California Turtle & Tortoise Club

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California Turtle & Tortoise Club founded in 1964 and dedicated to Turtle & Tortoise Preservation, Conservation and Education

A common snapping turtle, *Chelydra serpentina,* basking on a log in the Arapaho Bend Natural Area, Fort Collins, Colorado. Photo © 2012 by Leejcooper. Source: Creative Commons; license CC-BY-SA 3.0.

Turtle of the Month

Common Snapping Turtle, *Chelydra serpentina* (Linnaeus, 1758)

The North American Snapping Turtle

by M. A. Cohen

Powerful and aggressive, the common snapping turtle, *Chelydra serpentina*, is a heavy-bodied species with a distinctive primitive look. The genus name, *Chelydra,* means "water serpent," while the species name, *serpentina*, means "snakelike."

Formally described by the Swedish botanist and zoologist Carolus Linnaeus (1707-1778) in 1758, the common snapping turtle, *Chelydra serpentina*, is one of only two living members of the chelonian family Chelydridae, the other member being the alligator snapping turtle, *Macrochelys temminckii*. While population levels are currently stable, *C. serpentina* is still heavily exploited, and researchers continue to document population declines in portions of its range.

Identification

The second-largest freshwater turtle native to North America, the adult common snapping turtle weighs up to 75 pounds (34 kilograms) with a straight-line carapace length (SCL) from 8 to 19.4 inches (20 to 49.4 centimeters). The massive alligator snapping turtle, at 249 pounds (113 kilograms) and a SCL of 31.5 inches (80 centimeters), is the only chelonian native to North America that is larger than the common snapper.

Olive to brown to black in color, the carapace of younger common snappers has three pronounced keels running lengthwise that typically become worn smooth as the turtle ages. A thick coating of mud and/or algae frequently obscures the actual color of an individual's carapace. Present at hatching, serrated rear marginal scutes remain dentate throughout the turtle's life.

Much smaller than that of most turtles relative to its overall body size, the cruciform (cross-shaped) plastron of the adult snapping turtle is yellowish-tan in coloration, while that of the hatchling is dark gray with white marbling. Because of its relatively small size, the plastron of *C. serpentina* leaves the turtle's head, limbs and tail exposed and unprotected (see the illustration on page 3).

Skin coloration of the common snapping turtle on its outer side ranges from black to gray or tan to yellow; its underside skin is generally yellowish-tan. While it is generally patternless, the species' skin sometimes displays white speckling.

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California Turtle & Tortoise Club: a Society Dedicated to Turtle & Tortoise Preservation, Conservation and Education Since 1964. Promoting and Facilitating the Care, Rescue and Adoption of Native and Nonnative Turtles and Tortoises.

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Update your email address through your MailChimp account, or send changes/corrections to **tgdistribution@tortoise.org**

Map of the native range of the common snapping turtle (blue area) in North America. Author: D. Gordon E. Robertson; source: Creative Commons; license CC-BY-SA-3.0.

Tubercles, wart-like outgrowths, protrude from the upper side of its long neck, and its sizable brown head has a slightly projecting snout. In contrast to that of most freshwater turtles, the head of *C. serpentina* is so large that the turtle cannot withdraw its head into its shell. Often flecked with dark patterning, the common snapping turtle's muscular jaws are cream-colored to yellow, and two barbels (filaments of skin) are usually present on the chin.

The species' limbs, stocky and strong, terminate in substantial feet with webbed toes and long, heavy claws. As long or longer than its carapace, the thickset tail of *C. serpentina* features three rows of saw-toothed tubercles on its top side, adding to its primordial appearance (Ernst & Lovich, 2009).

Lacking significant sexual dimorphism, *C. serpentina* males and females are difficult to differentiate based on outward features. Generally speaking, the male is larger than the female, and he is likely to have a somewhat concave plastron.

Range and Habitat

Spanning the eastern two-thirds of North America, the native range of *C. serpentina* stretches from southern Alberta, Canada eastward to Nova Scotia. In the United States, it ranges from east of the Rocky Mountains to the eastern seaboard and southward from eastern New Mexico through the Gulf Coast to northern Florida.

Introduced throughout the western United States, nonindigenous but well-established populations of common snapping turtle exist in California, Oregon, Washington, Idaho, Nevada, Utah and Arizona (Nakama, 2014). As a result, *C. serpentina* is the most widely distributed reptile in the nation, with populations in every state in the continental United States. Curiously, scientists have documented introduced populations in Japan (Honshu), China and Taiwan (Uetz & Hallermann, n.d.). These nonindigenous Asian populations are likely the result of escaped or "released" pets or farmed turtles.

While its preferred habitat is still or slow-moving water with a soft mud or sand bottom and an abundance of aquatic vegetation, *C. serpentina* inhabits almost any freshwater ecosystem within its range that offers plentiful aquatic vegetation or submerged tree trunks and brush in which to hide.

While favoring a shallow freshwater environment, the common snapping turtle will sometimes venture into brackish (somewhat salty) water, and will sometimes live on the shallow edges of deep lakes and rivers, as well as in wetland ecosystems such as marshes, swamps, reservoirs and temporary ponds. The species occupies elevations from tidally-influenced lowlands to approximately 6600 feet (2000 meters) (van Dijk 2012).

Subspecies

The chelonian scientific community currently recognizes no subspecies of *C. serpentina*. In the 20th century, most biologists recognized two subspecies of common snapping turtle, namely, *C. s. osceola* and *C. s. serpentina*. However, in the early 21st century, molecular evidence emerged from chelonian scientists' research that did not support separating *C. serpentina* into two subspecies (Shaffer, Starkey, & Fujita, 2008). As a result, chelonian science currently considers the names *C. s. serpentina* and *C. s. osceola* to be synonymous.

Foods and Feeding

A consummate omnivore, the common snapping turtle will feed on "anything that can fit in its mouth," (Ernst, Altenburg, & Barbour, n.d.). For instance, it consumes a variety of invertebrates such as crabs, crayfish, fiddler crabs, leeches, molluscs, planarians, shrimp, snails, worms and freshwater sponges, as well as insects such as beetles and butterflies. Its vertebrate prey includes amphibians, birds, fish, small mammals, and small reptiles such as snakes and turtles.

C. serpentina consumes aquatic vegetation such as algae (many species), *Carex* (sedges), *Elodea* (waterweeds), *Nymphaea* (water lilies), *Sagittaria* (duck potato), *Typha* (cattails), and many other aquatic plants (Ernst & Lovich, 2009). Being an opportunistic feeder, the common snapping turtle also scavenges carrion.

Younger common snapping turtles will actively forage, hunt and catch moving prey, while adults opt for lying in wait to ambush prey as it passes by. With only its nostrils and eyes exposed, the adult common snapper typically buries itself in the soft mud and decaying vegetation awaiting an occasion to strike. While feeding typically occurs underwater, *C. serpentina* will also graze on riparian (riverbank) plant species such as sedges.

Behavior

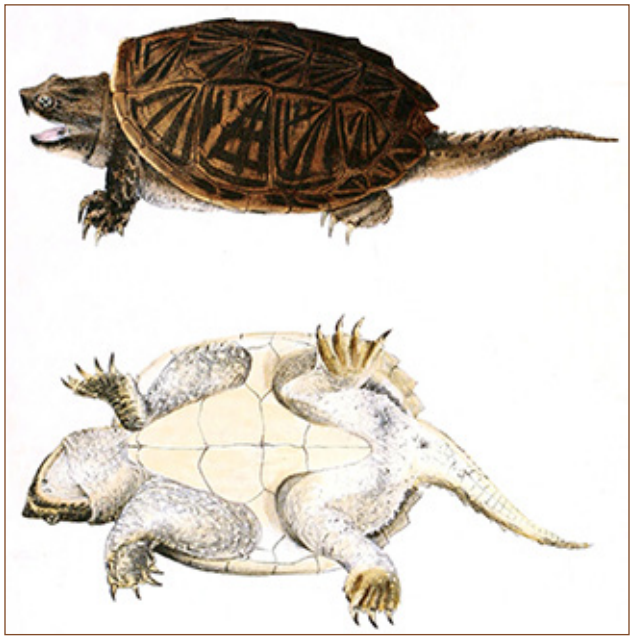
Among the most aquatic turtle species in North America that only occasionally basks, the adult common snapping turtle devotes much of its time to resting on the mud bottom of a waterbody awaiting a feeding opportunity. Additionally, the species hides out among submerged brush, roots, stumps, and such objects, as well as in muskrat burrows and lodges (Ernst & Lovich, 2009). It also passes time floating just below the surface of a waterbody with only its nostrils and eyes above water.

Posing a threat to the common snapping turtle, relatively high air temperatures and the subsequent rapid loss of moisture appear to limit the amount of aerial basking in which the species engages (Ernst & Lovich, 2009). This sensitivity to high temperatures accounts for the tendency of the species to float at the surface of the waterbody and bask on partially submerged logs.

Close-up of the head of a common snapping turtle photographed in Norman, Oklahoma. Note the two barbels projecting from the turtle's chin. Photo © 2014 by Jeremy Clark. Source: Creative Commons; license: CC-BY-SA-4.0.

In the northerly portions of its range, *C. serpentina* is primarily diurnal, i.e., active during the day, and is most active in the morning and early evening. These facts notwithstanding, even in the northernmost reaches of its range, *C. serpentina* may not enter a deep state of dormancy in extremely cold weather, based on observations of individuals crawling under the ice in midwinter (Ernst & Lovich 2009).

In the southerly reaches of its range, the turtle may be nocturnally active, with some activity likely to occur at any time of the day or night. The farther south the common snapper population, the greater the likelihood of year-round activity (Ernst & Lovich, 2009).



Hand-colored lithograph of the common snapping turtle. Rendering by John Edward Holbrook (1794-1871) published in *North American herpetology; or, A description of the reptiles inhabiting the United States* (1841). Public domain.

Emerging from brumation in April and May in the northerly portions of its range, the common snapping turtle generally commences brumation by late October by burrowing into the soft mud bottom, sheltering under logs and plant debris, crawling into cavities under overhanging banks, entering muskrat or beaver lodges, or burrowing in boggy pastures (Ernst & Lovich, 2009). As its range extends southward, emergence from brumation will occur as early as March. In the southernmost portions of its range, no brumation may occur, although cold winter temperatures prompt the species to enter a period of dormancy.

Relatively calm and retiring when in the water, *C. serpentina* is extraordinarily aggressive and intimidating when confronted on land. While it does not pose a significant risk to swimmers and typically only seeks an escape route, the species is a danger to humans when on land and is capable of inflicting serious injury ("Common snapping turtle, Chelydra serpentina", n.d.).

Reproduction

At 7 to 7.5 inches (18 to 19 centimeters) SCL, the male *C. serpentina* reaches breeding age, while the female matures at 8 to 9 inches (20 to 22 centimeters) SCL (Ernst & Lovich, 2009).

In most of its North American range, mating season is March through November and nesting takes place from mid-May to mid-June. Variations in these time frames do occur. For instance, in the cooler, northernmost reaches of its range, mating and nesting take place later in the year, beginning in mid-June and continuing into August. In the warmer southern regions these activities happen earlier in the year, with nesting and oviposition beginning as early as February in southern Florida (Ernst & Lovich, 2009). Moreover, in southern Florida, mating occurs throughout the year ("Common snapping turtle - Chelydra serpentina | ARKive", n.d.).

Following mating, female common snappers may travel great distances in water and overland in search of suitable nesting sites. For example, in Canada, researchers documented the round trip of a female common snapping turtle overland journey as having a length of 10 miles (16 kilometers). As a result, the consequence of such extensive overland voyages is increased vulnerability of female turtles (Ernst & Lovich, 2009).

Females generally select an open site with a loose substrate such as loam, sand, plant debris, or even sawdust left at old sawmills. Sometimes muskrat and beaver lodges serve as nesting sites, as do man-made sites such as dams, railways and roadsides.

Producing a single clutch each year, female common snapping turtles oviposit 4 to 109 eggs, with a typical clutch size of 25 to 45 eggs. Ordinarily, clutches incubate for 55 to 125 days, with 75 to 95 days

being the average incubation period.

In a mechanism known as temperature-dependent sex determination (TSD), incubation temperature influences the gender of *C. serpentina* hatchlings, with sites having warmer temperatures yielding mostly or exclusively female hatchlings while sites with cooler temperatures producing mainly or solely males.

In what is known as a "classic TSD-2 pattern," a relatively low incubation temperature of 68°F (20°C) produces all female hatchlings, while a temperature of 70-72°F (21-22°C) results in a mix of male and female hatchlings. Eggs incubated at 73-75°F (23-24°C) produce only male hatchlings; incubation at 77-82°F (25-28°C) yields hatchlings of both sexes, while eggs incubated at 84-88°F (29-31°C) produce only female hatchlings (Ernst & Lovich, 2009).

Chelydra serpentina. Photo © 2013 by Spencer Neurath/USFWS. Source: Wikimedia Commons; license CC-BY-2.0.

Typically emerging from their nest cavity between mid-August and early October, hatchling common snapping turtles tend to burrow into the soil near their nest or bury themselves in nearby leaf litter or debris, presumably to rest up for their journey to water. Depending on the distance from their nest to the nearest body of water, the hatchlings may travel a considerable distance. Upon reaching a body of water, hatchlings promptly begin to drink, and continue to drink until satiated. Following this quenching of their thirst, hatchlings seek suitable hiding spots (Ernst & Lovich, 2009).

As with other aspects of the life cycle of *C. serpentina*, emergence from the nest may occur earlier in the southerly portions of the range. Emergence from the nest may be delayed until the following spring in some colder northerly regions. Delaying emergence is not without risk because hatchlings sometimes freeze to death while overwintering in their nests.

Threats

Predators, including bullfrogs, crows, minks, foxes, great blue herons, raccoons, skunks, water snakes, other large turtles, and large predatory fish such as largemouth bass, feed on *C. serpentina* eggs and hatchlings ("Chelydra serpentina", n.d.). However, the rate of survivorship for subadults and adults increases substantially, as the turtle becomes a formidable opponent that will fight ferociously when attacked. Despite the turtles' fierce temperament, humans, alligator snapping turtles, alligators, otters, coyotes and black bears prey on *C. serpentina* adults (Ernst & Lovich, 2009).

Consequently, humans constitute the most serious threat to the species. Unlimited commercial collection in several states within its range for Asian food and traditional medicine markets, as well as for domestic human consumption, poses a significant risk to the species.

In a recent paper on the commercial harvest and export of common snapping turtles, authors Benjamin Colteaux and Derek Johnson report that "over three million live snapping turtles from farm and wild caught stock were exported from the US to Asia in 2012–14 alone." Furthermore, the authors describe "increases in the export of wild caught snapping turtles to over 200,000 individuals in 2012 and 2014, compared to under 50,000 in other years" (Colteaux & Johnson, 2017).

Habitat destruction and water pollution in some portions of its range pose threats to the species, and will continue to do so as land is developed for agricultural, industrial and residential uses.

Another risk that is attributable to humans, vehicular traffic also takes a toll on the species, particularly on the female turtles that may travel considerable distances over land to locate suitable nesting sites following mating. Population studies adjacent to roadways suggest that the sex ratio in such locations is distinctly skewed toward male turtles (Ernst & Lovich 2009).

Conservation

According to its 2016 assessment, the International Union for the Conservation of Nature's Red List ranks *C. serpentina* as a species of "Least Concern," based on the its adaptability, relatively high reproductive potential, and widespread distribution (van Dijk, 2012.

The species is not federally listed as an endangered species in the United States. As published in the Federal Register on 24 May 2016, the US Fish and Wildlife Service listed *C. serpentina* along with three other freshwater species in CITES Appendix III, effective 21 November 2016, which affords a species some international protection by requiring an official export permit and certificate of origin documenting the take as performed in compliance with the law.

As of 2015, ten states within the range of *C. serpentina* had no limits on the commercial harvest of the species. It is necessary for state governments to enact regulations to stop the untrammeled exploitation of native turtles largely for export purposes. These changes are already in progress in several states.

In some states within its range, *C. serpentina* already receives or will likely receive some legal protection in the form of limitations on commercial harvest. Kentucky, Michigan, Indiana, and West Virginia prohibit all capture of wild common snapping turtles, while Pennsylvania enforces strict bag limits, according to the Center for Biological Diversity (Ban Sought on Unlimited Wild Turtle Trapping in Ohio, 2017).

Recently enacted Texas Parks and Wildlife regulations prohibit the capture of wild snapping turtles on public lands and in public waterways, while allowing capture on private lands and in private waterways (Texas Turtle Regulations, 2016).

With a trapping season from March to November, Minnesota has strict rules governing the trapping of wild snapping turtles, and enforces reporting practices,

including the number of traps set, the number of turtles harvested, and the legal size of the take, with a requirement of monthly report submission ("Chelydra serpentina (Linnaeus 1758)", n.d.).

Additionally, other states such as Iowa, Missouri and Ohio are currently considering limiting the commercial harvest of the species, including establishing a closed season during which the take of snapping turtles is prohibited. Ω

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Turtles in Cyberspace: 20 Years and Counting!

Happy Twentieth Anniversary, tortoise.org

CTTC and its members can be very proud of the CTTC web site, which has become an internationally recognized educational resource for all things chelonian largely due to the efforts of Dr. Michael J. Connor, developer and original webmaster of the site. It is a perfect time to reprint the article Dr. Connor prepared for the March 1997 *Tortuga Gazette*.

World Wide Web Page Update

by Michael J. Connor

California Turtle & Tortoise Club now has a new, permanent address on the internet. Come and visit the Club's new site at: <http://www.tortoise.org>

Space for the site has been made available to CTTC by Andy Lambros of cyberweb1.com, which is physically located in Chatsworth, California. Visit cyberweb1.com (home of Animal World) on the internet, and don't forget to show your appreciation to Andy for donating space to CTTC. The move to the new address was precipitated by the closing down of our previous host, inetjungle. Thanks go to Scott Gross, inetjungle webmaster, in appreciation for the free space provided to CTTC for the last year. Because the CTTC Executive Board owns the tortoise.org domain, our new internet address should be permanent.

Visitors to the CTTC world wide website will notice that I have begun upgrading the site to improve its appearance and to make it easier for visitors to find the valuable information it contains. New features include: "The Turtle Gallery," where pictures of turtles can be viewed; "Tortoise Calls," where audio files of tortoise vocalizations can be downloaded; articles in the "Chelonian Archives" area which have been listed alphabetically by species name and new articles have been added; and the "About CTTC" area now features a page from which you can send email to your chapter (well, most of them!) and to the Executive Board.

Thanks again to all members who have dropped by the site and sent me such kind messages and feedback; all your suggestions are keenly valued. Every day we receive mail from visitors from all over the state and the outside world who are desperate for more information. These messages run the gamut from school kids researching school projects on desert tortoise conservation to the two ladies in Bakersfield (CA) and Singapore who found injured turtles and wanted to know how to treat them.

The CTTC website is clearly filling a significant and important need, but there is always room for more articles and graphics, particularly on the conservation and care of the more commonly encountered species. You can help fill this need by writing articles, sending in your high-quality photographs, or at least making helpful suggestions. As a reward for doing this, not only will you get to see your name up on the internet and help make CTTC's site a truly comprehensive place for turtle & tortoise information for everyone, but you could very well help save a few turtles' lives.

And when you visit our new site, remember to update your bookmarks! Ω

Originally published in the *Tortuga Gazette* 33(3), March 1997.

Foothill Chapter to Hold Annual Plant Auction 28 April

The Foothill Chapter will have its Annual Plant Auction on Friday, April 28 at 7:00 PM in the Palm Room at the LA County Arboretum. The address is 301 North Baldwin, Arcadia. We will be getting a wide variety of plants and trees donated by Steve List who is the head of the Horticulture Dept. at Sylmar High School. We also receive donations from Armstrong centers and plants from the Sunland Water Gardens for those of us who have water turtles! Our members also provide their homegrown plants. Parking at the Arboretum is free, and refreshments are provided.

The California Turtle & Tortoise Club
CHINO VALLEY CHAPTER

IS HAVING A

TURTLE AND TORTOISE SHOW IN "CHINO"

SATURDAY, MAY 20, 2017
10:00am to 3:00pm

ADMISSION $2.00

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ADOPTION INFORMATION
TURTLE BOUTIQUE

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From the 60 freeway exit Central Ave. and go south to Riverside Drive then go right. Take Riverside Drive to Third Street (1st signal) and turn right. The Girl Scout House in on the corner of "Third" and "Center" Streets

E-MAIL: jlcalif2@aol.com OR CALL LYNDA AT 909/627-0424 FOR MORE SHOW INFORMATION

CTTC Valley Chapter
Turtle & Tortoise Show

Saturday, May 20, 2017
11:00 AM ~ 4:00 PM
Woodland Hills Christian Church
5920 Shoup Avenue
Woodland Hills, CA 91367

- Live turtles and tortoises
- Information on care, adoptions and conservation
- Tortuga Gift Shop • Raffle
- "Ask the Vet" booth

Admission
Adults $3.00
Seniors 60+ $2.00
Children 6+ $2.00
Children under 5 ..... FREE

For more information, contact:
Show Chair: Karen Berry
theflyingturtle1953@yahoo.com
Co-Chair: Cristina Perovich
cribetti@gmail.com

Sponsored by CTTC Valley Chapter: http://www.tortoise.org/valley, P.O. Box 7364, Van Nuys, CA 91409-7364.
The Valley Chapter of California Turtle & Tortoise Club is a not-for-profit 501(c)(3) organization.

California Turtle and Tortoise Club
Inland Empire Chapter
A Non-Profit Organization
is having their

Annual Turtle & Tortoise Show

Saturday, June 17, 2017
10:00am – 3:00pm
Admission: FREE

*Live Exhibits *Adoption Information
*Educational Displays *Fund Raising Table
*Raffle *Baked Goods & Soft Drinks

Redlands Senior Citizen Center
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Redlands, CA

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For show information
Check out: www.tortoise.org

Classified Advertisements

Classified advertisements run for one issue at $5[00] for four lines or less or $30[00] for ¼ page. They are accepted at the discretion of the Editor. Classified ads are available to members and subscribers **only**. Advertisements 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: Redfoots, Russians, Marginateds, Hermann's, Graecas, Elongateds, Forstenis, Leopards, Reeves and Boxes — all breeding adults. Reeves, Box and Russian hatchlings. Call Bob 805-481-5222. (6)

Updating your Contact information

Every CTTC member on this mailing list has a MailChimp account that s/he can update as needed. When you receive your newsletter notification, there is a link at the bottom of the page titled "update your preferences." Simply click on this link to jump to your account page and update your email address and other information. Thank you!

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**.

Pleurodire and Cryptodire Differences Linked to Prey Capture
Turtles are classed as either side-necked or hidden-necked. New fossil indicates that the way turtles withdraw their head and necks is linked to how they capture prey.

Fossil of Extinct Bahaman Tortoise Yields DNA
A specimen of an extinct tortoise species that fell into a water-filled sinkhole in the Bahamas about 1,000 years ago has been recovered with some of its DNA intact.

The Big Turtle Year
New initiative of the Florida Turtle Conservation Trust seeks to raise awareness of the rich diversity, ecology, and conservation needs of turtle species occurring in the United States.

Lonesome George Goes Home
The preserved remains of Lonesome George have been returned to the Galapagos.

Tortoises Have Long Memories
Most tortoise owners already knew this, but now scientists have learned that red-footed tortoises trained to recognize specific visual cues still remember the cues when retested 18 months later.

Red Cliffs Plan Excludes New Freeway
Not sure how long this good news will last but the Bureau of Land Management's latest plan for Red Cliffs Conservation Area excludes a right-of-way for a new freeway through the desert tortoise preserve

Marines Plan to Displace More Desert Tortoises
Despite the ongoing population declines, yet again the agencies are allowing large-scale translocation of West Mojave desert tortoises.

Green Sea Turtle Counts Overestimated?
New research indicates that green sea turtles may re-nest many more times than originally thought. Population estimates of the threatened species based on counting females on nesting beaches may have overestimated numbers by twofold.

Marine Turtle Newsletter
The latest issue of the Marine Turtle Newsletter (January 2017) is now available.

Kemp's Ridley Science
The journal Gulf of Mexico Science has a special issue on the Kemp's Ridley sea turtle available for free download.

2014 Sea Turtle Symposium Proceedings
The *Proceedings of the Thirty-Fourth Annual Symposium On Sea Turtle Biology And Conservation* held in New Orleans, 2014 are available for free download.

Climate Change Effects on Sea Turtles
A couple of interesting studies illustrate the need to look at the whole scenario when making predictions about turtle and tortoises.

The good news is that study of seven sea turtle species shows that while increased temperatures may increase the proportion of female hatchlings the better survival of newly hatched males and more frequent mating by adult males mean that population size will not be compromised.

The bad news is that increased sand temperatures are detrimental to all hatchlings...

Sea Turtle Hatchlings Dying in Extreme Heat
On a related note, turtle hatchlings were found dying in extreme heat on Queensland's famous Mon Repos beach where a heat wave pushed the sand's temperature to a record 75 degrees Celsius (167 degrees Farenheit).

Science of the Deepwater Horizon Oil Spill
Endangered Species Research has a special issue on the effects of the Deepwater Horizon oil spill on protected marine species including sea turtles. This is open access so downloads are free.

Box Turtle Life
On the lighter side, Fred Seitz interviews a box turtle he met while walking in a Maryland Park.

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Turtle & Tortoise Care Society Life Members

- **Curtis M. Cameron**
- **Connie Dunst**
- **Crystal Lucier**
- **Cathy Pagone-Williamson**
- **Irene Talley**

CTTC Meetings and Programs

Cen-Val: 9 March; 13 April

Chino Valley: 17 March; 21 April

Foothill: 24 March; 28 April – Annual Plant Auction

High Desert: 13 March; 10 April

Inland Empire: 3 March; 7 April

Kern County: 13 March; 10 April

Low Desert: 3 April

Orange County: 10 March; 14 April

Ridgecrest: 13 March; 10 April

Santa Barbara-Ventura: Contact the chapter for meeting information.

Santa Clarita: 18 March

Silicon Valley: 17 March; 21 April

TOOSLO (San Luis Obispo): 8 March; 12 April

TTCS (Long Beach): 17 March – Barry Nerhus on Western Pond Turtle Restoration; 21 April

Valley: 17 March; 21 April

Executive Board: 8 April. Meetings are held at the Los Angeles County Arboretum, Arcadia, CA.

Check your Chapter web site for the latest program information. Programs may be scheduled after the newsletter is published.

In the depth of winter I finally learned that there was in me an invincible summer.

— Albert Camus (1913-1960)
French philosopher and journalist

"... the current position of the California Department of Fish and Wildlife is that it is illegal to breed captive [desert] tortoises."

[The Desert Tortoise Council's *Answering Questions* e-publication is currently offline in revision.]

"CTTC will not place desert tortoises (*Gopherus agassizii*) in situations where captive breeding may occur. CTTC works with California Department of Fish and Wildlife (CDFW) to place desert tortoises. Both CDFW and CTTC discourage the captive breeding of desert tortoises."

– **tortoise.org/cttc/adoption.html**

Ban Sought on Unlimited Wild Turtle Trapping in Ohio

Commercial Traders Now Sell as Many Turtles as They Can Catch — Center for Biological Diversity press release

Columbus, Ohio—11 January 2017— The Center for Biological Diversity and several Ohio-based conservation organizations petitioned the Ohio Department of Natural Resources today to end unchecked commercial collection of the state's wild turtles. Turtle traders can now legally collect unlimited numbers of common snapping and softshell turtles to process and sell domestically or export for Asian food and medicinal markets.

"For-profit turtle traders should not be allowed to put the state's turtles at risk," said Collette Adkins, a Center biologist and senior attorney who authored the petition. "Ohio desperately needs limits on the number of snapping and softshell turtles trappers can take from the wild. Selling so many turtles for meat is bad for the turtles, of course, but also for all of us who care about the health of the state's waterways and wetlands."

Under current regulations in Ohio, anyone with an annual fishing license may trap and sell unlimited numbers of common snappers, spiny softshells and smooth softshells. Although Ohio law prohibits live export of turtles, traders can sell live turtles within the state or process the animals to sell across state lines or overseas for meat and medicinal markets. Also, because turtles **bioaccumulate** toxins from prey and burrow in contaminated sediment, turtle meat is often laced with mercury, PCBs and pesticides, posing a health risk. Adult turtles are also taken from the wild to breed hatchlings for the international pet trade.

"Commercial trapping is devastating to turtle populations that are already suffering from multiple other threats, including habitat loss, water pollution and vehicular collisions," said Dr. Lisa Regula Meyer, a visiting assistant professor of biology at the University of Akron. "All of our neighboring states ban or limit for-profit turtle trapping, and Ohio should too. This simple step could vastly improve turtle conservation efforts in the state, with little cost to Ohio and its citizens."

Scientists have repeatedly documented that freshwater turtles cannot sustain any significant level of wild collection without population declines. In a 2014 study, researchers found that, looking at mean demographic rates, no harvest could be sustained for softshells, and common snappers could withstand only minimum rates of juvenile harvest and no adult harvest.

Spiny softshell turtle, *Apalone spinifera*, a species native to Ohio. Photo © 2007 by LA Dawson. Source Wikimedia Commons; license CC-BY-SA 2.5.

The Center for Biological Diversity, Ohio River Foundation, Ohio Wetlands Association, Kent Environmental Council, Friends of the Ravines and Dr. Regula Meyer submitted today's petition.

Background

As part of a campaign to protect turtles in the United States, the Center for Biological Diversity has been petitioning states that allow commercial turtle collection to improve regulations. In 2009 Florida responded by banning almost all commercial collection of freshwater turtles from public and private waters. Then, in 2012, Georgia approved state rules regulating the commercial collection of turtles, and Alabama completely banned commercial collection. This past July, Iowa published proposed rules that, if finalized, would impose seasons, daily bag limits and possession limits for common snapping turtles, painted turtles, spiny softshells and smooth softshells. And in October the Missouri Department of Conservation announced — in response to a Center petition —that it will consider ending unlimited commercial collection of the state's wild freshwater turtles.

Also this year, in response to a 2011 Center petition, the U.S. Fish and Wildlife Service in May added four turtles — including common snapping turtles, smooth softshell turtles and spiny softshell turtles that are targeted in Ohio — to a list called "CITES Appendix III." Trade in Appendix III species requires an export permit and documentation that the animal was caught or acquired in compliance with the law, allowing the United States to monitor trade closely. The animals must also be shipped using methods designed to prevent cruel treatment.

None of the states that share a border with Ohio allow unlimited commercial collection of turtles. Kentucky, Michigan, Indiana and West Virginia prohibit all commercial collection of turtles, and Pennsylvania enforces strict bag limits. **Ω**

Defining Bioaccumulation

"An important process through which chemicals can affect living organisms is **bioaccumulation**. Bioaccumulation means an increase in the concentration of a chemical in a biological organism over time, compared to the chemical's concentration in the environment. Compounds accumulate in living things any time they are taken up and stored faster than they are broken down (metabolized) or excreted. Understanding the dynamic process of bioaccumulation is very important in protecting human beings and other organisms from the adverse effects of chemical exposure, and it has become a critical consideration in the regulation of chemicals.

•••

A typical food chain includes algae eaten by the water flea eaten by a minnow eaten by a trout and finally consumed by an osprey (or human being). If each step results in increased bioaccumulation, that is, biomagnification, then an animal at the top of the food chain, through its regular diet, may accumulate a much greater concentration of chemical than was present in organisms lower in the food chain. "

– from the Pesticide Information Project's
Extension Toxicology Network

Chicago Herpetological Society: Herpetology 2016

Abstracts of recently published herpetological papers prepared by the editorial staff of the CHS

Spotted Turtles in Georgia

D. J. Stevenson et al. [2015, Chelonian Conservation and Biology 14(2):136-142] report that conservation of the imperiled spotted turtle (*Clemmys guttata*) at the regional level (i.e., Georgia, USA) will require knowledge of the species historic and contemporary distribution, activity patters, and habitat preferences. To address these needs, they compiled 170 records of spotted turtles in Georgia from 1892 to 2014, including 89 museum records, 80 records based on credible observations or photos and 1 literature record.

Spotted turtle, *Clemmys guttata,* photographed in North Carolina by John J. Mosesso, NBII. Public domain.

There are recent (1995-2014) records for 79 locations in 31 counties, with 29 of these occurring on 14 conservation lands. Results demonstrate that spotted turtle ranges throughout much of the Coastal Plain of Georgia including the Flint River and the Withlacoochee River drainages of the Gulf Coastal Plain. Half of the records for which habitat could be classified (62 of 124; 50%) were associated with blackwater creek swamps or seepage slope swamps. Remarkably, all but 4 Georgia spotted turtle records with body size data (i.e., 150 of 154; 97%) were based on adult turtles. The majority of Georgia records with the date included were from late winter-spring (134 of 160; 84%, February – May). Likewise, the majority of observations were turtles found on roads (94 of 179 records; 55%), the majority of which were alive (63; 67%). For the spotted turtle in Georgia, the authors recommend 1) continued protection and state-listing status, and 2) initiating long-term mark-recapture efforts to estimate population sizes and demographics and evaluate population trends.

—Originally published in Bull. Chicago Herp. Soc. 51(5):86, 2016.

§ § §

Pond Turtles on the Kinmen Islands

S.-M. Lin et al. [2015, Journal of Herptology 49(3):399-404] point out that demilitarized zones may aid in the protection of endangered wildlife. They compared relative abundance of the endangered Chinese pond turtle (*Mauremys reevesii*) among water bodies on the Kinmen Islands, a recently demilitarized zone between Taiwan and China. Vegetation and wildlife on the two islands, located 2 km (1.2 mi) from the Chinese coastline, were degraded by bombardment and military occupation between 1958 and early 2000s. However, natural habitats gradually recovered after military forces withdrew. More than 100 ponds, mostly produced during the occupations to provide freshwater for the soldiers, are now abandoned and provide habitat for aquatic turtles. The authors sampled 41 ponds and found that presence of *M. reevesii* was tightly associated vegetation coverage around the pond, whereas its relative abundance was associated with aquatic vegetation and distance from roads. Comprehensive protection and management of this species should consider both vegetation coverage and road effects in certain vulnerable areas where establishment of a natural reserve might be considered.

—Originally published in Bull. Chicago Herp. Soc. 51(5):86, 2016.

Chinese pond turtle, also known as Reeves' turtle, *Mauremys* (= *Chinemys*) *reevesii.* Photo 2008 by Σ64. Source: Wikimedia Commons; license CC-BY-3.0.

§ § §

Courtship in the Big-headed Turtle

Y.-F. Wei et al. [2016, The Herpetological Journal 26(2):85-91] note that turtles are an excellent group for understanding the theory of sexual selection, sexual dimorphism and the evolution of courtship behavior. Asia has a rich diversity of turtle species, but qualitative analysis of courtship behavior has only been conducted on a single species. This study quantitatively analyzed courtship and mating behaviors of captive *Platysternon megacephalum* to serve as a basis for future comparisons with other freshwater turtles. A total of 259 courtship behavior sequences stemming from 66 pairings between 12 males and 24 females were analyzed. Seven (approaching, sniffing, chasing, resting, mounting, subduing, copulating) and three mutually exclusive motor pattern (fleeing, mating resistance, mating acceptance) were performed by males and females, respectively. The temporal sequences of courtship and mating behaviors were analyzed statistically, and a flow diagram was constructed. Male courtship display patterns involved tactile, visual and olfactory cues for conspecific[1] and sexual recognition. In response, females may have emitted olfactory cues regarding their sex and reproductive status. Male *P. megacephalum* exhibited biting, but no head movement or foreclaw display in courtship, which differs from other freshwater turtles. This study provides the first record of male biting during courtship behavior in an Asian turtle species. Recommendations for captive breeding of the endangered species *P. megacephalum* are presented. **Ω**

—Originally published in Bull. Chicago Herp. Soc. 51(10):174, 2016. All abstracts are reprinted with permission from the Editor of the Bulletin.

[1] conspecific: belonging to the same species.

the Turtle's Garden

planting for chelonians

by M. A. Cohen

Calendula: *Calendula officinalis*

Side view of *Calendula officinalis*. Photo © 2008 by Berdan. Source: Wikimedia Commons; license: CC-BY-SA-3.0.

A flowering annual herb, calendula (*Calendula officinalis*) first appeared in culinary use during the Roman Empire as an economical alternative to expensive saffron. Often called the "queen of spices" and prized as a culinary flavoring spice, food coloring, and textile dye, saffron was a status symbol that commanded a price out of reach for all but the wealthiest Romans.

After being harvested and dried for use, the stigmas, one of the female parts of the saffron flower, impart a rich, golden color to both food and fabric. The production of saffron requires immense quantities of flowers to produce a small quantity of saffron, as each flower produces only three stigmas, hence the high price of the spice. To this day, saffron is the world's most exotic and costly spice, priced upwards of $1,500^{00}$ per pound (per 0.45 kilogram), depending on the quality, and is typically sold by the gram (0.04 ounce) ("The world's priciest foods - Saffron (4) - Small Business", 2017).

Close-up of the wild type of *Calendula* blossom. Photo © 2006 by Wildfeuer. Source: Wikimedia Commons; license: CC-BY-SA-3.0.

Being a resourceful lot, the less-affluent Roman citizens who desired the appealing color of saffron without the hefty price tag subsequently discovered that dried calendula petals served as an excellent substitute for the costly saffron, the result of which was the moniker "the poor man's saffron" (Barash, 1993).

As a member of the Asteraceae, the sunflower or daisy family, *Calendula officinalis* is one of some 20 species of herbaceous annuals and perennials in the genus *Calendula*. Sometimes known by the common name "pot marigold," calendula actually belongs to a completely different genus than the marigolds, which are members of the genus *Tagetes*. Moreover, *C. officinalis* is generally recognized as safe and nontoxic.

Appearance

With its branching growth habit, *C. officinalis* ordinarily grows to a height of 18 to 24 inches (46 to 61 centimeters) tall and 12 to 18 inches (30 to 46 centimeters) wide, with somewhat sticky leaves and slightly fuzzy stems (Brenzel, 2012).

Flowers of the wild type of calendula vary in color from yellow to goldenrod to orange with diameters from 2.5 to 4.5 inches (6.4 to 11.4 centimeters) across. Cultivars, cultivated varieties developed by the horticulture industry for specific purposes, exist for *C. officinalis*, including white-, apricot-, and red-colored flowers, bicolored flowers and double-flowered forms. Dwarf cultivars, ranging in height from 12 to 15 inches (30 to 38 centimeters), fit well in smaller gardens and containers, and many bear unique, showy blossoms.

Culture

Full sun, moderate irrigation, and a fast-draining soil provide ideal conditions in which to grow calendulas. Grow plants from seed or purchase seedlings from a garden center to establish calendula in the garden (Brenzel, 2012).

Botanically speaking, calendula is a cool-weather annual, meaning that it completes its life cycle in a single season and flowers in cooler weather. In cold-winter climates with relatively cool summers, calendula flowers from spring to fall. In mild-winter climates that typically experience warm summers, calendula flowers from late fall through spring. Known to gardeners as deadheading, the timely removal of spent flower heads promotes flower production.

Edibility and Medicinal Uses

Described as slightly bitter in flavor, calendula is more often used for its golden color than for its flavoring in human cuisine. In contemporary cuisine, cooks use calendula petals to add an appealing golden color to casseroles, to potato and rice dishes, as well as to baked items such as biscuits and cakes (Barash, 1993).

Historically used in German soups and stews, the common name "pot marigold" derives from the fact that cooks added calendula flowers to the cooking pot in traditional dishes (History of Calendula).

Used in medicine since ancient times, *C. officinalis* possesses properties for treating digestive issues, skin conditions, wound care, detoxification of the liver and gall bladder, as well as other beneficial qualities (History of Calendula) **Ω**

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Columbus Zoo and Aquarium: The First Zoo-Born of the New Year is…A Snake-Necked Turtle

Powell, Ohio—6 January 2017—If the first newborn of the New Year is any indication of what 2017 has in store, the Columbus Zoo and Aquarium should anticipate a year of patience, endurance and stability. The first zoo-borns – born on New Year's Eve and New Year's Day – were northern snake-necked turtles.

Of the recent clutch, four turtles have hatched so far: one on Dec. 29, one on Dec. 31 and two on Jan. 1. Prior to the clutch that hatched last year, the Columbus Zoo has not bred this species since 1998. All hatchlings weigh about 9 grams each. Adults can reach up to 10 pounds.

The northern snake-necked turtle (*Chelodina oblonga*) is named for its uniquely long neck that, instead of retracting inside its shell, wraps tightly around the turtle's body for protection. It is one of two snake-necked turtle species cared for at the Columbus Zoo and Aquarium; the other, the Roti Island snake-necked turtle (*Chelodina mccordi*), is much smaller and is listed as critically endangered. (The northern snake-necked turtle is listed as "near threatened" by the International Union for Conservation of Nature and Natural Resources, or IUCN.)

Like most turtle species, the northern snake-necked turtle is facing human-related threats to their populations. While indigenous people of Australia have been able to live harmoniously with this species, increasing agricultural development of the region is threatening these turtles' long-term survival.

At the Columbus Zoo and Aquarium, breeding presents its own challenges.

"Snake-necked turtles are not easily bred, and very little research has been published about breeding techniques," said Saul Bauer, a reptile expert at the Zoo's Shores Region. "The new hatchlings are an exciting success, not just for us at the Columbus Zoo, but for turtle research at large."

While these hatchlings will not immediately be on public view, their parents – as well as Roti Island snake-necked turtles – can be visited at the Reptile Building at the Columbus Zoo. **Ω**

—press release by Jen Fields, Director of Communications, Columbus Zoo and Aquarium

Louisiana Refuses to Protect Freshwater Turtles From Commercial Trapping — *Unlimited Harvest Threatening 20 Wild Turtle Species*

Baton Rouge, Louisiana—5 January 2017—The Louisiana Department of Wildlife and Fisheries on Wednesday denied a scientific petition from the Center for Biological Diversity and Gulf Restoration Network to protect 20 turtle species from unlimited commercial trapping and sale. The petition included several studies indicating that even moderate levels of harvest can devastate turtle populations.

"Turtles are a precious part of Louisiana's rich wildlife heritage, so it's disappointing to see state officials turning a blind eye to this problem," said Elise Bennett, a staff attorney at the Center for Biological Diversity who is dedicated to protecting rare reptiles and amphibians. "Because of turtles' unique life histories, it could be decades before populations reflect the irreversible damage caused by unrestrained harvest. At that point it could be too late."

Louisiana law currently allows holders of a reptile-and-amphibian-collection license to take and sell unlimited numbers of common snapping turtles, southern painted turtles, eastern and western chicken turtles, river cooters, red-eared sliders, Mississippi mud turtles, stripe-necked musk turtles, eastern musk turtles, five types of map turtles, and five types of softshell turtles with no closed season. Licensed collectors are also permitted to take unlimited numbers of the estuarine Mississippi diamondback terrapins during an open season. Until mid-2016 Louisiana did not require commercial trappers to report information about their turtle catches, so the state Department of Wildlife and Fisheries has little information on how many wild turtles are actually being removed from state waters.

"Louisiana's incredible diversity of turtles deserves careful protection," said Raleigh Hoke, campaign director at the Gulf Restoration Network. "It is my hope that the state Department will gather more data on our turtle populations and make it publicly available to scientists and concerned citizens so we can address this threat together."

As part of a campaign to protect turtles in the United States, the Center has successfully petitioned states that allow unrestricted commercial turtle collection to improve harvest regulations. In 2009 Florida responded by banning almost all commercial collection of freshwater turtles from public and private waters. In 2012 Georgia approved state rules regulating the commercial collection of turtles, and Alabama completely banned commercial collection. And in October 2016, Missouri agreed to consider a ban on unlimited commercial harvest in response to a petition submitted by the Center and Great Rivers Environmental Law Center. More than 100 scientists signed a letter in support of banning for-profit trapping in Missouri.

Background

Life-history characteristics such as delayed sexual maturity, dependence on high adult survival, and high natural levels of nest mortality make turtles vulnerable to rapid declines from exploitation. Scientists have repeatedly documented that freshwater turtles cannot sustain any significant level of wild collection without population declines. **Ω**

— Center for Biological Diversity press release

Southern painted turtle, *Chrysemys picta dorsalis*, one of the 20 native chelonian species to which the state of Louisiana has denied protection from commercial trapping. Photo © 2011 by Suzanne Collins of the Center for North American Herpetology. Source: Wikimedia Commons; license CC-BY-SA 1.0.

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[1]SunPower lease not available in all states. Talk with your local SunPower dealer for more information.

[2]Source: Photon International, Feb. 2011, Market survey on solar modules 2011.

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Turtle of the Month

Common Snapping Turtle
Chelydra serpentina

CTTC Online: tortoise.org
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Membership in the California Turtle & Tortoise Club and subscriptions to the *Tortuga Gazette* are handled through the CTTC Chapters. The Chapters also manage membership renewals.

Members are free to join any Chapter. Many members in California choose to join a nearby Chapter to participate in Chapter meetings and other activities. Print membership forms from the **CTTC website** and mail to the Chapter of your choice.

Membership fees

- Individual/family...$25^{00}
- Canada/Mexico...$25^{00}
- Foreign...$40^{00}
- Life membership...$500^{00}

The Chapters' postal mailing addresses are listed in the following section. Click on the links to visit the Chapters' web sites.

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Postal mailing address: P. O. Box 1753, Chino, CA 91708-1753.

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Santa Clarita Chapter
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Silicon Valley Chapter
Postal mailing address: P.O. Box 64135, Sunnyvale, CA 94088-4135.

TOOSLO (San Luis Obispo) Chapter
Postal mailing address: P.O. Box 14222, San Luis Obispo, CA 93406.

Turtle & Tortoise Care Society Chapter
Postal mailing address: P.O. Box 15965, Long Beach, CA 90815-0965.

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

The state of Florida officially designated **April 10th** as **Gopher Tortoise Day** on 4 April 2016. The gopher tortoise, *Gopherus polyphemus*, is found in parts of all 67 counties in the state.

According to the Gopher Tortoise Council, "Gopher tortoises are considered a keystone species because they dig burrows that provide shelter for 360 other species of wildlife including "commensals." These commensal species include the gopher frog, Florida mouse, eastern indigo snake, and hundreds of invertebrates like beetles and crickets. Without the gopher tortoise, many of these species would not exist. "

2017 — The Big Turtle Year

The Florida Turtle Conservation Trust has initiated a year-long effort to raise awareness of the remarkable "diversity, ecology, and conservation needs" of turtle species in the United States. Some 59 species of chelonian are native to the USA, making the nation a global biodiversity hotspot.

The concept grew out of an unofficial birding competition called the "Big Year" that focused on observing and identifying avian species in the wild and recording those observations in one's life list.

The Big Turtle Year focuses on observing and identifying as many turtle species as possible during the calendar year 2017.

Thanks to Dr. Michael Connor for bringing this initiative to our attention through his Net Picks column. For more information on this action and the native species, please click on **the Big Turtle Year web site**