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Taxon reviewed (including common and taxonomic names):

Alligator snapping turtle (*Macrochelys temminckii*)—the alligator snapping turtle, a member of the family Chelydridae, is the largest freshwater turtle in the United States. The species has a moderately wide distribution in the greater Mississippi drainage and number Gulf drainages. Despite this broad distribution, however, the alligator snapping turtle is poorly known ecologically, and is a secretive and almost entirely aquatic turtle. This species is long-lived; the oldest animal that could be reliably aged was a 36-year old male. Scientists estimate that sexual maturity is reached at 11 to 13 years for both males and females. Females appear to breed annually but may skip a year if they have poor foraging success. Production of multiple clutches in a single year has not been observed in the wild. Clutch size varies across the species range; in Florida, the sizes are 31-40 but in Georgia females lay as few as 9 eggs. Alligator snapping turtles have long been harvested by humans as a food source in southeastern United States with the industry increasing in size dramatically in the late 1960s through the 1970s. By the late 1970s, populations in Georgia, Louisiana, Florida, and Alabama were depleted by commercial harvest. As a result, legal protection of this species was put in place in

most states where it occurs. Commercial harvest is still legal in Louisiana. Trade in turtle meat has significantly decreased but the pet trade in this species has significantly increased beginning in the late 1980s.

Table 1 – Comments from reviewer on applicability of criteria for listing on Appendix I

<p style="text-align: center;">CRITERION</p> <p>For your information for a species to fulfill the draft criteria for Appendix I it must meet the trade criteria and at least one of the criteria A-D.</p>	<p style="text-align: center;">NOTES</p> <p>Whenever appropriate, indicate ways in which this criterion and definitions, explanations and guidelines could be improved and/or quantified to better suit this taxon and its relatives (If you need additional space, please use a separate sheet of paper).</p> <p>For the following specific questions, if a point estimate is not available, please provide a likely range of values (e.g., “about 6,000 – 10,000 individuals”) or some kind of rough estimate or inference (e.g., “likely to be less than 500 square kilometres”). Please try to make a numerical guess or give a verbal description and only use DNW (Do Not Know) if there is truly no information available on the quantity in question.</p>
<p>Trade Criterion Is or may the <u>species</u> be <u>affected by trade</u>?</p>	<p>Criterion definition works. No changes suggested other than add “international” before the word “trade.” Domestic trade issues should be covered under other criterion.</p>
<p>A) The <u>wild population is small</u>, and is characterized by at least one of the following (see definitions below):</p>	<p>What was/is the estimated size of the <u>population</u>? Please include units of measurement.</p> <p>For the alligator snapping turtle, estimated population size information is unavailable. We believe this information will be unavailable for many species. It is unclear what the consequences of the lack of this type of information has on the listing process; i.e., does this mean that a species should not be listed if we lack numerical data? Guideline numbers given in the definition should be deleted as they are not useful and may be misleading.</p>
<p>A)(i) an observed, inferred or projected <u>decline</u> in the number of individuals or the area and quality of habitat; or</p>	<p>Criterion applies to this species. Historical records indicate that large-scale harvesting of reproductive adults has caused declines in most populations of <i>Macrochelys</i> throughout the range of the species and the near or complete extirpation of populations in some rivers.</p>
<p>A)(ii) each <u>sub-population being very small</u>; or</p>	<p>What were/are the estimated sizes of the <u>subpopulation</u>(s)? Please include units of measurement.</p> <p>The size of subpopulations is lacking for this species, but some subpopulations may be very small in some watersheds due to past large-scale harvesting (see A above).</p>
<p>A)(iii) a majority of individuals, during one or more life-history phases, being concentrated in one <u>sub-population</u>; or</p>	<p>Although species does not meet this criterion, the criterion is understandable and useful.</p>

<p>A)(iv) large short-term fluctuations in the number of individuals appropriate to measuring population size for the species concerned;</p>	<p>If the population was/is characterized by large short-term fluctuations in the numbers of individuals, what was/is the average magnitude in orders of magnitude? What was/is the average period of fluctuation in years?</p> <p>Only anecdotal information available for this species. Numerical guidelines used in the definition should be deleted – not useful and could be misleading.</p>
<p>A)(v) a high vulnerability due to the species' biology or behaviour (including migration).</p>	<p>This is a particularly pertinent criterion for the alligator snapping turtle because the species is completely aquatic (except for terrestrial nesting) and exchange among populations in different river systems is unlikely to occur. Because of this restriction to particular systems, the extirpation of turtles in one system creates an ecovoid that will not be filled by recruitment from populations in other rivers.</p>
<p>B) The wild population has a restricted area of distribution and is characterized by at least one of the following (see definitions below):</p>	<p>What was/is the estimated area of distribution? If listing on the basis of one or more sub-populations, what were/are the estimated areas of distribution of the subpopulation(s)? Please include units of measurement?</p> <p>Numerical references in the definition should be deleted (see comments above for other definitions)</p>
<p>B)(i) fragmentation or occurrence at very few locations; or</p>	<p>Definition of fragmentation is fine, except for numerical explanation. Fragmentation includes consideration of not only subpopulation size, but also distance between the subpopulations. Also, must be careful not to confuse fragmentation with species that naturally occur in metapopulations.</p>
<p>B)(ii) large fluctuations in the area of distribution or the number of sub-populations; or</p>	<p>Numerical references in the definition for “Area of distribution” should be deleted (see comments above for other definitions)</p>
<p>B)(iii) a high vulnerability due to the species' biology or behaviour (including migration); or</p>	<p>See A (v)</p>
<p>B)(iv) an observed, inferred or projected decrease in any one of the following:</p>	
<ul style="list-style-type: none"> the area of distribution; or 	<p>Valid criterion and is true for this species.</p>

<ul style="list-style-type: none"> the area of habitat; or 	Valid criterion and is true for this species.
<ul style="list-style-type: none"> the number of sub-populations; or 	Valid criterion and is true for this species.
<ul style="list-style-type: none"> the number of individuals; or 	Valid criterion and is true for this species.
<ul style="list-style-type: none"> the quality of habitat; or 	Numerical data is not readily available for the species, but water quality of many streams has decreased overtime until recently. Not clear how important this criterion is for the species.
<ul style="list-style-type: none"> the recruitment. 	Valid criterion and is true for this species; individuals of breeding age are being collected from populations resulting in lower recruitment into populations.
C) A marked decline in population size in the wild, which has been either (see definitions below):	Historical extent of decline - To what extent has the population or the area of distribution (please specify which) declined since historical times (i.e., going back 100 years or more if known; else based on whatever information is available)? (Ex. The ___ has declined down to ___% of the historical levels of ___ years ago.)
	Recent rate of decline - Characterize the recent (10-20 year) trends in population size or area of distribution (please specify which).
	No numerical data is available to calculate the % of decline (only anecdotal information). This is probably the case for many species. However, information does exist on the timeframe in which massive commercial harvesting of reproductive adults took place and subsequently declined.
C)(i) observed as ongoing or as having occurred in the past (but with a potential to resume); or	Valid criterion and is true for this species
C)(ii) inferred or projected on the basis of any one of the following:	Valid criterion and is true for this species.
<ul style="list-style-type: none"> a decrease in area of habitat; or 	Valid criterion and is true for this species.

<ul style="list-style-type: none"> • a decrease in quality of habitat; or 	Criterion applies to species and species meets criterion.
<ul style="list-style-type: none"> • levels or pattern of exploitation; or 	Criterion applies to species and species meets criterion.
<ul style="list-style-type: none"> • threats from extrinsic human-induced factors such as competition/predation by introduced species or the effects of hybridization, toxins and pollutants; or 	This criterion needs to be expanded to include naturally occurring stochastic events. Suggest that “human-induced” be removed and add “effects of naturally occurring stochastic events”.
<ul style="list-style-type: none"> • a decreasing recruitment 	Valid criterion and is true for this species.
D) If not included in Appendix I, is likely to satisfy one or more of criteria A-C within 5 years?	Valid criterion, unlikely that this criterion is true for this species.

For criteria **A)(v)** and **B)(iii)**, please check which if any of the vulnerability factors listed below apply:

We agree that the vulnerability factors are particularly useful when looking at criterion A(v) and B(iii), but they are also useful in thinking about the status of the species and should be used throughout the entire process of evaluating the species with the whole set of criteria.

- | | | |
|---|---|---|
| <input type="checkbox"/> low fecundity | <input checked="" type="checkbox"/> specialized niche requirements (e.g. diet and habitat) | <input type="checkbox"/> threats from invasive species |
| <input checked="" type="checkbox"/> slow growth rate (<i>define what this is relative to????</i>) | <input type="checkbox"/> species associations such as symbiosis and other forms of co-dependency | <input type="checkbox"/> threats from rapid environmental change (e.g. climate regime shifts) |
| <input checked="" type="checkbox"/> high age at first maturity | <input type="checkbox"/> fragmentation and habitat loss | <input checked="" type="checkbox"/> selectivity of removals (that may compromise recruitment) |
| <input type="checkbox"/> distorted age, size or sex ratio | <input type="checkbox"/> reduced genetic diversity | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> complex social structure | <input type="checkbox"/> depensation (prone to continuing decline, even in the absence of exploitation) | |
| <input type="checkbox"/> extensive migratory behaviour | <input checked="" type="checkbox"/> high degree of endemism | |
| <input type="checkbox"/> strong aggregating behaviour (e.g., schooling) | <input type="checkbox"/> threats from disease | |
| <input type="checkbox"/> low population density (for sessile or semi-sessile species) | | |

For the alligator snapping turtle, several of the above vulnerability factors apply; no other factors would need to be added for this species but the list could be expanded to include factors for other species. A more comprehensive list is preferred.

Table 2 – Comments from reviewer on applicability of criteria for listing on Appendix II

<p style="text-align: center;">Criterion</p> <p>For your information for a species to fulfill the draft criteria for Appendix II it must meet at least one of the criteria A-D.</p>	<p style="text-align: center;">NOTES</p> <p>Whenever appropriate, indicate ways in which this criterion and definitions, explanations and guidelines could be improved and/or quantified to better suit this taxon and its relatives (If you need additional space, please use a separate sheet of paper).</p>
<p>Trade Criterion Is or may the <u>species</u> be <u>affected by trade</u>?</p>	<p>Add the word “international” before the word “trade”.</p>
<p>A) It is known, or can be inferred, that the regulation of trade in the species is necessary to avoid it becoming eligible for inclusion in Appendix I in the near future.</p>	<p>Criterion is valid.</p>
<p>B) It is known, or can be inferred or projected, that harvesting of specimens from the wild for international trade has, or may have, a detrimental impact on the species by either:</p>	<p>Criterion is valid and is true for this species.</p>
<p>B)(i) Exceeding, over an extended period, the level that can be continued to perpetuity.</p>	<p>Length of “extended period” is unclear. Concept needs to be defined. Criterion is true for this species</p>
<p>B)(ii) Reducing it to a population level at which its survival would be threatened by other influences.</p>	<p>Criterion is valid and is true for this species.</p>

<p>C) 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, such that a non-expert, with reasonable effort, is unlikely to be able to distinguish between them.</p>	<p>Criterion is valid.</p>
<p>D) There are compelling reasons, other than those given in C to ensure that effective control of trade in currently listed species is achieved.</p>	<p>Criterion is valid, although examples of compelling reasons would be useful – perhaps clarify if the “compelling reasons” are things that are not related directly to the biology of the species.</p>

For criteria A) and B), please check which if any of the vulnerability factors listed below apply:

- low fecundity
- slow growth rate
- high age at first maturity
- distorted age, size or sex ratio
- complex social structure
- extensive migratory behaviour
- strong aggregating behaviour (e.g., schooling)
- low population density (for sessile or semi-sessile species)
- specialized niche requirements (e.g. diet and habitat)
- species associations such as symbiosis and other forms of co-dependency
- fragmentation and habitat loss
- reduced genetic diversity
- depensation (prone to continuing decline, even in the absence of exploitation)
- high degree of endemism
- threats from disease
- threats from invasive species
- threats from rapid environmental change (e.g. climate regime shifts)
- selectivity of removals (that may compromise recruitment)
- Other (please specify)

No other vulnerability factors are needed for this species, but see comments under vulnerability factor for Appendix I species.