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California Turtle & Tortoise Club

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A Bornean river turtle, *Orlitia borneensis*, photographed in Bangka Belitung Province in the Republic of Indonesia. Photo © 2020 by Muhammad Yeriyan Nurramadhan

featured species

Malaysian Giant Turtle, *Orlitia borneensis* (Gray, 1873)

The Largest Freshwater Turtle in Southeast Asia

by M. A. Cohen

First scientifically described by the prolific British zoologist and taxonomist John Edward Gray (1800-1875) in 1873, the Malaysian giant turtle belongs to the Geoemydidae family. This chelonian family was formerly known as the Bataguridae.

Members of the Geoemydidae, the largest, most diverse chelonian family, comprise some 70 species of turtle and include European and Asian pond and river turtles and Neotropical (Central and South American) wood turtles. Their habitats include coastal marine regions, freshwater ecosystems, and tropical forests. The Geoemydidae family is most closely related to the family of land tortoises, the Testudinidae.

According to Ernst and Barbour, the genus name *Orlitia* is "a word without meaning, coined by Gray" (Ernst & Barbour, 1989). The species name *borneensis* means "from Borneo" and refers to the species' type locality.

The definition of a **type locality** is the area in which the type specimen was first observed or collected. The definition of the term **type specimen** is the original individual utilized for the naming and scientific description of the new species.

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The Malaysian giant turtle is **monotypic** within the genus *Orlitia*, meaning it is the only recognized species within the genus.

Much of the natural history of the Malaysian giant turtle remains unstudied. This species is quite rare. In the opinion of Lovich and Gibbons, "it is amazing that in the 21st century so little is known about an animal as large as the Malaysian giant turtle" (Lovich & Gibbons 2021).

Description

As its common name implies, the semi-aquatic Malaysian giant turtle is massive at maturity and can reach a carapace length of 31.5 inches (80 centimeters). One of the heaviest freshwater turtles in the world, adults may weigh as much as 110 pounds (50 kilograms) [Wildlife of RER: Malaysian Giant Turtle 2019].

The *O. borneensis* hatchling emerges from its egg at a carapace length of ±2.5 inches (60 millimeters). The dark carapace of the hatchling is rugose, i.e., rough or wrinkled in texture. Between the second and third vertebral scutes on the carapace, a peak is normally present when the turtle hatches. This peak flattens moderately as the turtle matures, but the species' carapace remains noticeably domed throughout its life.

The carapace of the *O. borneensis* adult is comparatively narrow, oval-shaped, smooth, and dark gray, dark brown, or black. The adult plastron is buff to yellow-tan and may have no patterning or some dark smudges (Lovich & Gibbons 2021).

The head of the Malaysian giant turtle is usually dark brown or black with a buff or yellow-tan chin. The snout of the species is somewhat protruding, and its jaws are powerful.

Young *O. borneensis* photographed in Belitung Timur in Indonesia. Notice its peaked carapace that is typical of the species' hatchlings. **Photo © 2020 by pzzz**

The neck, limbs, and tail of the species are ordinarily gray, brown, or black. The feet of this primarily aquatic turtle are sizable, resemble paddles, and have prominent webbing between the toes and long, thick claws (Ernst & Barbour 1989).

Adult males and females are similar in appearance except for their tails. The tails of the males are substantially longer and thicker than those of females.

Range and Habitat

Orlitia borneensis is endemic to peninsular Borneo and Sumatra in Indonesia, and western peninsular Malaysia (Too Little Done to Address Trade Threat to Asia's Tortoises and Freshwater Turtles 2011).

A riverine species, the Malaysian giant turtle inhabits freshwater habitats within forested areas, including large lakes, slow-flowing rivers, swamps, and ponds overgrown with vegetation (Lovich & Gibbons 2021).

Reproduction

Most chelonian species are subject to temperature-dependent sex determination, also known as environmental sex determination, referring to the fact that the incubation temperature of the eggs in the nest influences the sexes of the offspring.

The Malaysian giant turtle is one of the few exceptions to this chelonian reproduction regimen. The sexes of *O. borneensis* hatchlings are determined by the union of two gametes contributed by two parents in a

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Malaysian giant turtle photographed in Sumatra, Indonesia.
Photo © 2018 by Deni Parlindungan

process known as sexual reproduction (Uetz, n.d.).

Observers report that clutch size ranges from 12 to 15 eggs. Zoological institutions report that females lay one to two clutches per year (Malaysian Giant Turtle (Orlitia Borneensis), 2017). Little else is known about the reproductive life of the species (Lovich & Gibbons 2021).

Diet

O. borneensis is piscivorous, meaning its primary food source is fish. The species is also known to consume fallen fruit and may take available vertebrates besides fish (Uetz, n.d.).

Threats

As stated by the Asian Species Action Partnership, "the species has been depleted across much of its range and all current information points to a population decline of at least 80% over the last three generations (90 years)" (Malaysian Giant Turtle; Bornean River Turtle n.d.)

By all measures, the populations of *O. borneensis* are decreasing. Without question, the greatest threat to the species is the unsustainable exportation in "huge numbers" from Indonesia to East Asian food and traditional medicine markets (Horne et al., 2020). This exportation continues despite legal protection in Indonesia. Although the species is rare in Malaysia, no official protection has been enacted. Local people in the Malaysian peninsular continue to hunt the turtle for food.

Forests within the species' range are being cleared for conversion to palm oil plantations, resulting in habitat destruction that further fragments existing populations (Uetz, n.d.).

Poaching for the traditional medicine trade continues to threaten the Malaysian giant turtle (Uetz, n.d.).

Conservation

Some local legal protection exists in Sarawak, Borneo through the Fauna Conservation Ordinance of 1963, and some protected areas such as nature preserves and national parks provide sanctuary to the species [Malaysian Giant Turtle (*Orlitia borneensis)* 2017].

In 1999 the Republic of Indonesia enacted Government Regulation No. 7, affording the Malaysian giant turtle full legal protection. However, despite this regulation, the exportation of the species to other Asian countries continues in large quantities.

Following its evaluation in 2018, the International Union for the Conservation of Nature designated *O. borneensis* as "critically endangered" on its Red List of Threatened Species (Horne et al., 2020).

The Malaysian giant turtle is listed in Appendix II of the Convention on International Trade in Endangered Species. Appendix II specifies that there is a "zero quota for wild specimens for commercial purposes" (Orlitia borneensis 2022).

A Malaysian giant turtle photographed in habitat.
Photo © 2021 by marcelfinlay

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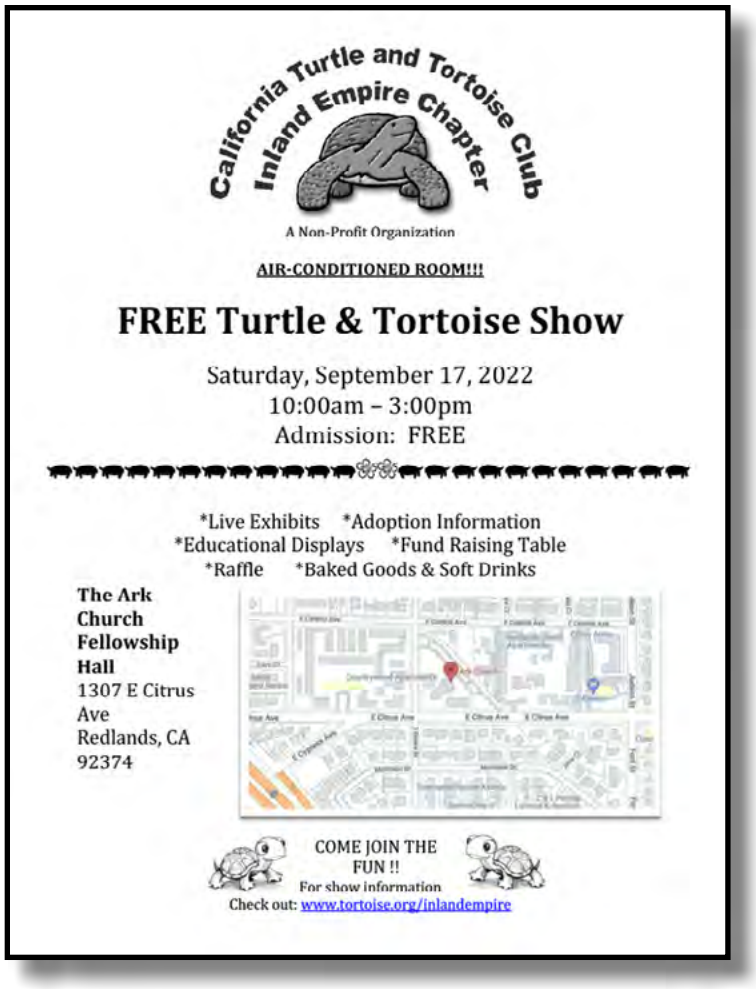

Classified Advertisements

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.

FOR SALE: Young Leopard tortoises for sale. Approximate age is 6 months. 75^{00} each. Contact Richard Roosman:
richardinwalnutpark@msn.com

Errata

Errors inadvertently appeared in the **Inland Empire Directory** listing published in the July/August *Tortuga Gazette*. The following slate of officers is correct.

President: Gerald Rezes
Vice president: Richard Roosman
Treasurer: Robyn Kohr
Recording Secretary: Amy Taylor

The Annual Tour de Turtles Migration Marathon is Underway!

An event founded by the Sea Turtle Conservancy based in Gainsville, Florida, the Tour de Turtles (TdT) raises awareness and funding on behalf of marine turtles. Since 2008 this annual summer event has occurred, offering an "educational journey through the science, research and geography of sea turtle migration using satellite telemetry."

Four species of marine turtles, leatherback turtles (*Dermochelys coriacea*), green turtles (*Chelonia mydas*), loggerhead turtles (*Caretta caretta*), and hawksbill turtles (*Eretmochelys imbricata*) fitted with PTT (Platform Terminal Transmitter) tags are traveling from their nesting beaches in the tropics to their foraging grounds in northern seas.

Satellite telemetry is the process of "following an object on the earth with the use of orbiting satellites." Using data from the PTT tags that are transmitted from the satellites back to a receiving station on earth, researchers analyze the transmissions on their computers.

After a year or two, the PTT tags stop transmitting and harmlessly fall off the turtles' carapaces.

This year nine leatherbacks, four greens, six loggerheads, and two hawksbills are participating in the TdT. Each turtle represents a cause that directly affects sea turtles like water quality, climate change, plastic debris, boat strikes, etc. Various businesses and environmental organizations sponsor the TdT turtles.

Interested persons can track the turtles' journeys by clicking on this link: Tour de Turtles home page

When you reach the leaderboards on the home page, click on a turtle's icon to see its swimming path and the distance it traveled so far.

The leatherbacks' marathon began on World Sea Turtle Day, June 16, and the hard-shelled turtles' marathon, on August 1. The tracking continues for approximately three months after August 1. The "winner" is the turtle that traveled the farthest from its starting point.

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ZOO MED IS A PROUD SPONSOR OF THE TSA

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

The Road Back to "Normal"

Story by Karen Berry, Valley Chapter and photos by Cristina Perovich and Karen Berry

This is one of the multiple sections of displays at the venue. There were 46 participating groups, many more than previous events

Our booth was busy all day; this was a little break in the action.

The pandemic, which started in 2020, changed our lives in many ways. The lockdowns and restrictions also affected how CTTC members interacted with their communities, and getting back to "normal" has been a long process. We've had a decent start back to outreach and chapter events this year.

Rudy the desert tortoise: "You're a nice little girl. My name's Rudy. What's yours?"

Maria Kennedy's Russian tortoises: "Good thing Mom packed some dandelion greens, 'cause there's nothing on the menu here."

The Los Angeles Department of Water & Power owns the property where the Chatsworth Nature Preserve is located. This 1325-acre expanse contains oak woodlands, grasslands, and an Ecology Pond, among other types of terrain. It is home to more than 200 species of birds, as well as numerous species of mammals, amphibians, and reptiles.

The area was formerly a reservoir with an earthen dam and was drained in the 70's after the 1971 Sylmar earthquake damaged the Van Norman reservoir that had a similar dam, placing numerous nearby residences in peril of flooding. As if the earthquake itself wasn't enough to ruin a lot of people's days.

The Chatsworth Nature Preserve is closed to the public except for one day a year when an open house is held to coincide with Earth Day. It is

A Mom explains to her daughter that Russian tortoises stay small. The keeper of the Russians, Maria Kennedy, is on the right in the striped shirt.

Cristina always has plenty of turtle stickers on hand for the younger visitors.

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The Chatsworth crew ready to pack up, and we are still smiling … left to right, Maria Kennedy, Cristina Perovich, and Karen Berry.

a very large community event, and Valley chapter has participated for a number of years.

The festivities this year took place on April 23 and had record-breaking attendance with over 3,000 visitors and participation by 46 organizations promoting conservation and education. Highlights for this year included an opening ceremony with a Native American blessing, guided nature hikes, community resource fair, and more.

Kevin Proulx speaking about a Sulcata he rescued that got a bad start in life which stunted its growth. The tortoise is improving and adjusting to a better life.

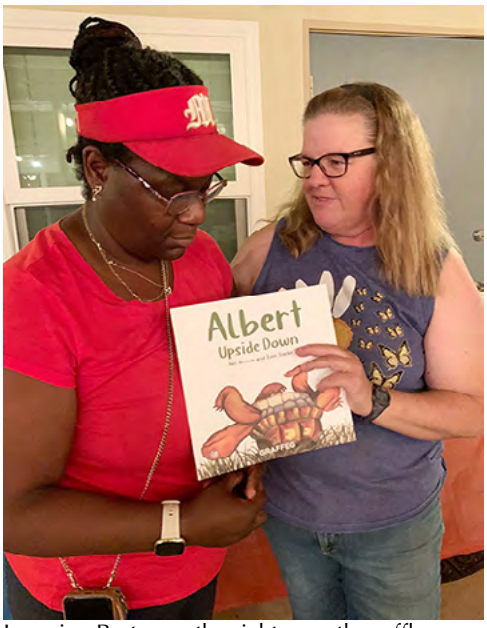
It was a very busy day for the Valley chapter, as Cristina Perovich, Maria Kennedy, and Karen Berry, and the tortoises they brought, promoted adoption, proper turtle and tortoise care, and membership in CTTC.

It was a fun day, the feeling of doing something "normal" was in the air, and the joy of being "out and about" was evident on the visitors' faces. It was wonderful to see people smile again.

Valley Chapter's July Meeting: Show-and-Tell

Valley resumed in-person meetings in June, and July was the annual members' "show and tell" meeting. For this event the chapter provided a great dinner from Stonefire Grill, and the members brought turtles and tortoises to share with the group. They provided education information about the particular breeds and shared funny stories or unusual experiences they have had with their shelled friends. It's always a fun meeting, and as is customary, was topped off with a raffle of prizes donated by members.

A highlight prize of the raffle was a signed book by well-known British children's book author Ian Brown, who donated it, along with two others, as raffle prizes for our fundraising efforts. Ian and his Greek tortoise "Albert", members of the Valley chapter since 2021, are promoting CTTC and our "Sofa Cushion Challenge" (SCC) in England. The Challenge is part of Valley Chapter's fundraising efforts to help with the veterinarian bills for our foster tortoises that have medical issues.



Jeannine Porter on the right, was the raffle winner of the Ian Brown children's book. Jeannine donated it to Maria Kennedy for the special needs children at the school where Maria works. The story is a great life lesson for everyone, but especially for young children.

To learn more about Ian Brown, Albert, and the SCC, check out this introductory blog: https://www.alberttortoise.com/2021/09/10/ambassador-albert/

Left to right: Maria Kennedy and one of her pet Russian tortoises, Jeannine Porter, original winner of the Ian Brown's book, and Karen Berry with Conan the Barbarian, one of the chapter's foster desert tortoises.

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

Xylorhiza (=*Machaeranthera*) *tortifolia*
Mojave Aster, Desert Aster

A Mojave aster blossom. Photo © 2012 by Tom Hilton

A member of the Asteraceae, the plant family variously termed the aster, composite, daisy, or sunflower family, the Mojave aster was formerly included in the genus *Machaeranthera*, and is still found under that name in some of the literature as well as in vendors' listings.

A perennial desert wildflower, Mojave Aster is native to the Great Basin, Mojave and Sonoran deserts of southeastern California, southern Nevada, southeastern Utah, and western Arizona (Royo n.d.).

In addition to the common names Mojave aster and desert aster, this species is also commonly called Mojave woody aster and Mohave aster (Sturla 2021).

Description

As the common name Mojave woody aster implies, *Xylorhiza tortifolia* is a woody sub-shrub reaching a mature height from 8 to 30 inches (20 to 76 centimeters). The base of the sub-shrub is wood-like, and its comparatively herbaceous flowering stems branch upwards from the base.

Leaves of the Mojave aster photographed in Inyo County, CA. Photo © 2020 by David Greenberger

The genus name *Xylorhiza* comprises two Greek word roots, *xylo-* meaning wood, and *-rhiza*, meaning root. Mojave aster grows from durable roots that can withstand extremes in temperature. The species name *tortifolia* consists of two Latin word roots: *tortu-*, meaning twisted, and *-foli*, meaning a leaf.

The species' leaves and stems are green to gray-green and are usually covered with short, soft, specialized glandular hairs.

The hairs that are present on Mojave aster's leaves and stems are an adaptation to desert life that help a plant resist wind movement and water loss by transpiration (Foster 2022).

Leaves are grouped low on the plant with few or no leaves toward the top of each flower stem. Narrow, oval leaves, 3 to 4 inches (7.6 to 10 centimeters) in length and feature thornless, toothed margins and a curled form to each leaf (Sturla 2021).

Being native to regions with harsh climatic conditions, Mojave aster is stress- or drought-deciduous, meaning that, in extreme situations, the sub-shrub may drop leaves in order to survive. Its persistent roots will produce new growth when conditions improve.

X. tortifolia bears single flowers on long stalks that range in color from white to pink, blue, lavender, and purple with yellow centers. The flower is somewhat cup-shaped and up to 2 inches (5 centimeters) in diameter.

Long, thin petals, white to purple in color, are called ray flowers, known in botany as ray florets, and there may be as many as 60 per blossom. The ray flowers are collectively known in botany as the corolla.

The closely-packed yellow center of the Mojave aster blossom is made up of small disc florets. Blossoms composed of ray and disc florets are typical of members of the daisy family.

In some parts of its range, Mojave aster dies back after flowering, but, being a perennial, it pushes new growth the following season.

Mojave aster blooms during spring, generally March through May, and may bloom again in October if there is sufficient monsoonal rainfall (Sturla 2021). The North American monsoon season ordinarily occurs between June and mid-September.

Habitat

According to Gene Sturla, Mojave aster prefers habitats such as "dry rocky slopes, canyons and mesas, ditches, grasslands, oak-pine and pine-woodlands." The species occurs from elevations of 700 to 6,500 feet (213-1,981 meters) in California, and from 2,000 to 3,500 feet (610-1,067 meters) elsewhere within its range (Sturla 2021).

Mojave aster is part of several named plant communities within its range, including creosote bush

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scrub, Joshua tree woodlands, and saltbush scrub.

Cultivation

Being a desert species, *X. tortifolia* does well in hotter, drier areas, requiring both full sun and excellent drainage to thrive. Soils primarily composed of gravel, sand, and/or small rocks provide the necessary rapid drainage to keep the plant healthy. Mojave aster grows best in moderately alkaline soil with a pH of 7.0 to 8.0 (Walker, 2022).

Mojave aster, *Xylorhiza tortifolia*, photographed near Lone Pine, Inyo County, CA. **Photo © 2017 by Catherine Kaye**

In a garden setting, Mojave aster should be watered moderately but regularly until established, typically for one season. After it is actively growing, the plant is highly drought-tolerant and does best with summer drought.

X. tortifolia will not tolerate temperatures much below freezing coupled with wet conditions. Excessive wet and cold will typically result in the death of the plant.

The species is comparatively low maintenance and is suitable for a drought-tolerant garden. Deadheading, the removal of spent flowerheads, following the spring flowering will promote the production of fall flowers, as does the monsoonal rainfall in southwestern deserts.

Flowers that are left on the Mojave aster to set seed will freely re-seed and add new plants to the garden.

Comparatively rare white-flowered form of Mojave aster photographed in Joshua Tree National Park, CA. **Photo © 2017 by Kat Halsey**

Benefits to Wildlife

X. tortifolia is attractive to a variety of wildlife that use it for numerous reasons. Sturla states that the plant "may be visited by hummingbirds and/or small mammals including rodents and granivorous [ed. note: grain-eating] birds in search of food, nectar and protection through cover."

Fortunately for gardeners living in an area with native rabbits, the Mojave aster resists browsing by this plant-eating mammal (Mojave Aster 2022).

Furthermore, Sturla observes that an array of insects make use of the Mojave aster, including "butterflies, moths, bee flies, honeybees, native bees and other insects in search of nectar, food or shelter and protection" (Sturla 2021).

The larvae of the Desert Checkerspot butterfly are especially fond of the Mojave aster. These black caterpillars with gray and orange stripes congregate on the host plant after wet winters to feed before their metamorphosis into small orange and black butterflies (Royo n.d.).

Many of these insects are pollinators that are critically important to the health of wild plant communities as well as to domesticated food crops.

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Seed of Mojave aster. **Photo © 2017 by Richard Spellenberg.**

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

Desert Tortoises Benefit from Recent Desert Rainstorms

The recent rains that have closed roads and allowed a summer "green up" have enabled desert tortoises in Mojave National Preserve and Joshua Tree National park to come out and forage on the abundant food supply.

Sulcata Stops Trains

I couldn't resist this dog days of summer story, "Escaped giant tortoise halts Cambridge to Norwich trains".

Pompeii Tortoise

The finding of the 2,000 year old remains of a female *Testudo* under the floor of what was a shop in ancient Pompeii generated lots of media coverage.

Some Turtles Show Negligible Rates of Aging

Two studies showing that some turtles exhibit negligible rates of aging also generated massive media coverage.

Euphrates Softshell Spotted in Turkey

An endangered Mesopotamian softshell, *Rafetus euphraticus*, was caught on a fishermen's line near the Atatürk Dam (Turkey) and released. This is an interesting location given that dams along the Euphrates and Tigris Rivers have contributed to the turtles decline.

Diamondback Terrapin Meeting

The Ninth Triennial Workshop on the Ecology, Status, and Conservation of Diamondback Terrapins will be held in Athens, Georgia October 28-30, 2022.

Changes in the Composition of Sea Turtle Scientists

Boding well for the conservation of the world's sea turtles, analysis of authors from thirty years of the annual Sea Turtle Symposium reveals significant progress towards gender equity and globalization.

Bumper Year for Sea Turtle Nest in Georgia

Georgia reported 3926 sea turtle nests in 2022, a new record for the state.

Sea Turtle Nests on the Mississippi Mainland

For the first time in four years, a sea turtle nest was found on a Harrison County beach on the Mississippi mainland. Sea turtles in this area were badly hit by the massive 2010 oil spill.

Florida's Recent Hatchling Sea Turtles Mostly Female

"Scientists that are studying sea turtle hatchlings and eggs have found no boy sea turtles, so only female sea turtles for the past four years".

Mass Stabbing of Green Sea Turtles in Okinawa

Horrendous report of more than 30 adult green sea turtles being stabbed by a fisherman.

Turtle DNA Used to Trace Poaching Hotspots

Endangered hawksbill turtles are still being hunted for the tortoise shell or bekko market. A major turtle DNA database is tracing illegal shells to poaching hotspots.

CTTC's Turtle and Tortoise Listserve

To talk with other turtle and tortoise fans in a friendly atmosphere join CTTC's Turtle and Tortoise list or send an email to: <CTTC-Turtle-AndTortoise-list+subscribe@groups.io>.

CTTC On Facebook

For breaking news updates follow CTTC on Facebook!

The Mesopotamian or Euphrates softshell turtle, *Rafetus euphraticus*, photographed in Turkey. **Photo © 2009 by kseniiamarianna**

The Mesopotamian softshell one of two members of the genus *Rafetus*. Beginning in 1975, construction of dams on the Tigris and Euphrates Rivers has caused populations of *R. euphraticus* to plummet. Native to Iran, Iraq, Syria and Turkey, the species is currently listed as Endangered on the IUCN Red List.

Galápagos Conservancy News

Ecological Restoration of Santa Fé Island, Galápagos

Part of the rugged coastline of Santa Fé Island. The tallest vegetation in the image is *Opuntia echios,* the Giant Galápagos Opuntia. **Photo © 2005 by Avavyd**

May 2022—A team of 12 people, formed by scientists from Galápagos Conservancy and park rangers from the Galápagos National Park, undertook a 7-day expedition to Santa Fé Island in order to carry out biodiversity monitoring activities on the island as part of the Iniciativa Galápagos program.

The trip was made by sea and land; they sailed 20 miles from Santa Cruz Island to their destination, then they transported the necessary equipment, water, and food, 2 miles uphill through rocky and arid terrain, to the site where they installed the expedition camp. This effort seeks to contribute to the ecological restoration of Santa Fé Island and is part of the activities of one of the Galápagos Initiative projects.

The project originated in 2011 when the Galápagos National Park Directorate (DPNG), with the support of the Galápagos Conservancy, assessed the island's ecological status. One of the main conclusions was that there were very few juvenile *Opuntia* cacti in Santa Fé due to the absence of the main herbivorous species, the giant tortoise. However, a good number of iguanas and many adults and sub-adult cacti were observed. Consequently, starting in 2015, the DPNG decided to repopulate the island with tortoises using the giant tortoise from the island of Española, *Chelonoidis hoodensis*, as an analogous species since Santa Fé's own species became extinct approximately 150 years ago, and there is no way to recover it.

The General Director of Galápagos Conservancy, Washington Tapia, pointed out that the tortoises of the Española Island are similar to the extinct ones of Santa Fé, both from the genetic point of view and from the morphological point of view, which added to the fact that there were already running a very successful breeding and captive breeding program, making it the ideal candidate to repopulate the island. "The results from 2015 until now show us that the presence of the tortoises is having a very positive effect on the dynamics of the ecosystem," said Tapia.

The expedition was divided into four working groups; the first carried out a census of tortoises using the mark-recapture method to evaluate how the 742 repatriated tortoises have dispersed from the release sites and to know which are the areas of biggest density within the island. The result shows that most of the tortoises move in an area of 5.5 square kilometers [2.1 square miles] of the island and are gradually taking advantage of new places in Santa Fé.

The second group recorded information in the 20 plots delimited in 2014, 10 with fencing and 10 controls without fencing, to measure the effect of turtles and iguanas on cacti and other species of flora in general. In this way, the experts will be able to record changes in the vegetation attributable to the presence of turtles and land iguanas, and their ecological role will be precisely determined. Both species of reptiles are ecosystem engineers, consuming cacti, woody and herbaceous vegetation, and shaping the landscape.

The third group evaluated *Opuntia* cacti, recording their growth, survival and recruitment of new individuals to understand the population dynamics of this species. In 1979 the DPNG managed to eradicate the feral goats in Santa Fé, an invasive species that was present for decades and caused severe damage to the ecosystem; this added to the absence of tortoises on the island resulting in unwanted changes, such as the absence of juvenile cacti.

"The return of the turtles to Santa Fé has given hope to the *Opuntia* cactus. One of the main positive effects of the presence of the turtles on the island is the dispersion of cactus seeds; since the turtles have been here, we have found a large number of juvenile cacti in different parts of the island, associated precisely with the places where there are the turtles," said the Director of Conservation of the Galápagos Conservancy, Jorge Carrión.

Finally, the Galápagos Conservancy Board of Directors chairman, Dr. Dan Sherman, trained a team of park rangers and scientists in taking and using super-high-resolution panoramic photos as a long-term ecological monitoring tool. Photographs of the vegetation zones of Santa Fé are available from several years ago; with current pictures, it will be possible to make a comparison and follow-up to evaluate the changes that have occurred over time.

"We are proud to work hand in hand with the Directorate of the Galápagos National Park, an institution that has shown commitment and decision in the responsible management of the ecosystems of the archipelago, we reiterate our desire and commitment to continue collaborating and being part of this important challenge of conserve the wonderful Galápagos Islands", assured Sherman.

Back in the Day — 10 years ago

The World Loses Lonesome George

With the death of this tortoise the Pinta Island tortoise is now extinct

Lonesome George, *Solitario Jorge* in Spanish, photographed in 2008 on Santa Cruz Island, Galápagos. Photo © 2008 by Arturo de Frias Marquez

Puerto Ayora, Santa Cruz Island, Galapagos, Ecuador— June 24, 2012—Early this morning, Lonesome George, the sole remaining Pinta Island tortoise and Galapagos conservation icon, was found dead in his corral at the Tortoise Breeding and Rearing Center in Puerto Ayora, Santa Cruz Island, by members of the Galápagos National Park Service (GNPS).

Fausto Llerena, the park ranger who discovered George and has been his long-term caretaker, was unhappily surprised when he arrived at Lonesome George's corral this morning. Fausto discovered George stretched out in the direction of his watering hole with no signs of life.

Possible causes of death of this individual, the sole survivor of the Pinta Island tortoise (*Chelonoidis abingdoni*), will not be known until after a necropsy. The body of Lonesome George, whose age is unknown but estimated at more than 100 years old, is currently being held in a cold chamber to avoid decomposition prior to a necropsy.

Lonesome George was found on Pinta in 1972 although Pinta tortoises were thought to be extinct. Since then, Lonesome George has been part of the Tortoise Program of the GNPS. Various efforts were made to get George to reproduce. Two female tortoises collected on Wolf Volcano (Isabela Island) were put in Lonesome George's corral. These females produced eggs at the end of 15 years with Lonesome George. Unfortunately all of the eggs were infertile. Later two females from the Española tortoise population (the species most closely related to Pinta tortoises genetically) were with George until the end.

The plight of Lonesome George provided a catalyst for an extraordinary effort by the government of Ecuador to restore not only tortoise populations throughout the archipelago but also improve the status of other endangered and threatened species.

Edwin Naula, Director of the GNPS, stated, "This July, the GNPS is convening an international workshop to focus on management strategies for the restoration of tortoise populations during the next ten years. The workshop will be held in honor of Lonesome George."

Lonesome George's legacy will be an increased effort in both research and management to restore his island of Pinta and all of the other giant tortoise populations of Galápagos.

Galápagos National Park press release. Originally reprinted in the Tortuga Gazette 48(5), September/October 2012

Pinta Island Restoration Efforts

Pinta Island is the northernmost large island in the Galápagos Archipelago. The ecosystem was unspoiled until 1959 when local fishermen released three goats onto the island to provide them with fresh meat during their lengthy fishing expeditions.

The goat population on the island literally exploded, and by 1970 was estimated to be 40,000 individuals! The goats destroyed the island's vegetation along with suitable tortoise habitat.

"Lonesome George," the last known Pinta Island giant tortoise (*Chelonoidis abingdoni*), was observed in the wild in 1971 by József Vágvölgyi, a Hungarian researcher studying snails on the island.

Vágvölgyi reported his observation to local park authorities. In 1972, park rangers transported the tortoise to the Tortoise Center at Puerto Ayora, Santa Cruz Island, hoping to breed "Lonesome George," but breeding success eluded the Center staff.

In the 1970s, the park implemented a goat eradication program on Pinta Island, and by 2003 authorities declared the island to be "goat-free."

Project Pinta aimed to restore the island's ecosystem by introducing sterilized hybrid giant tortoises in 2010 to work as habitat engineers. These herbivores continue to revitalize the damaged vegetation, disperse seeds, and promote ecosystem balance.

Some 17 giant tortoises with "partial Pinta Island ancestry" were found on Isabela Island through DNA testing, paving the way for the eventual reintroduction of a breeding colony of giant tortoises on Pinta island.

Drone Images Provide Possible Glimpse of World's Rarest Turtle

Wildlife Conservation Society news release

Ha Noi, Viet Nam–18 July 2022– A series of drone images taken by researchers from the Wildlife Conservation Society (WCS) and partners may show the world's most endangered turtle, Swinhoe's softshell turtle (*Rafetus swinhoei*). The images were captured during aerial surveys on Dong Mo Lake some 30 miles west of Ha Noi.

Image that is a possible siting of a *Rafetus swinhoei* (Swinhoe's softshell turtle) in Dong Mo Lake in Viet Nam. The green figure to the right of the shadowy, oval shape is the reflection of the WCS drone in the Lake. **Photo © 2022 by WCS_Lonnie McCaskill**. Provided for media use.

There are only three known individuals remaining of this giant freshwater turtle, which can weigh over 200 pounds.

The images show a large round shape just under the surface of Dong Mo Lake. According to the drone operator, Lonnie McCaskill an Animal Curator at WCS's Prospect Park Zoo, the team had been taking a break from flying all morning when they saw a bubble trail on top of the water. They redeployed the drone and quickly spotted the submerged object. McCaskill was able to hover over it for approximately five minutes before it eventually dove out of sight.

Said McCaskill: "It certainly has the shape of a *Rafetus*, and I can't explain anything else in the lake or in nature that has that particular shape. One of the local turtle team from the area is a retired turtle hunter and said it's a *Rafetus*. This was exciting for me personally to be a part of the team working to learn more to conserve this highly endangered species."

Andrew Walde, Chief Operating Officer for the Turtle Survival Alliance, one of the partners that has been involved in the Rafetus project for years said, "The use of drones to help us cover more area, particularly for such a large and rare species, is the next logical step in improving the survey methodologies. In time, we will refine drone use for not just *Rafetus*, but other hard to observe species."

WCS and partners have been working in this region since 2019 to survey the Critically Endangered turtles. In October 2020, WCS cooperated with the Ha Noi Department of Agriculture and Rural Development and Asian Turtle Program (ATP) of Indo-Myanmar Conservation (IMC) capturing and confirming a female turtle on Dong Mo using an ultrasound scan. Authorities believe there is at least one more turtle in Dong Mo and another in nearby Xuan Khanh Lake.

Conservationists hope to capture and determine the sex of the other turtles in both Dong Mo and Xuan Khanh Lakes. Ultimately, conservationists aim to ensure at least one male and female are given a chance to breed to ensure this species can return from the brink of extinction.

The Viet Nam Government is leading the effort and partnerships to save this species. The partners conducting this work thank the following: Forest Protection Department (FPD), Viet Nam Forest Administration, Fisheries Department, the Biodiversity Conservation Agency (BCA) of the Ministry of Natural Resources and Environment (MoNRE), Finance department, Natural Resources and Environment department, Planning and Investment department, Science and Technology, Tourism, Culture and Sport, Ba Vi district People's Committee, Son Tay town People's Committee, the Institute of Ecology and Biological Resources of the Vietnam Academy of Science and Technology, the Central Institute for Natural Resources and Environmental Studies, Viet Nam National University (VNU CRES), and the Ha Noi Department of Agriculture and Rural Development.

Additional support for this work came from: Alan and Patricia Koval Foundation, Auckland Zoo, Birdlife International, British Chelonia Group (BCG), Browse Poster UK, Central Institute for Natural Resources and Environmental Studies, Viet Nam National University (VNU CRES), Cleveland Metroparks Zoo and Cleveland Zoological Society, Columbus Zoo and Aquarium, Critical Ecosystem Partnership Fund (CEPF), Education for Nature (ENV), Global Wildlife Conservation (GWC), IUCN, Island Foundation, Mohamed bin Zayed Species Conservation Fund (MBZ), Ocean Park Conservation Foundation, Hong Kong (OPCFHK), Panaphil and Uphill Foundations, Turtle Conservation Fund (TCF), Turtle Survival Alliance (TSA), George Garretson Wade Charitable Trust, Washington State University, Wildlife Conservation Society Canada (WCS Canada), Zoological Society of London (ZSL), as well as a number of private donors who have supported efforts to save the *Rafetus swinhoei*.

Meeting Schedule: September/October 2022

Click on your Chapter's website link for the latest program information which is posted as it becomes available.

Chino Valley
16 September; 21 October

Foothill
Meeting information to be announced.

High Desert
12 September; 10 October

Inland Empire
2 September; 7 October

Kern County
12 September; 10 October

Low Desert
Meeting information to be announced.

Orange County
2 September; 7 October

Ridgecrest
12 September; 10 October

Santa Barbara-Ventura
Meeting information to be announced.

Santa Clarita
Meeting information to be announced.

TOOSLO (San Luis Obispo)
Contact the chapter for meeting information.

TTCS (Long Beach)
17 September; 22 October

Valley
16 September; 21 October

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.

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