belly is a solid white or gray.

#### Habitat/Behavior

The Texas scarlet snake is a secretive burrower, spending most of its time underground. It prefers sandy thicket habitats along the Gulf of Mexico coastline. It also commonly inhabits pinewoods, dry prairies, salt grass prairie, maritime hardwood hammock, and sandy areas or loamy well-drained soils. It is seldom seen above ground. Individuals are sometimes found under rocks or in or under logs and can reach 32 inches (81.3 centimeters) or 2.7 feet (0.8 meters) in length.

The snake is inactive in cold weather. It is most active at night, though diurnal (daytime) activity is known. This species of snake is active aboveground from May to early August in northeastern Texas, where activity is stimulated by summer rains. Eggs are laid under moist humus or in other underground sites (in June-July, hatching in late summer).

#### Threat

Texas scarlet snakes are often mistaken for coral snakes (below) and killed. If a Texas scarlet snake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated by a qualified biologist.



Photographs of the non-venomous Texas scarlet snake, which is often mistaken for a venomous coral snake (see below photographs) and killed.



Photographs of the venomous coral snake. The yellow and red coloring on a coral snake is adjoining, whereas on a Texas scarlet snake, the yellow and red are separated by black (the red NEVER meets the yellow). Texas scarlet snakes have red color at the tip of their faces, whereas coral snakes have black color at the tip of their faces.

### TIMBER (CANEBRAKE) RATTLESNAKE

#### Description

The **timber or canebrake rattlesnake** (*Crotalus horridus*) is a **venomous** pit-viper that is state-listed as threatened. These snakes have wide heads and narrow necks – a typical distinction of all venomous snakes except coral snakes. The timber rattlesnake has a pit on each side of its face between (but lower than) its eye and nostril. The pupil of its eye is vertical (similar to other venomous snakes) and its eye is typically bright yellow. The color pattern of this snake varies geographically, but almost always has dark crossbars (approximately 20 to 29 dark, V-shaped) with jagged edges that form a distinctive pattern across its back. In Texas, it has a heavy, light yellow, gray or greenish-white body with a rust-colored strip along the length of its back, and a black tail tipped with rattles. A horny rattle or button exists on the end of its tail. Adult timber rattlesnakes reach a length of 36 to 40 inches (91.4 to 101.6 centimeters), and weigh 1.3 to 2 pounds (0.6 to 0.9 kilograms).



Photographs of the venomous timber (canebrake) rattlesnake.

#### Habitat/Behavior

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. They are found in upland woods and rocky ridges in the eastern third of Texas. Underground crevices provide retreats for

overwintering, such as a fissure in a ledge, a crevice between ledge and ground, talus (rock slide) below a cliff, open skree slope (fallen rocks not associated with a cliff), or fallen rock (talus or skree) partly covered by soil. The snake is active during the day during spring and fall and becomes active at night during the oppressive heat of summer. In Texas, the snake spends 2-3 months at overwintering dens but occurs on the surface during warm periods throughout the winter.

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 bitten by the timber rattlesnake, seek immediate medical attention.

#### Threat

Habitat destruction is the leading threat to timber rattlesnakes. Timber rattlesnakes are killed out of fear. The non-venomous Eastern hognose snake (*Heterodon platirhinos*) is commonly mistaken for the timber rattlesnake (see photograph below) and killed. The timber rattlesnake differs from non-venomous snakes of similar appearance by having a pit on each side of the face in front of and below the eye (see photographs below).



**Photographs of the non-venomous Eastern hognose snake (left) and the venomous timber rattlesnake (right). The Eastern hognose snake does not have the vertical pupil nor does it have a pit in front and below the eye as is clearly visible on the timber rattlesnake. The timber rattlesnake photograph provides an example of how snakes can vary in appearance throughout their range (compare to photographs of timber rattlesnake on the previous page of this pamphlet).**

If a timber rattlesnake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated.

## GULF SALT MARSH SNAKE

### Description

The **Gulf salt marsh snake** (*Nerodia clarki clarki*) is a **non-venomous** state-listed rare snake. It grows to a length of 15 to 30 inches (38.1 to 76.2 centimeters). Distinguishing characteristics of this snake include two longitudinal tan or yellow stripes on each side of the body, making up the top pattern of the snake. It has a reddish-brown or grayish-black bottom color with one to three rows of large pale spots along the center of the belly. This snake is flat headed.



Photographs of the non-venomous Gulf salt marsh snake.

### Habitat/Behavior

This striped water snake occurs almost exclusively in salt-water habitat. Its markings are similar to those of the garter snake (*Thamnophis sirtalis*). Gulf salt marsh snakes inhabit coastal salt marshes and brackish estuaries. They usually are not found in freshwater environments. These snakes are active primarily at night, and hide in wrack lines and vegetation during the day.

### Threat

The Gulf salt marsh snake is often killed, along with other water snakes, out of fear of mistaken identity as cottonmouth snakes (*Agkistrodon piscivorous*). The Gulf salt marsh snake does not resemble the appearance of a cottonmouth snake (see photograph below). In addition to the threat of being killed due to mistaken identity, the Gulf salt marsh snake is also considered rare (high likelihood of becoming threatened or endangered) due to loss and degradation of coastal habitat.



**Photograph of a venomous Cottonmouth Snake.**

If a Gulf salt marsh snake is encountered during construction, the snake should be allowed sufficient time to move away from the site or be relocated by a qualified wildlife biologist before construction or clearing is resumed. Only a qualified wildlife biologist is permitted to come in contact with the snake. Construction can resume after the snake has moved from the area or has been relocated.

The best way to avoid the venomous cottonmouth snake is to watch where you step and to not handle them. If the venomous cottonmouth snake is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

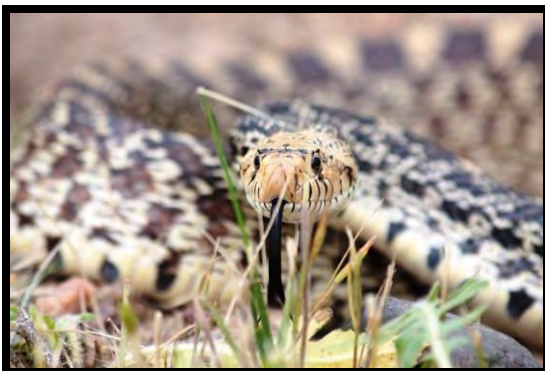
#### **OTHER SNAKES OF INTEREST**

The following snakes might also be encountered during the construction of the Project. Some of the snakes listed below are venomous. Other snakes listed below are non-venomous, but resemble and/or behave like venomous snakes. Please familiarize yourself with these snakes so that no harm comes to you or the snakes. None of the following snakes are federally- or state-listed species. However, they might be encountered during construction and should not be harmed.

## BULLSNAKE

### Description

The **bullsnake/gopher snake** (*Pituophis catenifer sayi*) is a **non-venomous** snake. These snakes are beige to light brown and they have dark brown or black blotches. The ventral side of this snake is yellow with black spots. Bullsnares are heavy-bodied and can reach lengths of 3 to 5 feet (0.9 to 1.5 m).



Photographs of the non-venomous Bullsnares. This is an adult from Northwestern Kansas.

### Habitat/Behavior

Bullsnares are found in brushlands, grasslands, and the sandy soils of fields. These snakes are active during the day, but become more active during the nights of the summer.

These snakes are known to be quite variable in temperament. Some are incredibly docile while others will act very defensively towards anyone who approaches too closely. They can hiss very loudly and even pose in an S-shaped curve. These displays can be very alarming, but they will not strike unless severely provoked. Their patterning and defensive postures might initially resemble a rattlesnake's, but they do not have the characteristic "triangular" shaped head, pits between the eyes and nostrils, or a rattle, nor do they contain venom.

### Threat

Aside from being killed due to mistaken identity from their similarity in appearance and/or behavior like venomous snakes, bullsnares tend to move slowly and bask on roadways. This results in an additional threat to this species through vehicular strikes and subsequent mortality.

## COPPERHEAD

### Description

The **copperhead** (*Agkistrodon contortrix*) is a **venomous** pit viper. An adult can reach 24 to 26 inches (61 to 66 centimeters) in length. Like many other venomous snakes, they have a wide head and a narrow neck. This species has yellow eyes with vertical pupils and heat sensing "pits" between the eyes and nostrils. The body is typically pale brown or light tan and many times will have a pinkish tint. This snake has a pattern of dark, hour glass-shaped bands across its dorsal surface. This patterning helps the snake to blend well into areas with leaf litter. The copperhead has rough scales.



Photographs of the venomous Copperhead. This individual is a juvenile from North Texas.

#### Habitat/Behavior

Copperheads prefer to hide in the leaf litter, logs, and branches of wooded lowlands and mixed pastures. They are usually found in river bottoms. They can also be found in wooded suburbs.

This snake is diurnal (active during the daytime) during the early spring and late fall. During the summertime, they are nocturnal (active during the nighttime) and prefer to hunt during the evening.

#### Threat

The copperhead is a venomous snake that blends well into its surroundings. The best way to avoid the venomous copperhead is to watch where you step and to not handle them. If the venomous copperhead is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

### **LOUISIANA MILK SNAKE**

#### Description

The **Louisiana milk snake** is a **non-venomous** snake. The Louisiana Milk Snake reaches lengths of 16 to 24 in (40.6 to 61 centimeters). Like the Texas scarlet snake (see above) it mimics the appearance of the venomous coral snake. It has bands of red, black, and yellow, but unlike the coral snake, the bands are black-red-black-yellow-black. The red bands are solidly colored and wider than either the black or yellow bands. It has a slightly pointed black head and shiny scales.

#### Threat

Due to its similarity in appearance to coral snakes, Louisiana milk snakes are often killed. A helpful saying to distinguish between the non-venomous Louisiana milk snake and the coral snake is "Red and Black, Friend of Jack; Red and Yellow, Kills a Fellow".



Photographs of the non-venomous Louisiana milk snake. Compare to the photographs of the coral snake (see below photographs) and note that the milk snake has red touching black, NEVER red touching yellow.



Photographs of the venomous coral snake. The non-venomous Texas scarlet snakes and Louisiana milk snakes are often mistaken for coral snakes. The yellow and red coloring on a coral snake is adjoining whereas on the Louisiana milk snake, the yellow and red are NEVER adjoining.

The best way to avoid the non-venomous Louisiana milk snake is to watch where you step and to not handle them. If this non-venomous snake is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

#### WESTERN DIAMOND-BACKED RATTLESNAKE

##### Description

The **Western diamond-backed rattlesnake** (*Crotalus atrox*) is a **venomous** pit viper. It has a wide head and a narrow neck. The snake can reach between 3.5 to 4.5 feet (1.1 to 1.4 m) long. It has brown diamond-shaped markings on its dorsal surface and an alternating pattern of black and white bands before the rattle on its tail.





Photographs of the venomous western diamond-backed rattlesnake. This individual is a juvenile from North Texas.

#### Habitat/Behavior

Western diamond-backed Rattlesnakes can be found in a large variety of habitats. These include arid and semiarid regions, plains, mountains, sandy flats, rocky uplands, desert, grassland, shrubland, woodland, open pine forest, river bottoms, and coastal islands. It will utilize animal burrows, rock crevices, and cavities. It can also be found climbing vegetation or entering water.

This snake is diurnal during the cooler months and mostly crepuscular (active during dawn/dusk) and nocturnal during hot summer months.

#### Threat

Western diamond-backed rattlesnakes are killed out of fear because they are venomous snakes. The best way to avoid this snake, as with other snakes, is to watch where you step and to not handle them. If this snake is encountered during construction, do not approach it. Walk away from it and allow it sufficient time to move away from the construction area and out of the way of construction personnel and equipment.

### **YELLOW-BELLIED KINGSNAKE**

#### Description

The **yellow-bellied kingsnake/prairie kingsnake** (*Lampropeltis calligaster*) is a **non-venomous** snake. This medium-sized snake has smooth scales, a thick neck, and a cylindrical head. The color pattern is variable. The dorsal surface can be tan, grayish-brown, or yellowish-brown and has black-edged, dark brown to reddish brown or greenish blotches along the back. It also has two alternating rows of smaller, less distinct blotches on the sides. The top of the head has a V-shaped marking. This snake typically reaches lengths of 30 to 42 inches (76.2 to 106.7 centimeters).



Photographs of the non-venomous yellow-bellied kingsnake.

#### Habitat/Behavior

This snake can be found in a variety of open or semi-open areas. These can include farmland, pastures, prairies, open woodland, sandhills, barrier beaches, coastal salt-grass savannas, marshes, residential areas, rocky hillsides, and thickets. This species is crepuscular in the spring and fall and nocturnal in the summer.

#### Threat

The yellow-bellied kingsnake has coloration, patterning, and even behaviors similar to some rattlesnake species. This snake will even shake its tail in leaf litter if it feels threatened, giving a “rattle” sound. However, unlike the rattlesnakes it is trying to mimic, this species does not have the characteristic triangular head, pits between the eyes and nostrils, nor does it have a rattle.

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