

# CITES

## Proposed revision of Resolution Conf. 9.24 (CoP12 Com. I. 3)

### Criteria for listing on Appendix I and Appendix II

### Test of the applicability of the criteria

This document has been prepared to facilitate the assessment of the proposed revision of Resolution Conf. 9.24 (CoP12 Com. I. 3) using an individual plant or animal taxon.

**Notice to reviewers:** This review should focus on whether the criteria in Table 1, Table 2 and the accompanying definitions, explanations, and guidelines in Annex 5, are biologically sound and applicable for the taxon under review. The purpose of this review is not to determine whether the current listing status of the taxon under review is appropriate.

## Registration Form and Contact Details

Please fill in the details below and send the completed document, as appropriate, to the Chairman of the Animals Committee or the Chairman of the Plants Committee.

**Name(s) and affiliation(s) of reviewer(s):**

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**Taxon reviewed (including common and taxonomic names):**

*Acipenser transmontanus*, white sturgeon

The white sturgeon (*Acipenser transmontanus*), is the largest North American sturgeon species, reaching lengths approaching 6 meters, and weights up to 900 kg. The species is also the most long-lived, with an average lifespan of about 80 years. Sexual maturity for males is reached between 10-20 years, while females mature between 15-30 years. The average spawning frequency for males is one to two years, and females spawn every two to six years. Historic distribution of the species included Pacific coastal waters, and major river systems, from Mexico to Alaska. The overall distribution remains intact today, although spawning populations exist in only a few major river systems between the Fraser River in British Columbia, Canada and the Sacramento-San Joaquin Rivers in California, U.S. Over-harvest during the late 19<sup>th</sup> and early 20<sup>th</sup> Centuries resulted in major declines throughout the species' range. Several contemporary threats to the species include: habitat fragmentation caused by dam construction and impoundments that disrupt movement for spawning

and migration, and heavy manipulation of river flows for generation of electricity and agricultural purposes. Changes in river flow have also produced adverse effects for spawning runs and migration. Declining water quality throughout the region, attributed to forestry practices, agricultural run-off, and industrial pollution, is also considered a hazard to the species.

**Please return your completed paper or electronic document to one of the below:**

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## Instructions on conducting the criteria review

- Tables 1 and 2 outline the proposed draft criteria for listing species on Appendix I and Appendix II of CITES, respectively. These should be read in conjunction with the definitions, explanations, and guidelines included in the proposed amendment of Annex 5.
- Please test the criteria for Appendix I and II using the information you have for the taxon selected i.e. fill out Table 1 and Table 2. This allows a more complete test of the criteria in the short time allowed to us.
- If you fill in this form electronically then these definitions and explanations can be accessed by clicking on the Hyperlink within the table (or 'Ctrl' and click). To get back to the text after clicking a Hyperlink you click on the 'Back' arrow in the Web toolbar (if this is not set up in your version of Word then go to 'View' in the Word menu, then 'Toolbars' and click on 'Web').
- We have provided a copy of the definitions and explanations (Annex 5) at the end of this document for those who wish to fill in the tables as a hard copy.
- Using the data available to you for your chosen taxon please indicate the key data that you used to make your decision, and any problems you had in interpreting or applying the criteria for your chosen taxon.
- Once completed, please send electronic copies and/or hard copies of the review, as appropriate, to the Chair of the Plants Committee or Animals Committee.
- Thank you for taking part in this process.

The Completed forms must be returned by 31 October 2003

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

<p style="text-align: center;"><b>CRITERON</b></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;"><b>NOTES</b></p> <p><b>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).</b></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 kilometers”). 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><b>Trade Criterion</b> Is or may the <u>species</u> be <u>affected by trade</u>?</p>	<p>In spite of commercial fisheries closures and restrictions on recreational harvest in the late 1980’s/early 1990’s, white sturgeon continues to be a highly valued species today. In light of the current difficulties in identifying captive bred vs. wild stock in origin sturgeon, and potential for increasing demand for white sturgeon product in international markets, there is the possibility poaching and illegal trade could have detrimental impacts on the wild population.</p> <p>We suggest adding to the criterion the word "international" before the word “trade”.</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>Abundance estimates for each nationally significant population have been determined based on monitoring programs employing different techniques (mark-recapture, radio telemetry, life history studies, commercial/recreational catch statistics). With a total estimate of 54,791 individuals in the wild in Canada (cumulative total of all nationally significant populations as per below), the species exceeds the general guideline of 5,000 individuals expressed in the criteria defining what constitutes a “small wild population”. Taken individually, a number of these ‘sub-populations’ (all with the exception of the Lower Fraser River population) approach this threshold.</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>Data are incomplete for the species in the United States. Lack of a population estimate should not preclude listing, if other criterion indicates a need to list the species. For some species (and sturgeon spp. are a good example), it may be more appropriate to request the number of extant populations, and estimated size-<u>if known</u>. At least four populations are</p>

present in the United States, including a coastal stock that also migrates into Canadian waters. The population size estimate for the Kootenai River stock, shared with Canada, is 1,468 individuals. The Columbia River population is divided into three separate groups: the lower Columbia River stock with access to the ocean, sturgeon isolated (functionally but not genetically) between dams on the river, and fish located in several tributaries. The estimate of some 200,000 individuals, available for the lower Columbia River population, is for harvestable fish only. The lower Columbia River is the only segment of the river where commercial harvest is permitted. Sturgeon sub-populations isolated by dams are evaluated every three years using mark-recapture techniques. The total population estimate for three pools in the mid-section Columbia River is ~120,000 individuals. There are no contemporary estimates for the coastal stock and the Sacramento-San Joaquin Rivers stock, although both are believed to be larger than the 5,000 individuals suggested in the definition section.

The cumulative population estimates across all populations in Canada exceed the guideline for what constitutes a "small wild population". However individually, 5 of 6 populations would fall under the minimal limit of 5,000 individuals suggested as a guideline.

We suggest that "decline in individuals" and "decline in area or quality of habitat" become separate criteria.

In the United States, white sturgeon population declines have been attributed to loss of habitat due to dam building and river flow modifications for transportation and agricultural purposes, and over-harvest. Due to the absence of population data for the Sacramento-San Joaquin Rivers stock and Pacific coastal populations, it is difficult to assess this criterion. However, overharvest during the late 19th century and early 20th century resulted in closure of the commercial fishery in California in 1917. White sturgeon would meet criteria for decline in "number of individuals", but not "area of distribution" as populations exceed suggested minimal limits. In numbers of individuals, there has been an observed overall decline rate across all populations of greater than 50% over the past three generations (generation time of ~35 yrs), thereby satisfying the guideline for historical extent of decline. Decline is continuing and is projected to be in the order of 20% in the next 25 years. Of the 6 nationally significant populations in Canada, 3 have declined by ~83% in less than 1 generation, thereby satisfying the recent rate of decline guideline of 15-20% decline for a commercially exploited aquatic species with low productivity. In terms of area/quality of available habitat, there has been a marked decline over the past 100 years in quantity and quality of habitat to support life history functions (attributed to dams, water regulation/diversion, contamination). As a result, populations have become fragmented.

	The area of occupancy for all populations in the white sturgeon in the Fraser and Columbia river systems has been calculated to be 2,870 km <sup>2</sup> .
<b>A)(ii)</b> each <a href="#">sub-population being very small</a> ; or	<p>What were/are the estimated sizes of the <a href="#">subpopulation</a>(s)? Please include units of measurement.</p> <p>This criterion can be used to assess sub-populations, but may only apply to the upper Columbia River population in the United States. Using the general guideline figure of less than 500 individuals as what constitutes a very small wild sub-population, two of the six nationally significant populations (Nechako R and Kootenay R.) have lower confidence limits under current population estimates that fall within this threshold.</p> <p>The upper Columbia River population is considered "significantly depleted", and is estimated to be ~1500 individuals. Population sizes below are expressed both in number of individuals with confidence intervals and number of adults capable of reproduction (in parentheses) in the two significant Canadian populations (and the upper Columbia River: - Nechako River 571; 421-890 (942) RL&amp;L (2000); Upper Columbia River - 1427; 1,295 - 1580 (942); Kootenay River - 760; 430 - 1,090 (752) .</p>
<b>A)(iii)</b> a majority of individuals, during one or more life-history phases, being concentrated in one <a href="#">sub-population</a> ; or	<p>Sub-population is not the correct term here, at least for this species. If you consider a segment of the population that is concentrated, such as juvenile, or non-reproductive individuals, the definition does not fit, as there is <u>no genetic exchange</u>. Considering sturgeon and other anadromous fishes, a majority of individuals that are concentrated in a specific life-history phase might be better defined by the <u>habitat</u> utilized by the life-history phase of the species. Juveniles tend to move to marine waters, if possible, while adults migrate to rivers and estuaries to spawn, again, when movement is not blocked by dams or other barriers to migration.</p> <p>Perhaps, A(iii) could be changed to "a majority of individuals, during one or more life phases, being concentrated in one <a href="#">sub-population</a> or <a href="#">habitat</a>?"</p>
<b>A)(iv)</b> large short-term <a href="#">fluctuations</a> in the number of individuals	If the population was/is characterized by large short-term <a href="#">fluctuations</a> 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>appropriate to measuring population size for the species concerned;</p>	<p>The only large short-term <u>biological</u> fluctuations in the number of individuals of this species would be the success of the stock during spawning season, and the substantial natural mortality of age-0 fingerlings. These are important factors used to predict the strength of year-classes, and therefore, the number of adults available to spawn in the future. If spawning conditions are favorable (physical conditions), then more eggs will be fertilized and will subsequently hatch, leaving a large pool of larvae, and consequently, fingerlings for recruitment. For sturgeon species, survival to maturation is generally estimated as one to three percent, weighted towards the lower end. Harvest and trade could (and has, in the past) result in a man-made fluctuation, but currently, the only commercial U.S. harvest is located in the lower Columbia River system, and quotas are strictly managed and enforced to prevent such occurrences.</p> <p>When defining fluctuations, we suggest addressing biological, physical, and artificial (man-made) causes of fluctuations, to clarify the definition.</p> <p>As a long-lived species with lengthy life history processes (growth, age at maturity, spawning intervals, generation time), fluctuations in population sizes within the order of magnitude suggested in the criteria have not been observed in white sturgeon populations. Similarly, area of distribution has not changed markedly with such frequency/rapidity that it would affect population size over the short term.</p>
<p>A)(v) a high <u>vulnerability</u> due to the species' biology or behaviour (including migration).</p>	<p>This criterion works well for this species.</p> <p>White sturgeon are considered to be highly vulnerable to population declines due to overharvest and are self-limiting because of the species' reproductive biology, e.g., late maturity (15-30 years), low fecundity, and specific spawning requirements that are negatively affected when habitat and water flow regimes are altered (Birstein 1993; Echols 1995; UCRRP 2002; TRAFFIC 2001). Vulnerability to overharvesting has been well documented in population crashes that have occurred following periods of heavy fishing pressure in the Fraser, Columbia, and Sacramento-San Joaquin River systems at the end of the 19th century (Semakula and Larkin 1968; UCRRP 2002; TRAFFIC 2001). More recently, it has been demonstrated that habitat loss and fragmentation has affected spawning/recruitment to the wild population. Finally, the species is particularly vulnerable to harvest and trade for caviar, as the reproducing female is the only portion of the population targeted.</p>

<p><b>B) The wild <u>population</u> has a restricted <u>area of distribution</u> and is characterized by at least one of the following (see definitions below):</b></p>	<p>What was/is the estimated <u>area of distribution</u>? If listing on the basis of one or more <u>sub-populations</u>, what were/are the estimated areas of distribution of the subpopulation(s)? Please include units of measurement?</p> <p>The criterion is applicable to the species, and is especially important for migratory populations when addressing separate populations arising from, and returning to spawn, within distinct river systems. Examining individual populations demonstrates that all but two (Upper Columbia River, Nechako River) fall within the suggested guideline of 10,000 km<sup>2</sup> constituting a restricted area of distribution.</p> <p>The Sacramento-San Joaquin River population inhabits some 153,000 km<sup>2</sup> and the Columbia river system spans seven states in the U.S. and a portion of British Columbia, as noted below (TRAFFIC 2001). The cumulative Area of Distribution (analogous to extent of occurrence in IUCN Red List categories [IUCN 2001]) for all populations in Canada is calculated to be 44,720 km<sup>2</sup> which is considerably greater than the suggested guideline of 10,000 km<sup>2</sup> in the criteria.</p>
<p><b>B)(i) <u>fragmentation</u> or occurrence at very few locations; or</b></p>	<p>The definition for fragmentation should clearly state if it applies to habitat or species distribution pattern. The species has been fragmented as the result of anthropogenic changes (damming, dredging, contamination) affecting its habitat and physical changes (Kootenai River white sturgeon became land-locked after the end of the Wisconsin glaciation, 10,000 years B.P.).</p>
<p><b>B)(ii) large fluctuations in the <u>area of distribution</u> or the number of <u>sub-populations</u>; or</b></p>	<p>The number of sub-populations and area of distribution has not undergone observed fluctuations (to the extent required in the suggested guideline as above).</p>
<p><b>B)(iii) a high <u>vulnerability</u> due to the species' biology or behaviour (including migration); or</b></p>	<p>See A(v) above (why is this criterion repeated?).</p>
<p><b>B)(iv) an observed, inferred or projected decrease in any one of the following:</b></p>	<p>How does 'decrease' relate to the definition provided for decline?</p>
<ul style="list-style-type: none"> <li>• the <u>area of distribution</u>; or</li> </ul>	<p>Area of distribution for white sturgeon is closely linked to availability of habitat. In the</p>

	<p>Canadian range of the species' distribution, habitat loss due to development and contamination is believed to have contributed to an observed decrease in area of occupancy. This decline has been most prevalent in the Nechako, Upper Columbia and Kootenay River systems. In the U.S. range, habitat loss due to river alterations, such as dams and other barriers to migration is largely found in the Columbia River system where there are 18 dams spanning the river. Alterations of flow have also impacted the Kootenai River population and the Sacramento-San Joaquin population. All U.S. populations are also subject to threats by contaminants from agricultural and industrial sources, further limiting distribution.</p>
<ul style="list-style-type: none"> <li>the area of habitat; or</li> </ul>	<p>As above (under B. iv "area of distribution").</p>
<ul style="list-style-type: none"> <li>the number of <a href="#">sub-populations</a>; or</li> </ul>	<p>Number of sub-populations (10 total for both countries) has remained stable.</p>
<ul style="list-style-type: none"> <li>the number of individuals; or</li> </ul>	<p>A decline in number of individuals has been observed in all distinct populations.</p>
<ul style="list-style-type: none"> <li>the quality of habitat; or</li> </ul>	<p>Quality of habitat has been degraded from water regulation and diversion directly attributed to installation of dams, dykes (Columbia, Kootenay, Nechako - Duke et al. 1999; Hildebrand et al. 1999; RL&amp;L 2000; Anders et al. 2001; Korman and Walters 2001; UCRRP 2002; TRAFFIC 2001; Columbia River Mgmt. Plan 2001) and dredging of channels and gravel mining. Indirect effects on habitat include contamination from industry, farming and urban areas (MacDonald et al. 1997), as well as changes to species composition in some river systems.</p>
<ul style="list-style-type: none"> <li>the recruitment.</li> </ul>	<p>Length-frequency distributions for populations and age analyses show regular recruitment is occurring in the mainstem Fraser River (RL&amp;L, 2000; Yarmish and Toth, 2002). Conversely, evidence from studies in the Nechako, Kootenay and upper Columbia River populations indicate recruitment failure (RL&amp;L 2000; Hildebrand et al. 1999; Duke et al. 1999).</p>

<p><b>C) A marked <u>decline in population size in the wild, which has been either</u> (see definitions below):</b></p>	<p>Historical extent of <u>decline</u> - To what extent has the <u>population</u> or the <u>area of distribution</u> (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.)</p> <p>Recent rate of <u>decline</u> - Characterize the recent (10-20 year) trends in population size or area of distribution (please specify which).</p>
<p><b>C)(i)</b> observed as ongoing or as having occurred in the past (but with a potential to resume); or</p>	<p>The white sturgeon's area of distribution within the U.S. appears to have remained intact over the time historical information has been kept. Historic data on population size is problematic, as records are not available for U.S. stocks going back 100 years. However, patchy data does exist for 50 years or so, for some stocks. Recommend removal of "historical times", defined as 100 years, and request that "declines based on "X" years" are provided, allowing the reviewer to enter the number of years information has been collected and/or is available for the species. Historical data on fluctuations in population size or density in Canada are generally lacking. Monitoring of populations in all systems are relatively recent (over the past 25 years) and only deal with the current situation.</p> <p>Overharvest in the Sacramento-San Joaquin Rivers population during the late 19th century resulted in closure of the commercial fishery in 1913. It has never resumed. Likewise, considerable overharvest in the Columbia River system led to a joint management plan developed by the States of Oregon and Washington for the sustainable management of the commercial fishery. Analyses of commercial fisheries statistics has concluded that overharvesting of sturgeon in the lower Fraser river has contributed to significant declines in the past. Relatively recent closures on commercial fishing and restrictions on recreational fisheries have minimized the impacts of exploitation on this population.</p>
<p><b>C)(ii)</b> inferred or projected on the basis of any one of the following:</p>	
<ul style="list-style-type: none"> <li>• a decrease in area of habitat; or</li> </ul>	<p>See B(iv) above</p>
<ul style="list-style-type: none"> <li>• a decrease in quality of habitat; or</li> </ul>	<p>See B(iv) above</p>
<ul style="list-style-type: none"> <li>• levels or pattern of exploitation; or</li> </ul>	

	Throughout British Columbia, commercial and sport fisheries have been prohibited since 1994 and some First Nations have voluntarily restricted harvesting in an effort to promote recovery of the species. Also, see C(i) for information regarding U.S. closures and management changes for the conservation of the species.
<ul style="list-style-type: none"> <li>• threats from extrinsic human-induced factors such as competition/predation by introduced species or the effects of hybridization, toxins and pollutants; or</li> </ul>	May be very difficult to assess, given unknown factors, such as, baseline species status at the time of introduction of an invasive species, temporal initial occurrence of introduction of invasive species, or onset of hybridization. Illegal introduction of non-resident walleye ( <i>Stizostedion vitreum</i> ) has potentially affected larval distribution of the Canadian portion of the Columbia River mainstem (UCRRP 2002).
<ul style="list-style-type: none"> <li>• a decreasing recruitment</li> </ul>	As above, length-frequency distributions for populations and age analyses show regular recruitment is occurring in the mainstem Fraser River (RL&L 2000; Yarmish and Toth 2002). Conversely, evidence from studies in the Nechako, Kootenay and upper Columbia River populations indicate recruitment failure (RL&L 2000; Hildebrand et al. 1999; Duke et al 1999).
<b>D) If not included in Appendix I, is likely to satisfy one or more of criteria A-C within 5 years?</b>	

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

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

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

<p style="text-align: center;"><b>Criterion</b></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;"><b>NOTES</b></p> <p><b>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).</b></p>
<p><b>Trade Criterion</b> Is or may the <u>species</u> be <u>affected by trade</u>?</p>	<p>In spite of commercial fisheries closures and restrictions on recreational harvest in the late 1980's/early 1990's, white sturgeon continues to be a highly valued species today. In light of the current difficulties in identifying captive bred vs. wild stock in origin sturgeon, and potential for increasing demand for white sturgeon product in international markets, there is the possibility poaching and illegal trade could have detrimental impacts on the wild population.</p> <p>We suggest adding to the criterion the word "international" before the word "trade".</p>

<p><b>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.</b></p>	<p>This is an applicable criterion for assessing white sturgeon. The Appendix II listing in 1998, and quotas allocated for the commercial fishery in the Columbia River, have been necessary to prevent overharvest and, thus, the need to include the species in Appendix I. The Columbia River Accord was signed in 1989, to allow for joint management of the species of the Columbia River by the States of Washington and Oregon. Declines of all white sturgeon stocks occurred over decades, and it was necessary to allocate quotas to provide protection for the species while allowing for increased recruitment and recovery of the Columbia River stock. All other white sturgeon populations in the U.S. are closed to commercial harvest. All other white sturgeon exports originate from captive conditions. Currently white sturgeon products originating in Canada and destined for trade are captive in origin, and have posed no detrimental effects to the wild population. Commercial aquaculture in BC is controlled and will soon be regulated under a provincial sturgeon aquaculture policy. It is expected that there will be no extra protection offered to the wild population under an Appendix I listing.</p>
<p><b>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:</b></p>	
<p><b>B)(i)</b> Exceeding, over an extended period, the level that can be continued to perpetuity.</p>	<p>This is an important criterion because it can encompass wild harvest and/or recruitment overfishing. See A above, for information regarding conservation measures taken for the lower Columbia River population. Given captive rearing for trade takes place within the province of BC in a controlled regulatory environment, there is little chance (aside from potential for poaching/illegal harvest) that international trade has, or may have detrimental impacts on the wild population. As noted above in criteria for Appendix I listing, the major limiting factors threatening all populations are continued habitat loss and contamination.</p>
<p><b>B)(ii)</b> Reducing it to a population level at which its survival would be threatened by other influences.</p>	<p>Give examples of “other influences” here. For white sturgeon "other influences" might be: disease, hybridization, or a large pollution event, such as an oil spill.</p>

<p><b>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.</b></p>	<p>White sturgeon was originally listed under CITES Appendix II for meeting the ‘look-alike’ criteria under Res. Conf. 9.24. While advances have been made in differentiating sturgeon products in trade (e.g. Environment Canada’s CITES identification guide to sturgeons and paddlefish, 2001), this criterion still applies.</p>
<p><b>D) There are compelling reasons, other than those given in C to ensure that effective control of trade in currently listed species is achieved.</b></p>	<p>The caviar trade is particularly vulnerable to illegal harvest and trade. Entry into the fishery is relatively easy, and harvest of even one large female can garner thousands of dollars in profit. The product is small, easily transported, and extremely valuable. Including comments from enforcement agents might be a consideration when proposing a species, such as sturgeon, for listing.</p>

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

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

## References and information sources:

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### Definitions, explanations and guidelines

#### **Species**

In Article I of the Convention the term species is defined as "any species, subspecies or geographically separate population thereof".

Species and subspecies refer to the biological concept of a species, and do not require any further definition.

The two terms also cover varieties.

"Geographically separate population" refers to parts of a species or a subspecies within particular geographical boundaries. This can also refer to populations or subpopulations, or, for the sake of convenience in certain cases, to 'stocks' as the term is understood in fisheries management.

Until now, the Conference of the Parties has interpreted 'geographically separate populations' as populations delimited by geopolitical boundaries, whereas they have rarely used the other option of geographical boundaries.

#### **Affected by trade**

A species "is or may be affected by trade" if:

1. it is known to be in trade, and that trade has or may have a detrimental impact on the status of the species; or
2. it is suspected to be in trade, or there is potential international demand for the species, that may be detrimental to its survival in the wild.

#### **Area of distribution**

Area of distribution of a species is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of occurrence, excluding cases of vagrancy and introductions outside its natural range (though inferring and projecting area of occurrence should be undertaken carefully, and in a precautionary manner). The area within the imaginary boundary should, however, exclude significant areas where the species does not occur, and so in defining an area of distribution, account should be taken of discontinuities or disjunctions in the spatial distribution of species. For migratory species, the area of distribution is the smallest area essential at any stage for the survival of that species (e.g., colonial nesting sites, feeding sites for migratory taxa, etc.). For some species for which data were available to make an estimate, a figure of less than 10,000 km<sup>2</sup> has been found to be an appropriate 18guideline (not a threshold) of what

constitutes a restricted area of distribution. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable to all taxa. There will be many cases where this numerical guideline does not apply.

## Decline

A decline is a reduction in the abundance, or area of distribution, of a species. Decline can be expressed in two different ways: (i) the overall long-term extent of decline or (ii) the recent rate of decline. The long-term extent of decline is the total estimated or inferred percentage reduction from a baseline level of abundance or area of distribution. The recent rate of decline is the percentage change in abundance or area of distribution over a recent time period. The data used to estimate or infer a baseline for extent of decline should extend as far back into the past as possible.

A general guideline for a marked historical extent of decline is a percentage decline to 5%-30% of the baseline, depending on the reproductive biology of the species. The extremes of 5% and 30% will be applicable to only a relatively small number of species, but some species may even fall outside of these extremes. However, both these figures are presented only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology (\*see footnote with respect to application of decline to commercially exploited aquatic species).

A general guideline for a marked recent rate of decline is a percentage decline of 50% or more in the last 10 years or three generations, whichever is the longer. If the population is small, a percentage decline of 20% or more in the last 5 years or 2 generations (whichever is the longer) may be more appropriate. However, these figures are presented

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\* Application of decline for commercially exploited aquatic species:

In marine and large freshwater bodies, a narrower range of 5-20% is deemed to be more appropriate in most cases, with a range of 5-10% being applicable for species with high productivity, 10-15% for species with medium productivity and 15-20% for species with low productivity. Nevertheless some species may fall outside this range.

In general, historical extent of decline should be the primary criterion for consideration of listing in Appendix I. However, in circumstances where information to estimate extent-of-decline is limited, rate-of-decline over a recent period could itself still provide some information on extent-of-decline.

For listing in Appendix II, the historical extent of decline and the recent rate of decline should be considered in conjunction with one another. The higher the historical extent of decline, and the lower the productivity of the species, the more important a given recent rate of decline is.

A general guideline for a marked recent rate of decline is the rate of decline that would drive a population down within approximately a 10-year period from the current population level to the historical extent of decline guideline (i.e. 5-20% of baseline for exploited fish species). There should rarely be a need for concern for populations that have exhibited an historical extent of decline of less than 50%, unless the recent rate of decline has been extremely high.

Even if a population is not declining appreciably, it could be considered for listing in Appendix II if it is near the extent-of-decline guidelines recommended above for consideration for Appendix I-listing. A range of between 5% and 10% above the relevant extent-of-decline might be considered as a definition of 'near'.

A recent rate-of-decline is important only if it is still occurring, or may resume, and is projected to lead to the species reaching the applicable point for that species in the Appendix I extent-of-decline guidelines within approximately a 10-year period. Otherwise the overall extent-of-decline is what is important. When sufficient data are available, the recent rate-of-decline should be calculated over approximately a 10-year period. If fewer data are available, annual rates over a shorter period could be used. If there is evidence of a change in the trend, greater weight should be given to the more recent consistent trend. In most cases, listing would only be considered if the decline is projected to continue.

only as examples, since it is impossible to give numerical values that are applicable to all taxa because of differences in their biology.

The historical extent of decline and the recent rate of decline should be considered in conjunction with one another. In general, the higher the historical extent of decline, and the lower the productivity of the species, the more important a given recent rate of decline is.

In estimating or inferring the historical extent of decline or the recent rate of decline, all relevant data should be taken into account. A decline need not necessarily be ongoing. If data are available only for a short period and the extent or rate of decline based on these data are cause for concern, the guidelines above (extrapolated as necessary or relevant) should still apply. However, natural fluctuations should not normally count as part of a decline, but an observed decline should not necessarily be considered part of a natural fluctuation unless there is evidence for this. A decline that is the result of legal activities carried out pursuant to a harvesting programme that reduces the population to a planned level, not detrimental to the survival of the species, is not covered by the term "decline".

#### Extended period

The meaning of the term extended period will vary according to the biological characteristics of the species. Selection of the period will depend upon the observed pattern of natural fluctuations in the abundance of the species and on whether the number of specimens removed from the wild is consistent with a sustainable harvesting programme that is based on these natural fluctuations.

#### **Fluctuations**

Fluctuations in population size or area of distribution are considered large when the population size or area in question varies widely, rapidly or frequently. Where data exist to make an estimate, one order of magnitude has been found to be an appropriate guideline (not a threshold) for population size. Similarly, fluctuations can be considered 'short term' if the period of fluctuation is about two years. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable to all taxa. There will be many cases where this numerical guideline does not apply.

#### **Fragmentation**

Fragmentation refers to the case where most individuals within a taxon are found in small and relatively isolated sub-populations, which increases the probability that these small sub-populations will become extinct and the opportunities for re-establishment are limited. For some species in trade where data exist to make an estimate, an area of distribution of 500 km<sup>2</sup> or less for each subpopulation has been found to be an appropriate guideline (not a threshold) of what constitutes fragmentation. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable to all taxa. There will be many cases where this numerical guideline does not apply.

#### **Generation length**

Generation length is the average age of <sup>20</sup>parents of the current cohort (i.e.,

newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural (i.e., pre-disturbance) generation length should be used.

### **Near future**

Refers to a time period in which it can be projected or inferred that a species would satisfy one (or more) of the criteria in Annex I unless it is included in Appendix II. Clearly this period will be taxon- and case- specific, however, 5-10 years may be considered a useful guideline. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable to all taxa. There will be many cases where this numerical guideline does not apply.

### **Population issues**

#### Population

Population refers to the total number of individuals of the species (as “species” is defined in Article 1 of the Convention and in this Annex (to be considered in light of any decision arising from consideration of Doc. 12.59)

#### Sub-population

Sub-populations are defined as geographically or otherwise distinct groups in the population between which there is limited genetic exchange.

#### Population size

When providing details on the size of a population or sub-population, it should be made clear whether the information presented relates to an estimate of the total number of individuals or to the effective population size (i.e., individuals capable of reproduction, excluding individuals that are environmentally and behaviourally or otherwise reproductively suppressed in the wild) or to another appropriate measure or component of the population.

In the case of species biologically dependent on other species for all or part of their life cycles, biologically appropriate values for the host or co-dependent species should be chosen.

#### Small wild population

For some species where data exist to make an estimate, a figure of less than 5,000 individuals has been found to be an appropriate guideline (not a threshold) of what constitutes a small wild population. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable to all taxa. There will be many cases where this numerical guideline does not apply.

#### Very small wild sub-population

For some species where data exist to make an estimate, a figure of less than 500 individuals has been found to be an appropriate guideline (not a threshold) of what constitutes a very small sub-population. However, this figure is presented only as an example, since it is impossible to give numerical values that are applicable

to all taxa. There will be many cases where this numerical guideline does not apply.

### **Possibly extinct**

A species is possibly extinct when exhaustive surveys in known and/or suspected habitat, and at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Before a species can be declared possibly extinct, surveys should take place over a time-frame appropriate to the species' life cycle and life form.

### **Recruitment**

Recruitment is the total number of individuals added to any particular demographic class of a population by either sexual or asexual reproduction.

### **Threatened with extinction**

Threatened with extinction is defined by Annex 1. The vulnerability of a species to threats of extinction depends on its population demographics, biological characteristics (such as body size, trophic level, life cycle, breeding structure or social structure requirements for successful reproduction), and vulnerability due to aggregating habits, natural fluctuations in population size, and/or residency/migratory patterns. This makes it impossible to give numerical threshold values for population size or area of distribution that are applicable to all taxa.

### **Vulnerability**

Vulnerability can be defined as the susceptibility to intrinsic or external effects which increase the risk of extinction. There are a number of taxon- or case-specific biological and other factors that may affect the extinction risk associated with a given percentage decline, small population size or restricted area of distribution. These can be, but are not limited to, aspects of any of the following:

- Life history (e.g., low fecundity, slow growth rate, high age at first maturity, long generation time)
- Low absolute numbers or biomass or restricted area of distribution
- Population structure (age/size structure, sex ratio)
- Behavioural factors (e.g., social structure, migration, aggregating behaviour)
- Density (for sessile or semi-sessile species)
- Specialized niche requirements (e.g., diet, 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)
- Endemism
- Threats from disease or invasive species
- Rapid environmental change (e.g., climate regime shifts)
- Selectivity of removals (that may compromise recruitment)