CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Nineteenth meeting of the Conference of the Parties
Panama City (Panama), 14 – 25 November 2022

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Transfer of North American members (*i.e.*, only species found in Canada and the United States of America) of the Snapping Turtle Family Chelydridae from Appendix III to Appendix II in accordance with Article II, paragraph 2(a) of the Convention and Resolution Conf. 9.24 (Rev. CoP17), Annex 2(a) as per:

Criterion B. It is known, or can be inferred or projected, that regulation of trade in the species is required to ensure that the harvest of specimens from the wild is not reducing the wild population to a level at which its survival might be threatened by continued harvesting or other influences.

Macrochelys temminckii (Troost in Harlan 1835)

and in accordance with Article II, paragraph 2(b) of the Convention and Resolution Conf. 9.24 (Rev. CoP17), Annex 2(b) as per:

Criterion A. The specimens of the species in the form in which they are traded resemble specimens of a species included in Appendix II under the provisions of Article II, paragraph 2(a), or in Appendix I, so that enforcement officers who encounter specimens of CITES-listed species are unlikely to be able to distinguish between them.

Chelydra serpentina (Linnaeus 1758)

B. Proponent: United States of America*

C. Supporting statement

1. Taxonomy

1.1 Class: Reptilia

1.2 Order: Testudines

1.3 Family: Chelydridae (Gray 1831)

1.4 Genus: *Macrochelys* (Gray 1856)

Species: *Macrochelys temminckii* (Troost in Harlan 1835)

1.4 Genus: *Chelydra* (Schweigger 1812)

Species: *Chelydra serpentina* (Linnaeus 1758)

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* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

as defined in the standard nomenclature reference for turtles, Fritz & Havaš (2007)

1.5 Scientific synonyms: See Fritz and Havaš (2007) for synonyms of genus and species names.

Based on an assessment of morphological and genetic variation in *M. temminckii*, the historically recognized monotypic genus has been proposed to comprise three species: *M. temminckii*, *M. apalachicolae*, and *M. suwanniensis* (Thomas *et al.* 2014). In 2015, a secondary analysis suggested that *M. apalachicolae* was not sufficiently diagnosable and proposed the genus include two species only: *M. temminckii* and *M. suwanniensis* (Folt & Guyer 2015). The most recent study assessed *Macrochelys* using next-generation sequencing and supported Thomas *et al.*'s (2014) designation of three *Macrochelys* species; however, this study has not yet been published (Apodaca *et al.* 2022). *M. suwanniensis* and *M. apalachicolae* are considered here as synonyms of *M. temminckii.* CITES does not currently recognize any subdivision of *M. temminckii*, which it still considers to be monotypic (following Fritz & Havaš 2007).

1.6 Common names: English: Alligator Snapping Turtle (*Macrochelys temminckii*); Common[1] Snapping Turtle (*Chelydra serpentina*); North American Snapping Turtle (*Chelydra serpentina*); Eastern Snapping Turtle (*Chelydra serpentina*)
Spanish: Tortuga-lagarto común (*Chelydra serpentina*)
French: chélydre serpentine (*Chelydra serpentina*)

2. Overview

Species with slow life history traits - late maturity, long adult lifespan, extended reproductive lives - are especially vulnerable to human-mediated activities and changes, including habitat loss/degradation, consumption for food/medicine, invasive species impacts, climate change, and collection for the international pet trade; these species include turtles, which are among the vertebrates with highest extinction risk (Stanford *et al.* 2020). This proposal is to transfer the two North American species in the Family Chelydridae (snapping turtles) from Appendix III (United States) to Appendix II: *Macrochelys temminckii* (alligator snapping turtle), which is endemic to the United States, and *Chelydra serpentina* (common snapping turtle), which is found in the United States and Canada (Fritz & Havaš 2007). Both species occur in the southeastern United States (Figure 1), which is one of three prominent global areas of high turtle and tortoise species richness (Turtle Taxonomy Working Group - TTWG 2021). Both species are also traded in high numbers internationally, and trade is driven largely by demand for turtle meat in eastern Asia (CITES 2016; Figure 2). International trade in turtles generally follows a "boom-and-bust" pattern, in which demand shifts from one species to another as populations are depleted or regulated (CITES 2016; Figure 2). The high numbers of both species in trade suggest we are witnessing a potential "boom" period that is concerning.

M. temminckii was historically harvested in large numbers in the United States for domestic consumption, with harvest levels peaking in the 1960s and 1970s. International trade began to rise steadily in the 1990s; up to 23,780 alligator snapping turtles were exported from the United States per year prior to 2006, when the species was included in Appendix III (U.S. Fish and Wildlife Service – USFWS 2021a). Since that time, international exports from the United States (2006-2020) have remained high and relatively consistent, averaging around 34,000 individuals per year. The near entirety of this trade comprises live (predominantly immature) turtles, largely originating from the United States (UNEP-WCMC 2022).

Despite inclusion in Appendix III, as well as domestic regulations on wild harvest, the national population of *M. temminckii* has not recovered from past harvest practices (USWFS 2021a,b). This finding is largely the result of the species' slow life history (*e.g.,* delayed maturation, long generation length) and low reproductive output, which make it vulnerable to any harvest from wild populations (USFWS 2021a,b). Compared to many other harvested species (Figure 3), female *M. temminckii* reach sexual maturity at a late age (13 to 21 years; Tucker & Sloan 1997) and thus have no reproductive output until that time. Moreover, *M. temminckii* has high immature mortality (USFWS 2021b), indicating that successful reproduction is likely to occur much later. Accordingly, populations of *M. temminckii* are heavily reliant on high adult survivorship, particularly of females, such that any less than 98% of adult female survivorship per year results in population declines (Reed *et al*. 2002). These characteristics make the species particularly susceptible to over-exploitation.

[1] The term "common" refers to *Chelydra serpentina*'s relatively wide-ranging geographic distribution and not to its conservation status.

A recent, national assessment of this species (USFWS 2020, 2021a) has prompted the United States to propose to list *M. temminckii* as federally Threatened under its U.S. Endangered Species Act (USFWS 2021b,c). The assessment indicates that just over 360,000 individuals likely remain in the wild, and models of future conditions and viability indicate the species is likely to be quasi-extirpated in a large portion of its range within the next 50 years (USFWS 2020, 2021a,b). This species faces a number of current and future threats throughout its range, including habitat loss and modification, nest predation, mortalities resulting from freshwater fishing and recreational activities, as well as legal and illegal harvest (USFWS 2021a,b).

Although harvest of wild *M. temminckii* is regulated domestically by States within its range in the United States (Table 1), legal and illegal harvest occur at unknown levels; it is unclear the extent to which demand for international trade drives this harvest (DOJ 2017). The near totality of international commercial trade in *M. temminckii* is indicated to be "specimens from the wild" (UNEP-WCMC 2022), but it may largely comprise individuals hatched in captive facilities, for which it is unknown if they meet requirements of Resolution Conf. 10.16 (Rev.) (USFWS 2021a). Wild harvest may also contribute to this trade: eggs and immatures may be harvested from the wild to supplement exports, and adults may be harvested to maintain as breeding stock. Given the potential contribution of international trade to wild harvest, combined with *M. temminckii*'s slow life history and low, declining national population numbers, it is necessary to include this species in Appendix II to complement existing domestic measures and ensure that use is sustainable and international trade is not detrimental to wild populations. It will complement State efforts to manage this species and regulate harvest.

This proposal further aims to transfer the other North American chelydrid, common snapping turtle (*Chelydra serpentina*), from Appendix III to Appendix II because of enforcement concerns related to its morphological similarities with *M. temminckii* when immature. Common snapping turtles are heavily traded internationally (UNEP-WCMC 2022), and both commercial and recreational/personal harvest occur legally in parts of its range within the United States (*e.g.*, van Dijk 2012; Colteaux & Johnson 2017). The species is considered to be Least Concern by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, with a stable population trend (van Dijk 2012). Although national population numbers are unknown, harvest for international trade is not thought to currently pose a significant threat to *C. serpentina*. Most international commercial trade is indicated to be captive-born or captive-bred (UNEP-WCMC 2022). However, as with alligator snapping turtles, *C. serpentina* captive breeding facilities are not necessarily closed systems (*e.g.*, immatures may be born from wild sources; adults may be harvested as breeding stock). This trade is also particularly problematic for enforcing Appendix II measures for *M. temminckii*.

While adults of the two chelydrids are distinguishable, they are not traded in high numbers internationally. Commercial trade is dominated by immature individuals, which are highly similar in appearance. For example, in both species, immatures exhibit dark coloration and have a rough carapace with three distinct keels (Ernst & Lovich 2009). The visually distinctive adult features are only prominent later in life, and hatchlings to subadults can be easily-confused and are likely to be indistinguishable to non-experts (B. Baker, Wildlife Forensic Scientist, USFWS National Fish and Wildlife Forensic Laboratory, pers. comm.). The similar appearance of immatures presents enforcement challenges should the two species have different CITES Appendix statuses. For example, hundreds of thousands of chelydrids in large-scale shipments (thousands to hundreds of thousands) have been exported from the United States in a single year (UNEP-WCMC 2022); the inability to easily distinguish the two species could present opportunities for laundering the more threatened *M. temminckii* as *C. serpentina*. Accordingly, inclusion of *C. serpentina* in CITES Appendix II is necessary to ensure that trade in *M. temminckii* is regulated effectively. As with *M. temminckii*, transfer of *C. serpentina* to Appendix II would also complement State and other domestic measures and ensure that specimens entering international trade are acquired sustainably, as well as legally, and will not be detrimental to the survival of the species.

3. Species characteristics

3.1 Distribution

M. temminckii is endemic to the United States and confined to river systems that drain into the Gulf of Mexico (Figure 1A,B). Its current distribution includes 12 States: Alabama, Arkansas, Florida, Georgia, Illinois, Kentucky, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, and Texas. Historically, this species was also found in Indiana and Kansas, but it is unknown if *M. temminckii* persists in these two States (USFWS 2020, 2021a). Occurrences in non-native areas have also been noted (*e.g.*, South Korea; Koo *et al*. 2021).

C. serpentina is a more widespread taxon; its range includes the entire eastern and central United States and extends north into southern Canada (Manitoba, New Brunswick, Nova Scotia, Ontario, Quebec, Saskatchewan; Figure 1C). Within the United States, *C. serpentina* is native and present in 42 States (including the District of Columbia) and has been introduced into a number of non-native areas, including parts of the western United States, as well as other countries (*e.g.*, Taiwan, China, Japan; van Dijk 2012).

3.2 Habitat

M. temminckii is highly aquatic, and adults are generally found in deep waters of large rivers and tributaries; they can also be found in canals, lakes, ponds, oxbows, swamps, and bayous (Ernst & Lovich 2009). Although the species is found in a variety of microhabitats (Ernst & Lovich 2009; USFWS 2021a), it is often associated with structure and cover (*e.g*., logs, stumps, submerged debris, stream banks: Harrel *et al.* 1996; Riedle *et al.* 2006; Howey & Dinkelacker 2009). Seasonal (potentially thermoregulatory) shifts in water depth occupancy have been documented, with shallower water depths used in early summer and deeper water depths in later summer and mid-winter (Riedle *et al*. 2006). Habitat preferences differ for immatures. Hatchlings use shallower waters with structure and canopy cover; juveniles need small streams with mud or gravel bottoms and structure (USFWS 2021b).

C. serpentina is also highly aquatic and found in a variety of freshwater habitats (*e.g.*, rivers, lakes, reservoirs, ponds, marshes; Ernst & Lovich 2009; van Dijk 2012). The species generally lives in shallow water bodies, but it can be found along the edges of deep lakes and rivers. Slow-moving waterways with soft mud or sand bottoms and plenty of aquatic vegetation, submerged brush or tree trunks are preferred habitats (Ernst & Lovich 2009). *C. serpentina* also exhibits ontogenetic shifts in habitat use; juveniles are generally found in shallower and vegetated microhabitats compared to adults (Ernst & Lovich 2009). Despite geographic overlap with *M. temminckii*, in areas of sympatry, the two species may occupy different microhabitats and may rarely be found in syntopy (Lescher *et al.* 2013).

3.3 Biological characteristics

M. temminckii is characterized by a slow life history and high immature mortality (overall low reproductive output) which make it particularly vulnerable to wild harvest (Reed *et al.* 2002; Figure 3). Males attain sexual maturity at 11-21 years, and females at 13-21 years (Tucker & Sloan 1997). Females lay only one clutch of eggs per year (9-61 eggs; average: 27.8 eggs) (Ernst & Lovich 2009). Females generally nest from May to July, with some temporal variation across the range (Ernst & Lovich 2009; USFWS 2021a). Nest selectivity appears to be relatively low, but females may avoid open sandbars and low forested areas with leaf litter and matted roots (Ernst & Lovich 2009). The nest predation rate is high (may reach 100% in some populations) (USFWS 2021a); juvenile-to-adult survival rate is estimated to be only 5%, with most mortality occurring in the first two years (Ernst & Lovich 2009). *M. temminckii* has a long generation length (up to 55 years; Dreslik *et al.* 2017), and a lifespan that may exceed 80 years (USFWS 2021b).

C. serpentina also exhibits a relatively slow life history, with some variation across its range. Males reach sexual maturity around 4-6 years (Ernst & Lovich 2009), but it is variable and may be as late as 15-20 years in northern populations (Committee on the Status of Endangered Wildlife in Canada - COSEWIC 2008). Reports of female sexual maturity are also variable (4-20 years); it also appears to occur later in northern populations, with average age at first nesting in an Ontario population reported to be 17-19 years (COSEWIC 2008; Ernst & Lovich 2009; Environment and Climate Change Canada - ECCC 2020; Figure 3). Females generally nest between May and June. There is some nesting site selectivity: females may select sites open to the sun in the north and more shaded sites in the south. Females generally produce one clutch per year. Clutch size is variable (4-109 eggs; average: 35.2 eggs) and increases with latitude (Ernst & Lovich 2009). Nest predation rates in *C. serpentina* are also high (30-100%; Ernst & Lovich 2009; USFWS 2021a), and hatchling survival is low (6.4-23.0%). *C. serpentina* has, on average, higher reproductive output compared to *M. temminckii* (Reed *et al.* 2002), but it is still relatively low compared to other harvested taxa (Figure 3).

3.4 Morphological characteristics

North American chelydrids, *M. temminckii* and *C. serpentina,* exhibit a suite of morphological characteristics that distinguish them from other North American turtles. Both species are generally large-bodied turtles, with large heads and powerful jaws. The upper jaw is hooked, and the carapace is rough, keeled and serrated posteriorly. The plastron is reduced, hinge-less, and cross-shaped; it connects to the carapace by a narrow bridge. The tail is long (as long or longer than the carapace) (Ernst & Lovich 2009).

Adult *M. temminckii* and *C. serpentina* also exhibit some distinguishing morphological features. The relatively larger *M. temminckii* is the largest freshwater turtle in North America; it has a dark carapace, grayish-brown plastron, and dark (brown to gray) skin that is lighter ventrally. It has a deeper head with a more pronounced hooked upper jaw compared to *C. serpentina*, and the eyes are located on the sides of the head, encircled by fleshy projections. *M. temminckii* has a lingual lure on its tongue that is variable in color, ranging from white to dark gray. The carapace has three prominent keels that extend its length, and a row of supramarginal scutes on each side; the latter is unique to *Macrochelys*. There is pronounced sexual dimorphism; males can weigh nearly twice as much as females (Pritchard 2006; Ernst & Lovich 2009).

The relatively smaller *C. serpentina* has a carapace that may be variably colored – tan, brown, olive, black. The plastron is yellow to tan; the skin may be dark (gray to black) or lighter (yellow to tan). This species has a low, anteriorly broad head with a less pronounced hooked upper jaw compared to *M. temminckii*; its eyes are also more dorsally oriented. The three carapacial keels are less conspicuous in adults; they do not extend along the entire length of the carapace, which may be smooth in older individuals, leading to a rounder carapace. There are no supramarginal scutes on the carapace of *C. serpentina*, and there is less pronounced sexual dimorphism (Pritchard 2006; Ernst & Lovich 2009).

Although the two species exhibit some morphological differences as adults, international export of snapping turtles is primarily composed of immature individuals, which are more similar in appearance. In both species, immatures have a rough carapace with three distinct keels. They both exhibit darkly-colored carapaces and skin, with some lighter mottling (Ernst & Lovich 2009). Because of their morphological similarities, immature alligator and common snapping turtles (hatchlings, juveniles, and subadults) can be easily-confused and are unlikely to be distinguishable by non-experts, particularly given their large-scale quantities in trade (B. Baker, Wildlife Forensic Scientist, USFWS National Fish and Wildlife Forensic Laboratory, pers. comm.).

3.5 Role of the species in its ecosystem

M. temminckii feeds primarily on fish, but its diet is varied and may also include fruits and other plant parts, leeches, clams, snails, crabs and crayfish; as well as amphibians, other turtles, snakes, birds and mammals. Humans appear to be the only predator of adults (Ernst & Lovich 2009). Nest predation rates are high; the most common predators are raccoons. Others include armadillos, opossums, bobcats, river otters, and fire ants (USFWS 2021a). Immature *M. temminckii* are vulnerable to some fish, birds, alligators, and otters (Ernst & Lovich 2009); hatchling mortality may also result from fire ants and other insects (USFWS 2021a).

C. serpentina is omnivorous and consumes both plant and animal matter; the latter includes fresh prey and scavenged carrion. Food items include sponges, snails, crabs, fish, insects, amphibians, snakes, birds, mammals, fruits and leaves. Nests are vulnerable to many predators, including mammals (*e.g.,* skunks, raccoons, foxes), snakes, birds, and fire ants. Immatures are vulnerable to fish, bullfrogs, snakes, birds and mammals, among others. The main predator of adults is humans, but they are also prey to alligator snapping turtles, alligators, and non-human mammals (*e.g.*, otters, coyotes, black bears; Ernst & Lovich 2009).

The roles of both *M. temminckii* and *C. serpentina* in the ecosystem are poorly understood, as is the case with many turtle species, but Lovich *et al.* (2018) note that loss of freshwater predators, such as *C. serpentina* (and by extension *M. temminckii*), can have cascading effects on ecosystems. For example, an experimental study by Garig *et al.* (2020) found that the short-term presence of *C. serpentina* in a pond community impacted a prey species survival, as well as the mean mass of its survivors, and ultimately altered the overall community structure. Lovich *et al.* (2018) also suggest that many frugivorous turtles, such as *M. temminckii* (and by extension *C. serpentina*), might play a role in plant seed dispersal and germination, as has been found with other turtle species. Accordingly, population declines and/or localized extinctions of either species are likely to have larger consequences for freshwater ecosystems.

4. Status and trends

4.1 Habitat trends

Multiple past and ongoing human activities within *M. temminckii*'s range can result in alterations to its habitat. Damming rivers can impede dispersal and gene flow, resulting in increased fragmentation (USFWS 2021a). Channelization, dredging, deadhead logging, and stream bank erosion, among other activities/processes, can alter preferred habitats by removing the structure and cover that is important for all life stages of *M. temminckii* (USFWS 2021a). Changes in water quality (*e.g.*, from agricultural and urban development runoff)

can also impact the suitability of habitat (USFWS 2021b). The impacts of these activities on the species have not been well-quantified, but the USFWS recently completed Species Status Assessment Reports for *M. temminckii* (considered to be two species: *M. temminckii* and *M. suwanniensis*) and identified habitat fragmentation and/or alterations as threats throughout the species' range (USFWS 2020, 2021a).

Although *C. serpentina* is considered adaptable and unlikely to be currently threatened by habitat change (van Dijk 2012), the species' habitat requirements indicate that populations of *C. serpentina* are also likely impacted by similar human-related activities and processes as described above for *M. temminckii*. Indeed, a recent management plan that was developed for Canada's *C. serpentina* population found conversion of aquatic habitats for agricultural and urban development purposes to be a threat of high-level concern for the species; one that is ongoing and widespread (ECCC 2020).

4.2 Population size

Recent, national Species Status Assessment Reports for *M. temminckii* indicate the most likely range-wide abundance estimate for this species is 363,213 turtles (*M. temminckii*: 361,213 individuals; *M. suwanniensis*: 2,000 individuals; USFWS 2020, 2021a).

The total population size for *C. serpentina* is unknown; one global abundance estimate ranges widely: 10,000 to >1,000,000 individuals (NatureServe Global Conservation Status Factors 2013). In its last Red List assessment, conducted over 10 years ago (2010), the IUCN categorized the species as Least Concern (van Dijk 2012). In Canada, *C. serpentina* is a species of Special Concern (reassessment is in progress; C. Caceres – Canadian Wildlife Service, pers. comm: Caceres 2022). The size of Canada's population (10% of the global population), while unknown, is estimated to be in the thousands (COSEWIC 2008; Caceres 2022).

4.3 Population structure

There are limited data on population structure for *M. temminckii*, and the information available can be difficult to interpret, because data on unharvested populations are lacking (Folt *et al.* 2016). Folt *et al*. (2016) suggest that an identified growing population in Georgia may provide the best reference data. The study found a nearly even adult sex ratio and a higher ratio of adults to juveniles, which is the expected structure for long-lived turtles. Elsewhere, documented adult sex ratios for *M. temminckii* populations range from even, to favoring males, to favoring females (USFWS 2021a). Adult to juvenile ratios also vary (East *et al.* 2013; Howey & Dinkelacker 2013; USFWS 2021a). Deviations from the expected population structure, identified in multiple populations (*e.g.*, East *et al.* 2013; Howey & Dinkelacker 2013; USFWS 2021a), may indicate that they have yet to recover from past harvesting practices and/or face current and ongoing threats; other natural factors might also contribute to variation (East *et al.* 2013; Howey & Dinkelacker 2013).

Unharvested *C. serpentina* populations generally have the expected population structure for long-lived turtles: even adult sex ratio and higher ratio of adults to juveniles (Howey & Dinkelacker 2013). Similar to *M. temminckii*, there is documented variation across populations, which may be indicative of past or present harvesting practices, other threats, and/or natural factors (*e.g.,* hatch season) (Ernst & Lovich 2009; Howey & Dinkelacker 2013).

4.4 Population trends

M. temminckii populations have declined throughout the species' range due to past commercial and recreational harvest practices that reached their peak in the 1960s and 1970s. During that time, there were dramatic population depletions in several States, including Louisiana, Alabama, Georgia, and Florida (USFWS 2021a). Commercial harvest has since been banned throughout the species' range. Most States banned the practice by the early 1990s; the latest State was Alabama in 2012 (USFWS 2021a; Table 1). Personal harvest (with limits) is still allowed only in Louisiana and Mississippi (USFWS 2021a).

Few studies have assessed trends of *M. temminckii* populations after implementing harvest restrictions. Of seven studies summarized in USFWS (2021a,b), five studies indicate that *M. temminckii* populations have not fully recovered and document altered population dynamics, population declines, or no changes in populations after recovery periods ranging from approximately 10 to over 20 years. These studies were conducted in different populations in Georgia, Oklahoma, Arkansas, and Missouri. Only two studies (one population in Arkansas and another in Georgia) indicated growing populations. Taken together, these studies

indicate that *M. temminckii* has not fully recovered from past harvesting practices. Moreover, this species faces a number of current and future threats, including legal and illegal harvest; models of future conditions and viability indicate that the species will likely decline throughout a large portion of its range over the next 30-50 years and face quasi-extirpation in many areas within the next 50 years (USFWS 2020, 2021a,b).

According to the IUCN Red List of Threatened Species (2010), there have been local declines in *C. serpentina* populations (particularly in the north), but the species has an overall stable population trend (van Dijk 2012). This assessment was conducted more than a decade ago, and current information on the species' status is generally limited. Given slow life histories, turtle populations can experience delays in population declines from some harvest practices (Tomillo *et al*. 2008). At the same time, slight increases in adult mortality can cause steep declines in seemingly large and stable populations; this has been demonstrated in population models for *M. temminckii* and *C. serpentina* (Reed *et al.* 2002; COSEWIC 2008; Midwood *et al*. 2015). Older, long-term studies on *C. serpentina* in Canada suggest that some populations are vulnerable to such increases in adult mortality and are in decline (COSEWIC 2008*;* Caceres 2022).

4.5 Geographic trends.

The geographic range of *M. temminckii* was recently assessed by comparing current (2000-2019) occupancy records with historical records (prior to 2000). This species may have recently disappeared from two areas in the United States with known historical occurrence: Indiana and Kansas. Its continued persistence within these two States is unknown. *M. temminckii* has also experienced recent range contractions in the northern portion of its range (Missouri, Illinois, Kentucky, Tennessee, and possibly Oklahoma; USFWS 2021a).

C. serpentina is widely distributed and is not known to have experienced recent large-scale contractions in its geographic range. In Canada, the species is relatively abundant in the eastern part of its range and less often encountered in Saskatchewan and Manitoba (COSEWIC 2008; ECCC 2020; Caceres 2022).

5. Threats

Multiple ongoing threats to *M. temminckii* populations have been identified. Habitat loss and modification; harvest and collection (both legal and illegal); nest predation by non-native or "subsidized" - by easily available resources – predators (*e.g.*, racoons); and capture, mortality and injury associated with freshwater fishing and other recreational activities (*e.g.,* capture as bycatch; ingestion of fishhooks; drowning from trotlines, limb lines, and entanglement in fishing lines; propeller strikes) are primary threats. Their impacts are variable across the range of *M. temminckii*, and, in many cases, these threats are considered to be substantial, in that, within a given area, they are estimated to reduce the survival rate of a particular age class by 8% or more and to impact more than 50% of alligator snapping turtles in an area. This species may also be impacted by disease, nest parasites, and climate change, but there is limited information regarding the effects of these latter three threats (USFWS 2021a,b).

C. serpentina continues to be heavily, legally exploited, leading to some local population declines (van Dijk 2012). Although generally considered to be adaptable (van Dijk 2012), populations may be impacted by habitat loss and degradation; habitat conversion has been identified as a threat of high-level concern to populations of *C. serpentina* in Canada (ECCC 2020). Other threats may include nest predation by "subsidized" predators (van Dijk 2012), as well as other human-induced injury and mortality associated with vehicle collisions and recreational or commercial fishing activities (van Dijk 2012; Steen *et al.* 2014; Midwood *et al*. 2015; Piczak *et al.* 2019). Road mortality is a threat of high-level concern to populations in Canada (ECCC 2020), where there are a number of additional threats of medium- and low-level concern, including illegal harvest and persecution (medium-level concern: ECCC 2020; Caceres 2022).

6. Utilization and trade

6.1 National utilization

Demand for *M. temminckii* within the United States is driven to some extent by the pet trade, but it has been more prominently exploited for meat consumption (Pritchard 2006). The alligator snapping turtle meat industry in the United States reached its peak in the 1960s and 1970s, when it was sold in commercial soup products, as well as in restaurants. During that time, in a single river, it is reported that 3-4 tons of alligator snapping turtles were harvested each day (Pritchard 2006; USFWS 2021b). Although commercial harvest is no longer permitted in any of the States within its range in the United States, personal harvest is permitted in

Mississippi and Louisiana (Table 1). Domestic demand for both pets and meat remains, and illegal harvest still occurs throughout its range to meet this demand (USFWS 2021b; DOJ 2017).

C. serpentina is similarly harvested to meet domestic demand for the pet trade, but more so for meat consumption (Roman & Bowen 2000; Colteaux & Johnson 2017). Personal harvest is allowed, and variably regulated, throughout the near entirety of its range in the United States. Commercial harvest is also permitted in many areas in the United States (*e.g.*, Colteaux & Johnson 2017). Harvest of *C. serpentina* in Canada is now prohibited throughout its range (all six provinces: ECCC 2020; Caceres 2022). There is no evidence of an organized pet trade in Canada (Caceres 2022), but there may be some growing domestic demand for *C. serpentina*, particularly in cosmopolitan areas (COSEWIC 2008; ECCC 2020).

6.2 Legal trade

International trade in *M. temminckii* has been regulated by CITES since June 14, 2006, when the species was included in Appendix III (USFWS 2005). The United States provides the near totality (approximately 99% or greater) of all exports, which is dominated by live individuals (predominantly immatures) for commercial purposes under source code "W" - "specimens taken from the wild" (see below). Between 2006 and 2020, commercial exports of live alligator snapping turtles from the United States totaled 515,510 individuals and included 505,115 individuals reported as source code "W", based on exporter reported quantities[2]. Importer reported quantities from the United States are lower for the same time period (just under 250,000 individuals); this discrepancy could be explained if annual reports are missing from some importing countries. Reported exports from the United States are complete. Trade numbers have remained relatively consistent over time, generally ranging between 30,000 and 44,000 individuals annually (Figure 4; average 34,367 individuals/year). The three primary importers of *M. temminckii* are Hong Kong, China, and Macao, which together comprise approximately 97% of live, commercial imports (UNEP-WCMC 2022).

Although nearly all exports of live alligator snapping turtles from the United States are coded as wild specimens, this trade may largely comprise immature individuals hatched in captive facilities. Such trade is not documented to be in accordance with Resolution Conf. 10.16 (Rev.), and the legal acquisition of founder stock remains unknown (USFWS 2021a). Harvest of wild individuals may also contribute to international trade as, for example, direct exports or for maintenance as adult breeding stock. Because *M. temminckii* is vulnerable to any wild harvest, inclusion in Appendix II will regulate this trade and provide the ability to assess the sustainable use of this turtle species (*e.g.*, consider demographic characteristics of exports and origin of founder stock).

The common snapping turtle (*C. serpentina*) was included in CITES Appendix III, effective November 21, 2016 (USFWS 2016). Similar to *M. temminckii*, trade in this species is primarily for commercial purposes, which is dominated by trade in live individuals (predominantly immatures). Unlike *M. temminckii*, commercial trade reported as source code "W" represents a small fraction of live animal trade (<2%); commercial, live-animal trade is primarily reported as source code "F" - "born in captivity" (76%) or source code "C" - "bred in captivity" (22%). Individuals coded as "F" may have been born from a wild source (*e.g.*, eggs, gravid females). The United States is the primary exporter (>99% of all exports) of *C. serpentina*. Between 2017 and 2020, exports from the United States of live common snapping turtles for commercial purposes totaled 773,205 individuals. Importer reported quantities indicate total live, commercial exports from the United States to be 901,858 individuals (includes 260,000 "specimens" imported to China in 2019). Here as well, discrepancies may be related to differences in annual reporting from some importing countries. The primary importer of live common snapping turtles for commercial purposes is China (83.6%). China, Hong Kong, and Macao comprise over 99% of these imports (UNEP-WCMC 2022).

Because harvest of *C. serpentina* is prohibited throughout its range in Canada, export from this country is expected to be very low (as supported by data above) and limited to scientific and conservation purposes. Canada does not allow imports of live turtles for commercial purposes (Caceres 2022).

6.3 Parts and derivatives in trade

For importer and exporter reported quantities, live animals comprise the majority of international trade for *M. temminckii* (>99.9%) and *C. serpentina* (>99.9%; includes 260,000 "specimens" reported by China in 2019).

[2] Unless otherwise noted, information presented in this section is based on exporter reported quantities.

Limited reports of other items in trade include bodies, carapaces, carvings, skeletons, skulls, and trophies for *M. temminckii*; and carapaces, eggs, meat, and trophies for *C. serpentina* (UNEP-WCMC 2022). Trade in turtle parts (*e.g.*, carapaces) may be related to their use in traditional medicines in China (Chen *et al.* 2009).

The primary derivative in domestic trade is snapping turtle meat (*e.g.*, Roman & Bowen 2000; Colteaux & Johnson 2017); *C. serpentina* leather may also be in demand (https://snappingturtleleathercompany.com/).

6.4 Illegal trade

There is limited information on the extent of illegal trade in *M. temminckii,* but it is known to occur. Between 2006 and 2020, a total of 3,726 live individuals (and one carapace) were reported as seized in international trade (source code "I" – "confiscated or seized"), based on exporter reported quantities (UNEP-WCMC 2022). Illegal domestic trade has also been reported. In 2017, the United States Department of Justice (DOJ) reported on convictions in two related cases involving illegal harvest and trafficking (or attempted trafficking) of *M. temminckii* from Texas to Louisiana. One case involved illegal harvest of over 60 turtles within a single year (DOJ 2017).

Information on illegal trade in *C. serpentina* is more limited. Between 2017 and 2020, the only reports of seized/confiscated material (source code "I") in international trade appear to be two live turtles (from Canada to the United States) and one trophy in 2017, and 50 grams of meat in 2018 (UNEP-WCMC 2022). Because harvest of common snapping turtles is legal in many States, the extent of illegal domestic trade is unclear.

In Canada, where harvest is now prohibited throughout *C. serpentina*'s range, some cases of illegal harvest and trade have been noted. Over a few decades, multiple people have been charged with possession and sale of dozens of common snapping turtles by the Ontario Ministry of Natural Resources and Forestry; there have also been documented cases of illegal personal harvest of *C. serpentina* in Quebec (Caceres 2022).

6.5 Actual or potential trade impacts

Although domestic regulations (see below) have reduced wild harvest of *M. temminckii* since the height of its exploitation in the 1960s/1970s, past levels have left long-lasting impacts on the population. Because of its slow life history (delayed maturity, long generation time, low reproductive output), this species has yet to recover from past harvest practices and is highly vulnerable to any current and future harvest from the wild (USFWS 2021a). High adult survivorship, particularly of females, is necessary to maintain stable populations; less than 98% adult female survivorship per year results in population declines (Reed *et al*. 2002). Although current domestic use of *M. temminckii* has not been well-quantified, regulations within the United States, coupled with high numbers of this species in international commercial trade, suggest international use likely exceeds domestic use**.** While international trade in this taxon may largely represent captive-born immatures (USFWS 2021a), it remains unclear how this trade might be impacting wild populations through, for example, acquisition of adult breeding stock from wild populations, collection of eggs from the wild, or supplementation of exports with wild individuals. Appendix III status of *M. temminckii* has not provided the level of oversight needed to ensure that specimens entering international trade are acquired sustainably, as well as legally, and will not be detrimental to the survival of the species.

International demand for *C. serpentina* is high and also likely exceeds domestic demand (Colteaux & Johnson 2017). Recent data (2017-2020) indicate this species is predominantly represented by captive-born or captive-bred individuals in international trade (UNEP-WCMC 2022). Exports of wild *C. serpentina* may have been higher in the past (Colteaux & Johnson 2017), but current captive-born individuals may also have been born from a wild source. It has been suggested that high international demand for this species cannot be met by the captive turtle industry, and while commercial harvest of wild *C. serpentina* is legal in many areas, there is some concern that harvest practices may impact this species' long-term viability (Colteaux & Johnson 2017). In Canada, illegal harvest is considered a threat of medium-level concern for *C. serpentina*, and, according to ECCC (2020), the Ontario Multi-Species Turtles at Risk Recovery Team estimated the maximum sustainable harvest of *C. serpentina* to be less than 1% of the population/year. Given its high numbers in trade, and morphological similarities of immatures to *M. temminckii*, trade in *C. serpentina* also presents potential opportunities for laundering the more threatened *M. temminckii* as *C. serpentina*.

7. Legal instruments

7.1 National

There are currently no federal regulations in the United States specific to *M. temminckii* or *C. serpentina* at a national level, but the United States Food and Drug Administration for health reasons prohibits turtles with a carapace length of less than 4 inches for sale, held for sale, or offered for any other type of commercial or public distribution, except if the live turtles are intended for export only [provided that the outside of the shipping package is conspicuously labeled "For Export Only"] (21 CFR 1240.62).

The USFWS currently recognizes two species of alligator snapping turtle: *M. suwanniensis* and *M. temminckii* (USFWS 2020, 2021a). In April and November 2021, respectively, the USFWS proposed to list both species, considered collectively here as *M. temminckii,* as Threatened under the U.S. Endangered Species Act of 1973 (ESA) and with a rule issued under its section 4(d) (USFWS 2021b,c). The proposed rules have not been finalized, and therefore, *M. temminckii* is not currently protected under the ESA. If the rules are finalized, this species will be added to the U.S. List of Endangered and Threatened Wildlife and will receive protections under the ESA. There would be some exceptions from prohibitions, including some exceptions related to trade in “captive-bred” and “bred-in-captivity" specimens (USFWS 2021b).

All *M. temminckii* States within its range in the United States prohibit commercial harvest of this species (Table 1). Personal harvest is prohibited in all but two States: Louisiana and Mississippi. Both States have regulations for personal harvest of alligator snapping turtles, but there are no reporting or tagging requirements (USFWS 2021a; Table 1; L. Pearson, Biologist, USFWS Ecological Services, pers. comm.).

C. serpentina is not protected under the ESA, nor has it recently been proposed to be listed as Threatened or Endangered. Harvest from the wild for commercial purposes is permitted in about half the States in which it occurs, and personal harvest is also permitted in nearly all States within its range in the United States (*e.g*., van Dijk 2012; Colteaux & Johnson 2017). CITES can complement these State regulations and management efforts to ensure that at a national level trade in both species is legal and use is sustainable.

In Canada, *C. serpentina* is considered a species of Special Concern on Schedule 1 under Canada’s *Species at Risk Act* (SARA). This status does not impart prohibitions that would provide protection. However, harvest is prohibited in each province where the species occurs (Caceres 2022).

7.2 International

Both *M. temminckii* and *C. serpentina* are included in CITES Appendix III (United States).

8. Species management

8.1 Management measures

Management measures related to commercial and recreational harvest for *M. temminckii* and *C. serpentina* are described elsewhere in this document (see: 7. Legal Instruments, 8.3 Control measures). Many States have also initiated reintroduction programs for *M. temminckii* (see: 8.4 Captive breeding and artificial propagation). A management plan for *C. serpentina* in Canada has been developed with objectives to maintain or increase the index of area of occupancy and abundance of common snapping turtles, as well as reduce threats, particularly those impacting adult individuals. The plan details several broad strategies (*e.g.*, reducing mortality, injury, and harvest; conserving the population and habitat) and conservation measures to implement (*e.g.*, preserve suitable habitat; conduct population monitoring; ECCC 2020).

8.2 Population monitoring

Surveys for *M. temminckii* are being conducted by many State agencies to better understand the species’ status. Other organizations and universities are also conducting, or have plans to conduct, some monitoring and research projects (USFWS 2021b). Population monitoring and surveys are included as a broad strategy in the management plan developed for *C. serpentina* in Canada (ECCC 2020).

8.3 Control measures

8.3.1 International

There are no international control measures, other than the CITES Appendix III inclusion for the two species.

8.3.2 Domestic

Commercial harvest of *M. temminckii* is prohibited throughout its range, and personal harvest is limited to Mississippi and Louisiana. In Mississippi, personal harvest is limited to one individual/year and is prohibited April 1-June 30. A license is required, and the carapace length must be 24 inches or greater; the size limit may help prevent harvest of adult females (USFWS 2021a). In Louisiana, a license is required for personal harvest; the daily possession limit is one alligator snapping turtle/person/vehicle. Louisiana does not limit the size of an alligator snapping turtle that may be harvested. Mississippi and Louisiana do not collect data on legal harvest of turtles, making it difficult to assess the effectiveness of these State's control measures (USFWS 2021a; L. Pearson, Biologist, USFWS Ecological Services, pers. comm.). Moreover, illegal harvest is known to occur (see above), but at unknown levels. Current estimates of the prevalence of illegal harvest on *M. temminckii* appear to be highest in areas where legal harvest also occurs (USFWS 2021a), suggesting these domestic control measures may be inadequate to ensure sustainable harvest of this species.

Harvest of *C. serpentina* in Canada is prohibited in the six provinces where it occurs (Caceres 2022); but harvest (either commercial, personal or both) of *C. serpentina* is legal and regulated throughout much of the species' range in the United States (*e.g.*, van Dijk 2012; Colteaux & Johnson 2017). Specific regulations related to the number of individuals that may be harvested, size limitations, season limitations, as well as requirements for permits, vary across States (*e.g.*, van Dijk 2012; Colteaux & Johnson 2017). Recent research suggests that establishing minimum size limits for turtle harvest effectively reduces overall harvest of *C. serpentina*, particularly in years with high harvest pressure. However, there is also concern that minimum size limits can have long-term demographic consequences by removing large, breeding adults from populations, which may ultimately reduce population viability (Colteaux & Johnson 2017).

8.4 Captive breeding and artificial propagation

8.4.1 Reintroduction programs

Confiscated *M. temminckii* individuals were recently repatriated in Texas (Texas Comptroller 2022). Programs using captive breeding and head-starting (raising hatchlings in captivity until they are older and less vulnerable in the wild) to facilitate conservation of *M. temminckii* through reintroductions have also been initiated in the United States. Tishomingo National Fish Hatchery in Oklahoma established a program for this species in 1999, and turtles from this facility have been involved in multiple reintroductions that have met with varying success (USFWS 2021a). Dreslik *et al.* (2017) used information from reintroductions in three States and evaluated the efficacy of such programs through population viability analyses. Reintroduction was found to have low probability for establishing sustainable populations; additional conservation efforts (*e.g.*, to reduce mortality) would be important for future attempts. Similarly, a recent (2016-2018) survey of alligator snapping turtles in West Tennessee found *M. temminckii* at only one out of 11 surveyed sites where turtles from Louisiana farms were reintroduced approximately 10-15 years earlier (Garig *et al.* 2021). These results highlight the importance of mitigating threats that underly *M. temminckii* population declines (*e.g.*, legal and illegal harvest) to ensure that conservation efforts can be successful (USFWS 2021a).

8.4.2 Commercial trade

Captive breeding of *M. temminckii* and *C. serpentina* for commercial trade also occurs. Between 2017 and 2020, most (76%) *C. serpentina* exports from the United States were coded as "born in captivity"; others (22%) were coded as "bred in captivity" and in accordance with Resolution Conf. 10.16 (Rev.). A small proportion (<2%) were reported as "specimens from the wild" (UNEP-WCMC 2022), but captive-born individuals (comprising the majority) may include those born from a wild source. Recent research on *C. serpentina* trade data prior to inclusion in Appendix III suggests that annual exports of wild-caught common snapping turtles were high (*e.g.,* exceeding 200,000 in 2012 and 2014; Colteaux & Johnson 2017). Farmed specimens are likely helping meet some international demand that might otherwise be met by wild specimens. However, there has also been concern that *C. serpentina* is in such high demand that farms must supplement trade from wild populations (Colteaux & Johnson 2017). This poses concerns for both *C. serpentina* and the morphologically similar *M. temminckii*. Including this species in Appendix II will allow national CITES Authorities to ensure that specimens entering international trade are acquired sustainably, as well as legally, and will not be detrimental to the survival of the species.

M. temminckii is noted to be bred and raised in farming facilities to supplement domestic and international demand (USFWS 2021b). Most recent *M. temminckii* exports (2006-2020) may have been hatched in these captive facilities (USFWS 2021a), which may alleviate some pressure on wild populations (USFWS 2021b).

As noted above, however, it is unknown whether these facilities meet the requirements of Resolution Conf. 10.16 (Rev.) as self-sustaining populations and bred in a 'controlled environment'; the legal acquisition of founder stock is also unknown (USFWS 2021a). This industry may impose pressure on wild populations through, for example, harvest of adult individuals for breeding stock or removal of eggs from the wild for raising in captivity. Inclusion in Appendix II will allow additional oversight and evaluation of non-detriment by national CITES Authorities.

Both species are also reportedly farmed in China (Haitao *et al.* 2008).

8.5 Habitat conservation

The range of *M. temminckii* falls within several areas that have some protection at the national level within the United States, including multiple National Forests, National Wildlife Refuges, and units managed by the National Parks Service, among others (USFWS 2021b). This species also occurs in other private and public protected areas. Despite its presence in protected areas, habitat fragmentation and alteration have been identified as threats to this species throughout its range (see: 4.1 Habitat trends).

C. serpentina occurs within a number of private and public protected areas within the United States (van Dijk 2012); it also occurs in some protected areas in Canada (COSEWIC 2008). Habitat conservation is part of the broad strategies defined in Canada's *C. serpentina* management plan (ECCC 2020).

8.6 Safeguards

The level of international commercial trade in *M. temminckii* has been relatively consistent between 2006, when it was included in CITES Appendix III, and 2020 (Figure 4). Although there appears to be more variation in trade numbers across years (2017-2020) in *C. serpentina* (Figure 5), it is generally traded in higher numbers than *M. temminckii*. Both species occur in high numbers in trade, and a change in CITES status is not expected to stimulate increased trade, but rather to provide more oversight of the existing trade. It is possible that additional regulation in North American chelydrids could impact international trade in Central and South American chelydrids (see below), and this should be monitored.

9. Information on similar species

M. temminckii and *C. serpentina* are the only North American species of Chelydridae. The distinctive morphological features of this family (described above) make them unlikely to be confused with other North American turtle species encountered in the live animal trade; live animals represent >99% of international trade in these two species (UNEP-WCMC 2022).

Chelydrid turtles are, however, represented by two additional species in the genus *Chelydra* outside of North America: *C. acutirostris* and *C. rossignonii*. *C. acutirostris* is found in southern Central America and northwestern South America. *C. rossignonii* occurs in eastern Central America (Fritz & Havaš 2007). Both taxa were once considered subspecies of a monotypic *C. serpentina*, but they were elevated to species-level based on genetic variation (Phillips *et al.* 1996). Morphological differences among the *Chelydra* species are subtle (Phillips *et al.* 1996), and they are unlikely to be distinguishable by non-experts in trade based on visual observation, particularly as immatures. However, these two species are geographically separated from North American chelydrids and are unlikely to be encountered in trade from the United States.

10. Consultations

In the United States, we have an open, transparent process to engage and consult with the public, including: States, Tribes, industry, non-governmental organizations and other interested stakeholders when it comes to CITES issues at a CoP as outlined in Part 23 of Title 50 of our U.S. Code of Federal Regulations (https://www.ecfr.gov/current/title-50/chapter-I/subchapter-B/part-23#23.87). We are one of the few countries in the world with such a robust and lengthy process. For the specific comments on species proposals to amend the CITES Appendices, please see: https://www.regulations.gov/docket/FWS-HQ-IA-2021-0008.

A consultation letter was sent to Canada requesting information on the biology, management, and status of *C. serpentina*, as well as its views on the proposed inclusion of this taxon in Appendix II. A response was received from Carolina Caceres (Director, International Biodiversity Policy, Canadian Wildlife Service; May 27, 2022) that provided information on the biology, management, and status of *C. serpentina* in Canada.

11. Additional remarks

The IUCN/SSC Tortoise and Freshwater Turtle Specialist Group supports inclusion of *M. temminckii* and *C. serpentina* in CITES Appendix II (https://www.regulations.gov/comment/FWS-HQ-IA-2021-0008-0093).

This proposal was reviewed by turtle biologist, Dr. Kurt Buhlmann of the University of Georgia, Savannah River Ecology Laboratory (Aiken, South Carolina). He agrees that the regulation of trade in these species is needed and supports the inclusion of *Macrochelys* and *Chelydra* in CITES Appendix II.

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Figures

Figure 1. Distribution maps for A) *Macrochelys temminckii*; B) *Macrochelys suwanniensis* (considered collectively here as *M. temminckii*, following Fritz and Havaš (2007)); and C) *Chelydra serpentina* (maps from TTWG 2021: pages 103-105).

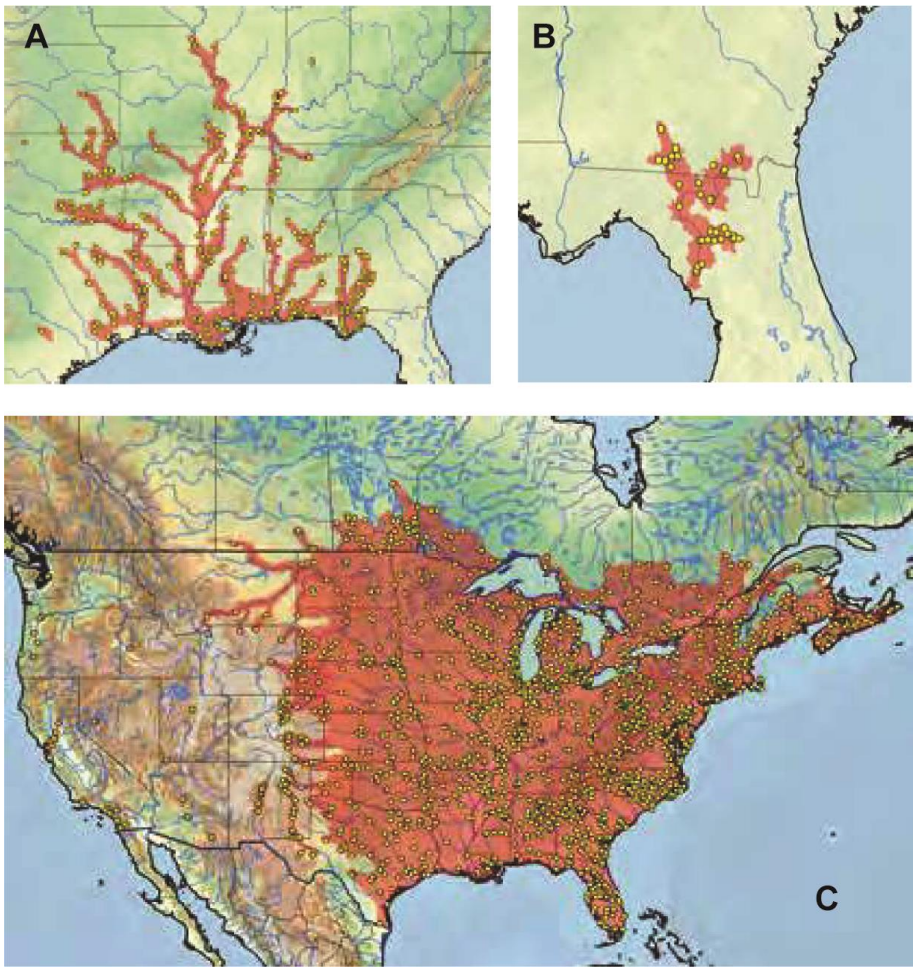


Figure 2. Exports of turtle species by specimen numbers. This graph demonstrates the “boom-and-bust“ pattern in turtle trade. As Asian turtle species (*Cuora amboinensis*, *Heosemys* spp., *Siebenrockiella crassicollis*, *Lissemys punctata*) are depleted or regulated in trade, the trade shifts to other turtle sources/species, such as in the United States, and including *Chelydra*. (Credit: IUCN Tortoise and Freshwater Turtle Specialist Group; CITES CoP15; from CITES 2016: page 17)

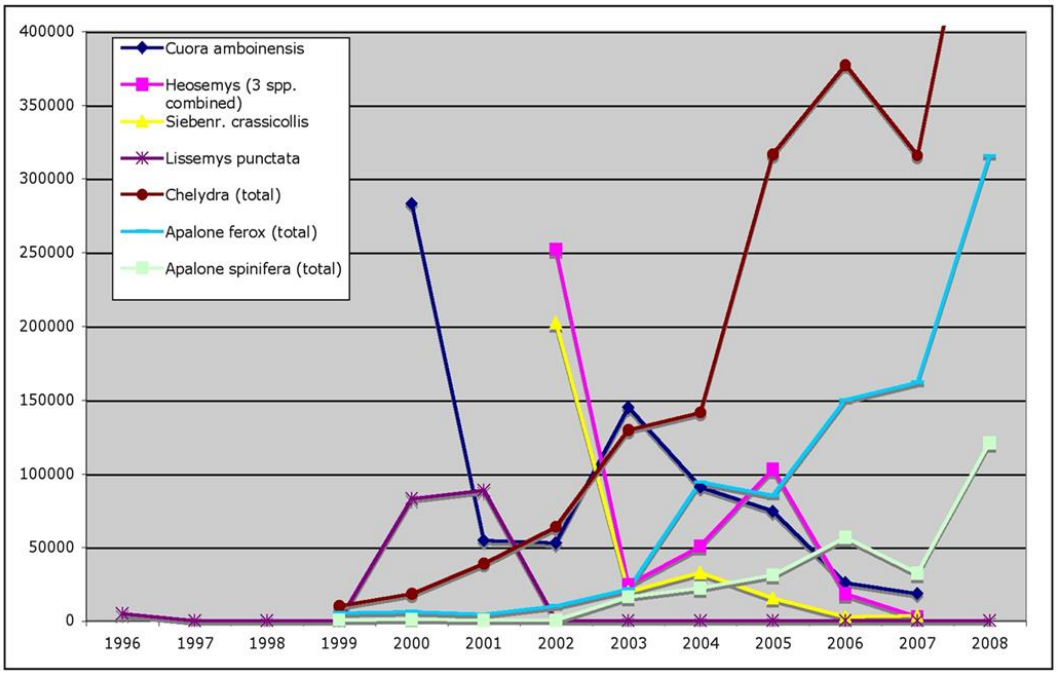


Figure 3. Comparison of reproductive output of a common snapping turtle (*Chelydra serpentina*) to managed North American game species: black bear, moose, and white-tailed deer. A single clutch of *C. serpentina* eggs is obtained only after 17 years, when an individual female reaches adulthood. Age at first reproduction occurs much earlier in black bears (6 years), moose (3 years), and white-tailed deer (2 years), making the reproductive potential of these three species much higher after 17 years (25, 681, and 912 individuals, respectively) (Credit: Ron Brooks Co-Chair of OMSTARRT (Ontario Multi-Species of Turtles At Risk Recovery Team; CITES 2016: page 18). Note: *C. serpentina* has, on average, higher reproductive output compared to *M. temminckii* (Reed *et al.* 2002), suggesting alligator snapping turtles would have even lower comparative reproductive potential.

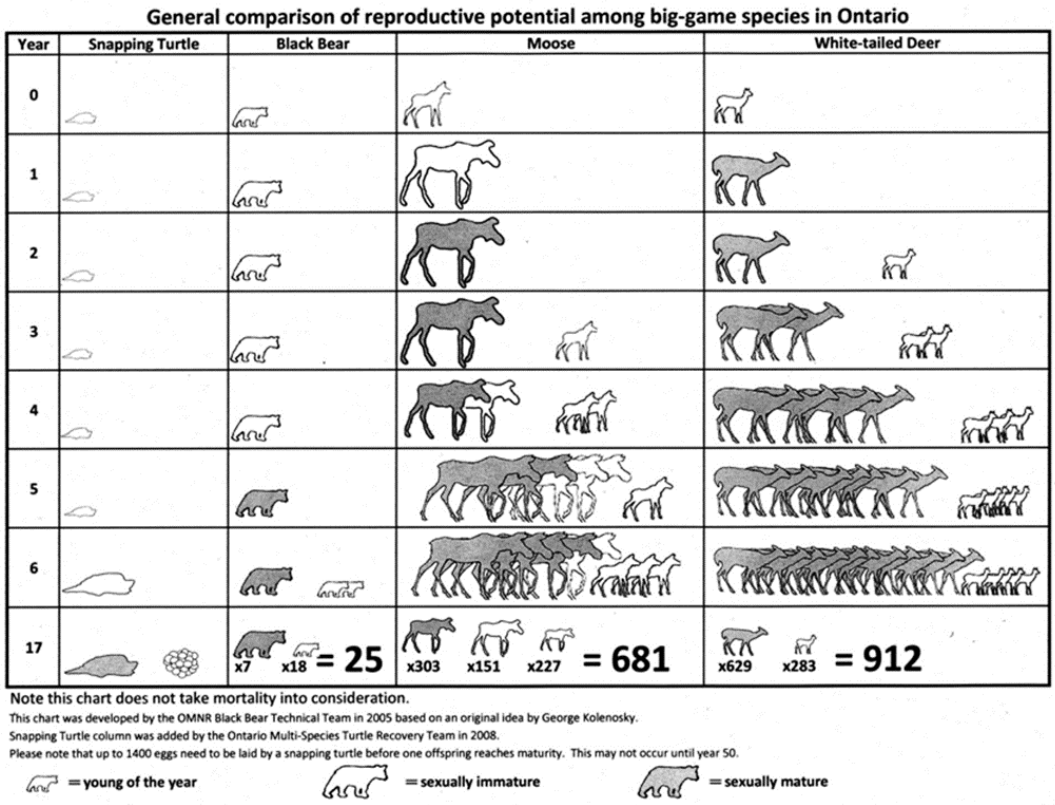


Figure 4. Annual exports from the United States of live (predominantly immature) *Macrochelys temminckii* for commercial purposes between 2006 and 2020. Numbers are represented by exporter reported quantities from the UNEP-WCMC CITES Trade Database and supplemented with United States export data (2019-2020) (UNEP-WCMC 2022).

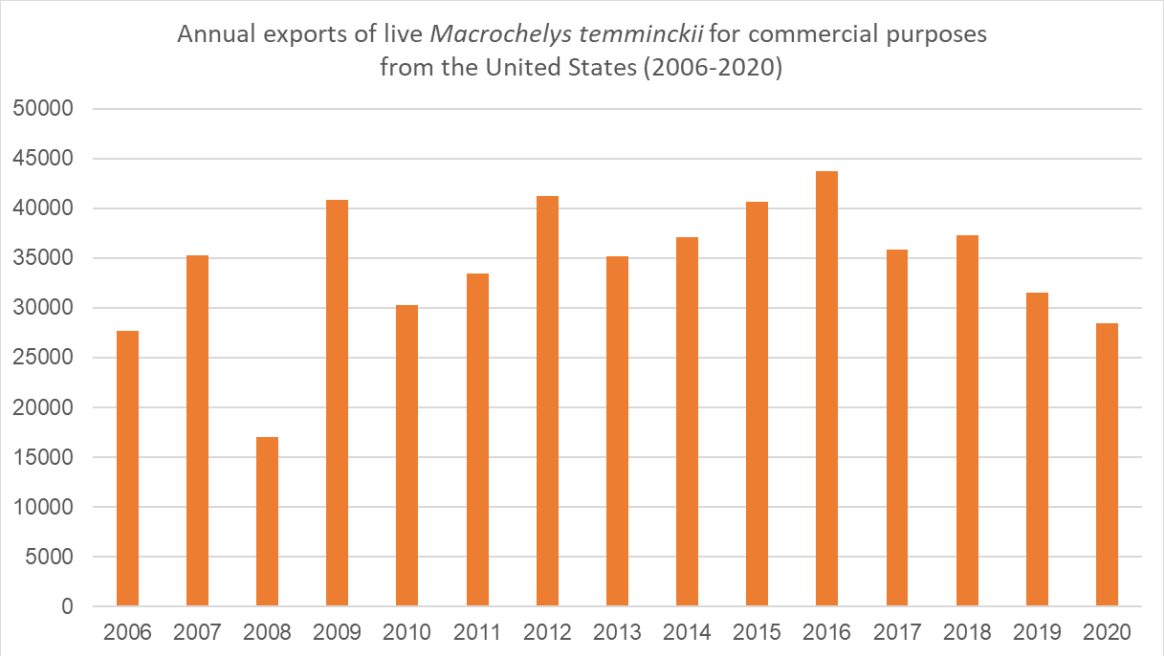
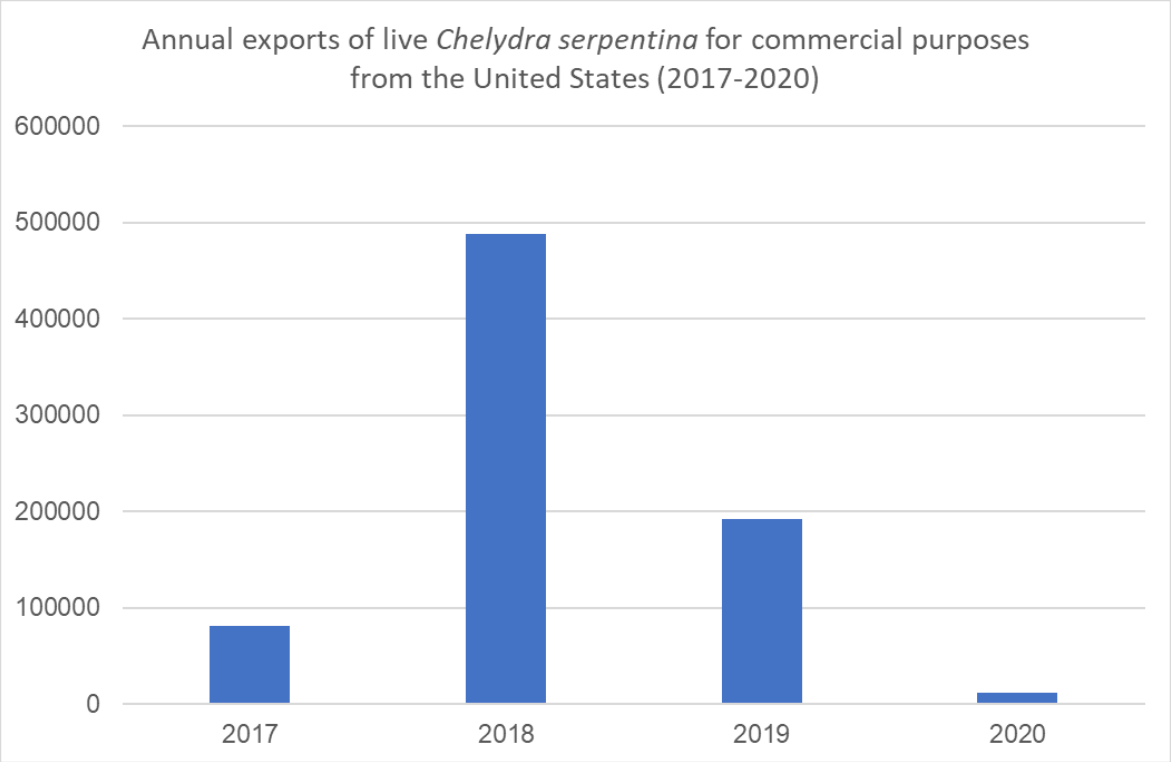


Figure 5. Annual exports from the United States of live (predominantly immature) *Chelydra serpentina* for commercial purposes between 2017 and 2020. Numbers are represented by exporter reported quantities from the UNEP-WCMC CITES Trade Database and supplemented with United States export data (2019-2020) (UNEP-WCMC 2022).



Tables

Table 1. Protected status and harvest regulations for *Macrochelys temminckii* within U.S. range States. The table was modified from USFWS (2021a: page 130) and supplemented with species status information.

State	State status	Year commercial harvest prohibited	Year personal harvest prohibited	Notes
Alabama	Species of concern	2012	2012	
Arkansas	None	1994	1994	
Florida	Threatened[1]	2009	2009	
Georgia	Threatened	1992	1992	
Illinois	Endangered	1994	1994	
Indiana[2]	Endangered	1994	1994	
Kansas[2]	Species of greatest conservation need	Unsure	Unsure	
Kentucky	Threatened	1975	2012	
Louisiana	Species of greatest conservation need	2004	Still allowed	License required for personal harvest; harvest limits: one turtle per day, per person, per vehicle/vessel; no restrictions on size of turtle
Mississippi	Species of greatest conservation need	1991	Still allowed	License required for personal harvest; harvest limits: one turtle per year; carapace length of turtle must be 24 inches or greater
Missouri	Species of conservation concern	1980	1980	
Oklahoma	Species of greatest conservation need	Never allowed	1992	
Tennessee	"In Need of Management"; considered rare to very rare and imperiled	1991	1991	
Texas	Threatened	1993	1993	

[1]Only populations considered to represent *Macrochelys suwanniensis* (Florida Fish and Wildlife Conservation Commission 2021)
[2]Current persistence within state is unknown.