

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.

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| Name(s) and affiliation(s) of reviewer(s): Dr Vin Fleming CITES Scientific Authority (Fauna0 Joint Nature Conservation Committee Monkstone House City Road Peterborough PE1 1JY United Kingdom |
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|--|
| Contact person: as above |
| Contact address: as above |
| Tel: + 44 (0)1733 866870 Fax: + 44 (0)1733 866855 e-mail: vin.fleming@jncc.gov.uk |

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| Taxon reviewed (including common and taxonomic names): <i>Probarbus jullieni</i> Jullien's golden carp / Isok Barb (English) Barbeau de Jullien (French) Carpilla ikan temoleh (Spanish) Sources of information for review: http://www.cites.org/eng/cttee/animals/16/16-8-1.pdf http://www.cites.org/eng/cttee/animals/16/16-8-1-1.pdf www.fishbase.org |
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| Please return your completed paper or electronic document to one of the below: |
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Review of applicability of CITES criteria - *Probarbus jullieni* -

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| <p>Margarita A. Clemente Muñoz Presidenta del Comité de Flora CITES Universidad de Córdoba / Jardín Botánico Avenida de Linneo s/n E-14004 CÓRDOBA Spain / España / Espagne email cr1clmum@uco.es</p> | <p>Thomas Althaus Chair of the CITES Animals Committee Federal Veterinary Office Schwarzenburgstrasse 161 CH-3097 LIEBEFELD Switzerland / Suiza / Suisse email: thomas.althaus@bvet.admin.ch</p> |
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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

| CRITERION | NOTES |
|--|--|
| <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>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> |

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| <p>Trade Criterion Is or may the species be affected by trade?</p> | <p>There is clear evidence that the species is in demand in trade as a food item. Evidence also indicates that much of this trade is cross-border and is invariably illegal (no legal transactions recorded in CITES trade database). The species commands high prices due to its scarcity and its value as a food fish.</p> <p>No problems encountered in applying this criterion</p> |
| <p>A) The wild population is small, and is characterized by at least one of the following (see definitions below):</p> | <p>What was/is the estimated size of the population? Please include units of measurement.</p> <p>There are no hard estimates of population size available against which to assess this criterion. The species is unlikely to meet this criterion, especially if non-mature individuals in the population (eggs, fry etc) were to be counted (i.e. even a small population of mature individuals could give rise to a large population of eggs, juveniles etc). Data insufficient to estimate if it would meet this criterion if effective population size only counted.</p> <p>The guidance provided in the IUCN 2001 red list criteria relating to ‘mature individuals’ are relevant also to any reference to ‘effective population size’ in the CITES revised draft criteria. Indeed, for a species such as this (or for other species), it is difficult to see why CITES does not harmonise its measure of population size with that of IUCN – namely by referring only to mature individuals when assessing the population size criterion. Such an approach would thus be consistent with IUCN red list assessments and also be more precautionary.</p> |
| <p>A)(i) an observed, inferred or projected decline in the number of individuals or the area and quality of habitat; or</p> | <p>N/A</p> |
| <p>A)(ii) each sub-population being very small; or</p> | <p>What were/are the estimated sizes of the subpopulation(s)? Please include units of measurement.</p> <p>N/A</p> |
| <p>A)(iii) a majority of individuals, during one or more life-history phases, being concentrated in one sub-population; or</p> | <p>N/A</p> |

Review of applicability of CITES criteria - *Probarbus jullieni* -

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| <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>N/A</p> |
| <p>A)(v) a high vulnerability due to the species' biology or behaviour (including migration).</p> | <p>N/A</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>Arguably, the species meets this criterion. The species is / was known from only 6 river systems / water bodies (now extant in only 3-4). Its area of distribution is further restricted because of its reliance on spawning beds located in the upper reaches of the river systems which it occupies. However, in both cases, it has not been possible for the reviewer to quantify an area of distribution in km².</p> <p>The guidance in Annex 5 was not particularly helpful for a species occupying long, linear habitats such as rivers (these do not easily convert into areas of distribution). Clearly, it would be possible to convert this distribution into some sort of quantitative measure if greater time was available. The reference in Annex 5 to recognizing that, for migratory species such as <i>Probarbus</i>, it is the <u>smallest</u> area of distribution essential for the survival of the species (in this case spawning beds) is important and perhaps deserves greater emphasis in the guidance.</p> |
| <p>B)(i) fragmentation or occurrence at very few locations; or</p> | <p>The populations are not fragmented in the sense defined in Annex 5. Whilst restricted to a small number of river systems, these probably do not correspond to 'locations'.</p> <p>No guidance is provided in Annex 5 as to what constitutes a 'location'. By contrast, IUCN red list criteria do define a location – it would be helpful to borrow this definition for the CITES criteria.</p> |
| <p>B)(ii) large fluctuations in the area of distribution or the number of</p> | <p>No fluctuations in area of distribution or number of sub-populations known to the reviewer.</p> |

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| <p>sub-populations; or</p> | |
| <p>B)(iii) a high vulnerability due to the species' biology or behaviour (including migration); or</p> | <p>The species appears to meet this criterion. Its need to migrate upriver to spawning beds means the species is vulnerable to dams preventing movements or to the loss of spawning beds to dams / forestry operations etc. The use of flooded forest as a nursery habitat for juvenile fish also increases the species' vulnerability to habitat change.</p> <p>No need for any changes to the criterion.</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>Yes -in this case, there are measurable losses in area of distribution</p> <p>No problem in applying this criterion</p> |
| <ul style="list-style-type: none"> • the area of habitat; or | <p>Yes - in this case, there are clear cases of the area of habitat being reduced (e.g. loss of spawning habitat or access to it obstructed).</p> <p>No problem in applying this criterion</p> |
| <ul style="list-style-type: none"> • the number of sub-populations; or | <p>Yes - extirpation recorded from two river basins and losses in two others (with populations restored or supported by release of juvenile fish).</p> <p>No problem in applying this criterion</p> |
| <ul style="list-style-type: none"> • the number of individuals; or | <p>Yes – decline in catches, size of fish caught and catch per unit effort recorded (see below).</p> <p>No problem in applying this criterion</p> |
| <ul style="list-style-type: none"> • the quality of habitat; or | <p>Yes – loss of spawning habitat etc. Also industrial pollution in some areas.</p> <p>No problem in applying this criterion</p> |
| <ul style="list-style-type: none"> • the recruitment. | <p>Not known – though a decline in recruitment may be likely due to reductions in numbers of mature fish?</p> |

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| <p>C) A marked <u>decline in population size</u> in the wild, which has been either (see definitions below):</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>Catches in many areas are reportedly reduced to 10-20% of former levels despite increased effort. These declines in catches have occurred over the period from 1960s to the present. In addition, the reported typical size of caught fish has declined from up to 60kg to typically less than 10kg today. Populations are increasingly dominated by younger / smaller fish or the species is rare / expirpated.</p> <p>No problem in applying this criterion</p> |
| <p>C)(i) observed as ongoing or as having occurred in the past (but with a potential to resume); or</p> | <p>The species meets this criterion readily on the basis of available information. The species also falls within the parameters of decline suggested in Annex 5 for commercially exploited aquatic species, namely having a historical extent of decline to <20% of baseline.</p> <p>Generally no difficulties in interpreting this criterion with the exception below. However, not clear into which class (high, medium or low) of productivity this fish should be placed. Here taken as being ‘medium productivity’ but the decline is still consistent with meeting the criterion. However, to aid interpretation of this criterion for commercially exploited aquatic species, some indication should be provided as to how productivity of such species should be assessed (it is not always straightforward) – e.g. how are high, medium or low productivities distinguished.</p> |
| <p>C)(ii) inferred or projected on the basis of any one of the following:</p> | |
| <ul style="list-style-type: none"> • a decrease in area of habitat; or | <p>Decline can be inferred / projected based on ongoing losses of critical habitat</p> |
| <ul style="list-style-type: none"> • a decrease in quality of habitat; or | <p>Decline can be inferred / projected based on deterioration in habitat quality</p> |

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| <ul style="list-style-type: none"> • levels or pattern of exploitation; or | Decline can be inferred / projected based on levels and pattern of existing targeted exploitation |
| <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 | Decline can be inferred / projected based on impact of dams, pollution etc |
| <ul style="list-style-type: none"> • a decreasing recruitment | Less clear if this criterion applies but with reduction in range and population size and age of fish etc, likely that overall recruitment is diminished. |
| D) If not included in Appendix I, is likely to satisfy one or more of criteria A-C within 5 years? | Indications from above are: yes. [There appears to be a inconsistency of logic between this criterion and criterion A for listing under Appendix II – see comments there.] |

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

- | | | |
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| <input type="checkbox"/> low fecundity | <input checked="" type="checkbox"/> specialized niche requirements (e.g. diet and habitat) | <input type="checkbox"/> threats from disease |
| <input type="checkbox"/> slow growth rate | <input type="checkbox"/> species associations such as symbiosis and other forms of co-dependency | <input type="checkbox"/> threats from invasive species |
| <input 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. dams) |
| <input type="checkbox"/> distorted age, size or sex ratio | <input type="checkbox"/> reduced genetic diversity | <input type="checkbox"/> selectivity of removals (that may compromise recruitment) |
| <input type="checkbox"/> complex social structure | <input 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;">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> |
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| <p>Trade Criterion Is or may the species be affected by trade?</p> | <p>There is clear evidence that the species is in demand in trade as a food item. Evidence also indicates that much of this trade is cross-border and is invariably illegal (no legal transactions recorded in CITES trade database). The species commands high prices due to its scarcity and its value as a food fish.</p> <p>No problems encountered in applying this criterion</p> |

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| <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>The assessment above indicates that this species meets this criterion, and indeed some Appendix I criteria, already. A proportion of the trade, at least, is cross-border and so international. However, much of the exploitation may be driven by internal demand within countries.</p> <p>See comments above re criterion D for Appendix I – there appears to be a logical inconsistency between criterion D for Appendix I and criterion A here for Appendix II. This criterion (A) suggests a species can qualify for Appendix II to prevent it becoming eligible for Appendix I in the near future (5-10 years) whilst criterion D above advocates listing in Appendix I if it is likely to meet the criteria within 5 years? With a few species that may meet Appendix I criteria in the near future, these criteria give two options as to the way forward and no clear guidance as to how Parties should approach this. It might be appropriate to give parties guidance on this issue.</p> <p>However, these criteria might be reconciled if the ‘near future’ was defined as 5-10 years (i.e. as a fixed period and not as an example) to avoid overlap with criterion D above. <u>Or</u>, if criterion D was reserved for species already on Appendix II (which could then be uplisted to Appendix I) and this criterion (A) was used to add new species to Appendix II in an effort to prevent them becoming eligible for Appendix I in the future.</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>B)(i) Exceeding, over an extended period, the level that can be continued to perpetuity.</p> | <p>The declines in the fishery indicate that the species is being exploited at unsustainable levels – especially in combination with other threats such as loss of spawning beds etc. This exploitation is made worse by the practice of targeting fishing during reproductive migrations and at spawning periods (the eggs are valued as food source).</p> <p>No problems with this criterion even though hard data on the (un)sustainability of harvests not available – these can be inferred from the data that is available.</p> |
| <p>B)(ii) Reducing it to a population level at which its survival would be threatened by other influences.</p> | <p>The species is clearly being reduced to levels at which other factors, such as depensation, may affect its survival. However, firm evidence of this is not available.</p> <p>Some direct reference to the vulnerability of a species to ‘other influences’ would seem sensible</p> |

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| | in this criterion. Perhaps re-wording as ‘ <i>reducing it to a population level at which its vulnerability to other factors would be increased</i> ’?? The definition of vulnerability should include some reference to the stochastic risk to which small populations are prone? |
| 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. | Not thought to be a problem with this species hitherto. However, two other species of <i>Probarbus</i> (<i>P.labeamajor</i> and <i>P. labeaminor</i> – both data deficient in IUCN red list) are described from the Thailand and Cambodia. These may have been confused with <i>P jullieni</i> in the past and are likely to be subject to the same ecological and trade pressures. Look-alike issues between these species would merit further investigation. |
| D) There are compelling reasons, other than those given in C to ensure that effective control of trade in currently listed species is achieved. | None. |

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

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

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 km² has been found to be an appropriate guideline (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 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

* 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.

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 km² 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 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
- Dependence (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)