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The bolson tortoise, *Gopherus flavomarginatus*, photographed in Mexico. Photo © 2006 by Mbtrap

featured species

Bolson Tortoise, *Gopherus flavomarginatus* (Legler, 1959)

The Chihuahuan Desert Tortoise

by M. A. Cohen

The largest of the known species of *Gopherus* tortoises, the bolson tortoise, *G. flavomarginatus*, is also the largest terrestrial reptile in North America. In its native habitat, the bolson tortoise is called *la tortuga grande,* which translates into English as the large (or great) turtle. In addition, other Spanish common names for the species include *la tortuga del monte* (turtle of the mountain) and *la tortuga del llanera* (turtle of the plains).

The bolson tortoise is endemic to central northern Mexico, where it currently inhabits isolated pockets within the region of the Chihuahuan Desert known as the *Bolsón de Mapimí*. This phrase translates into English as the Mapimí Basin. While there is fossil evidence that the species once roamed the entire Chihuahuan Desert, and possibly beyond, *G flavomarginatus* currently inhabits a drastically reduced area within the Mapimí Basin.

The species was scientifically described in 1959 by American herpetologist John M. Legler in a paper titled "A new tortoise, genus *Gopherus*, from north-central Mexico" published by the University of Kansas Publications, Museum of Natural History. At first the newly described species was met with considerable skepticism. Subsequently, the species became widely accepted as valid. However, the bolson tortoise is likely the least studied of the *Gopherus* species.

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Even though it inhabits a comparatively harsh and remote ecosystem, the bolson tortoise faces significant threats to its continued existence. The origin of these threats is largely due to the human presence in its habitat of the tortoise and will be discussed later in this article.

Description

Gopherus flavomarginatus is a large land-dwelling tortoise, typically reaching a carapace length of 14.5 inches (37 centimeters) at maturity. According to research by herpetologist Dr. David Morafka, fossil evidence suggests that the carapace length could have been 39 inches (1 meter). The mass of modern mature individuals is generally 33 to 40 pounds (15 to 18 kilograms) or more.

The carapace of the species is oblong in shape and varies in coloration from straw-colored through greenish-yellow to brown. The central area of each scute, known in biology as the areola, is darker brown or black.

The species name, *flavomarginatus*, derives from two Latin word roots: *flav-*, meaning yellow, and *-marginato,* meaning edge or border. This specific name describes the lateral marginal scutes, which tend to be lighter in color than the rest of the carapace.

The plastron of the bolson tortoise is typically yellow with a dark-brown to black blotch on each scute in younger animals. The dark blotches tend to fade as the animal matures. As is typical of other *Gopherus* species, the skin on the head, limbs and tail of the bolson tortoise is yellow to brown.

While there is minimal sexual dimorphism (differences in appearance between male and female bolson tortoises), males tend to be somewhat smaller at maturity than females. The male usually has a more concave plastron than the female, but there are exceptions to this generalization.

The tail of the male is somewhat larger than that of the female, and his gular scutes are longer. The male's cloaca is located outside the rear marginal scutes, whereas the female's cloaca is underneath the rear marginals. The male displays enlarged chin glands, particularly during mating season.

An unusual characteristic of the male bolson tortoise is the two dark-tipped spurs on the thigh of each of its hind legs; these spurs are absent on the female of the species (Gopherus flavomarginatus).

Of the recognized *Gopherus* species, the bolson tortoise is physiologically most closely related to the gopher tortoise, *G. polyphemus*, a native of the southeastern United States. Biologists consider the species of *Gopherus* in the desert southwest to be "more distant cousins" of the bolson tortoise (Species: Bolson Tortoise (Gopherus flavomarginatus). [2019]).

Map of the Mapimí Basin. **Illustration © 2013 by Smallchief**

Range

Historically the bolson tortoise occupied a significantly larger range than it does today. During the Pleistocene epoch (spanning the time from 2.6 million to 11,700 years ago), there is fossil

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evidence that the species ranged as far north as the modern state of Oklahoma in the United States and as far south as the Transverse Volcanic Axis. Also known as the Trans-Mexico Volcanic Belt, this region of active volcanoes runs from the state of Jalisco eastward to Veracruz in central southern Mexico.

The modern range of *G. flavomarginatus* is considerably more limited than its estimated historical range. In the decade between 1970 and 1980, Dr. David J. Morafka conducted extensive field studies on the species. In a paper published in 1982, he estimated that the wild population at that time was confined to less than 20,000 square miles (50,000 square kilometers) in central northern Mexico in the Mapimí Basin.

Subsequent research indicated that this range estimate was probably too optimistic. A paper published in 1997 estimated that the Mexican range of *G. flavomarginatus* could be as small as 2.3 square miles (6,000 square kilometers), and "the actual area occupied by tortoises may not be larger than 0.38 square miles (1,000 square kilometers), supporting a maximum population of 10,000 adults" (Aguirre, et.al, 1997).

Habitat

Encyclopedia Britannica Online describes a *bolsón* as "a semiarid, flat-floored desert valley or depression, usually centered on a playa or salt pan and entirely surrounded by hills or mountains. It is a type of basin characteristic of basin-and-range terrain. The term is usually applied only to certain basins of the southwestern United States and northern Mexico." Rivers and streams in the Mapimí Basin flow toward the center of the valley floor rather than to the Gulf of Mexico. These rivers and streams generally end in swamps or ephemeral lakes.

Bolson tortoise, *Gopherus flavomarginatus*, photographed inside the compound at the desert field station of the Mapimí Biosphere Reserve. Photo by Dr. David J. Germano. Reprinted with permission from the photographer..

The Mapimí Basin is some 50,000 square miles (129,000 square kilometers) in total area and overlays portions of the Mexican states of Durango, Chihuahua, Coahuila and Zacatecas. The area is named after the town of Mapimí in Durango.

G. flavomarginatus inhabits the plains and low hills in the Mapimí Basin at elevations of 3,280 feet (1,000 meters) to 4,265 feet (1,300 meters), possibly up to 4,593 feet (1,400 meters) of elevation. Soils in this region are alkaline, coarse, and ordinarily composed of sand.

The bolson tortoise prefers areas in the Mapimí Basin with a slope of 1 to 2.5%. Poorly drained areas with a slope of less than 0.5% are less than desirable for burrowing, due to the possibility of summer flooding. In areas where the slope exceeds 3%, no burrows are found. This is likely due to the fact that the sandy soil of these lesser inclines is replaced by the coarser desert pavement that overlies rocky substrate, making burrow excavation nearly impossible as well and as limiting plant growth (Morafka, 1982).

This region, according to Dr. Morafka, is "characterized by strong seasonality." Winter is cold and dry, with evening frost from November through March, and January is typically the coldest month of the year. In spring, April and May are warm and dry, while summer, June through October, are hot and wet; June is ordinarily the warmest month of the year. Summer is the season during which most of the significant rainfall occurs.

The vegetation of the Mapimí Basin is collectively described as a tobosa grassland. The dominant plant material in much of the area is tobosa grass (*Pleuraphis* [=*Hilaria*] *mutica*), on which the bolson tortoise feeds. Other plant life in the tobosa grassland ecosystem includes creosote (*Larrea divaricata*), prickly pear (*Opuntia* species), guayule (*Parthenium argentatum*), honey mesquite (*Prosopis glandulosa*), tarbush (*Flourensia cernua*), etc.

Seasonal Activities

The bolson tortoise is usually dormant in its burrow from the onset of the cold, dry winter season through early spring.

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During this time temperatures on the soil surface are dangerously low and food is in short supply. The tortoise may bask at the mouth of its burrow on sunny days, and may even occasionally forage for food. This winter dormancy occurs from November through April.

G. flavomarginatus emerges from winter dormancy with periodic foraging sessions in May and early June, particularly when spring brings enough rainfall to promote the germination of seedlings. Observers in Mexico report that courtship and mating occur at the same time.

When the warmer, wetter weather arrives in late July and continues through September, tortoises are active and out of their burrows grazing and hydrating. Generally speaking females nest in June and July, following which neonates emerge from July through early October.

During periods of intense heat, the bolson tortoise will retreat into its burrow to escape the searing surface temperatures. The burrow provides a thermal refuge from the temperature extremes of the surface environment. As temperatures begin to fall and rainfall diminishes in late October, bolson tortoises again take to their burrows for their annual winter dormancy.

Incidentally, *G. flavomarginatus* evolved during the Pleistocene Epoch, when Planet Earth was generally warmer and wetter, plant life in the grasslands of Mexico was more lush and plentiful than it is today.

Because of the increasingly hotter and drier conditions in its range, scientists surmise that climate change contributes significantly to the decline of the bolson tortoise due to reduced supplies of quality foods coupled with the skewing of the sex ratios in the tortoise populations. Like many other chelonians, the bolson tortoise is subject to temperature-dependent sex determination, meaning the sex of hatchlings depends on the incubation temperature of its eggs.

Bolson tortoise photographed in habitat in the state of Durango, Mexico. **Photo © 2020 by Miguel San Martin**

Legal Protection

Mexican wildlife laws issued by the Ministry of Social Development (*Secretaría de Desarrollo Social* [SEDESOL]) legally protect the bolson tortoise (Zylstra, 2007).

The U. S. Fish & Wildlife Service listed *G. flavomarginatus* as "endangered" in the Endangered Species Act in 1979. At the second meeting of the CITES Conference of the Parties in San José, Costa Rica in the same year, uplisting of the bolson tortoise to CITES Appendix I occurred. The species was formerly listing in CITES Appendix II.

As of its last assessment in 2017, the International Union for the Conservation of Nature (IUCN) listed the bolson tortoise as "critically endangered" with a "decreasing" population trend. The IUCN estimated the number of mature tortoises in the *Bolsón de Mapimí* to be 2,500 individuals (Kiester, et al., 2018).

Threats

The most significant threats to the bolson tortoise are posed by humans. Exploitation of the species for food and modification of its habitat are continuing issues despite the layers of legal protection enacted by various governmental agencies. According to the Turner Endangered Species Fund, "recent estimates suggest that fewer than 2,000 bolson tortoises remain in the wild" (Species: Bolson Tortoise (Gopherus flavomarginatus), [2019]).

Since the pre-Columbian era, the tortoise and its eggs have been taken by the native people as sources of protein. The arrival of European settlers in Mexico compounded the exploitation, with *tortugueros* (tortoise hunters) using picks and shovels to excavate tortoise burrows.

The construction of a railway running from Cuatro Cienegas, Coahuila south to the city of Coahuila — through bolson tortoise habitat — has produced dire consequences for the

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individual tortoises that formerly lived near the railroad's location. As a result of direct human predation, tortoises within 6.2 miles (10 kilometers) of either side of the railroad tracks have been extirpated.

A Mexican government program to establish cooperative farms (*ejidos*) in "under-utilized" regions such as the *Bolsón de Mapimí* is contributing to the declining populations of the rare bolson tortoise. With irrigation, crops such as cotton, beans, corn, and melons grow on these co-op farms. The co-op settlers are often inexperienced in farming. Consequently the co-op settlers are forced to subsist by hunting wildlife, resulting in further exploitation of the bolson tortoise in habitat.

Agriculture (plowing and irrigation of crops), overgrazing by cattle and goats, damaging off-road vehicle use, and oil and gas exploration — all are factors contributing to the modification and destruction of the bolson tortoise's Mexican habitat.

Conservation Efforts

Living Desert Zoo and Gardens State Park

Located in Carlsbad, New Mexico, the Living Desert Zoo and Gardens (LDZG) is a native wildlife zoo and botanical garden located in the Chihuahuan Desert Ecoregion. Accredited by the Association of Zoos and Aquaria, the LDZG was the first zoo to put purebred bolson tortoises on exhibit in 2006.

Renowned herpetologist Dr. David Morafka brought a group of bolson tortoises from their habitat in Durango, Mexico to the Appleton Ranch near Elgin, Arizona in 1973. Four members of this group, two males and two females, were donated to the LDZG to establish a breeding colony.

Close-up of a bolson tortoise photographed in Mexico. **Photo © 2020 by Heriberto Avila G. (glezah)**

Partnering with the Turner Endangered Species Fund in an effort to produce genetically diverse bolson tortoise hatchlings, the LDZG continues to manage a successful captive breeding program..

Mapimí Biosphere Reserve

Founded in 1977 under "a cooperative program with the State of Durango, the Mexican federal government, UNESCO, the Mexican Ecological Institute," and local rancher Rosendo Aguilera, the 845,100–acre (342,000–hectare) Mapimí Biosphere Reserve (MBR) is located within the *Bolsón de Mapimí* in the state of Durango (Morafka, 1982). The goal of the MBR is the protection of the bolson tortoise and its ecosystem (Kiester, et al., 2018)

The MBR is one of 500 protected areas in 100 countries in a World Network of Biosphere Reserves, which are internationally recognized as living laboratories. "Biosphere reserves were developed in part to integrate conservation with regional development objectives and thereby to include protected areas within the resource management of inhabited areas" (Kaus, 1993).

El Laboratorio del Desierto (The Desert Laboratory) is the name of the MBR field station managed by *El Instituto de Ecología, A.C.* (INECOL). Researching and protecting the bolson tortoise and its habitat are primary goals of this field station. With the cooperation of the local residents, the MBR has realized substantial success protecting bolson tortoises within the Reserve itself.

Turner Endangered Species Fund

Ted Turner, an American businessman and environmentalist, is the founder of the Turner Endangered Species Fund (TESF), a conservation organization that studies and protects a variety of endangered species and their ecosystems. In partnership with a variety of zoos, veterinarians, and biologists, the TESF endeavors to produce genetically diverse hatchlings with the long-term goal of establishing several colonies of breeding adults in the wilds of the Chihuahuan Desert in the United States.

Located near the city of Truth or Consequences in south-central New Mexico, two TESF facilities named the Armendaris Ranch and the Ladder Ranch have captive breeding programs for the bolson tortoise. The

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long-term goal of these captive breeding efforts is the eventual reintroduction of the species to its former range in the United States. Both the TESF ranches are located in the northern tip of the Chihuahuan Desert Ecoregion within the historical range of the species.

In 2006 26 long-term captive bolson tortoise adults and 7 hatchlings were transferred from the Appleton ranch in southern Arizona to the TESF's Armendaris Ranch in New Mexico. Known as the Appleton tortoises in honor of bolson tortoise conservationist Ariel Appleton, the adult animals had lived in captivity on her ranch for several decades. The adult tortoises, together with the hatchlings, were the first members of the TESF assurance colonies.

The Appleton captives were placed in predator-resistant "secure enclosures...at [the] Armendaris Ranch...[that] contained soil textures, dominant forage vegetation, and landscape gradients selected to mimic those at the Mapimí Biosphere Reserve" (Phillips and McCaffrey).

To summarize the latest published data, as of 2018, the TESF had produced 840 bolson hatchlings; 537 were confirmed as alive while 204 had died, and the status of 66 was unknown (Species: Bolson Tortoise (Gopherus flavomarginatus), 2019).

Candidates for release into predator-accessible enclosures must be at least 4.3 inches (110 millimeters) in length, which typically takes 3 to 7 years, depending on weather and forage quality. The candidates for release are PIT-tagged (an acronmym for Passive Integrated Transponder) and will be tracked with solar-powered GPS units.

Bolson tortoise in habitat in the Mapimí Biosphere Reserve.
Photo © 2019 by manuel_rdz

Between 2012 and 2018, TESF moved 164 juveniles into predator-accessible enclosures. In the latest published data, 118 tortoises fitted with transmitters were confirmed as being alive (Species: Bolson Tortoise (Gopherus flavomarginatus), 2019).

Turtle Conservancy

The Turtle Conservancy and the Andrew Sabin Family Foundation with the assistance of Josiah T. Austin and the Desert Tortoise Council purchased a property adjacent to the INECOL field station in the Mapimí Biosphere Reserve in an effort to protect *G. flavomarginatus* and its habitat.

Named the Bolson Tortoise Ecosystem Preserve (BTEP), as of 2013 this parcel of land was 11,861 acres (4,800 hectares) in size and located in the middle of the MBR in prime bolson tortoise habitat.

The *Fundación de la Tortuga Grande* will manage the BTEP, protecting it from habitat destruction by the overgrazing of livestock and off-highway vehicular traffic.

In 2019 the Turtle Conservancy, in partnership with the Mexican non-governmental organization HABIO, A.C., Global Wildlife Conservation, the Rainforest Trust, and several private donors, contributed to the purchase of a former cattle ranch adjacent to the Mapimí Biosphere Reserve in the state of Coahuila.

Totaling 18,850 acres (7,628 hectares), this property harbors "largely undamaged Chihuahuan desert vegetation" and a significant array of both "resident and migratory wildlife".

The goal of the partnership is the conservation and restoration of the biodiversity within the desert-grassland ecosystem. Under the leadership of HABIO, A. C., the BTEP will be managed for the protection of the environment and its wildlife (18,850 Acres of Critical Wildlife Habitat Secured in Northern Mexico!, 2019).

With a current total of some 62,439 acres (25,268 hectares), the desert-grassland wildlands managed by the Turtle Conservancy, HABIO, A. C., and other partner entities provide a contiguous protected environment for the extraordinary biodiversity of wildlife in this unique ecoregion.

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Marine biologists raise and release Blanding's turtles in Michigan to save species — news release from the Detroit Free Press written by Emma Stein

22 June 2021—Blanding's turtles, [*Emydoidea blandingii*] a species of concern in Michigan, are being raised by marine biologists at SEA LIFE Michigan Aquarium and then released into their natural habitat in an attempt to save the species.

Marine biologists released dozens of them into wetlands in Holly Township on Monday.

"They're a species of special concern in Michigan," said Lauren Marcon, lead aquarist at SEA LIFE Michigan. "And they are dwindling in numbers. Because one of the biggest reasons is probably roadside mortalities, so they get hit by cars a lot. So that's where they're found a lot of times, like on the side of roads."

They're an aquatic species and can usually be found in swamps, ponds, and watersheds, but the females will end up crossing busy roads in an attempt to find "suitable nesting grounds."

Blanding's turtle, Emydoidea blandingii, photographed in habitat by Courtney Celley/USFWS Midwest Region. Public domain.

The initiative is a partnership between SEA LIFE Michigan Aquarium, Herpetological Resource Management [HRM], and Consumers Energy.

HRM will find turtles that have died, usually on the side of a road, and then extract the eggs from them and give them to SEA LIFE to raise.

"We usually keep them anywhere from like six to eight months," Marcon said. "And they grow 10 times to 12 times bigger. We weigh them weekly, we do physicals on them, measurements on their shells, and track their growth to make sure that they're eating properly. They have proper lighting and enough room to swim and move around and clean water and everything."

Marcon emphasized that, like all animals, the Blanding's turtles are important to the balance of the ecosystem and they are looking forward to continuing the project and raising more turtles next year.

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the Turtle's Garden
planting for chelonians
by M A Cohen

Leptospermum scoparium
New Zealand Tea Tree, Mānuka

The flowers, flower buds, and leaves of *Leptospermum scoparium*. **Photo © 2005 by Gerald.w**

Native to the islands of New Zealand and Australia, *Leptospermum scoparium* is a member of the Myrtaceae, the myrtle family of woody, flowering plants with aromatic properties that includes eucalyptus (*Eucalyptus*), guava (*Feijoa*), allspice and bay rum (*Pimenta* species), and clove (*Syzygium*).

Leptospermum scoparium has several common names, including mānuka, manuka, manuka myrtle, New Zealand tea tree, broom tea tree, and tea tree. The name manuka is the Māori word for the New Zealand tea tree, the Māori being an indigenous Polynesian people that inhabit mainland New Zealand.

In 1769 British navigator and cartographer Captain James Cook (1728–1779) sailed the HMS *Endeavor* from Tahiti to New Zealand. On board the ship were two botanists, Sir Joseph Banks and Dr. Daniel Solander.

Double-flowered blossoms of the New Zealand tea tree in shades of pink. **Photo © 2020 by Jean Pawek**

The crew found a safe harbor which they named Mercury Bay. The Maori locals were friendly and introduced the ship's crew to edible plants in the area, one of which came to be known as New Zealand tea tree (Harvey, 2012).

The ship's crew made a tea by steeping the aromatic leaves of *L. scoparium*, and this is the origin of the common name "tea tree." This tea, having a wealth of vitamin C, helped the crew treat the disease scurvy (Brenzel, 2012). Furthermore, the crew also brewed a type of beer using manuka leaves and the twigs of the rimu tree, another species native to New Zealand (Harvey, 2012).

The common name "tea tree" is used for two distinct species. Oils from the two species of tea tree are used as ingredients in various personal care products such as shampoo and toothpaste.

One species is the subject of the present article, *L. scoparium*, and the other is a different species in the Myrtaceae family, a tree native to Australia named *Melaleuca alternifolia* that is commonly called the Australian tea tree, paper bark, or snow-in-summer.

Manuka honey, a monofloral (single-flower) honey produced in New Zealand by bees that collect nectar from *L scoparium*, has antibacterial, antifungal, and antiviral properties that aid in the healing of wounds and burns when certified as medical grade (has a purity rating of 9+). In addition, scientists are exploring several other health-related uses of manuka honey. Moreover, there are culinary uses for other grades for manuka honey such as sweetening and baking.

Description

A multi-branched evergreen shrub with an upright growth habit, the New Zealand tea tree bears an abundance of small, showy, single or double flowers

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that are white, pink, or red. Borne in late spring and summer, the half-inch diameter flowers resemble "tiny wild roses" (Brenzel, ed., 2012). The blossoms are attractive to bees, butterflies, and other pollinators.

The shrub has small, narrow, sharp-pointed leaves that are fine-textured and aromatic when crushed. Essential oils from the manuka leaves and extracts from its bark are utilized for various medicinal purposes (Myers, 2020).

Tea tree cultivar 'Burgundy Queen' photographed at the Auckland Botanical Garden in Auckland, New Zealand. The left image is the shrub in the botanical garden; the right image is a close-up of blossoms and leaves. **Photos © 2017 by Krzysztof Ziarnek, Kenraiz**

Upright varieties of *L. scoparium* grow 6 to 12 feet (1.8 to 3.7 meters) tall at maturity with an equal spread. Dwarf varieties, cultivars that grow up to 1.5 feet (0.5 meter) tall, are suitable for use as ground covers.

Cultivation

With its resistant to pests and diseases, and its tolerance of drought and of most soils, *L. scoparium* is comparatively easy to grow. Two requirements are necessary for the shrub to thrive: good drainage and full sun. Poor drainage typically results in root rot, thus killing the shrub. While it may tolerate light shade, *L scoparium* grows and flowers best in full sun.

While the New Zealand tea tree is not particular about soil texture, the soil **must** drain well. The preferred soil pH for the species is slightly acidic. If planting the species in heavy clay soil, adding some organic matter (coconut coir or compost) or sand promotes drainage by improving the clay soil's texture.

While *L. scoparium* has low to moderate water requirements once it's established, a newly planted shrub needs consistent irrigation. Regular deep watering promotes a strong root system, enabling the shrub to better tolerate some drought.

While its pruning needs are minimal, *L. scoparium* requires some caution during trimming. Do **not** cut into bare wood because new growth will not sprout from it. Prune only to remove dead or damaged branches. If the shrub becomes bare near the base, one can "limb it up" to mimic a small tree (Brenzel, 2012).

Prune the tea tree cautiously after flowering to maintain its shape, encourage a more compact shrub, and promote an abundance of flowers (Leptospermum scoparium [Tea Tree]). Trim no more than a few inches from the tips of the branches when shaping the shrub.

Using a balanced fertilizer (such as a 12–12–12 N-P-K ratio), feed the tea tree at the beginning of the growing season when new growth appears on the tips of the branches (Degnan, 2018). A single annual feeding is generally sufficient.

The New Zealand tea tree will do well in a container if provided with consistent watering. Keep the soil in the container uniformly moist to avoid the sudden death of the tea tree.

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Galápagos Conservancy News

NASA, Galápagos Conservancy Partner on Rewilding Galápagos Program

15 May 2021—The Galápagos Islands have been the focus of perhaps the largest-scale "rewilding" program ever attempted on Earth. Largely thanks to the work of the Galápagos National Park Directorate and Galápagos Conservancy, more than 10,000 captive-bred Galápagos Giant Tortoises of multiple species have been released to the wild, helping to reverse the decimation of populations caused by centuries of exploitation. Still, current populations are just 10% of their original size and occupy only 35% of available habitats. Our program accounts for approximately one-third of all Galápagos Giant Tortoises in existence, which are distributed on most of the larger islands and volcanoes in the Archipelago. Restoring Giant Tortoise populations to their historical numbers will require intensive rewilding and monitoring programs for decades to come.

"Fernanda," the female Fernandina Island Galápagos tortoise (*Chelonoidis phantasticus*) discovered by biologists in 2019. Read about her positive identification by Yale University scientists on page 11. Image provided for media use. **Photo © 2019 by Galápagos National Park Directorate / Galápagos Conservancy**

With more than $750,000 in funding provided by NASA's [National Aeronautical and Space Administration's] Applied Science Ecological Forecasting program, Galapagos Conservancy and the State University of New York College of Environmental Science and Forestry (SUNY-ESF) will develop integrated technological tools to guide future decision-making by the Galápagos National Park Directorate in its efforts to inform the "when and where" of rewilding Giant Tortoises throughout the archipelago. Decision-making tools will be based on factors including expected future climatic conditions, probability of population establishment, ecosystem status, biodiversity enhancement, economic outcomes, and operational costs.

Forecasts for temperature and precipitation in the coming century fall outside the ranges ever observed in the Islands, so the effects of climate change will have significant consequences for Giant Tortoises. To account for those changes, the tools developed will integrate satellite-derived data on land vegetation cover, land surface temperature, and precipitation, in addition to more than 2 million field observations on tortoise distribution, data from camera traps, photography from tourists on social media, and economic forecasts on rewilding costs and income from tourists. Data from these tools will promote efficient decision-making that incorporates both scientific and human perspectives; facilitate communication between key stakeholders and the public about tortoise restoration; and provide a framework for transparency and consensus decision-making, a key component of Ecuador's National Biodiversity Strategy and Action Plan.

Efforts to rewild Galápagos are accelerating with the NASA-Galápagos Conservancy-SUNY-ESF partnership, the recently announced $43 million investment led by Leonardo DiCaprio, and the ongoing work of the Giant Tortoise Restoration Initiative. Galápagos Conservancy is thrilled to be a leader in these efforts, and we are grateful to NASA and SUNY-ESF for joining us in this pivotal moment.

—Galápagos Conservancy news release

To view a short video of the Fernandina Island giant tortoise click **Fernanda**

Galápagos Conservancy News

"Extinct" for 112 Years: Galápagos Giant Tortoise Rediscovery Confirmed

Urgent expeditions will be launched to find mate and save species — *Galápagos Conservancy news release*

25 May 2021—Scientists at Yale University have confirmed genetic similarity between a lone female Giant Tortoise recently discovered on Fernandina Island and the Fernandina Giant Tortoise (*Chelonoidis phantasticus*), last reported 112 years ago and long considered lost forever. The female Giant Tortoise was found during a 2019 joint expedition of the Galápagos National Park Directorate (GNPD) and Galápagos Conservancy. To avoid the same tragic fate as Lonesome George – the last Pinta Giant Tortoise who died in 2012 – an urgent expedition to Fernandina Island will be launched by GNPD and Galápagos Conservancy to find a mate and save the species.

At the time of discovery, the GNPD and Galápagos Conservancy team was confident that the female Giant Tortoise was the lost Fernandina Giant Tortoise. However, to verify their assumption, a blood sample was sent to geneticists at Yale, where a team led by Dr. Gisella Caccone sought to uncover the genetic origin of the female tortoise and determine how closely it matched the only other tortoise ever found on Fernandina Island, a now-deceased large male found in 1906.

Nicknamed "Fernanda" by her discoverers, genetic analysis has now confirmed that she is related to the *Chelonoidis phantasticus* tortoise species native to the island. These findings verify what researchers at Galápagos Conservancy and GNPD had long hoped for.

"One of the greatest mysteries in Galápagos has been the Fernandina Island Giant Tortoise. Rediscovering this lost species may have occurred just in the nick of time to save it. We now urgently need to complete the search of the island to find other tortoises," said Dr. James Gibbs, Vice President of Science and Conservation for the Galápagos Conservancy and tortoise expert at the State University of New York.

"We desperately want to avoid the fate of Lonesome George," said Danny Rueda Córdova, Director of the Galápagos National Park Directorate. "My team from the Park and Galápagos Conservancy are planning a series of major expeditions to return to Fernandina Island to search for additional tortoises beginning this September."

Fernandina Island's landscape is dominated by an active volcano that makes expeditions very challenging. If a male tortoise is located on the volcanic terrain, he will be united with the lone female at the Galápagos National Park's Giant Tortoise Breeding Center in Santa Cruz. Scientists would then oversee breeding efforts, rear any young safely in captivity, and eventually return them to safe habitats on their native island of Fernandina.

Prior to the 2019 discovery, only one specimen of the Fernandina Giant Tortoise had ever been found — a male collected during the California Academy of Sciences expedition in 1905–06. While populations of Giant Tortoises were decimated throughout the Galápagos archipelago in the 19th century due to exploitation by whalers and buccaneers, the Fernandina Giant Tortoise species was believed to be extinct due to volcanic eruptions in past centuries. The current population of Giant Tortoises throughout the Islands is only 10–15% of its historical numbers, estimated between 200,000–300,000 individuals.

But there is hope. Park rangers have found signs (tracks and scat) of at least two other tortoises on Fernandina Volcano during the searches that resulted in the discovery of the lone female. Galápagos Conservancy has launched an urgent appeal at **galapagos.org/savethefernandinatortoise** to raise funds to undertake the expedition to find these and perhaps other tortoises to save this species from the brink of extinction.

The western Galápagos Islands photographed from the Space Shuttle. Photo courtesy of NASA. Public domain.

Mike's Turtle Net Picks by Michael J. Connor, Ph.D.

A varied selection of recent articles, stories and sites on the Web that some of you may find as interesting as I did. This list is also posted at tortoise.org/turtlenetpicks/turtlenetpicks.html

Suit Filed to Stop the Highway Through Red Cliffs Preserve
Seven environmental organizations filed suit against the Bureau of Land Management to stop a highway being built through desert tortoise critical habitat in the Red Cliffs Conservation Area.

Tortoise Petting Zoo
Zoo Knoxville will allow guests who walk their new Tortoise Trail to pet, scratch and feed radiated and Aldabra tortoises.

Egyptian Tortoise Conservation
Work to protect Egyptian tortoises in Libya and Egypt from smuggling and habitat destruction.

Confiscated Tortoises Stuck in Hong Kong
Turtles and tortoises seized from smugglers are stranded in holding facilities in Hong Kong due to the Covid-19 pandemic (video).

Mexican Box Turtle Seizure
At the end of May, 42 rare Mexican box turtles were seized at the Memphis Port of Entry. The story includes rare video of the turtles now at the Memphis Zoo.

The Mojave's Western Pond Turtles
New review of the status of California's Mojave Desert populations of western pond turtle.

Black Softshell Conservation in Assam
The Hayagriva Madhava Temple has signed off on a new plan to establish a wild population of 1,000 adult black softshell turtles (*Nilssonia nigricans*) in Assam by 2030.

Rapid Differentiation of Orinoco and Amazon Matamatas
A cheap, two hour DNA testing toolkit allows rapid differentiation of Amazon River matamatas, *Chelus fimbriata*, from the newly described Orinoco River matamata, *Chelus orinocensis*.

Ancient Suction Feeder
Sahonachelys mailakavava, a newly described fossil side-necked turtle with a frog like face, took the same approach to feeding as the modern day matamatas and sucked down its prey.

Mental Gland Evolution
Desert tortoise owners are well aware of the prominent chin or mental glands on male tortoises. This scientific report reveals a single evolutionary origin for mental glands in an aquatic ancestor.

96 Million-Year-Old Fossil Sidenecked Turtle
A new species of sidenecked turtle, *Pleurochayah appalachius*, found in Texas is the earliest known North American sideneck.

SWOT Report 2021
The latest State of the World's Sea Turtles report is out.ly protected.

Green Sea Turtles at La Jolla
A group of four East Pacific green sea turtles has permanently settled in the waters off La Jolla Shores.

Cayman Sea Turtle Conservation
Conservation measures in the Cayman Islands are paying off with green and loggerhead sea turtle populations pulling back from the brink of extinction.

Sea Turtle Rescue Alliance
A network for sea turtle rescue and rehabilitation centers that allows the public to report injured sea turtles.

Tracking the Lost Years
The Sargassum Sea provides a perfect nursery for young green sea turtle turtles.

Mitigating Climate Change Impacts to Loggerhead Sea Turtle Sex Ratios
Environmental sex determination (ESD) is common in turtles with the sex of hatchlings being determined by the incubation temperature. Climate change is skewing sex ratios, putting their future in jeopardy. A study of loggerhead sea turtles in Cape Verde found that covering nests with simple fabric shades reduced nest temperatures and increased the proportion of males.

Sea Turtle Postage Stamps
The Sea Turtle Postage Stamps of the World website is now in its 25th year.

The Park Service Has Lost Its Conservation Compass
OpEd by Jeff Ruch, Public Employees for Environmental Responsibility, berating the National Park Service's growing institutional disregard for conservation.

CTTC's Turtle And Tortoise Listserve
CTTC's Turtle and Tortoise list has now moved to io.groups. If you want to talk with other turtle and tortoise fans in a friendly atmosphere just send an email to: **<CTTC-TurtleAndTortoise-list+subscribe@groups.io>**

CTTC on Facebook
For breaking news updates visit and "like" us on Facebook!

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ZOOMED.COM

A CRITICALLY ENDANGERED TORTOISE ENJOYS ZOO MED GRASSLAND TORTOISE FOOD

The Radiated Tortoise *(Astrochelys radiata)* is the 6th rarest tortoise in the world, and the heroes at Turtle Survival Alliance (TSA) are fighting for its future. As a non-profit, the TSA relies on support from the community. Zoo Med has pledged to donate pallets of their Natural Grassland Tortoise Food to TSA's Madagascar location 3 times a year. This food prevents shell and spinal growth deformities by matching the nutrient profile and high fiber content of a wild tortoise diet.

Join Zoo Med in supporting the TSA's conservation efforts; visit their website to learn more and how to contribute: turtlesurvival.org

TSA
turtle survival alliance

A Tortoise "Worst Nightmare" by Karen Berry, CTTC Valley Chapter

Imagine being awakened in the middle of the night by your security system's motion detectors, and see someone in the process of stealing one of your tortoises. You race out to chase the thieves away, and a horrible scenario unfolds in seconds right in front of your eyes.

We usually don't think of tortoises as being subjects of theft, but it does happen. An incident in Laveen, Arizona, reported in the media June 8th, really brings home the concept of security for our tortoises. The owner of the 200–pound female Galapagos tortoise named Jasmine is brokenhearted over the loss of his longtime pet, feelings with which all of us who have tortoise pets can identify.

Laveen, Arizona, is described as an "urban village" within the city of Phoenix. Located about 8 miles southwest of downtown, the area has an agricultural heritage and a more rural feel. Jerry Fife breeds Galapagos tortoises, which are exotic and extremely valuable. More importantly, the tortoise, named Jasmine, was more a member of the family, having spent her entire 27 years growing up with Fife's children.

Mr. Fife was awakened by the motion detectors, and once he saw what was happening, went out to investigate. A pickup truck had pulled into his front yard, and two persons were attempting to carry one of his tortoises to the truck. Upon seeing him, they dropped the tortoise, got back in the truck, spun around to escape and ran over the tortoise, which could easily have been avoided.

When he got to the tortoise, Mr. Fife saw that the top portion of her shell had been torn off, with pieces of it scattered around where she lay gravely injured, but Jasmine was still alive. Her lungs were exposed and punctured in several areas, making it extremely difficult to breathe. There was also severe spinal cord damage, but he said she recognized him as he tried to comfort her. She was taken to a vet for treatment, but the injuries were too devastating, and she was humanely euthanized.

The truck was identified as a Chevy Silverado, the investigation is ongoing, and a reward fund has been set up for information leading to the arrest of the suspects. The following is a link to a local newspaper report with a televised news item about the incident: **https://tinyurl.com/arizona-galapagos**

Most of us are not collectors or breeders of exotic turtles or tortoises, but our pets are still important to us and many people consider their pets to be members of the family. A number of people who have applied to adopt a desert or other tortoise indicated that a prior tortoise had been stolen from their yard. The last year plus has not always brought out the best in people, and every day, the local news has story after story about the rise in crime since the start of the pandemic, plus the increase in people from outside the area roaming individual neighborhoods.

Don't be paranoid, but also don't assume it couldn't be coming to your neighborhood. Take a good look at the security precautions for your own personal property and see what might need to be tightened up to keep your family and pets safe. Use the advantage of technology where you can, such as cameras to watch your shelled friends to make sure that they aren't getting into trouble. A camera can also alert you to trespassers or other human intrusion into your yard, as well as raccoons and other natural threats to your pets.

Start with your fencing and gates. Are your gates high enough to discourage climbing over them, and are they locked, especially when you aren't home? Gardeners leaving gates open is one of the most common reasons tortoises escape from the back yard, but someone on your property to do construction work or repairs is also how many are stolen.

Consider having a secure place where your tortoise can stay while strangers are on the property, or bring the tortoise inside. If you have multiple animals, the tortoise is too large to bring inside, or you have exotic turtles in your pond, make sure that workers are aware you are keeping an eye on their activity. Periodic checks to see what progress they are making or to offer water or refreshment, plus checking your tortoises/turtles at the same time, lets them know you are

article concludes on page 15 ▶

"on top of things".

Does the entire neighborhood know you have a tortoise(s)? It's a good thing if they know where your tortoise belongs if he/she should get out of the yard, but can also be a negative. Many neighborhoods have had people move away, and we don't always get to know the new people who have moved in. Your neighbors' kids may be great, but what about their friends?

Do you have permits and tags for all of your desert tortoises? A tag in plain view on your tortoise can help get him or her home should there be a jail break, and might deter someone from taking the tortoise.

Several years ago, a desert tortoise belonging to one of Valley chapter's adopters was stolen from his yard. That took an effort as the house was in an out-of-the-way location and fences were high. Someone had to know the tortoise was there, and that the caretaker wasn't home at the time. It would have taken the tortoise way too long to get to the bottom of the hill under his own power and next to the canyon road where he was found. Either the thief thought the tag was radioactive or otherwise trackable, or had some other reason for abandoning him.

Fortunately, someone who knew the Good Samaritan who kept the tortoise from venturing onto the road emailed one of our members about the found tortoise and we were able to get him back where he belonged.

If you don't have a permit for your desert tortoise(s), remember that it is required by law. Contact your chapter adoption person if you need more information.

No one should have to live Mr. Fife's horrible loss. While there have always been people who would steal a tortoise from a yard, the pandemic has increased a lot of bad behavior. Do a check of your own security, and take steps to prevent your tortoise or turtle pets from being stolen. The same goes for your dog or cat, especially if you have one of the popular and expensive breeds. You can also microchip your tortoise. The chip is usually inserted into a rear leg. Check with your veterinarian to see if they are able to do the chipping for you. If you do not already have a veterinarian for your tortoise, check with your chapter for a referral, or check out the list on **www.tortoise.org**

If you have questions, or if you need advice or ideas, contact your chapter's adoption person for assistance. They do yard consultations for adoptions and have experience in helping people secure their yards.

More than 1,000 Loggerhead Sea Turtles Died in Mexico in 2020

Mexican Government Rejects Bycatch as Cause

11 June 2021—Over the past few years, the amount of North Pacific loggerhead sea turtle deaths in Baja California Sur, Mexico has been an issue, and in 2020, they increased to alarming and dire numbers. At least 1,977 turtles died over the past four years, but 2020 resulted in more deaths than the previous three years combined, with 1,088 deaths, likely because of entanglement in fishing gear. The actual number of deaths is likely much higher. Not all dead sea turtles will be stranded on local beaches, and many are carried away by currents and not recorded.

These numbers came from official data from the Mexican government and suggest a disturbing increase in entanglements. However, the Mexican government denied turtles died from being trapped in fishing gear, despite scientific evidence showing the main cause of loggerhead turtle mortality being entanglement. The government continues to deny bycatch as a cause of death, even with international scrutiny and the increased numbers of sea turtle deaths.

In an effort to curtail the issue, conservation groups requested the Commission for Environmental Cooperation to formally record and review the efficacy and enforcement of Mexican laws in environmental efforts.

The North Pacific Ocean Distinct Population Segment (DPS) of the loggerhead sea turtle was listed as endangered under the ESA in 2011. Endangered North Pacific loggerhead sea turtles are born in Japan and swim to the coast of Baja California Sur, Mexico to feed and reproduce.

– Turtle Island Restoration Network news release

Delaware Urged to Ban Commercial Trapping of Wild Turtles

Unlimited Numbers of Snapping Turtles Can Currently Be Caught, Sold

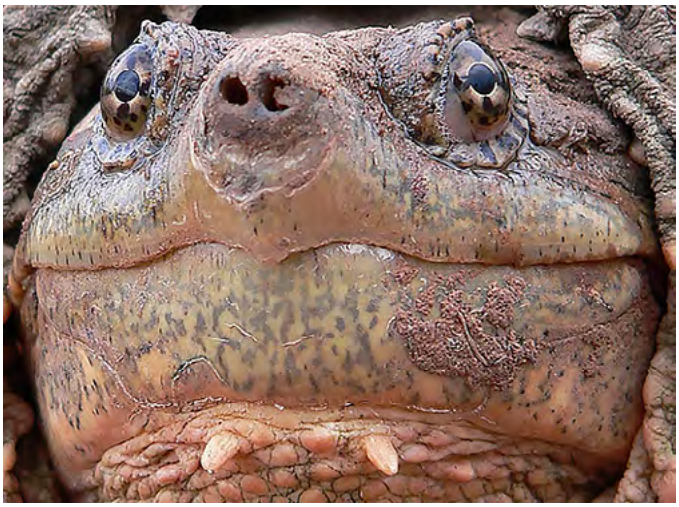
Dover, Delaware—05/05/2021 —The Center for Biological Diversity and Delaware Riverkeeper Network petitioned the Delaware Department of Natural Resources and Environmental Control today to end commercial collection of the state's common snapping turtles. Under current state law, turtle trappers can legally collect unlimited numbers of common snapping turtles to sell domestically or export for food and medicinal markets.

"The commercial harvest of turtles is always unsustainable and bad for our rivers," said Tamara Strobel, a staff scientist at the Center. "It's time for Delaware to step up and add its name to the growing list of states that have banned commercial turtle trapping, which threatens the very existence of our beloved turtles."

Nearly 17,000 wild common snapping turtles were known to be trapped in Delaware between 1998 and 2019, according to reports submitted by holders of snapping turtle harvest permits. Reporting snapping turtle catch in Delaware is voluntary and almost certainly drastically underestimates the real numbers of collected turtles.

"Turtles are an important part of our waterways and they already face enough threats," said Maya van Rossum, Delaware Riverkeeper. "Banning commercial trapping in Delaware would remove a huge threat and would be a step in the right direction for the survival of our turtle populations."

Scientists have repeatedly documented that freshwater turtles can't sustain any significant level of wild collection without population declines. In response to a multiyear study, neighboring Virginia sharply restricted commercial trapping of common snapping turtles in 2019. Based on similar research and petitions from the Center and other groups, many additional states have also imposed restrictions or completely banned commercial trapping of turtles.



The face of the common snapping turtle, *Chelydra serpentina*, photographed by Greg Kramos, USFWS Mountain-Prarie. Public domain.

Background

Millions of turtles classified as wild caught are exported from the United States every year to supply food and medicinal markets in Asia, where native turtle populations have already been depleted by soaring consumption. Because turtles accumulate toxins from prey and burrow in contaminated sediment, turtle meat is often laced with mercury, PCBs and pesticides, posing a health risk. Adult turtles are also taken from the wild for the international pet trade.

As part of a campaign to protect turtles in the United States, the Center has petitioned states that allow unrestricted commercial turtle collection to improve their regulations.

Last year South Carolina ended commercial trapping of its wild freshwater turtles. In 2017 New York halted all commercial terrapin turtle harvesting and Iowa adopted new regulations setting closed seasons and possession limits for commercial trappers. In 2012 Georgia approved state rules regulating the commercial collection of turtles, and Alabama completely banned commercial collection. And in 2009 Florida responded by banning almost all commercial collection of freshwater turtles from public and private waters.

— Center for Biological Diversity press release

2021 California Turtle & Tortoise Club Directory

Executive Board

Important note: The Executive Board is strictly an administrative body for the corporate portion of CTTC, and does not handle animals or adoptions.
General Information:
CTTCEBOfficers@tortoise.org
Chair: **Don Williams**
Vice-chair: **Robyn Kohr**
Treasurer: **Javier Gonzalez**
Secretary: **Stephanie Roberts**

Chino Chapter

President: **Lynda Misiak**
Vice president: **David Bowman**
Secretary: **Rachelle Buck**
Adoptions: **Jim Misiak**
Meeting: Meetings have paused due to CoVid–19 restrictions.

Foothill Chapter

President: **Joanna Bolt**
Secretary: **Mardy Graves**
Treasurer/Membership:
Jeanette Lea
Meeting: Contact the chapter for meeting information.

High Desert Chapter

President: **Regene Fonville**
Vice president: **Toni Clegg**
Secretary: **Mary Dutro**
Treasurer: **Jose Zamudio**
Meeting: Second Monday, 6:00 PM at Hillside Medical Building, 15247 11th Street, Victorville CA 92395 until further notice.

Inland Empire Chapter

President: **Monica Dirac**
Vice president:
Richard Roosman
Corresponding Secretary:
Amy Taylor
Recording Secretary:
Gerald Rezes
Treasurer: **Robyn Kohr**
Meeting: Virtual meetings take place via Zoom until further notice.

Kern County Chapter

General information:
KernCTTC@tortoise.org
President/membership:
Heather Ponek
Vice president: **Tim Brennan**
Treasurer: **Kathy Studer**
Adoptions: **Adoptions email**
Meeting: Virtual meetings take place via Zoom until further notice.

Low Desert Chapter

General Information:
Tony Vaninetti
Secretary: **Marlies Dietrich**
Adoptions: **Bill Powers**
Meeting: The chapter paused its in-person meetings until it is safe of gather again.

Orange County Chapter

General Information email
President: **Sharon Paquette**
Vice president: **John Kim**
Secretary: **Joyce Keyak**
Treasurer/membership:
Virginia Doepping
Adoptions: **Adoptions email**
Meeting: Second Friday, 7:30 PM at Grand Street Center (First Presbyterian Church), 146 N. Grand Street, Orange, CA 92866

Ridgecrest Chapter

President: **Robert Parker**
Vice president: **Sue Parker**
Adoptions: **Montynne Yates**
Meeting: Second Monday, 7:30 PM outdoors at Maturango Museum, 100 East Las Flores Ave., Ridgecrest, CA 93555. No meetings in July or August .

Santa Barbara-Ventura Chapter

President: **Don Williams**
Meeting: Contact the Chapter for meeting information.

Santa Clarita Chapter

General Information:
Abigail DeSesa
President: **George Ordway**
Treasurer/membership/adoptions: **Abigail DeSesa**
Secretary: **Jennifer Fields**
Meeting: Information about the meetings to be announced.

TOOSLO (San Luis Obispo) Chapter

President: **Brandon Froelicher**
Vice president: **Brian Kusko**
Treasurer: **Diane O'Leary**
Meeting: The chapter has paused its activities until further notice due to the pandemic.

Turtle & Tortoise Care Society Chapter

President: **John Kim**
Vice president: **Casey Quinn**
Secretary/Co-Treasurer:
Yolanda Keh
Treasurer: **John Wong**
Adoptions:
Adoptions Inquiries
Meeting: Third Saturday, 7:30 PM at St. Gregory's Episcopal Church, 6201 East Willow Street, Long Beach, Ca. 90815.

Valley Chapter

President: **Bob Hazard**
Treasurer: **Karen Berry**
Adoptions:
Valley Adoption Team
Meeting: Virtual meetings take place via Zoom until further notice.

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CTTC membership renewals are handled by the chapters.

The last page of each issue lists the chapters' postal mailing addresses.

Meeting Schedule

Click on your Chapter's website link for the latest program information. Programs may be scheduled after newsletter publication.

Chino Valley
Meeting dates to be determined due to CoVid-19 restrictions.

Foothill
Contact chapter for information.

High Desert
12 July; 9 August - meeting place Hillcrest Medical Bldg., 15247 11th Street, Victorville.

Inland Empire
2 July; 6 August via Zoom.

Kern County
12 July; 9 August via Zoom.

Low Desert
Paused in-person meetings until it is safe to gather.

Orange County
9 July; 13 August joint meetings with TTCS via Zoom.

Ridgecrest
Meetings paused in July and August.

Santa Barbara-Ventura
Contact the chapter for meeting information.

Santa Clarita
Meeting information to be announced.

TOOSLO (San Luis Obispo)
Paused activities due to pandemic restrictions.

TTCS (Long Beach)
9 July; 13 August joint meetings with OC via Zoom.

Valley
16 July - outdoor 'Show and Tell' meeting at Woodland Hills Christian Church; 20 August format TBA.

California Turtle & Tortoise Club: a Society Dedicated to Turtle & Tortoise Preservation, Conservation and Education since 1964. Promoting and Facilitating the Care, Rehoming, and Adoption of Native and Non-native Turtles and Tortoises.

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Please make your check payable to the California Turtle & Tortoise Club.

Please send ad fee to: CTTC *Tortuga Gazette*, attn Treasurer, P. O. Box 7300, Van Nuys, CA 91409-7300.

Mail fee with ad copy to the *Tortuga Gazette* mailing address; OR, mail fee to the postal address above, and email the ad copy to the **Gazette Editor**.

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The California Turtle & Tortoise Club (CTTC) is a non-profit 501(c)(3) corporation. Contributions are tax deductible to the full extent of the law. Please pay by USA funds only (US bank check, money order, or International Postal Order).

Membership in the CTTC and subscriptions to the *Tortuga Gazette* are handled through the CTTC Chapters. The Chapters also manage membership renewals (see postal addresses to the right).

Many members choose to join a nearby Chapter to participate in Chapter meetings and other activities. Print membership forms from the **CTTC website**.

Your Chapter and your renewal date (month/year) are displayed on your newsletter notification. Mail your new or renewal membership/subscription to the Chapter of your choice.

Membership fees

- **Student membership** 15^{00}
- **Individual membership** 25^{00}
- **Family membership** 35^{00}
- **Life membership** 500^{00}

CTTC Mailing Addresses

Chino Valley Chapter: P. O. Box 1753, Chino, CA 91708-1753

Foothill Chapter: P. O. Box 51002, Pasadena, CA 91115-1002

High Desert Chapter: P. O. Box 163, Victorville, CA 92393

Inland Empire Chapter: P.O. Box 2371, San Bernardino, CA 92406-2371

Kern County Chapter: P.O. Box 81772, Bakersfield, CA 93380-1772

Low Desert Chapter: P.O. Box 4156, Palm Desert, CA 92261

Orange County Chapter: P.O. Box 11124, Santa Ana, CA 92711

Ridgecrest Chapter: P. O. Box 1272, Ridgecrest, CA 93555

Santa Barbara-Ventura Chapter: P.O. Box 3086, Camarillo, CA 93011-3086

Santa Clarita Chapter: P.O. Box 4012, Castaic, CA 91310

TOOSLO Chapter: P.O. Box 763, Grover Beach, CA 93483

Turtle & Tortoise Care Society Chapter: P O Box 15953, Long Beach, CA 90815

Valley Chapter: P.O. Box 7364, Van Nuys, CA 91409-7364

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