Dedicated to Turtle & Tortoise Conservation, Preservation, and Education Since 1964

California Turtle & Tortoise Club

the Tortuga Gazette

Volume 56, Number 5 • September/October 2020

Lepidochelys kempii, the Kemp's ridley sea turtle, photographed on a Texas beach in 2006 by the USEPA Environmental Protection Agency. This is a Gulf Coast Ecosystem Restoration image. Public domain.

featured species **Kemp's ridley sea turtle, *Lepidochelys kempii* (Garman, 1880)**

The Atlantic ridley sea turtle

by M. A. Cohen

The smallest and rarest living marine turtle, Kemp's ridley turtle is also the most endangered sea turtle species. While the species is widely known as the Kemp's ridley, it is also called the Atlantic ridley because it ranges from the Gulf Coast northward along the Atlantic seaboard. In 2013 the legislature of the state of Texas designated *L. kempii* as the official State Sea Turtle of Texas.

The Kemp's ridley is one of two species in the genus *Lepidochelys*, the other being the olive or Pacific ridley sea turtle, *L. olivacea*. Like the other six hard-shelled sea turtle species, *L. kempii* is a member of the Cheloniidae family.

Harvard University herpetologist Samuel Garman (1843–1927) published the species description for *Lepidochelys kempii* in 1880. This ridley species is named after a naturalist and fisherman from Key West, Florida by the name of Richard M. Kemp, who submitted the first specimen to science for identification in 1880 (Spotila, 2004).

Prior to being identified as a new species and formally described by Garman, the local residents of the Gulf Coast regarded *L. kempii* as the hybrid offspring of matings between green sea turtles and loggerhead sea turtles. The origin of the term 'ridley' is something of a mystery, and it may be "a vernacular of local usage in Florida" for the word 'riddle' (Dundee, 2001).

Description

The smallest of the five marine turtle species inhabiting the Gulf

article continues on page 2 ▶

CONTENTS

The Atlantic Ridley Sea Turtle by M. A. Cohen	1
How do the World's Smallest Sea Turtles Become Stranded in Cape Cod? What is *Sargassum*?	4
Española Tortoises Return Home Following Closure of Successful Breeding Program	6
The Turtle's Garden: *Dahlia* species, Dahlia	8
Drone Technology Helps Researchers Count Turtles on the Great Barrier Reef	10
Two Map Turtle Species Move One Step Closer to Endangered Species Act Protection in Mississippi, Louisiana	11
Sea Turtles Often Lose Their Way, but Always Reach Their Destination	12
Woodland Park Zoo To Release Endangered Turtles Into The Wild	13
Mike's Turtle Net Picks by Michael J. Connor, Ph.D	14
California Fish and Game Commission Accepts Recommendation to Strengthen Protections for Desert Tortoise	15

of Mexico, the mature *L. kempii* averages 2 to 2.3 feet (61 to 70 centimeters) in carapace length and weighs up to 100 pounds (45 kilograms) [Kemp's Ridley Turtle].

The carapace of Kemp's ridley is typically as wide as it is long, giving the carapace a distinctly circular appearance. While both the carapace and plastron are charcoal gray to black upon hatching, the coloration of the mature turtle is generally grayish-green on the carapace and pale yellow on the plastron.

Triangular in shape, the head of Kemp's ridley has a slightly hooked beak. The jaws of the species feature large crushing surfaces that aid the turtle in crushing and consuming hard-shelled prey (Kemp's Ridley Sea Turtle-NWF). The coloration of the turtle's head generally follows the color scheme of the carapace and plastron, darker above and lighter below.

Range and Habitat

Ranging throughout the near-shore and inshore waters in the northern Gulf of Mexico, Kemp's ridleys, primarily subadults, can be found as far north as Nova Scotia in the Atlantic Ocean (Kemp's Ridley Sea Turtle-NPS). The downside of the northerly reach of its range is this: *L. kempii* may become cold-stunned in the northern Atlantic waters with a sudden change in the weather.

Breeding and nesting occur in the warmth of the Gulf of Mexico. A nesting beach named Rancho Nuevo in the state of Tamaulipas, Mexico is the site of the largest synchronized nesting events of Kemp's ridleys. Smaller numbers of females nest in Vera Cruz, Mexico and Padre Island National Seashore in Texas (Kemp's Ridley Sea Turtle). Occasionally a Kemp's ridley nest is found in other Gulf Coast states.

After nesting season, female *L. kempii* move to foraging areas off the northern and western Yucatan Peninsula, near-shore Texas, and the northern Gulf Coast, while males remain in the vicinity of the nesting beaches (Spotila, 2004). Adults rarely leave the Gulf of Mexico.

Biologists estimate that Kemp's ridleys live in *Sargassum* mats in the Gulf of Mexico for between two and 10 years following hatching, or until their carapace length reaches approximately 8 inches (20 centimeters). The subadults return to the near-shore area to continue their development. Preferring comparatively shallow waters with silted or muddy bottoms, *L. kempii* rarely travels into waters deeper than 160 feet (49 meters) [Kemp's Ridley Sea Turtle-NWF].

Feeding

An omnivore in its feeding habits, the Kemp's ridley favors many species of crabs, and also consumes clams, mussels, and shrimp, using its powerful jaws for crushing and grinding the hard shells of such prey. *L. kempii* also eats fish, jellyfish, sea urchins, and squid (Introduction to Sea Turtles: Kemp's Ridley Sea Turtle).

Being an omnivore, the species will occasionally consume *Sargassum* and other types of macroalgae (seaweed) [Kemp's Ridley Sea Turtle-NG]. According to the NOAA Fisheries website, the species will also "scavenge on dead fish and discarded bycatch" (Kemp's Ridley Turtle).

Reproduction

As with many other chelonian species, Kemp's ridley is subject to temperature-dependent sex determination (TSD), meaning the temperature in the nest at the time of incubation heavily influ-

Kemp's ridley turtle nesting on the Padre Island National Seashore, Texas in January 2007. Photo by the National Park Service (Division of Sea Turtle Science and Recovery). Public domain.

article concludes on page 3 ▶

ences the sexes of the hatchlings.

A research paper published in 2012 revealed that, within the nest, the temperature is not completely uniform. The temperature in the center of the nest is higher than that at the edges of the nest due to the metabolic heat generated by the eggs themselves. Thus, eggs in the center of the nest tend to produce female hatchlings while those at the edges of the nest tend to yield males (LeBlanc et.al, 2012).

A juvenile Kemp's ridley sea turtle checking out a patch of sargassum. Photo © Blair and Dawn Witherington and reprinted with permission from the photographer.

Unlike other marine turtle species, Kemp's ridley turtles nest during the day. In an event known as an *arribada* (Spanish for "arrival"), large groups of female Kemp's ridleys come ashore together to nest. The only other marine turtle species known to nest in such large gatherings is the olive ridley turtle, *Lepidochelys olivacea*.

Biologists estimate that Kemp's ridley females reach reproductive maturity at 12 years of age. Nesting season typically occurs from April through July. The females nest frequently, every 1 to 3 years on average, often 2 to 3 times per season. They lay an average of 110 eggs during each nesting, and the eggs typically incubate for some 55 days (Information About Sea Turtles: Kemp's Ridley Sea Turtle).

Threats

Hatchling Kemp's ridleys face numerous natural predators as they emerge from their nests and head for the ocean, including crabs, birds, and small mammals.

The most serious threats to the species occur as a result of "human use activities" (Information About Sea Turtles: Kemp's Ridley Sea Turtle). Being trapped in discarded or lost fishing gear is a major cause of death; gill nets, shrimp trawls, seafood traps and pots, and recreational fishing gear are examples "human use" threats to the species (Kemp's Ridley Turtle).

Another serious threat to Kemp's ridleys, and all species of sea turtles, is ocean pollution and marine debris. Ingesting plastic debris, such as fishing line, balloons, plastic bags, and random plastic pieces, that is mistaken for food can cause life-threatening digestive-tract problems. Entanglement in discarded or lost fishing gear causes injury or death or death to many turtles (Kemp's Ridley Turtle).

At one time, the majority of eggs laid by *L. kempii* were harvested for human consumption. Fortunately, egg collection is less of a threat today because the governments of both Mexico and United States have implemented legal protections for the nesting beaches of the species (Kemp's Ridley Turtle). More information will follow in the Conservation section of this article.

Conservation

Many measures are underway to protect the rarest and most critically endangered sea turtle, the Kemp's ridley. Headstarting programs involving digging up nests and moving the eggs to fenced nesting corrals protects eggs from wildlife during incubation (Spotila, 2004).

Biologists and volunteers walk the nesting beaches to monitor nesting females, find and protect new nests, and work with nearby communities to educate local populations (Spotila, 2004).

The continued use of turtle-excluder devices by fishermen and shrimpers is vital to protect Kemp's ridleys, and other sea turtles, from entrapment in fishing gear.

References

Dundee, H. A. (2001). The Etymological Riddle of the Ridley Sea Turtle. Marine Turtle Newsletter 58

Information About Sea Turtles: Kemp's Ridley Sea Turtle. https://conserveturtles.org/information-about-sea-turtles-kemps-ridley-sea-turtle/

Kemp's Ridley Turtle. https://www.fisheries.noaa.gov/species/kemps-ridley-turtle

Kemp's Ridley Sea Turtle (NG). https://www.nationalgeographic.com/animals/reptiles/k/kemps-ridley-sea-turtle/

Kemp's ridley sea turtle (NPS). (2018). https://www.nps.gov/pais/learn/nature/kridley.htm

Kemp's Ridley Sea Turtle (NWF). https://www.nwf.org/Educational-Resources/Wildlife-Guide/Reptiles/Sea-Turtles/Kemps-Ridley-Sea-Turtle

LeBlanc, A. M., Wibbels, T., Shaver, D., & Walker, J. S. (2012). Temperature-dependent sex determination in the Kemp's ridley sea turtle: effects of incubation temperatures on sex ratios. Endangered Species Research

Spotila, J. R. (2004). Sea Turtles—A Complete Guide to Their Biology, Behavior, and Conservation. Johns Hopkins University Press.

Kemp's ridley hatchlings emerge from their nest in a nesting corral in Rancho Nuevo, Tamaulipas, Mexico. Photo © 2017 by Hrchenge

How do world's smallest sea turtles become stranded in Cape Cod?

Written by the Vet Candy staff and posted on VetCandy.com

A computational analysis has surfaced new insights into the wind and water conditions that cause Kemp's ridley sea turtles [*Lepidochelys kempii*] to become stranded on beaches in Cape Cod, Massachusetts. Xiaojian Liu of Wuhan University, China, and colleagues present these findings in the open-access journal *PLOS ONE* on December 4, 2019.

The Kemp's ridley sea turtle is smaller and in greater danger of extinction than any other sea turtle in the world. This species is found in coastal waters ranging from the Gulf of Mexico to Nova Scotia, Canada. While Kemp's ridley populations have slowly risen since conservation efforts began in the 1970s, the number of turtles found stranded on Cape Cod beaches in the last few years is nearly an order of magnitude higher than in earlier decades.

To help clarify the conditions that lead to stranding, Liu and colleagues combined computational modeling with real-world observations. This enabled them to investigate circumstances that could trigger hypothermia in Kemp's ridley turtles—the primary cause of most strandings—and subsequent transport of the cold-stunned animals to shore.

The researchers used the Finite Volume Community Ocean Model to simulate ocean currents in Cape Cod Bay. To validate these simulations, they also released drifting instruments into the currents and tracked their movements via satellite. Then, they looked for links between the simulations, the drifter data, water temperature data, and records of where and when Kemp's ridley turtles were found stranded.

The findings suggest that Kemp's ridley sea turtles are more likely to become stranded at certain beach locations along Cape Cod when water temperatures drop below 10.5° Celsius [50.9° Fahrenheit] and, concurrently, winds blow with high wind stress in certain directions. Once stranded, hypothermic turtles usually require assistance from trained volunteers in order to survive.

While these findings provide new insights that could help guide future search and rescue efforts, questions remain. Further research is needed to clarify the depth of water at which Kemp's ridley sea turtles typically become hypothermic, and how processes like wind and waves may impact stranding events at those depths.

Co-author James Manning notes: "While the state-of-the-art ocean model can help simulate the process, both the student-built drifters and bottom temperature sensors deployed by local fishermen are critical to the investigation."

To view the complete, technical research article, click **On simulating cold-stunned sea turtle strandings on Cape Cod, Massachusetts**

What is *Sargassum*?

Sargassum is a genus of large brown seaweed (a type of algae) that floats in island-like masses and never attaches to the seafloor.

Sargassum is abundant in the ocean. Upon close inspection, it is easy to see the many leafy appendages, branches, and round, berry-like structures that make up the plant. These "berries" are actually gas-filled structures, called pneumatocysts, which are filled mostly with oxygen. Pneumatocysts add buoyancy to the plant structure and allow it to float on the surface.

Floating rafts of *Sargassum* can stretch for miles across the ocean. This floating habitat provides food, refuge, and breeding grounds for an array of animals such as fishes, sea turtles, marine birds, crabs, shrimp, and more. Some animals, like the sargassum fish (in the frogfish family), live their whole lives only in this habitat. *Sargassum* serves as a primary nursery area for a variety of commercially important fishes such as mahi mahi, jacks, and amberjacks.

When *Sargassum* loses its buoyancy, it sinks to the seafloor, providing energy in the form of carbon to fishes and invertebrates in the deep sea, thus serving as a potentially important addition to deep-sea food web.

Because of its ecological importance, in 2003, *Sargassum* within U.S. Exclusive Economic Zone off the southern Atlantic states was designated as Essential Fish Habitat, which affords these areas special protection. However, *Sargassum* habitat has been poorly studied because it is so difficult to sample. Further research is needed to understand, protect, and best conserve this natural resource.

— Courtesy of Ocean Exploration/NOAA

A mass of sargassum weed. Note the many small, spheres which are filled with carbon dioxide gas, allowing the vegetation mat to float. Photo courtesy of Ocean Explorer/NOAA. Public domain.

SAVE YOUR REPTILES
ZOO MED
LABORATORIES, INC.
GET THE BEST FOR YOUR TURTLE
Turtle Dock
LARGE SIZE
Turtle Dock
Unique Floating Aquarium Dock For All Types Of Aquatic Animals
REPTIBATOR
DIGITAL EGG INCUBATOR
FEATURES
Turtle Dock™ Unique Floating Aquarium Dock For All Types of Aquatic Animals
Reptibator® Digital Egg Incubator
GOURMET
TORTOISE FOOD
Gourmet Tortoise Food
A food medley of Zoo Med's Natural Tortoise Food.
TURTLE CLEAN 50
EXTERNAL CANISTER FILTER for Aquatic Turtles
Up to 50 GALLONS
QUALITY
TurtleClean™ External Canister Filter For Aquatic Turtles
ZOO MED LABORATORIES, INC.
3650 Sacramento Dr.
San Luis Obispo, CA 93401
Phone: 805-542-9988
email: zoomed@zoomed.com
www.zoomed.com

Diego (center) and two companions at the CDRS. Diego appears to be resting up for his next efforts to save his subspecies. Photo by Robert Hazard.

In 2017 Robert Hazard, president of the CTTC Valley chapter, traveled to the Galápagos Islands. During his trip, he visited the Charles Darwin Research Station (CDRS) located in Puerto Ayora on Santa Cruz Island. At the time of Robert's visit, Diego, a Hood Island or Española Giant Tortoise (*Chelonoidis hoodensis*) was living at the CDRS. This image, captured on 17 December 2017, shows him at rest. According to genetic testing, Diego has fathered approximately 800 hatchlings, about 40% of the *C. hoodensis* tortoises bred at the CDRS, over the 40+ years since he came to CDRS from the San Diego Zoo. These young tortoises were repatriated to Española and Santa Fe Islands when they grew large enough to be predator-resistant, which occurs at roughly five years of age.

Española Tortoises Return Home Following Closure of Successful Breeding Program

▶ With the release of the 15 original Española Island tortoises back to their island home after 55 years in the program, one of the most successful captive breeding programs in the world is now officially closed.

▶ The reproduction of these 15 tortoises in captivity led to the eventual reintroduction of nearly 1,900 Española tortoises to their island or origin through the breeding program. Many of those tortoises have survived in the wild and started breeding so that there are now more than 2,300 tortoises on the island – all the offspring and "grandchildren" of the original 15 surviving Española tortoises.

▶ The giant tortoise dubbed "Diego" is part of this group that contributed to saving his species from extinction, contributing to approximately 40% of the offspring repatriated to the island.

▶ Watch: "Escaping Extinction: The Long Road Home for the Española Tortoise Species" (3.24) on YouTube

On Monday, June 15, 2020, the Galápagos National Park Directorate and Galápagos Conservancy carried out the release of the original group of 15 reproductive adult tortoises from Española Island (*Chelonidis hoodensis*) back to their island of origin as part of the Giant Tortoise Restoration Initiative (GTRI). The Española tortoise program, which was created in the mid–1960s, represents one of the most successful captive reproduction and breeding programs ever undertaken anywhere in the world, as these 15 last remaining tortoises from Española effectively saved their species from extinction and have contributed to the restoration of the island's ecological integrity.

With their return to their island of origin, they will join approximately 2,300 other tortoises that now reproduce naturally on the island — which is now able to support the growing tortoise population in the long term following the eradication of introduced goats. The Española captive breeding program is officially closed after being deemed a success.

"This captive breeding program, in addition to the management actions implemented on Española island, give us peace of mind that we managed to save a species that would otherwise have become extinct. It can only be described as successful and an example of the conservation efforts that we implement as a National Government in synergy with our allies," said Paulo Proaño, Minister of Environment and Water.

The Expedition

The 15 breeding tortoises were subjected to an extended quarantine process, as their release was initially planned for March but the COVID–19 pandemic prevented their transfer at that time. Prior to their release, they were internally and externally de-parasitized and an identification microchip was placed in each. At dusk on Sunday, the tortoises were loaded on board a Galápagos National Park boat that would sail for Española on Monday.

After arriving on the island and completing the disembarkation, the rangers and scientists began

article concludes on page 7 ▶

The 15 breeding tortoises were carried 1.5 miles to the Las Tunas release site by park rangers and scientists. Photo © Andrés Cruz / GTRI.

the 1.5 mile journey to Las Tunas, where the largest number of *Opuntia* cacti is concentrated (the primary food for tortoises), which will facilitate their re-adaptation to their home island.

"The work is strong but the commitment is stronger; the 12 females, weighing an average of 77 lbs, were carried by a single person, while for the 3 males whose weight exceeded 120 lbs, two people were needed in relays. After the release, the staff remained for approximately four more hours, making observations of the behavior of the tortoises as they settled back into their home," said Danny Rueda, Director of the Galápagos National Park.

"The first monitoring trip will take place in about six months," commented Washington Tapia, Director of the GTRI through Galápagos Conservancy. "However, each tortoise has a GPS satellite device that will send six positions daily, which will add to images from 40 motion-triggered cameras distributed in the area. These will allow us to know all of their movements and activities."

Diego's Legacy and the 14 Other Breeding Tortoises

The famous giant tortoise Diego, that was originally transferred from the San Diego Zoo, has also returned to his island of origin almost 80 years after he was removed.

Diego's story began when there was a need to increase the number of breeders in the captive breeding program. Only 12 females and 2 males were found on Española island, as this species was heavily exploited by mariners in the 1800's to the point of near extinction. It was necessary to do a worldwide search to determine if there were more individuals, especially males, that could contribute to the genetic variability of this unique species. The search paid off, and an adult male was found at the San Diego Zoo, having been collected on the island by a research team in the mid-1930s.

The tortoise then began his return trip to the Galápagos, where he arrived in 1977 and quickly joined the captive breeding program, originally started and managed in its first decades by the Charles Darwin Foundation. Diego actively contributing to the reproduction of a large number of hatchlings (approximately 40%).

Despite their great age (Diego is more than 100 years old), each tortoise remains fit and agile and is expected to do well back on its home island — and perhaps even better than in captivity, given the abundant food and space now on Española Island.

— Galápagos Conservancy press release. Images © Galápagos Conservancy and provided for media use.

The staff unpacked the tortoises following the trek to the release site. The white objects on the tortoises' carapaces are GPS trackers that allow monitoring of their activities following their release. Photo © Andrés Cruz / GTRI.

Galapagos Conservancy
Saving One of the World's Great Treasures

After his release at Las Tunas, Diego homes in on an *Opuntia* shrub, a food source that is plentiful in the area. Photo © Andrés Cruz / GTRI.

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

Dahlia species, Dahlia

Blossoms of the *Dahlia* 'Nagano' cultivar. Photo © 2006 by Mark Twyning

With 42 recognized species and several subspecies, the genus *Dahlia* is a large and diverse group of perennial plants belonging to the Asteraceae family, commonly known as the aster, daisy, or sunflower family.

Over the past few centuries since the discovery of the dahlia in the mountains of Mexico and Guatemala, botanists and horticulturists have developed countless hybrids and cultivars of the species. In 1963 *Dahlia pinnata* was named as the national flower of Mexico (Raven).

The genus *Dahlia* was named in honor of Dr. Anders Dahl (1751–1789) who was a Swedish botanist. Dahl was a student of the Swedish botanist and zoologist Carl Linneaus (1707–1778), who developed binomial nomenclature, the modern system for scientifically naming organisms.

Very popular worldwide, dahlias have great versatility in the garden, ranging in height from 1 foot to 20 feet (30 centimeters to 6 meters) tall, have an abundant array of flower colors, forms, and sizes, and are easy to grow given the proper garden conditions.

Dahlia blossom with the tuberous roots of the species. Tuberous roots are enlarged, fleshy storage organs that supply nutrients for the plant's use during its growth and maintenance processes. In addition to dahlias, many types of plants possess tuberous roots. Furthermore, carrots, potatoes, and beets are tuberous roots that are themselves consumed as food. Photo © 2019 by Krishna satya 333

Description

Growing 10 to 20 feet (3 to 6 meters) tall, the tree dahlia (*Dahlia imperialis*) is an herbaceous perennial. Conversely, bedding dahlias are dwarf forms as small as 1 foot (30 centimeters) tall. Bush dahlias may grow as tall as 7 feet (2 meters). Many commercially available dahlias are in the 4– to 5–foot (1.2– to 1.5–centimeter) range, making them suitable for border plantings (Brenzel, ed., 2012).

Leaf colors range from deep green to bronze to brownish-purple. Most varieties have a compound leaf form, meaning each leaf is divided into many small leaflets. Most leaflets have margins that are moderately serrated (saw-toothed).

Available in virtually every color except true blue, dahlia flowers range from solid white through solid maroon, as well as numerous bicolored and even tricolored blossoms. The sizes of dahlia flowers vary from less than 2 to 12 inches (5 to 30 centimeters) across (Brenzel, ed.,2012). See the following section for a brief discussion of flower forms.

Basic Flower Forms

According to the American Dahlia Society (ADS), one way to categorize dahlias is by the form of their flowers. It is beyond the scope of this article to describe each of the 20 forms identified by ADS. A sampler of flower forms appears below.

Ball: flower head is round with uniform petals;
Cactus: straight, narrow petals radiating uniformly from the center
Collarette: single row of flat petals with petaloids forming a "collar" around an open center;
Informal Decorative: curled, twisted, or wavy petals in an irregular arrangement;
Single: single row of flat petals that overlap uniformly (ADS descriptions).

Cultivation

To describe a plant's cold tolerance, the terms "tender" and "hardy" are used in horticulture. "Tender" plants will not tolerate winter's cold, while "hardy" plants will endure cold temperatures with little or no damage.

Tender perennials in much of temperate North America, dahlias are typically treated as annuals in these regions. Gardeners will remove the stems and leaves in the fall, dig up the tubers, and store them indoors for planting out the following spring. The website of the American Dahlia Society has extensive instructions on the

article concludes on page 9 ▶

subject of "**Digging, Dividing, and Storing Tubers**."

In warmer regions, dahlias can re—main outdoors all year. However they are not suited for the extreme heat of southern Texas or Florida. Ideal conditions for dahlia cultivation are "moist, moderate climates" (Boeckmann).

While dahlias will tolerate various soil types, the preferred soil in which to plant dahlias is "rich" loam, meaning it contains a lot of humus (organic matter). If the planting site has either sandy or heavy clay soil, enrich the ground by adding compost, oak leaves, aged manure, or similar products.

For the best flower production, dahlias require a minimum of six hours of direct sunlight on their planting location, preferably morning sun. However, in hotter areas, they benefit from light shade. Dahlias struggle in cold soil, so it's best to plant tubers or seedlings when the soil temperature is at least 60°Fahrenheit (16°Celsius), and all danger of frost has passed (Boeckmann). The preferred soil pH is slightly acidic (6.5 to 7.0), and dahlias require good drainage.

When selecting tubers, avoid those that appear shrunken or spongy or show signs of mold or rot. When planting tubers, place in the soil, but do not water until new shoots appear above the soil surface to avoid the possibility of rot.

After new growth is visible, apply water regularly but do not overwater. A low-nitrogen fertilizer (such as a 5–10–10 formula) will benefit the plant. Apply fertilizer after new growth appears and about once a month throughout the growing season (Boeckmann).

Dwarf or bedding dahlias do not require support, but taller bush types that may grow as tall as 6 to 7 feet (1.8 to 2.1 meters) will need to be staked. It is best to insert the stake at the time of planting the tuber, taking care not to damage the tuber.

Dahlia 'Graceland' blossom. Photo © 2008 by Jan Mehlich

Blossoms begin to appear about eight weeks after tubers are planted, blooming from late spring through fall. In order to promote larger flowers, many gardeners use a technique called disbudding. Dahlias typically grow three flower buds per stalk, and removing the side two buds will enable the center bud to produce a larger flower. To prolong the season of blooming, remove spent flower heads in a timely manner, a process known as deadheading.

Most gardeners recommend against mulching dahlias for two reasons. Mulch harbors slugs, garden pests that relish the new growth on the plants. Dahlias like the sun on their roots and mulch blocks the sun from warming the roots.

A variety of pests and diseases may attack dahlias. In addition to the aforementioned slugs, snails and cutworms also chew on dahlia plants.

Sap-sucking insects, including aphids, leafhoppers, mites, and thrips routinely infest dahlias. Some of these insect pests act as vectors of diseases that can severely harm or even kill dahlias (Grant).

Fungal diseases that are common in dahlias include stem rot and botrytis blight. Viral diseases include mosaic viruses and verticillium wilt. Most of these diseases are incurable, so it is best to carefully remove the plant altogether and dispose of it in the rubbish (Grant). Do NOT compost diseased plants.

If you are planning to offer dahlias to your pets, ***be sure to use only non-toxic methods of pest and disease control.***

Garden Usage

With their multitude of sizes, dahlias are suitable for many garden purposes, as mentioned previously. In addition, smaller-scale, lower-growing varieties are excellent container plants. Beautiful dahlia blossoms are also long-lasting cut flowers, often lasting as much as a week in a vase.

References

American Dahlia Society. https://www.dahlia.org/growing/dahlia-university/

Boeckmann, C. (2013). Growing Dahlias (The Old Farmers Almanac). https://www.almanac.com/plant/dahlias

Brenzel, ed., K. N. (2012). The Sunset Western Garden Book. Time Home Entertainment.

Grant, B. L. Dahlia Pests and Diseases. https://www.gardeningknowhow.com/ornamental/bulbs/dahlia/dahlia-pests-and-diseases.htm

M., A. (2019). Planting Dahlia Bulbs & Dahlia Care. https://plantinstructions.com/flowers/planting-dahlia-bulbs-how-to-grow-and-care-for-dahlia-flowers/

Raven, S. History of the Dahlia. https://www.sarahraven.com/articles/history_of_the_dahlia.htm

Planting of the cactus dahlia cultivar named *Dahlia* 'Karma Sangria.' Photo © 2007 by Mark Twyning

Drone technology helps researchers count turtles on the Great Barrier Reef

— Department of Environment and Science, Queensland, Australia press release posted 9 June 2020.

Researchers at Raine Island, the world's largest green turtle rookery, have used a drone to conduct accurate population surveys, with stunning results.

Green turtle surfacing for a breath of air near Whitsunday Islands in the Great Barrier Reef. **Photo © 2017 by Alpha Juliet**

Drone vision captured in December 2019 as part of the Raine Island Recovery Project showed up to 64,000 green turtles around the island waiting to come ashore and lay clutches of eggs.

Dr Andrew Dunstan from the Department of Environment and Science (DES) and lead author of the paper said researchers had been investigating different ways of conducting turtle population surveys.

"New scientific research published on Monday 8 June in *PLOS ONE* found that drones, or Unmanned Aerial Vehicles (UAVs), were found to be the most efficient survey method," Dr Dunstan said.

"Underwater video using a Go-Pro may also be a useful alternative for in-water surveys of turtles.

"Previous population survey methods involved painting a white stripe down the green turtles' shell when they were nesting on the beach. The paint is non-toxic and washes off in a couple of days.

"From a small boat, we then counted painted and non-painted turtles, but eyes are attracted much more to a turtle with a bright white stripe than an unpainted turtle, resulting in biased counts and reduced accuracy.

"Trying to accurately count thousands of painted and unpainted turtles from a small boat in rough weather was difficult. Using a drone is easier, safer, much more accurate, and the data can be immediately and permanently stored."

The drone vision was analysed, frame by frame in the laboratory, reducing observer error and allowing accurate counts on painted and unpainted turtles.

"The ratio of unpainted and painted turtles allowed us to estimate the total population for last December to be 64,000 green turtles waiting to nest on the island," Dr Dunstan said.

Research partner Richard Fitzpatrick from the Biopixel Oceans Foundation said vessel-based counts were inaccurate.

"When we compared drone counts to observer counts we found that we had under-estimated the numbers in the past by a factor 1.73," Mr Fitzpatrick said.

"By using drones we have adjusted historical data. What previously took a number of researchers a long time can now be by one drone operator in under an hour."

Great Barrier Reef Foundation Managing Director Anna Marsden congratulated the researchers on their outstanding work and results.

"We're seeing the world's largest aggregation of green turtles captured in these extraordinary drone images that are helping to document the largest turtle numbers seen since we began the Raine Island Recovery Project," Ms Marsden said.

"This important research combines science and technology to more effectively count endangered green turtles.

"Raine Island is the world's largest green turtle nesting site and that's why we're working with our Raine Island Recovery Project partners to protect and restore the island's critical habitat.

"We're taking action to improve and rebuild the island's nesting beaches and building fences to prevent turtle deaths, all working to strengthen the island's resilience and ensure the survival of our northern green turtles and many other species."

BHP Mitsubishi Alliance (BMA) Asset President James Palmer said it was great to see innovative technology like drones used in this way for turtle conservation.

"The Raine Island Recovery Project is a great example of business, governments, Traditional Owners and not-for-profits working together to protect the Great Barrier

article concludes on page 11 ▶

Two Map Turtle Species Move One Step Closer to Endangered Species Act Protection in Mississippi, Louisiana

Pascagoula, Pearl River Map Turtles Threatened by Dams, Pollution, Sprawl

Pearl River map turtle, *Graptemys pearlensis*. Photo by Cris Hagen, University of Georgia, Savannah River Ecology Laboratory / Courtesy of USGS.

NEW ORLEANS, LA — 6 July 2020—As the result of a lawsuit by the Center for Biological Diversity and Healthy Gulf, the U.S. Fish and Wildlife Service has agreed to decide on Endangered Species Act protection for Pascagoula and Pearl River map turtles by Oct. 29, 2021.

Approved Thursday by U.S. District Court Judge Emmet G. Sullivan, the agreement resolves a suit filed in January that challenged the Service's failure to make a timely initial finding on a 2010 petition to protect the Pascagoula map turtle under the Endangered Species Act.

"North American turtles survived the asteroid that killed the dinosaurs, but these two species need help to live through the havoc we're wreaking on rivers," said Jason Totoiu, a senior attorney for the Center for Biological Diversity. "These turtles are in steep decline and need the safeguards afforded by the Endangered Species Act before it's too late."

Map turtles serve as indicators of river health, and poor water quality can devastate their populations. In addition to habitat loss and degradation from dams, floodplain clearing and river channelization, other threats include the harvest of turtles for sale in Asian food and medicinal markets and collection for the pet trade.

"The Pearl River Map turtle needs all the help it can get, so it's good that the listing determination will proceed," said Andrew Whitehurst, Healthy Gulf's water program director. "Ten miles of its breeding and feeding habitat are now in the project area for the 'One Lake' project to dredge and dam the Pearl River's main channel in Jackson, Mississippi. The Corps of Engineers is evaluating the project's final Environmental Impact Statement now, so the Fish and Wildlife Service's work is timely and relevant for these turtles."

Map turtles are often called "sawbacks" for the ridges along their backs that can form small spikes. Pearl River map turtles can live up to 30 years in the wild.

The Pascagoula map turtle has a relatively small range in the Pascagoula river system in Mississippi, while the Pearl River map turtle is only found in creeks and rivers within the Pearl River drainage in Mississippi and Louisiana. The Pearl River map turtle was once considered to be the same species as Pascagoula map turtle, but scientists more recently determined they're two separate species.

—Center for Biological Diversity press release

Pascagoula map turtle, *Graptemys gibbonsi*. Photo courtesy of Grover Brown.

Reef, in this case the remarkable ecosystem of Raine Island," he said.

Dr Dunstan said the Raine Island Recovery Project is making a major contribution to the future sustainability of the world's most important green turtle rookery.

"This research is of prime importance to the understanding and management of the vulnerable green turtle population," he said.

"In the future, we will be able to automate these counts from video footage using artificial intelligence so the computer does the counting for us."

The five-year, $7.95 million Raine Island Recovery Project is a partnership between BHP, the Queensland Government, the Great Barrier Reef Marine Park Authority, the Great Barrier Reef Foundation and the Wuthathi and Meriam Nation (Ugar, Mer, Erub) Traditional Owners.

To access drone vision, please visit: https://www.dropbox.com/sh/3ycu2148j47n6d4/AACcnbz9PDFwcn23hQsqoNGZa?dl=0

The research paper can be found here: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0228524

For more information on the Raine Island Recovery Project, please visit: https://parks.des.qld.gov.au/raineisland

Sea turtles often lose their way, but always reach their destination

by Elizabeth Claire Alberts. Posted on **Mongabay.com** on 21 July 2020.

A green turtle swimming near the eastern Caribbean island of Martinque. Image by Michelle Roux / Coral Reef Image Bank. Reprinted with permission.

A new study found that green sea turtles rely on a "crude map" to navigate the ocean, often going several hundred kilometers off course before successfully arriving at their destination.

Using GPS tracking devices, the research team tracked the migrations of female green turtles from nesting grounds on Diego Garcia Island in the Indian Ocean to foraging grounds on isolated oceanic islands.

Green turtles demonstrate a particularly high fidelity to foraging grounds, which made them an ideal species to study.

The researchers say they hope their findings will help inform conservation efforts to protect green turtles, which are an endangered species.

When baby sea turtles hatch from their eggs, they skitter across the sand to the shoreline before disappearing into the open ocean. Many years later, by some remarkable feat, female turtles find their way back, sometimes traveling thousands of kilometers, to arrive at the exact beach where they were born. This time, it's to lay their own eggs.

It's believed that turtles use the Earth's geomagnetic field to find their way, but there is still a lot that's unknown about this process. A team of scientists, who published a new paper in *Current Biology* this month, used satellite tracking to study the navigation skills of female green turtles (*Chelonia mydas*). They found that while green turtles eventually arrived at their preferred destination, they didn't always get there with pinpoint accuracy, but followed a kind of "crude map."

"I think we had this idea that turtles were running on rails, and that they had some sort of fine scale navigational ability," Alex Rattray, co-author of the paper and research fellow at the School of Life and Environmental Sciences at Deakin University in Australia, told Mongabay. "But what we found out is that they make mistakes, they miss their targets, they overshoot the targets, and they do a lot of searching."

Nesting grounds aren't the only locations sea turtles habitually return to — they also return to the same foraging grounds. In fact, another study found that migrating sea turtles were so loyal to their preferred foraging locations that they would bypass other suitable places to forage while searching for their "home" site. Green turtles, in particular, demonstrate a very high fidelity to foraging grounds, and do not stop anywhere else during open-ocean crossings, according to the study, which makes the species an ideal subject matter.

The research team collected data by fitting satellite trackers to 35 sea turtles nesting on the island of Diego Garcia in the Indian Ocean. The trackers transmitted high-accuracy Fastloc-GPS location data several times each day. Once the turtles laid their eggs, they returned to the ocean to travel to their foraging grounds off the coasts of small, isolated islands. But most of the time, the turtles did not get there directly, sometimes traveling several hundred

Green turtle nesting. Image captured in 2011 by the U.S. Geological Survey staff. The structure on the turtle's carapace is a satellite tracking device that scientists use to monitor its movements. Public domain.

article concludes on page 13 ▶

kilometers off course before reaching their destination.

"We were also surprised at the distance that some turtles migrated," Graeme Hays, lead author of the study and the Alfred Deakin professor of marine science at Deakin University, said in a statement. "Six tracked turtles traveled more than 4,000 kilometers [2,500 miles] to the east African coast, from Mozambique in the south, to as far north as Somalia. So, these turtles complete round-trip migrations of more than 8,000 kilometers [5,000 miles] to and from their nesting beaches in the Chagos Archipelago."

While the green turtles traveled via circuitous routes, the study showed that they do have the ability to navigate vast swaths of the ocean, and to reorient themselves when astray.

"None of these turtles got irrevocably lost," Rattray said. "They all eventually found a way home. One of the turtles ... [traveled off course] about 200 kilometers [120 miles] south of its destination after one month, and then spent another two months finding its way back to its target after it'd overshot it.

"They're amazing creatures," he added, "and they truly are the number one navigators in the world."

Green turtles are an endangered species on the IUCN Red List. Primary threats include fishing net entanglement, habitat degradation, boat strikes, and egg harvesting. However, due to global conservation efforts, green turtle populations appear to be slowly rebounding.

Rattray said the team hopes its findings will help inform efforts to protect larger areas of the ocean, encompassing both the nesting and foraging grounds of sea turtles.

"Diego Garcia is a marine protected area ... but they [female green turtles] are only there about 10% of their lives," Rattray said. "The rest of the time, they don't respect national boundaries. So, the conservation future of these turtles relies on the efforts of 12 to 15 governments. There has to be a concerted effort throughout the rest of the turtle's life cycle to protect them in some way."

Citations

Hays, G. C., Cerritelli, G., Esteban, N., Rattray, A., & Luschi, P. (2020). Open ocean reorientation and challenges of island finding by sea turtles during long-distance migration. Current Biology. doi:10.1016/j.cub.2020.05.086

Shimada, T., Limpus, C. L., Hamann, M.,Bell, I. Esteban, N., Groom, R., & Hays, G. C. (2019). Fidelity to foraging sites after long migrations. Journal of Animal Ecology, 89(4), 1008–1016. doi:10.1111/1365-2656.13157

Woodland Park Zoo To Release Endangered Turtles Into The Wild

The zoo will release dozens of their bravest endangered western pond turtles into the wild next month.

By Charles Woodman, Patch Staff — press release from Woodland Park Zoo

SEATTLE, WA — 20 July 2020 — Next month the Woodland Park Zoo will be releasing 29 turtles into the wild in an attempt to help support an endangered turtle population.

The western pond turtle [*Actinemys marmorata*] is a species native to the Puget Sound area, but their habitat stretches all the way through western Oregon and into Baja California. Unfortunately, they are also endangered, so in 1991 Washington launched the Western Pond Turtle Recovery Project to boost their chances of survival.

Under that program, Washington Department of Fish and Wildlife collects several western pond turtle eggs in late summer—which are then given to the Woodland Park Zoo and Oregon Zoo who raise the turtles until they're ready to survive on their own in the great outdoors.

The zoo says this gives the turtles a critical head start to help them survive.

"Due to the fact that wild turtles don't feed in the winter, they become active in the ponds at a very small size and are easily predated on," said Kevin Murphy, animal curator for the Woodland Park Zoo. " Head-started turtles are fed all year and so when released, are less likely to be predated on just because of their larger size."

Now that the turtles weigh a hearty 2 ounces, the zoo says they're ready to hack it in nature. The turtles are now being checked, measured, and marked for identification before they are released into the wild next month.

Once released their lives will not be easy ones: they face danger from invasive bullfrog species, pollution, loss of habitat, and an emerging shell disease. Plus, they have to survive to 10 to 12 years old in order to have babies, a long time for a species already in trouble.

But experts say, this program is working to bring the turtles back from the brink. Before recovery efforts began, scientists in 1990 estimated there were just 150 western pond turtles alive in the wild. Now, in the 29 years since the turtle rescue program was launched, zoos have raised and released more than 2,300 western pond turtles into the wild, of which around 800 to 1,000 are still alive and thriving.

Here's hoping these 29 turtles join them in thriving in their journey ahead.

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

USFWS to Reconsider Sonoran Desert Tortoise Listing
Under a court-approved agreement, USFWS will reconsider the conservation status of the Sonoran desert tortoise that was prompted by the listing petition that I co-authored in 2008.

Ecoflight Highlights Impacts to Desert Tortoise Habitat
Well-illustrated blog of Tom Egan's recent flight across the western Mojave.

California Fish and Game Commission to Vote on Desert Tortoise Review
In October 2020, the California Fish and Game Commission will vote on whether consideration of up-listing the status of the state's desert tortoises from threatened to endangered is warranted.

Act Soon to Help Stop the Highway Through Red Cliff's Desert Tortoise Habitat
Federal and local politicians, developers and agencies are working to push the Northern Corridor Highway through the most important desert tortoise habitat in Utah. Comments on the Draft Environmental Impact Statement are due September 10, 2020. Save Red Cliffs has a helpful page of comment guidance.

Saving the Impressed Tortoise
A second impressed tortoise has been found in Arunachal Pradesh, northeast India.

Suwannee Alligator Snapping Turtles
Short news story with pictures of the Suwannee alligator snapping turtle, *Macrochelys suwanniensis*.

Madagascar Big-headed Turtles at Jersey Zoo
Two young *Erymnochelys madagascariensis* seized from smugglers have moved to the Jersey Zoo.

California Fish and Game Commission to Initiate Leatherback Sea Turtle Review
On August 20, the Commission determined that listing Pacific leatherback sea turtles as threatened or endangered under the California Endangered Species Act may be warranted. This vote began a one-year status review.

Florida's Sea Turtles Threatened by Development & Climate Change
As climate changes and sea-level rises, sea turtle nesting habitat will be exposed to increased coastal development, hindering the ability of sea turtles to adapt.

Importance of Protected Areas to Green Sea Turtle in the Gulf
Research on the distribution of green sea turtle nests along the Texas coast underscores the importance of having protected areas.

Federal Government Agrees to Protect Green Sea Turtle Habitat
The U.S. Fish and Wildlife Service and National Marine Fisheries Service must designate protected critical habitat for green sea turtles under a new legal agreement with conservation groups. (The previous 2 stories highlight why designating critical habitat is so important).

Park Service to End Critical Kemp's Ridley Programs
Padre Island National Seashore in Texas is under fire for proposed cuts to conservation measures for the world's most endangered sea turtle, the Kemp's ridley.

You can read what conservation measures are being cut on PEER's website

Video of the Month
Green Sea Turtle Rescue at Veracruz
Local conservationists in Veracruz, Mexico gathering turtle eggs for relocation noticed a trail coming up from the sea with no return trail. This lead to the dramatic rescue of a large green sea turtle who had been trapped under a collapsed sand dune while she was nesting.

Free Publications
African Sea Turtle Newsletter, Issue #3 Volume 2

Indian Ocean Turtle Newsletter

Proceedings of the Fourth Australian Marine Turtle Symposium held in September 2018

Open Access Research Papers
Desert tortoise decline at the Desert Tortoise Natural Area (DTNA)

The ontogeny of sea turtle hatchling swimming performance

How variation in the timing and continuity of heat wave exposure influences turtle sex and phenotype

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!

"Conservation is a cause that has no end. There is no point at which we will say our work is finished." — *Rachel Carson*

California Fish and Game Commission Accepts Recommendation to Strengthen Protections for Desert Tortoise — *Defenders of Wildlife press release*

SACRAMENTO, CA–20 AUGUST 2020—Today, the California Fish and Game Commission voted unanimously to accept a report from the California Department of Fish and Wildlife (CDFW) that recommends strengthening protections for the Agassiz's desert tortoise [*Gopherus agassizii*] from threatened to endangered. The CDFW's evaluation report comes in response to a petition filed in March by Defenders of Wildlife, the Desert Tortoise Council and the Desert Tortoise Preserve Committee to increase tortoise protections under the California Endangered Species Act, highlighting the dire condition of this critically imperiled reptile.

Today's acceptance of CDFW's evaluation report will be followed by a final Commission vote at its October 2020 meeting to decide whether or not to upgrade protections for the species.

Pamela Flick, California program director for Defenders of Wildlife, issued this statement:

"We are pleased that the Fish and Game Commission voted today to move forward with the process to strengthen protections for the Agassiz's desert tortoise. Our critically endangered state reptile is facing numerous threats, from increased off-road vehicle use to climate change, disease to widespread habitat loss. It's becoming increasingly apparent that without increased protections, this species will be driven to extinction."

Agassiz's desert tortoise, *Gopherus agassizii*. Photo by the Pacific Southwest Region USFWS. Public domain.

Data Visualization:

Defenders of Wildlife's Center for Conservation Innovation created an interactive story map where users can explore a visual guide to threats facing the desert tortoise as well as conservation measures designed to help recover the species throughout its range.

Background:

- The desert tortoise was listed as threatened under the California Endangered Species Act in 1989 and under the federal Endangered Species Act in 1990.
- A recovery plan prepared by the U.S. Fish and Wildlife Service for this federally listed species was adopted in 1994, with Critical Habitat concurrently designated. A revised recovery plan was adopted in 2011, noting distinct problems in responsible agencies implementing previous recovery plan actions.
- According to a 2018 study, adult tortoise population numbers have dropped by over 50% in some recovery areas since 2004, and by as much as 80–90% in some critical habitat units since approximately 1980.
- Tortoise population declines in the western Mojave Desert have been especially severe, due primarily to unmanaged off-highway vehicle use, grazing of wildlands by domestic livestock, contagious disease spread, expansion and upgrading of highways, and utility maintenance projects, as well as extended droughts associated with climate change.

Thanks to Abigail DeSesa for providing the link to the Defenders of Wildlife news release.

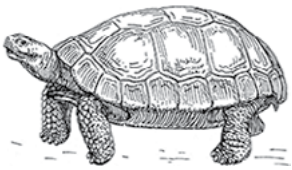
The **Endangered Species Act of 1973** is Federal legislation intended to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and provide programs for the conservation of those species, thus preventing extinction of native plants and animals. The law is administered by the Interior Department's Fish and Wildlife Service and the Commerce Department's National Oceanic and Atmospheric Administration Fisheries, depending on the species.

Definition of Threatened
The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range - - as defined in the Endangered Species Act.

Definition of Endangered
The classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Definition of Critical Habitat
Specific geographic areas, whether occupied by listed species or not, that are determined to be essential for the conservation and management of listed species, and that have been formally described in the Federal Register.

– Courtesy of US Fish and Wildlife



Meetings and Programs

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

Chino Valley
18 September; 16 October

Foothill
25 September; 23 October

High Desert
14 September; 12 October

Inland Empire
4 September; 2 October

Kern County
14 September; 12 October

Low Desert
5 October

Orange County
11 September; 9 October

Ridgecrest
14 September; 12 October

Santa Barbara-Ventura
Contact the chapter for meeting information.

Santa Clarita
19 September

TOOSLO (San Luis Obispo)
15 September; 20 October

TTCS (Long Beach)
19 September; 17 October

Valley
18 September; 16 October

Classified Advertisements

Classified advertisements run for one issue at 5^{00} for up to four lines. Ads are accepted at the discretion of the Editor. Classified ads are available to members and subscribers only and are run as a service to our members. California Turtle & Tortoise Club is not responsible for merchandise placed for sale in the *Tortuga Gazette*.

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**.

We won't have a society if we destroy the environment.

— Margaret Mead (1901–1978), American anthropologist

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 Nonnative Turtles and Tortoises.

The *Tortuga Gazette* (ISSN 1073-1334) is owned by the California Turtle & Tortoise Club Executive Board, which is incorporated in the State of California as a Not-for-Profit Corporation and is tax-exempt under IRS code 501(c)(3).

All material is copyright © CTTC unless otherwise attributed. CTTC policy permits reproduction of articles by other not-for-profit groups and educational institutions when permission is requested. Permission is granted on a case-by-case basis and CTTC must be cited as the source of the material.

Views expressed in the *Tortuga Gazette* are those of the contributors and not necessarily those of the Editor or the California Turtle & Tortoise Club.

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

Tortuga Gazette
California Turtle & Tortoise Club
Post Office Box 7300
Van Nuys, California 91409-7300

Is your email address changing?

Update your email address through your MailChimp account by clicking the "Update Your Preferences" link on your newsletter notice. Or send your changes and corrections to **tgdistribution@tortoise.org**