

Amphibians and Reptiles

With the great variety of habitats along the San Mateo coast, it is not surprising that over 33 species of amphibians and reptiles can be found here. Some of the more common and/or interesting species are discussed in this chapter.

Amphibians

Amphibians were the first vertebrates to face the rigors of life on land. They solved locomotion and air breathing problems but remained vulnerable to the dehydrating effects of terrestrial existence and were never able to divorce themselves completely from the aquatic environment. However, they gave rise to reptiles, whose scaly skin and shelled eggs offered protection against excessive water loss, thus enabling them to advance into an unoccupied arid environment.

Frogs and toads, salamanders, and tropical caecilians are the major kinds of living amphibians.

- A typical frog (*Rana*) differs from a toad (*Bufo*) in having longer hind legs, a smoother skin, and no large glands on the neck.
- Frogs differ from salamanders in lacking a tail and in having enlarged hind legs fitted for jumping.
- Salamanders resemble lizards, but they lack claws and have a moist skin without scales.
- Caecilians are legless and worm-like.

Like reptiles, amphibians are “cold-blooded.” When on land, they are often cooler than their surroundings because of water evaporation from the skin. The skin is smooth or warty, without scales, and usually well supplied with mucous and poison glands.

The wet skin and, in most species, lungs function in breathing. Because these animals lack a watertight body covering, water passes freely in through the skin. An amphibian will soon dry up if it does not have access to water, and certain land-dwelling salamanders may become water-logged if forced to stay in water. Some species maintain the proper water content by moving in and out of water and from moist to dry places on land.

Most amphibians have an aquatic larval stage. The western spadefoot toad illustrates the usual life cycle. Many jelly-coated eggs, sometimes more than 2,000 by a single female, are laid in fresh water. These eggs hatch into tadpoles that breathe by means of gills. They feed chiefly on plants, small animals, and decaying matter in the water. Later, the limbs appear, the gills are replaced by lungs, and the tadpole changes into a toad that, for a time, may retain the remnant of a tail. After a period of growth, the spadefoot returns to water to breed. Not all amphibians go through this cycle. Some lay their eggs on land, and the young hatch fully formed, whereas other amphibians are completely aquatic.

Salamanders

Ensatina (*Ensatina eschscholtzi*)

Three to five inches long; usually uniformly brown or reddish brown, though may be darker or have light spots. It is the only salamander with a tail that is narrower at its base and five toes on the hind feet. It lays its eggs underground and does not have an aquatic phase. It may remain active after the fall rains until May or through June in high or northern locales. Found under rocks and rotted logs in damp forest areas and shaded canyons. In cold to dry weather, retreats into caves, animal burrows, and between roots and logs. If threatened it takes a stiff-legged, sway-backed stance, with an arched and elevated tail, which easily snaps off if seized. May live 10-15 years.

Habitat: Douglas fir, redwoods, chaparral, coast live oak.

Food: Spiders, crickets, and beetles.

Rough-skinned Newt (*Taricha granulosa*)

Five to eight inches long, light brown to brownish-black above with an orange or yellow belly. Newts breed when the winter rains begin, moving from their forest home to ponds and streams and laying eggs on aquatic plants or twigs. Road signs in Butano State Park warn “Slow Newt Crossing.” Poisonous neurotoxins widespread in its body can cause skin irritation if handled or death if eaten in sufficient quantity. They can live up to 20 years. Newts are a subgroup of salamanders. That is, all newts are salamanders, but not all salamanders are newts.

Habitat: Slow-moving streams, lakes, ponds that have submerged vegetation and nearby damp forests or grassland.

Food: Invertebrates.

California Slender Salamander (*Batrachoseps attenuatus*)

A small lungless (plethodontid) salamander, which breathes through its smooth, moist skin. It is 3 to 5 ½ inches long, with short limbs, a narrow head, long slender body, and a very long tail—giving it a worm-like appearance. Variable in color, it is generally black or dark above, with a band down its back that can be red, brown, yellow, or tan. It lays its eggs in pockets beneath rocks or logs and does not have an aquatic phase. Likes to spend its days in damp forest debris or in rotted tree roots.

Habitat: Redwoods, grasslands, coastal mountains.

Food: Hunts at night for worms and small arthropods.

California Tiger Salamander (*Ambystoma californiense*)

It is black, with yellow or cream spots; 6 to 8.5 inches long, with a thick body and tail and a round snout. Adults spend the majority of their lives underground, in burrows created by other animals. Breeding takes place after the first rains in late fall and early winter, when the wet season allows the salamanders to migrate to the nearest pond, a journey that may be as far as a mile and take several days. Females attach eggs to underwater vegetation. They may live 10 years or more. The local species is listed as threatened by the state and federal governments.

Habitat: Often seen at night after heavy rains, especially during breeding season. Live beneath debris near water or in crayfish or mammal burrows.

Food: Voracious consumers of earthworms, large insects, small mice, and amphibians.

Toads

Some 300 species of toads are found worldwide; however, they are absent from extremely cold or dry areas and remote oceanic islands. The only true toad in Australia, the Marine Toad, *Bufo marinus*, was introduced. Many toads can live under adverse conditions. They range from below sea level in Death Valley to above 16,000 feet in the Andes of South America and from the tropics nearly to the Arctic Circle. Thirteen species are found in the Western United States.

Our species (genus, *Bufo*) is chunky, short-legged, and warty. Parotoid glands distinguish toads from all other tail-less amphibians. The parotoids and warts secrete a sticky white poison, which in some species can paralyze or kill dogs and other predators. Many animals, however, eat toads with no ill effect. The skin secretion may irritate the eyes or mouth and, if swallowed in quantity, can cause illness. However, ordinary handling poses no danger, and handling toads does not cause warts.

Western U.S. species differ in color, size, and shape of the parotoid glands, prominence and arrangement of the cranial crests (ridges that frame the innerside of the upper eyelids), wartiness, and appearance of the foot tubercles. Color may change from light to dark in response to temperature.

Breeding usually occurs in spring and summer, often after rains. Adult males of most species have a dark throat; exceptions are: the western, black, Yosemite, southwestern, and Sonoran Desert toads. All male toads develop brown nuptial pads on the thumb and inner fingers that help them cling to the slippery body of the female during amplexus. There is one predominate toad found at Pescadero Marsh, the western toad.



WESTERN TOAD

Western Toad (*Bufo boreas*)

A large toad, 2 ½ to 5 inches. It is gray to green, with a light-colored stripe down the middle of its back. Warts tinged with red and surrounded by black blotches. Male has pale throat. Its gold-flecked eyes have distinctive horizontal oval pupils. Behind each eye is a prominent oblong or kidney-shaped parotoid gland. It seeks shelter by burying itself in loose soil or by retreating to burrows of gophers, ground squirrels, and other animals. It tends to walk rather than hop. Diurnal at high elevations and nocturnal in low-lying areas.

Habitat: Prefers ponds, lakes, rivers, and streams.

Food: Variety of insects, small aquatic animals.

Voice: A mellow chirruping, similar to the peeping of a baby chick. These toads have no vocal sack.

Frogs

Frogs are typically slim-waisted, long-legged, smooth-skinned jumpers with webbed feet and often with dorsolateral folds (glandular ridges) that extend from behind the eyes to the lower back. Any western tail-less amphibian with dorsolateral folds is a true frog. Only the large, widespread genus *Rana* (with some 250 species) occurs in the New World. Two introduced species bring the western total to 10. The western frogs are difficult to identify, forcing us to rely heavily on the distribution maps. In males during the breeding season, forelimbs and thumb bases become enlarged and webbing increases; a dark nuptial pad appears on the thumb. Vocal sacs are paired or single and generally inconspicuous.

Bullfrog (*Rana catesbeiana*)

The largest of the true frogs in North America, reaching 3 ½ to 8 inches. It is green to yellow above, with mottling of darker gray, and has a cream or white belly. Native to the East Coast, the bullfrog was introduced outside its natural range by attempts to commercially harvest frog legs. Wary by day but readily found at night by its eyeshine. Often easily caught when dazzled by light. When first seized, it may “play possum,” hanging limp and motionless; be alert for sudden recovery! Reduces populations of red-legged and Pacific tree frogs, thereby reducing the food source of the San Francisco garter snake. Bullfrogs have been actively removed from the State Parks by staff and volunteers in an effort to help native California wildlife.

Habitat: Inhabits marshes, ponds, lakes, reservoirs, and streams, usually quiet water where there is thick growth of cattails or other aquatic vegetation.

Food: Large specimens have been known to catch and swallow small birds and young snakes; its usual diet includes insects, crayfish, other frogs, minnows, and small mammals.

Voice: A deep-pitched bellow suggesting *jug-o-rum*, or *br-wum*. Frightened individuals may give a squawk or catlike *miaow* when they leap into the water.

Red-legged Frog (*Rana draytonii*)

A moderately large frog—2 to 5 3/8 inches—reddish-brown to gray, with dark specks and blotches. Its underside is yellow, with a wash of red on its lower abdomen and hind legs. Primarily diurnal. May be extinct in the southern Sierra Nevada, because of habitat disturbances and the introduction of the bullfrog. Listed as a threatened species by the United States Fish and Wildlife Service in 1996. It was heavily marketed as a source of frog legs in the late 1800’s and early 1900’s. Pescadero Marsh has one of the largest known populations in California. They are also found in Pilarcitos Creek at Half Moon Bay State Beach, at the pond below the Visitor Center at Año Nuevo State Park, and in other nearby ponds and creeks. The frog is a major food source for the San Francisco garter snake.

Habitat: Frequents marshes, streams, lakes, reservoirs, ponds,



and other, usually permanent, sources of water. Generally found in or near water, but disperses after rains and may appear in damp woods and meadows far from water.

Food: Insects, Pacific tree frogs

Voice: Series of weak throaty notes, rather harsh, lasting 2-3 seconds.

Pacific Tree Frog (*Pseudacris regilla* aka *Hyla regilla*)

The smallest amphibian on the West Coast, growing between $\frac{3}{4}$ of an inch to 2 inches long, with the female being decidedly larger than the male. Highly variable in color, they can be anywhere from gray, brown, or tan, to bright green, and can even change between colors. They are usually a pale or white color on their bellies. Their one identifiable mark is a dark stripe that goes over the eye from the nose to the shoulder. Their skin is covered in small bumps. They have long legs compared to their bodies and they tend to be slender. Their toes are long and are only very slightly webbed. On the end of each toe, there is a round sticky pad that is used for climbing and sticking to surfaces. Active both day and night. Used extensively in Hollywood movies for an authentic outdoor nighttime frog sound (normally where there are no tree frogs).

Habitat: Grasslands, chaparral, woodland, forest, desert oases, and farmland. From sea level to mountains.

Food: Leafhoppers, flies, ants, beetles, and spiders.

Voice: A high pitched, two-part musical note.

Reptiles

Living reptiles comprise five major groups, four of which occur in North America: crocodiles, turtles, lizards, and snakes. Derived from ancient amphibians, the first reptiles appeared some 300 million years ago. The Age of Reptiles that ensued saw a proliferation of reptilian forms from small tree-dwellers to monstrous dinosaurs more than 100 feet long and perhaps weighing in excess of 50 tons. Except for the crocodilians, all of the ruling reptiles are extinct; only 4 of 16 ancient orders are alive today.

The reptiles' protective dry scaly skin and tough-shelled eggs, as well as enlarged and improved lungs, enabled them to colonize areas where amphibian existence was impossible. The ancient reptiles, in turn, gave rise to birds and mammals, whose subsequent proliferation coincided with the reptiles' decline.

Like fish, reptiles have a spinal column and scales, but they breathe by means of lungs rather than gills. Their skin is dry, in contrast to the moist, glandular, scale-less skin of the amphibian. As growth and wear take place, the outer layer of the skin is shed, usually in large pieces in most reptiles or in one piece in snakes and some lizards. In snakes the old skin loosens around the mouth and is turned back, inside out, as it catches on sticks, rocks, and other rough surfaces as the snake crawls. Even the watchglass-like covering of the eye is shed along with the head skin.

Like all animals, except birds and mammals, reptiles are cold-blooded, which means that they derive their body temperature chiefly from their surroundings rather than from internal heat. When this temperature is well below our body temperature, they feel cold to us. Most of them, however, exercise some control over their temperature by moving from sunlight to shade, from land to water, or in and out of the ground. In this way, many species are able to keep their

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temperature at a nearly constant level during periods of activity. The western fence lizard, for example, maintains its temperature at about that of people. Consequently, during most of the day, it may actually be warm-blooded.

The major groups of reptiles in the Bay region are easily recognized. Turtles have a shell into which they can withdraw the head and limbs. Lizards differ from snakes in usually having limbs, and their toes have claws. No snake has movable eyelids, thus the presence of eyelids distinguishes a legless lizard from a snake.

Turtles

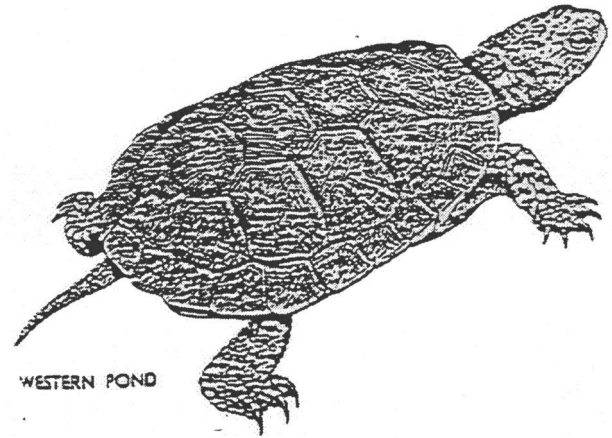
Western Pond Turtle (*Actinemys marmorata* aka *Clemmys marmorata*)

Seldom found more than a few feet from water. Individuals are often seen basking on logs, mats of dead tules, or on pond banks within easy reach of water. If even slightly disturbed by voices or loud footsteps, will quickly slip below water without being seen. It is best to approach their known areas quietly. Don't be afraid to tell your group to hush-up in order to see these turtles.

The western pond turtle is protected by the State of California and recent surveys have confirmed that many populations have been extirpated or are declining, particularly in southern California. Threats to the continued survival of the species include habitat modification/destruction, grazing, commercial harvest, vehicle-related mortalities, and competition from exotic species. Over 90 percent of the wetland habitats within the historic range of the species in California have been eliminated due to agricultural development, flood control and water diversion projects, and urbanization.

Habitat: Quiet waters of ponds, small lakes, streams, marshes, or reservoirs, often where there are tules. Commonly seen in Pescadero Marsh on the north side of the Sequoia-Audubon trail towards the tules and in Pescadero Creek at Turtle Bend under the eucalyptus.

Food: Aquatic plants (including pond lilies), beetles, and other insects and carrion.



Lizards

Western Fence Lizard (AKA Blue Belly) (*Sceloporus occidentalis*)

Measures about 6 inches in total length. Ranges from light gray to black with dark blotches on the back that continue down the tail. Male western fence lizards have bright blue, sometimes greenish, bellies, and the undersides of their legs are yellow. Like many species of lizards, this one is able to



change its general coloration to match its background.

Male lizards establish territories and attempt to drive away other males. This is done by a threat or warning signal made by flattening the sides of the body, lowering the skin of the throat, and a bobbing movement resembling push-ups. The effect is to flash the blue markings. If the intruder does not turn away or is aggressive, a fight may occur. Males use much the same type of display when courting. A fighting male attempts to seize his opponent in his jaws. He may grasp any part that is handy, but often takes hold of a leg or the skin of the sides or back. With a jerk of his head and body he may attempt to “throw” the other lizard. The threatening pose described reduces the chances for a skin hold and increases the apparent size of the lizard.

It is thought that the presence of western fence lizards diminishes the danger of transmission of Lyme disease by ticks. The incidence of Lyme disease is lower in areas where the lizards occur, and it has been found that when ticks carrying Lyme disease feed on these lizards (which they commonly do, especially around their ears), the bacteria that cause the disease are killed.

Habitat: Grassland and open woodland, especially where there are rock outcrops, fallen trees, brush heaps, old lumber or buildings. Avoids dense, shaded woods.

Food: Beetles, ants, wasps, aphids, caterpillars, and spiders.

Coast Horned Lizard (*Phrynosoma coronatum*)

A distinctive flat-bodied species; two horns at back of head longer than surrounding spines; two rows of fringed scales down sides; two rows of enlarged pointed scales on margin of lower jaw; yellowish, brown or gray back with contrasting wavy blotches of darker color; pointed scales on back; beige or yellow belly with black spotting.

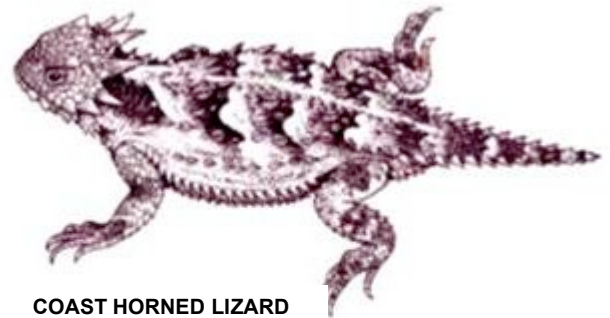
Depends mainly on its camouflage and sharp spines, rather than on speed, for protection. When the lizard is seen against a broken background, the shaded markings on its back may be mistaken for irregularities of the ground, and you may almost step on it before it moves. A snake that tried to swallow one was killed when its body was pierced by the lizard's spines. When the lizard is aroused, blood may spurt from engorged tissues at the corner of the eye. The coast horned lizard is listed as a Federal Special Concern species (FSC) and a California Special Concern species (DFG-CSC).

Habitat: Grassland, brushland, or woodland, usually in the warmer, drier areas where there is sand or loose, dry soil.

Food: Ants, wasps, bees, beetles, grasshoppers, flies, caterpillars, and other insects. Especially fond of ants (and could be a big seller for those on your tour with ant problems).

Western Skink (*Eumeces skiltonianus*)

A small, smooth-scaled lizard with relatively small limbs, measuring about 6 to 9 inches. It is brown, with four white or beige stripes, two on the back and one on each side. Juveniles have bright blue tails. Tail is easily lost to escape from predators. It is a good burrower and sometimes constructs burrows several times its own body length. Active during the warmer



COAST HORNED LIZARD

Illustration from
<http://www.friendsofhercules.org/reptiles.htm>

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months. Females lay eggs in June or July in nest chambers constructed in loose, moist soil under rocks, logs, or other cover. The young probably hatch in late summer. They can live for 5 to 10 years.

Habitat: Woodland, forests, and grassland, usually where there are rocks, rotting logs, or leaf litter. Look for this skink around the ranger office in Pescadero and in the willow area of the Sequoia-Audubon trail by rolling logs over.

Food: Beetles, grasshoppers, crickets, leafhoppers, moths, caterpillars, spiders, and sow bugs.

Northern and Southern Alligator Lizards (*Elgaria coerulea* and *Elgaria multicarinata*)

Both the northern and southern alligator lizards are found on the San Mateo coast. Alligator lizards are so-named because they look somewhat like tiny alligators, because they can swim well, and because they bite vigorously. Alligator lizards can be fairly large in size—up to 10 to 12 inches. The southern alligator lizard has yellow eyes and is usually light or medium brown with variable cross-bars on the back and some black and white spots along the sides. All alligator lizards have a fold of skin along the lower sides, where the scales of the belly meet the scales of the back; this fold expands when the lizards breathe deeply or eat a lot. Southern alligator lizards have faint, thin black stripes on the belly that run through the middle of each scale row. The northern alligator lizard is very similar to the southern; however, it has dark eyes and the dark lines on its belly run between the scales rather than through them. The southern alligator lizard lays eggs, in contrast to the northern alligator, which bears its young alive.

Habitat: Open grassland, woodland, and chaparral.

Food: Sow bugs, scorpions, spiders (including the black widow) and their egg cases, snails, grasshoppers, crickets, beetles, and occasionally the eggs and young of birds.

California Legless Lizard (*Anniella pulchra*)

This 4-7 inch brown lizard resembles a snake, but it has movable eyelids and small scales on the underside of its body instead of the long strap-like scales found in most snakes. A number of characteristics fit it for a burrowing life. It has no ear openings to become filled with sand, its nostrils are closed by valves, and its lower jaw fits snugly into the upper one, which prevents sand from getting into its mouth when it is digging. The legless lizard moves smoothly through the soil and is able to crawl backward or forward.

Habitat: Loose sand of washes, river banks, and beaches, usually where there is bush lupine, ice plant, and beach grass. Mixed sand humus under Coast live oak trees. Not documented at Año Nuevo State Reserve. Habitat exists at the point but is diminishing as sand blows away.

Food: Insects and spiders. In captivity: mealworms, flies, termites.

Snakes

In the presence of a reptile, especially a snake, most people show fear, disgust, curiosity, or delight—the kind of response depending on the individual and their background. Ignorance is responsible for most of our fear of snakes. Many people are interested in snakes, but an interest based on the belief that all snakes are deadly is worse than indifference. Scientists have done

much to dispel the fear and misunderstanding of these animals. We can begin our examination of snakes by pointing out some false beliefs concerning them:

- The fictitious “hoop snake” is supposed to take its tail in its mouth and roll like a hoop down a hill. After gaining momentum, it is said to straighten out and pierce its victim with a sharp spine at the tip of its tail.
- The so-called “glass snake” that may break into one or more pieces, when seized, is not a snake at all but a limbless lizard with a long, easily broken tail. These separated parts of the tail cannot grow together again, but the lizard can grow a new tail.
- There is no evidence that snakes can charm people or other animals. An animal, such as a bird or squirrel, may watch a snake closely, but the animal is not under the control of the snake.
- Snakes rarely chase people. There are a few reports of the eastern racer attacking people. The black mamba of Africa, the tiger snake of Australia, and a few others may be aggressive and chase people, but most snakes try to crawl away from people.
- On level ground, most snakes can strike a distance of about one-third their total length. An excited snake, especially a young one, may strike with such force as to leave the ground slightly, and certain South American vipers can actually leap a short distance. In general, however, snakes are unable to jump.
- Another myth is that snakes have to coil to bite—they don’t have to coil.

There are four poisonous snakes in the United States: the copperhead, water moccasin, rattlesnake (14 species), and the coral snake (2 species). The first three, called pit vipers, give birth to their young, have a pit on each side of the face between the eye and nostril, a broad head set off from the slender neck, and movable hollow fangs for the injection of venom. The venom acts chiefly on the circulatory system of the victim, breaking down the blood cells and walls of the blood vessels. The coral snake is a relative of the cobras and has erect, non-movable, hollow fangs in the front of the upper jaw. The venom acts chiefly on the nervous system, causing paralysis. Except for possibly a few coral snakes near the Arizona border, the only poisonous snakes in California are rattlesnakes.

Red Ringneck (*Diadophis punctatus*)

The ringneck is a small snake about as thick as an earthworm. Typically black or gray in color, with a yellow, orange, or red underside and an orange or yellow ring around the neck. They tend to grow to 10-14 inches and are long and slender. If threatened this snake will curl its tail and flash the bright underside as a warning to predators. Bright colors in nature frequently indicate a warning and is appropriate in this case, as a bird who eats a red ringneck becomes violently ill. The bird will remember the bright orange flash and supposedly leave other ringnecks alone.

Habitat: Under logs, boards, rocks, and other objects in or near woods, grassland, salt marshes.

Food: Tree frogs, slender salamanders, skinks, the you of other amphibians, and small snakes.

Western Terrestrial Garter (*Thamnophis elegans*)

Locally called the *coast garter snake*. A medium-sized snake, ranging from 18 to 42 inches in length, with a head barely wider than the neck. Color and pattern are highly variable, but there is usually a yellow dorsal stripe and a yellowish stripe along the bottom of each side. The

underside is yellowish to bluish-gray with varying amounts of reddish markings. One color phase, on the San Francisco Peninsula, has a yellow dorsal stripe and two distinct yellowish side stripes, with black checkered spots on the sides in between the stripes on a reddish ground color, creating a red and black checkerboard appearance. On some snakes in the Santa Cruz Mountains, the side stripes are reddish, with varying degrees of checkering or barring of the black on a reddish ground color. When frightened, it usually seeks shelter under brush rather than in water. If picked up, like other garter snakes, it often strikes repeatedly and releases feces and expels musk. All garter snakes give birth to fully developed, live young.

Habitat: Chiefly terrestrial—not as dependant on water as other garter snake species, but more likely to be found near water. Lives in a variety of habitats, from lowlands into the mountains and from coast to coast.

Food: Eats a wide range of prey, including amphibians and their larvae, fish, birds, mice, lizards, snakes, worms, leeches, slugs, and snails.

Western Aquatic Garter (*Thamnophis atratus*)

Similar to the western terrestrial garter, 18 to 40 inches in length. It is usually gray, brown or black, with a wide yellowish to orange-yellow dorsal stripe, but with the side stripes absent or obscured. There may be small alternating dark spots on the sides. The throat is white or yellow, sometimes bright yellow. The underside is bluish or greenish, sometimes with pink or yellow marks. A highly aquatic snake, able to remain underwater, but also found away from water. It is primarily diurnal and retreats to water if threatened. Like all garter snakes, it has toxins in its saliva, which can be deadly to prey and might produce an unpleasant reaction in humans. The toxin is not considered dangerous to humans, however.

Habitat: Inhabits mainly rivers and streams, brackish marshes at sea level. This snake can normally be found on all the trails in the marsh. The local representative is the Santa Cruz garter snake.

Food: Eats mainly amphibians and their larvae, including frogs, tadpoles, and aquatic salamander larvae (newts and giant salamanders, but small fish are also eaten). Captives have also taken small rodents.

San Francisco Garter (*Thamnophis sirtalis tetrataenia*)

The San Francisco garter snake is a subspecies of the common garter snake *Thamnophis sirtalis*. Adults of this species measure 18 to 55 inches in length, but the average size is under 36 inches.

It is the most colorful and easiest of the garter snakes to identify. Look for a red-brown head with a bright blue underside.

It has a wide blue-green or greenish

yellow dorsal stripe bordered with black stripes. Below the black stripe is a continuous red stripe, bordered below by another black stripe. Below that is a bluish or greenish yellow lateral stripe. There may also be a thin line of black below the lateral stripe on the edge of the belly.



The underside is bluish-green the head is red, with eyes that are relatively large compared with other garter snake species.

Designated as a rare and endangered species, it resides only in San Mateo County, and the extreme northern part of coastal Santa Cruz County. Its protected status has stymied some construction projects in the Bay Area. The U.S. Fish and Wildlife Service has stated that many locations that previously had healthy populations of garter snakes are now in decline due to land development pressure and the filling of wetlands in San Mateo County over the last 60 years.

Habitat: It utilizes a wide variety of habitats, including grasslands or wetlands near water. The snake's preferred habitat is a densely vegetated pond near an open hillside where it can sun, feed, and find cover in rodent burrows. It avoids brackish water. Can be seen along marsh trails.

Food: Adults snakes feed primarily on California red-legged frogs, also an endangered species, but will also eat Pacific tree frogs, other amphibians, and mice. They may feed on juvenile bullfrogs, but are unable to consume adults. (In fact, adult bullfrogs prey on juvenile garter snakes, and may be a contributing factor in their population decline.) Newborn and juveniles depend heavily upon Pacific tree frogs as prey.

Western Racer (AKA Western Yellow-bellied Racer) (*Coluber mormon*)

A slender, fast-moving snake, 20 to 36 inches in length. The adult is variable in color, ranging from brown or olive to bluish and has no stripes or other patterns. Its belly is a vibrant yellow. The young have dark blotches on sides and saddled markings on the back. Mainly terrestrial, but also a good climber. It hunts by crawling with its head held high off the ground, sometimes moving it from side to side. Prey is killed by being quickly overcome and captured, crushed with the jaws or trapped under the body, and swallowed alive. Lays eggs in early summer. Will bite repeatedly if picked up.

Habitat: Frequently occurs in low-lying and densely vegetated grasslands.

Food: Eats lizards, small mammals, birds, eggs, snakes, small turtles and frogs, and insects.

Gopher Snake (*Pituophis catenifer*)

A large snake, adults of this species can be 2 1/2 to 7 feet long, but most are from 4 to 5 feet. It is tan, with brown or reddish blotches on its back and smaller blotches on its sides. A dark stripe runs from in front of the eye to the angle of the jaw. Its underside is creamy or yellow, often with dark spots. Gopher snakes (the snake on the left in the picture) have been confused for rattlesnakes (pictured on the right) due to their response to danger: They will hiss loudly and sometimes flatten their head and vibrate their tail. (Illustration from: www.californiaherps.com/.../gophersnakes.id.html)

Habitat: Lives in a variety of habitats, from the lowlands high into the mountains and from coast to coast. More common east of Highway 1.

Food: Mice, kangaroo rats, gophers, ground squirrels, rabbits, occasionally birds and their eggs.

Western Rattlesnake (Northern Pacific subspecies) (*Crotalis viridis oregonus*)



Amphibians and Reptiles

A heavy-bodied, venomous pit viper, with a thin neck and a large triangular head. Most adults 15 to 36 inches long but they have been found up to 60 inches. Their color is variable, matching the environment—olive, brown, reddish brown, or tan—with dark blotches or bars usually with dark edges and light borders. They can be distinguished by their triangular head and tail rattles. A new rattle segment is added each time the snake sheds its skin, normally two to four times a year. Live-bearing; young are born August to October.

Heat sensing pits on the sides of the head help the snake to locate prey by their warmth. Long, hollow, movable fangs connected to venom glands inject a very toxic venom, which quickly immobilizes prey. The snake can control the amount of venom injected. Bites on humans are potentially dangerous without immediate medical treatment. Even a dead snake can bite and inject venom if the jaws reflexively open when they are touched. The effect of its venom varies depending on the size of the snake, when it last injected venom, and the age and condition of the victim/prey. Venom is not always injected if the snake is biting as a result of a defense mechanism rather than for the purpose of capturing prey.

Habitat: Although the western rattlesnake frequents a great variety of habitats, including shrub-covered coastal sand dunes, it is most likely to be encountered at higher altitudes in the watershed areas of local state parks.

Food: Eats mammals (mice, ground squirrels, and rabbits), nestling birds, lizards, snakes, and amphibians.

Miscellaneous Information

The following is a collection of additional information about amphibians and reptiles, which you can add to your storehouse of fascinating tidbits!

Amphibians

- Unlike fish, amphibian larvae have external gills; though in frog tadpoles, a gill cover forms shortly after the gills develop.
- Adult amphibians may breathe through lungs, gills, lining of the mouth, or skin, depending on the species.
- The rough skinned newt disperses 80% of carbon dioxide through its skin.
- Amphibians have a 3-chambered heart, like reptiles. Birds and mammals have 4; fish have 2.
- Amphibian teeth are polyphyodont (may be replaced an infinite number of times) and homodont (all teeth along the jaw are similar, no specialization).
- Ribs are very poorly developed in amphibians, and there is no rib cage.
- Frogs have vocal chords; salamanders do not, although some can make sounds.
- Amphibians hear four low-frequency environmental vibrations through their forelimbs and pectoral girdle, transmitted to the inner ear by an opercular bone. Frogs also possess an eardrum with which they can hear high-frequency sounds, i.e., courtship and territorial calls.
- Amphibians continue to grow throughout their lives.
- Many salamanders can lose their tails, like lizards.

- All salamanders in the northwestern United States have internal fertilization.
- All frogs in the northwestern U.S. have external fertilization (except the tailed frog).
- Many species of salamanders retain larval structures, such as gills, into adulthood. This can be environmentally induced (neoteny) or genetically fixed (paedogenesis).
- All frogs and salamanders possess toxic skin glands. The toxicity of different species ranges from deadly to no more than an irritant. The skin of the poison-arrow frog of South America is used by Indians to poison their arrow points.
- The toxic skin secretions of some newts have been found to be effective local anesthetics.
- The California newt, tailed frog, bull frog, and map turtle have been shown experimentally to use celestial cues for directional guidance.
- Frogs sing by passing air back and forth over their vocal chords from their lungs to their vocal sack. They sing with their mouths closed and can even sing under water.
- Many salamanders live more than 20 years.
- Many frogs live more than 10 years.

Reptiles

- The reptile egg is amniotic (contains amniotic fluid, a self contained aquatic environment). The shell is not totally waterproof, so eggs are usually laid buried in the soil or under rocks or logs where they are protected from drying out.
- Reptiles have no larval stage.
- Reptiles have tougher, less permeable skin than amphibians, which prevents them from drying out and requires that they all have lungs.
- Reptiles have true claws; amphibians do not.
- Reptiles have 3-chambered hearts (except crocodilians, which have 4).
- Lizards use their hind tongue for swallowing, fore tongue in food gathering, and the tip of tongue in carrying odor particles to Jacobson's organ in the roof of mouth. Not all lizards have all of these tongue parts. The most advanced lizards have long forked tongues, like snakes.
- Reptile teeth are commonly heterodont (teeth in different parts of mouth specialized for different purposes).
- Turtles have no teeth but have a sharp beak.
- Many lizards (and a few snakes) can lose their tails at will. The replacement tail (which takes up to a year to grow) is cartilaginous and cannot be lost unless broken off above the point where it broke off before.
- Turtles and lizards have eardrums. Snakes ear bones are connected to their lower jaw bone to allow snakes to hear low-frequency vibrations through the ground.
- Many female reptiles (and some salamanders) can store sperm in their bodies for several years after mating.

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- Many lizard species common on islands are parthenogenetic (females can reproduce without mating). If a female rafts to an island on a piece of driftwood, she can start an entire population of lizards. (You might mention this on seashore walks when talking about sand verbena, coconut palms, and other water-dispersed organisms.)
- Reticulated pythons are excellent swimmers and also colonize islands. They were the first reptiles to colonize Krakatoa after the famous eruption.
- Snakes and lizards that live at high altitudes and latitudes typically bear live young. (The warm season is too short for eggs to develop.)
- Most reptiles abandon their eggs. Exceptions: Female skinks stay with their eggs and protect them, turn them, and bring them back together if they are scattered. Female pythons incubate their eggs for about 6 weeks. They raise their body temperatures by spasmodic muscular contractions. They abandon the eggs two weeks before they hatch. Female alligators guard their nests and stay with their young a year or more. There are other exceptions.
- There are only two species of poisonous lizards in the world, the Gila monster and the Mexican beaded lizard. They are closely related to each other and both live in northwestern Mexico. Gila monsters are occasionally found in Arizona.
- Lizards are usually territorial, but when they become overcrowded, they shift to a dominance hierarchy. Because only the dominant is able to reproduce, overcrowding is eventually alleviated.
- Many snake species are gregarious. Forty ringneck snakes were placed in a laboratory arena with 10 identical flat discs for cover. Seven days later, 24 of them were congregated under one disc. Only one was alone under a disc.
- All snakes are carnivorous.
- Snakes are considered to be the most evolutionarily advanced of the reptiles. Their ancestors had legs but developed a more efficient means of locomotion so that legs eventually were lost.
- Many turtle species live more than 30 years.
- Many snake species live more than 20 years.
- Many lizard species live more than 10 years.