



# Case Study: U.S. Freshwater Turtles and Tortoises in the Context of the Convention on International Trade in Endangered Species of Wild Fauna and Flora

## INTRODUCTION

This document was prepared by the AFWA CITES Technical Work Group to provide an overview of the international demand and trade in U.S. species of freshwater turtles and tortoises in relationship to Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) and to identify information gaps and future steps needed to assist decision makers at the state, regional, and national levels to ensure wild turtle populations are sustainable.

Globally freshwater turtles and tortoises are harvested for food, use in traditional medicine, and the international “collectible”/pet trade. In addition to factors such as habitat loss and pollution, widespread exploitation puts many of the world’s turtle species at risk of extinction. An estimated 60% of all 335 modern freshwater turtle and tortoise species are categorized either as Threatened or Extinct by the International Union for Conservation of Nature (IUCN) after adjusting for the predicted threat rate of Data Deficient species (Turtle Taxonomy Working Group 2014).

Almost 40% of U.S. turtle species are threatened, a figure that is not different from the worldwide proportion. Why are turtles such an imperiled group? The literature suggests that turtles possess a co-evolved suite of life history traits that constrain their ability to respond to exploitation including 1) low annual fecundity; 2) high nest mortality; 3) delayed maturity; 4) high adult (and post-nest emergence) survivorship; and 5) longevity. The paradigm for turtle population stability suggests that high adult survivorship is necessary to ensure persistence due to the possession of those life history traits (Ernst and Lovich 2009).

## CITES

CITES is an international trade agreement among 182 countries (and the European Union) to ensure that international trade of wild animals and plants does not threaten species’ survival. CITES works by subjecting international trade of selected species to certain controls. These require that all imports, exports, re-exports, and introductions from the sea of species covered by CITES have to be authorized. The species covered by CITES are included in three Appendices according to the degree of protection needed. Appendix I includes species threatened with extinction. Trade in these species is only permitted in exceptional circumstances. Appendix II includes species not necessarily threatened with extinction, but for whom trade must be controlled in order to avoid utilization incompatible with their survival. Appendix III contains species that are protected in at least one country, which has asked other CITES countries for assistance in documenting trade.

---

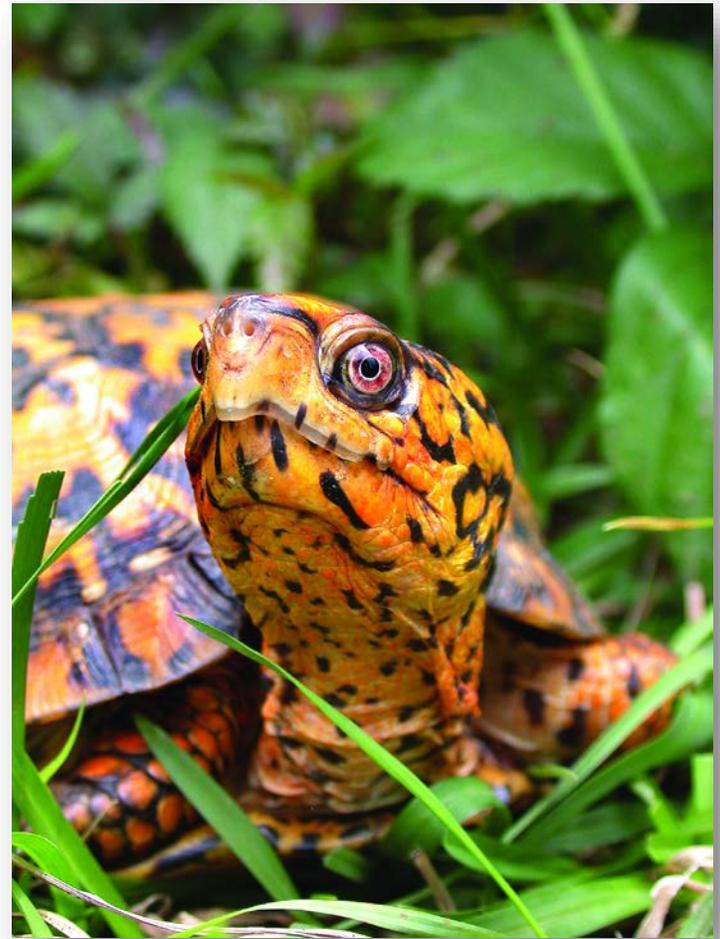
**There are 57 species of freshwater and terrestrial turtles in the U.S. which constitutes approximately 18% of the global turtle species. While the highest concentration of turtle species is found in southeastern Asia, the diversity of turtle species in the southeastern U.S. ranks as the second highest concentration of species in the world.**

---

## FRESHWATER TURTLES AND TORTOISES IN CITES

Freshwater turtles and tortoises globally have been included in CITES since its inception. Nearly 50 freshwater turtle and tortoise species worldwide were included in the Appendices in 1975, and in 1977 all tortoises were added to Appendix II. As of 2020, 183 freshwater turtles and tortoises were included (App I=37; App II=121; and App III=25).

Luiselli et al. (2016) analyzed CITES data from 1990–2010 to depict the main patterns of global trade for freshwater turtles and tortoises designated as of wild origin (permit source code “W”). About 2 million wild individuals were traded over 20 years of monitoring, with 48 species (of 335 turtle species in total) belonging to 10 distinct families being regularly traded and over 100 being at least occasionally traded. Most (93%) of the traded specimens are in the families Testudinidae, Geoemydidae, Emydidae, and Trionychidae which comprises about 250 species and represents 75% of turtle diversity. The trade of wild individuals reached its peak in the early 2000s, with this pattern being stronger in the Asian region. After the years 2003–2005, there was a substantial decrease in the number of wild exports from the Asian region, with a remarkable growth in the export numbers from the Nearctic region (North America). It is unknown whether the reduction of exported Asian region turtle numbers depended on 1) CITES regulation and supervision or 2) a collapse of the wild populations. There were uneven frequencies of wild turtles traded by biogeographic region, with a higher amount of traded wild turtles coming from Asian and Palearctic regions (Asia and Europe). There were 107 exporting countries, with Malaysia, the United States, and Indonesia being the most important countries in the trade (each country responsible for over 20% of trade). Overall, there were 66 importing countries, with the most important being the United States (17%) and China (15%). Hong Kong (Special Administrative Region of China) making up 12% of the imports.



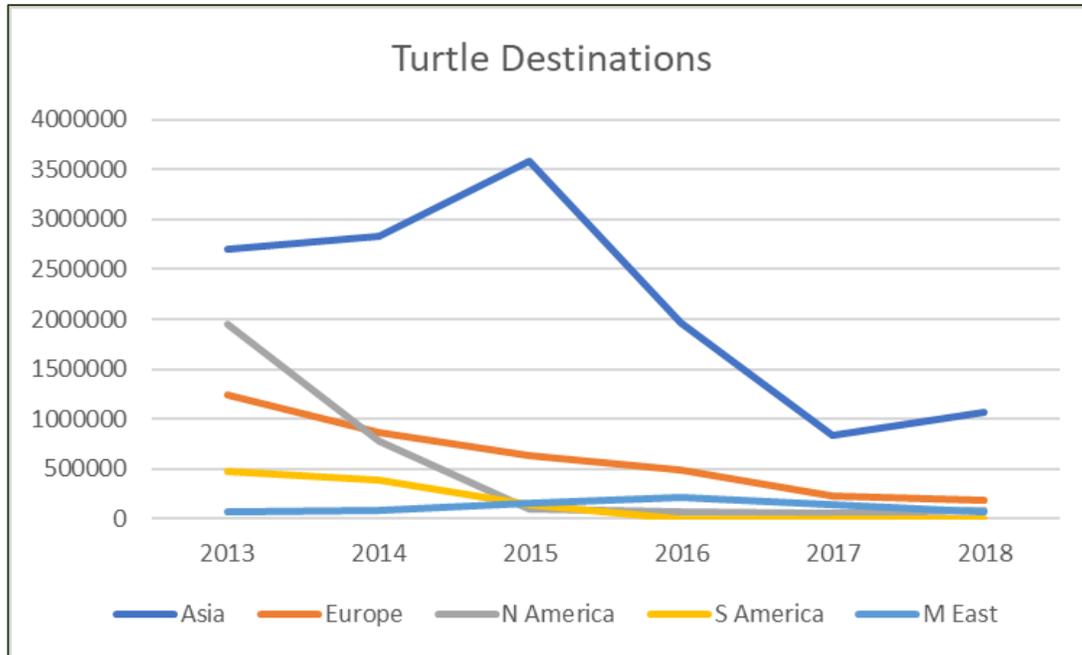
### Quantities of individual turtles and tortoises included in CITES that were traded between 1990 and 2010, divided by family (Luiselli et al. 2016)

# Turtles Traded	Family
748,008	Testudinidae (tortoises: approximately 11 genera and 40-50 species)
667,469	Geoemydidae (Eurasian pond and river turtles, and Neotropical wood turtles: about 75 species)
401,224	Emydidae (box turtles, terrapins, pond turtles, marsh turtles: 33 genera and 95 species)
181,015	Trionychidae (softshells: 12 genera and 25 species)
86,633	Pelomedusidae (freshwater turtles native to sub-Saharan Africa: 5 genera and 26 species)
59,705	Chelydridae (snapping turtles: 2 genera and 4 species)
9,070	Podocnemidae (side-necked turtles: 20 genera and 30 species)
421	Dermatemydidae (river turtle: 1 genus and 1 species)
38	Platysternidae (big-headed turtle: 1 genus and 1 species)
37	Chelidae (Austro-American side-necked turtles: 11 genera and approximately 40 species)

# Case Study: U.S. Freshwater Turtles and Tortoises

## EXPORTS OF U.S. FRESHWATER TURTLES AND TORTOISES

Law Enforcement Management Information System (LEMIS) data shows more than 18.4 million turtles were exported from the U.S. to six continents/subcontinents from 2013 to 2018 with 60.6% going to Asia, 15.9% to Europe, 4.7% each to South America and the Middle East, 0.25% to Australia, and 13.9% remaining in North America but exported primarily to Mexico. During this time frame, there was a decline in the numbers of turtles exported from the U.S. (Boundy 2019 unpublished report).



**In 2013, 6.44 million turtles were exported from the U.S. while 1.41 million turtles were exported in 2018.**

## U.S. FRESHWATER TURTLES AND TORTOISES IN CITES

Thirty-one species of the U.S. freshwater turtles and tortoises are included in the CITES Appendices.

### APPENDIX I

Includes species threatened with extinction. International trade is only permitted in exceptional circumstances.

	<u>Year Added</u>
Bog Turtle ( <i>Glyptemys muhlenbergi</i> )	1992

### APPENDIX II

International trade is permitted but controlled based on a system of permits and certificates and includes species not necessarily threatened with extinction, but for whom trade must be controlled in order to avoid utilization incompatible with their survival in the wild. Includes species that resemble species already included in Appendix I or II.

	<u>Year Added</u>
Spotted Turtle ( <i>Clemmys guttata</i> )	2013
Blanding's Turtle ( <i>Emydoidea blandingii</i> )	2013
Wood Turtle ( <i>Glyptemys insculpta</i> )	1992
Diamondback Terrapin ( <i>Malaclemys terrapin</i> )	2013
Box Turtle ( <i>Terrapene carolina</i> )	1995
Ornate Box Turtle ( <i>Terrapene ornata</i> )	1995
Mojave Desert Tortoise ( <i>Gopherus agassizii</i> )	1977
Sonora Desert Tortoise ( <i>Gopherus morafkai</i> )	1977
Texas Tortoise ( <i>Gopherus berlandieri</i> )	1977
Gopher Tortoise ( <i>Gopherus polyphemus</i> )	1977

### APPENDIX III

Includes species that are protected in at least one country, which has asked other CITES countries for assistance in documenting trade. International trade is permitted but tracked.

	<u>Year Added</u>
Common Snapping Turtle ( <i>Chelydra serpentina</i> )	2016
Suwannee Alligator Snapping Turtle ( <i>Macrochelys suwanniensis</i> )	2006
Western Alligator Snapping Turtle ( <i>Macrochelys temminckii</i> )	2006
Barbour's Map Turtle ( <i>Graptemys barbouri</i> )	2006
Cagle's Map Turtle ( <i>Graptemys caglei</i> )	2006
Escambia Map Turtle ( <i>Graptemys ernsti</i> )	2006
Yellow-blotched Sawback ( <i>Graptemys flavimaculata</i> )	2006
Common Map Turtle ( <i>Graptemys geographica</i> )	2006
Pascagoula Map Turtle ( <i>Graptemys gibbonsi</i> )	2006
Black-knobbed Sawback ( <i>Graptemys nigrinoda</i> )	2006
Ringed Sawback ( <i>Graptemys oculifera</i> )	2006
Ouachita Map Turtle ( <i>Graptemys ouachitensis</i> )	2006
Pearl River Map Turtle ( <i>Graptemys pearlensis</i> )	2006
False Map Turtle ( <i>Graptemys pseudogeographica</i> )	2006
Alabama Map Turtle ( <i>Graptemys pulchra</i> )	2006
Sabine Map Turtle ( <i>Graptemys sabinensis</i> )	2006
Texas Map Turtle ( <i>Graptemys versa</i> )	2006
Florida Softshell Turtle ( <i>Apalone ferox</i> )	2016
Smooth Softshell Turtle ( <i>Apalone mutica</i> )	2016
Spiny Softshell Turtle ( <i>Apalone spinifera</i> )	2016

## U.S. FRESHWATER TURTLES AND TORTOISES IN CITES CONT'D

Including U.S. turtle species in CITES has, in some instances, benefited commerce in certain species. Box Turtles, Blanding's Turtles, and other species that are prohibited from wild take in all of their range states can legally be captively propagated, with the appropriate permits, and have a legitimate commercial use through the rigors of meeting CITES production requirements. For those and other species the issuance of an Annual Master File for producers has alleviated the burden and cost of requesting a non-detriment finding and review for each shipment of turtles. In addition, CITES turtles must be identified to species. The export of so many turtles, listed simply as "Pseudemys sp." or "Trionyx sp." (as examples) is meaningless for management purposes, especially when taxonomy has changed but is not reflected in U.S. Fish and Wildlife Service 3-177 export form. Another benefit from the management perspective is that the identified exporter must be the original producer, which eliminates the difficult task of trying to obtain turtle source information from non-traceable brokers at distant ports (Boundy 2019 unpublished report).



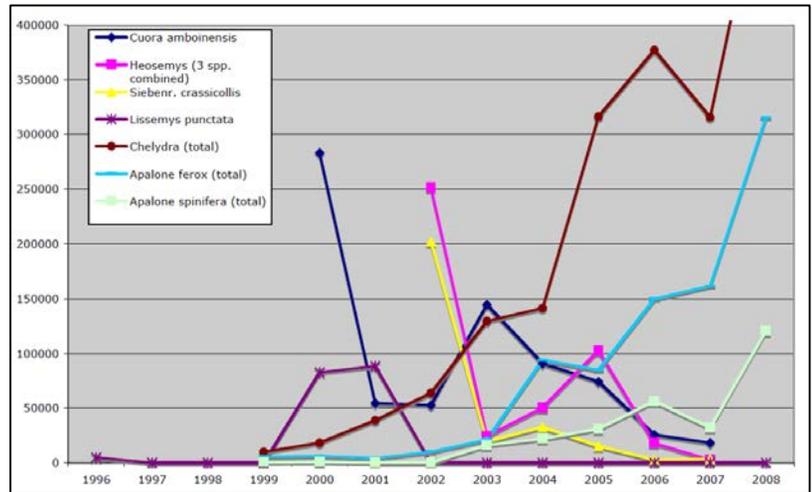
One negative aspect of species being included in CITES is the incorrect interpretation by the public when export permits indicate large quantities of "wild" turtles being shipped abroad. Shipments are designated with the "wild"-caught source code when exported turtles do not meet the CITES criteria for "Ranched or Captive-bred." The "W" source code on export permits does not necessarily mean the turtles were taken from the wild. This is most apparent with large shipments of hatchling turtles originating from farms or other captive facilities. The implementing regulations (CFR Part 23) prescribe a strict interpretation of the CITES source code definitions when export permits are issued which can result in a high proportion of shipments being designated as "W."

### CITES Export Permit Source Code Definitions Applicable to Turtles Exported from the U.S.

Source code	Description	CITES Appendix	Definition
<b>W</b>	Wild	I, II, III	Specimens taken from the wild.
<b>R</b>	Ranched animal	I, II, III	Specimens of animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood.
<b>C</b>	Bred in captivity	I, II, III	Animals bred in captivity in accordance with CITES Resolution Conf. 10.16 (Rev.) [i.e., second generation produced in captivity, with no or minimal involvement of initially gravid females in any founder breeding stock collected from the wild, and minimal addition of wild collected animals to existing stock], as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5.
<b>F</b>	Born in captivity	I, II, III	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof.
<b>I</b>	Confiscated or seized	I, II, III	Specimens that have been confiscated or seized; this source code must be used in conjunction with another source code.

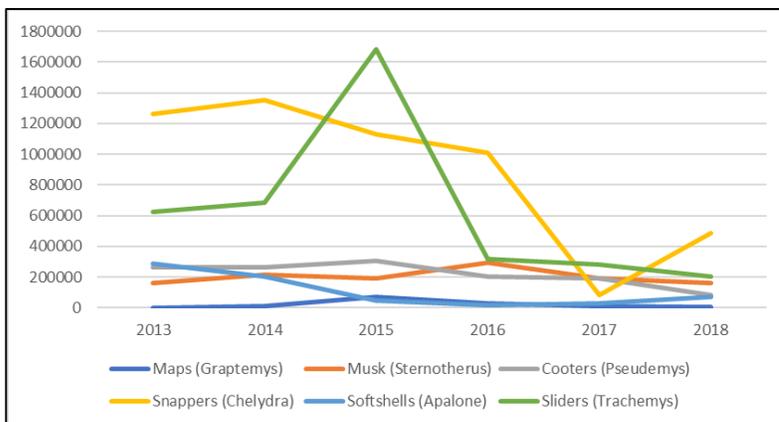
## TRENDS IN U.S. SNAPPING AND SOFTSHELL TURTLES EXPORTED TO ASIA FROM 1999 TO 2008

From 1999-2008, increased trade volumes were reported from the U.S. for Common Snapping Turtle (*Chelydra serpentina*), Florida Softshell (*Apalone ferox*), and Spiny Softshell (*A. spinifera*) as trade volumes for wild-collected *Cuora amboinensis* and other Asian hard-shelled turtles (*Heosemys*, *Orlitia*, *Siebenrockiella*) and softshells (*Amyda*, *Lissemys*) progressively declined, in a context of overall increasing turtle trade volume in Asia. The majority of exports of *Chelydra* and *Apalone* had declared source codes C, R or F, and were likely juveniles destined for the Chinese aquaculture industry (CITES SC61 Doc. 47 (Rev. 2) Annex 2). Similarly, from 2010-2016, Asian imports of U.S. Mud and Musk Turtles increased significantly creating a sudden demand for wild-caught turtles for export as well as to stock captive turtle farms to produce turtles to meet the growing market demand. Having a better understanding of the Asian trade in U.S. freshwater turtles and tortoises whether for food, medicine, or as pets may help identify other species that will have an increased market demand.



## TREND IN GROUPS OF U.S. TURTLES EXPORTED TO ASIA FROM 2013 TO 2018

Asia was the destination for 60.6% of all exported turtles from 2013 to 2018. Of the 13 million turtles exported to Asia, 41.3% were Common Snapping Turtle (*Chelydra serpentina*), 29.1% were Sliders (*Trachemys spp.*), 10.1% were Cooters (*Pseudemys spp.*), 9.3% were Map/Musk turtles (*Graptemys spp./ Sternotherus spp.*), and 5% were Softshells (*Apalone spp.*).



## NOTIFICATION FROM CHINA REGARDING WILDLIFE TRADE

On March 5, 2020 the CITES Secretariat published a Notification from China regarding wildlife trade. The Notification clarified the February 24th Decision from the Chinese government to prohibit the consumption of any terrestrial wildlife taken from the wild. It excludes aquatic wildlife, wild plants, and farmed amphibians and reptiles. Non-consumptive use of wild terrestrial animals, including for scientific research, medicinal use, and display, continue to be regulated by existing laws. It is unclear what impact this ban may have on the export of freshwater turtles and tortoises from the U.S. The full Notification is available on the CITES website at:

<https://www.cites.org/sites/default/files/notif/E-Notif-2020-018.pdf>.



Turtle populations can and do sustain their greatest natural losses in the egg and early juvenile stages, but experience very low natural adult mortality. Natural generation times (age at maturity+1/annual mortality rate) are known with certainty for few freshwater turtle and tortoise species and can vary across the species range. Available estimates and calculations suggest generation times of about 10-12 years for Chicken Turtle (*Deirochelys reticularia*) (Buhlmann et al., 2008), at least 25 years for Common Snapping Turtle (*Chelydra serpentina*) (Steyermark et al., 2008), about 25-30 years for Spotted Turtle (*Clemmys guttata*) (Litzgus, 2006), and 36-47 years for Blanding's Turtle (*Emydoidea blandingii*) (Congdon et al., 2000). Targeted exploitation of wild adult turtles, especially females, for human consumption and international trade, introduces a novel factor in turtle population dynamics and significantly reduces a population's reproductive output and associated recruitment over time. Once depleted, a turtle population recovers very slowly, typically requiring several decades to recover, if at all.



## INFORMATION GAPS AND FUTURE NEEDS

- Updated information on State turtle regulations.
- Guidance on regulatory harvest limits (e.g., species, possession limits, season, life stage, size) for offtake of wild turtles to ensure sustainability.
- Data on turtle harvest and trends from states where turtles can legally be collected from the wild for commercial purposes.
- Turtle life history trait table including species longevity, age at maturity, clutch frequency & size, and survival of various life stages.
- Cooperation and collaboration between biologists, researchers, and law enforcement staffs at the state, regional, and national levels.
- Better understanding of the Asian and European turtle markets.
- Best Management Practices for commercial farms and breeding facilities.
- Determine if "standards or certification programs" for captive turtle farms/breeding facilities would be beneficial.
- Communication strategies to promote conservation efforts and raise public awareness of the negative aspects of illegal collection and trade; and to assist in compliance among turtle harvesters, turtle farmer, and exporters.
- Improved organized intelligence and data sharing efforts.
- Tools to assist Law Enforcement and Customs Officers to accurately identify species.

## REFERENCES

- Boundy J. 2019.** Recent Trade in Non-marine United States Turtles, With an Emphasis on Those Affected by CITES. Louisiana Department of Wildlife and Fisheries. Baton Rouge, LA. Unpublished Report. 31p.
- Buhlmann KA, Gibbons JW, and Jackson DR. 2008.** *Deirochelys reticularia* (Latreille 1801) – chicken turtle. Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. Chelonian Research Monographs No. 5.
- CITES SC61 Doc. 47 (Rev. 2) Annex 2. IUCN/SSC Tortoise & Freshwater Turtle Specialist Group. 2011.** Implementation of Decision 14.128. A study of progress on conservation of and trade in CITES-listed tortoises and freshwater turtles in Asia. 33 p.
- Congdon JD, Nagle RD, Kinney OM, Osentoski M, Avery H, van Loben Sels RC, and Tinkle DW. 2000.** Nesting ecology and embryo mortality: implications for the demography of Blanding's turtles (*Emydoidea blandingii*). Chelonian Conservation and Biology, Vol. 3.
- Ernst CH and Lovich JE. 2009.** Turtles of the United States and Canada 2nd Edition. Johns Hopkins University Press. Baltimore MD. 827 pp.
- Luiselli L, Starita A, Carpaneto GM, Segniagbeto GH, and Amoria G. 2016.** Short Review of the International Trade of Wild Tortoises and Freshwater Turtles Across the World and Throughout Two Decades. Chelonian Conservation and Biology 15(2): 167–172.
- Nanjappa P and Conrad PM. 2011.** State of the Union: Legal Authority Over the Use of Native Amphibians and Reptiles in the United States. Version 1.03. Association of Fish and Wildlife Agencies, Washington, DC. 225 p.
- Steyermark AC, Finkler MS, and Brooks RJ (eds). 2008.** Biology of the Snapping Turtle (*Chelydra serpentina*). Johns Hopkins Univ. Press, Baltimore, MD.
- van Dijk P, Iverson J, Rhodin AG, Shaffer H, and Bour R (eds). 2014.** Turtle Taxonomy Working Group (2014) Turtles of the World, 7th Edition: Annotated Checklist of Taxonomy, Synonymy, Distribution with Maps, and Conservation Status. Chelonian Research Foundation, Lunenburg, MA, USA.