

Chelonian Basics

Interpreting with Turtles, Tortoises, and Terrapins: Your role as an interpreter is to inspire guests to join the Zoo in its mission to conserve wildlife and wild places. This can be accomplished by sharing meaningful information with guests in an accessible and engaging manner. In order to help with this, the Education Department has strategically written a series of talking points for you to use.

1. Wetlands

Theme: Humans are part of the great diversity of life and have the power to protect or destroy it.

Talking point: Conservation of wetland habitats (Appropriate for bog turtle, three-toed box turtle)

- Possible hook: Have you seen a turtle in the wild before?
- Related information:
 - Many chelonian species inhabit wetland ecosystems.
 - Rainfall washes trash, chemicals, agricultural sediment and other forms of pollution away, where it eventually concentrates in wetland habitats, like the Chesapeake Bay.
 - Pollution does more than make our environment look bad; it can harm wildlife.
 - Turtles living in polluted environments may ingest or get stuck in plastic trash, or come into contact with chemicals that can make them sick.

Shell Composition: The term **chelonian** refers to reptiles that have a shell. The shell is made of 2 parts: the *carapace* (upper shell), and *plastron* (lower shell). The shell is covered in specialized scales called *scutes*, which are made from keratin, and are regularly replaced. Under the scutes is a layer of bone that is created by an expansion of the ribs. This hard shell provides a strong layer of protection, and can heal from most minor injuries.

Terrapin vs. turtle vs. tortoise: While many cultures have their own way of designating turtles and tortoises, most North Americans typically refer to a land-dwelling, high-domed chelonian as a tortoise, while aquatic, flat-shelled chelonians are turtles. A terrapin is a title designated for specific water-dwelling chelonians—usually those that spend a great deal of time in brackish water.

Red-footed Tortoise

Chelonoidis carbonaria

Ectotherms: Tortoises are reptiles. Reptiles are *ectothermic*, or cold-blooded. Ectotherms do not produce their own body heat, and instead rely on outside sources of heat, such as the sun or a warm rock, to maintain a healthy internal body temperature. Ectothermic animals spend less energy maintaining their body temperature, and are able to survive while eating less.

Adaptations: Brumation: In the winter, it can be difficult for ectotherms to find an external source of heat. Northern turtles will *brumate* for the winter, a process that is similar to mammalian hibernation. Chelonians that brumate bury themselves under a layer of mud at the bottom of their habitat. During this time, their metabolism slows dramatically, and they can go for a very long time without eating, drinking, or even breathing.

Temperature-dependent sex determination: The gender of many reptiles, including several chelonian species, is determined by the temperature during incubation. Typically, embryos in eggs that are incubated with a relatively low ambient temperature become females, while embryos in eggs with a higher ambient temperature become males.

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Conservation Story

Conservation Status and Threats:

- Not listed on the IUCN Red List
 - The IUCN-endorsed Species Survival Commission for tortoises and freshwater turtles has recommended that the red-footed tortoise be listed as vulnerable.
- CITES—Listed under Appendix II, which limits exportation from their home country through the use of permits.
- Threats: The number and severity of threats facing this species is not well understood. However, there are several possible threats.
 - Habitat loss may be a threat to this species due to the loss of food items. However, the species can still thrive in areas that have been disturbed, but not destroyed, by humans, such as the edge of farm clearings.
 - Overhunting of the turtles as a food source also probably provides some pressure to the species.
 - Due to the attractive coloration and relatively large size of this tortoise, they are seen as desirable pets. Removal of adults or juveniles from the wild can be extremely damaging to the population due to their high mortality and low reproductive rates.
- Conservation efforts: While there are no concentrated efforts regarding the red-footed tortoise, many countries found in the range of this animal have created national parks in order to protect native animals such as the red-footed tortoise. Additionally, some countries, such as Suriname, have established hunting seasons and hunting limits for their local fauna to reduce the pressure on populations.

What We Can Do

- By supporting the Maryland Zoo, you are supporting global wildlife conservation. The Maryland Zoo works with many organizations around the world to conserve species and ecosystems.
 - The Maryland Zoo has a long standing partnership with Turtle Survival Alliance (TSA). TSA is comprised of many zoo professionals and conservationists working together to transform passion for turtles into effective conservation action through a global network of living collections and recovery programs.
- Get involved with your friends, coworkers, or neighbors to take action in your local community by organizing or participating in neighborhood initiatives to protect habitats. Some examples of community-level actions are cleanups, community gardens, and carpool systems. By working together, we can have an even bigger positive effect on the environment!

In the Wild

Red-footed Tortoise

Chelonoidis carbonaria

Description:

- Size: About 12-14 in (30-35 cm) long
- Weight: Up to 11 lb (5 kg)
- Physical description: A large tortoise with a high domed shell and *elephantine* (elephant-like) feet. As they mature, they develop an hourglass shape when viewed from above. The *scutes* may be smooth, or may have a well defined bump in the center of each scute with clearly defined growth rings.
- Coloration: There is considerable variation in the color of this species. The base color ranges from a very dark brown to a dull tawny color. The center of each scute ranges from brown to bright yellow. The edge of the *carapace* may similarly range from brown to bright yellow. The head typically has splotches of yellow and red, and the legs usually have bright red scales, giving this animal its common name.
- Sexual dimorphism:
 - Males are typically larger than females.
 - Males have a greater degree of concavity on the *plastron*.

Habitat and Range:

- Geographic range: Found in southern Central America to central South America. Home range includes the countries of Panama, Colombia, Venezuela, Guyana, Suriname, French Guyana, Brazil, Bolivia, Paraguay, and Argentina.
- Habitat: May be found in several different types of habitat, including dry grasslands, humid rainforests, and the forest edge.

Diet

- Omnivorous: Primarily eats fruit, but leaves also make up a major part of their diet. As opportunistic feeders, they also eat invertebrates (chiefly ants and beetles) and carrion when they encounter it.

Adaptations

- Shell: The males have a pronounced concavity in the shell which aids in mating.
- Elephantine feet: The elephantine rear legs provide power for this animal as it moves around. The thick claws provide additional grip as the tortoise crawls along the ground.

Lifespan

- Typically around 50 years (Median Life Expectancy data unavailable)

Ecosystem relationships:

- Predators: The only known predators of this animal are humans, though medium to large cats and large birds of prey may also eat this animal.
- Role/ Niche: Are important seed dispersers in their habitat. Most seeds are able to pass

Red-footed Tortoise

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through their gut undamaged, and therefore are able to move to new parts of the animal's range.

Reproduction

- Breeding season: Mainly breed during the rainy season, from June to September
- Behavior: Males court females through specialized head movements and vocalizations. Males may compete for mates by bumping and pushing each other.
- Incubation: Typically lasts 3-7 months. Females will dig a hole in which she will lay the eggs.
- Clutch size: Typically includes 2-15 eggs. Females may lay several clutches in a season.
- Maturation: No parental care is given, and few hatchlings survive into adulthood. Hatchlings are immediately independent, but maturation may take as long as 12 years.

Activity

- Diurnal
- Most active immediately after the rainy season

Other “fun facts”

- Classification: The tortoise's similar appearance to a number of other medium- to large-sized tortoises resulted in it being placed in the *Geochelone* genus for a long time. However, more recent molecular analysis has shown *Geochelone* to consist of relatively unrelated groups of animals. Therefore, the red-footed tortoise has been moved to the *Chelonoidis* genus with 3 other South American tortoises, included the Galápagos tortoise.

At the Zoo

Jake and **Ellwood** are both males purchased by the zoo from a vendor in 1986. They hatched in 1980.

What We Can Do

- Support the conservation efforts of local organizations like The Maryland Zoo as well as organizations working in the field to protect wildlife and conserve habitat. Learn more about them, spread the word, and consider donating or getting involved.
 - **Turtle Survival Alliance:** The TSA is comprised of many zoo professionals and conservationists working together to transform passion for turtles into effective conservation action through a global network of living collections and recovery programs.
- Do your research before buying a pet.

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- Make sure you are not purchasing a wild-caught individual – captive-bred turtle species are often easy to find.
- Make sure you know how to properly care for any animal before you decide to buy it as a pet.
 - Some things to consider include adequate housing, diet, temperature requirements and lifespan.
 - Some pets also require a lot of time and money to be properly cared for.

Additional Resources and References:

- Animal Diversity Web:
http://animaldiversity.ummz.umich.edu/accounts/Chelonoidis_carbonaria/
- California Tortoise and Turtle Club: <http://www.tortoise.org/archives/carbonar.html>
- <http://www.kingsnake.com/rockymountain/RMHPages/RMHred-footed.htm>
- Le, Minh, Christopher J. Raxworthy, William P. Mccord, and Lisa Mertz. "A Molecular Phylogeny of Tortoises (Testudines: Testudinidae) Based on Mitochondrial and Nuclear Genes." *Molecular Phylogenetics and Evolution* 40.2 (2006): 517-31. Web.
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- Vargas-Ramírez, Mario, Jérôme Maran, and Uwe Fritz. "Red- and Yellow-footed Tortoises, *Chelonoidis Carbonaria* and *C. Denticulata* (Reptilia: Testudines: Testudinidae), in South American Savannahs and Forests: Do Their Phylogeographies Reflect Distinct Habitats?" *Org Divers Evol Organisms Diversity & Evolution* 10.2 (2010): 161-72. Web.
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