

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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Information sources for the review:	
<p>Cicogna, F. & Cattanea, R. 1993. Il corallo rosso in mediterraneo: arte, storia e scienza. Ministero Politriche Agricola, Roma.</p> <p>García-Rodríguez, M. & Massó, C. 1986. Estudio biométrico de poblaciones de coral rojo (<i>Corallium rubrum</i> L.) del litoral de Gerona (NE de España). Bol. Inst. Esp. Oceanogr., 3(4), 61-64.</p> <p>García-Rodríguez, M. & Massó, C. 1986. Algunas bases para la determinación directa de la edad del coral rojo (<i>Corallium rubrum</i> L.) Bol. Inst. Esp. Oceanogr., 3(4), 65-74.</p> <p>García-Rodríguez, M. & Massó, C. 1986. Modelo de explotación por buceo del coral rojo (<i>Corallium rubrum</i> L.) del Mediterráneo. Bol. Inst. Esp. Oceanogr., 3(4), 75-82.</p> <p>Garrabou, J. & Harmelin, JG. 2002. A 20 year study on life-history traits of a harvested long-lived temperate coral in NW Mediterranean: insights into conservation and management. Journal of Animal Ecology 71, 966-978.</p> <p>Grigg, RW. 1984. Resource management of precious corals: a review and application to shallow water reef building corals. Marine Ecology 5, 57-74</p> <p>Ortiz, A., Massó, C., Soriano, O. & Limia, J. 1986. La barra italiana como arte de pesca del coral rojo (<i>Corallium rubrum</i> L.) en el mar de Alborán (SE de España). Bol. Inst. Esp. Oceanogr., 3(4), 83-92.</p> <p>Rossi, S., Gili, L.M. & Tsounis, G. 2003. La extracción abusiva impide que el coral rojo se recupere. Quercus, 211 (Sept. 2003), 14-19. Madrid.</p> <p>Santangelo, G & Abbiati, M. 2001. Red coral: conservation and management of an</p>	

over-exploited Mediterranean species. Aquatic Conservation: marine & freshwater Ecosystems 11, 253-259.

Santangelo, G, Carletti, E, Maggi, E. & bramanti, L. 2003. Reproduction and population sexual structure of the over-exploited Mediterranean red coral *Corallium rubrum*. Marine Ecology Progress series 248, 99-108.

Taxon reviewed (including common and taxonomic names):

Corallium rubrum

Red coral (English)

Corail rouge (French)

Coral rojo (Spanish)

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;">CRITERON</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 species be affected by trade?</p>	<p>The species meets this criterion. Red coral has been traded since ancient times and it continues to be used for jewelry and for homeopathic medicine. Harvesting colonies for trade (at c.25,000kg <i>per annum</i>) has measurable impacts on colony size and age structure and has led to reported over-exploitation of some populations.</p> <p>No problem in applying or interpreting this criterion.</p>
<p>A) The wild population is small, and is characterized by at</p>	<p>What was/is the estimated size of the population? Please include units of measurement.</p>

Review of applicability of the CITES criteria – *Corallium rubrum*

<p>least one of the following (see definitions below):</p>	<p>There is no estimate for the size of the population. However, the species is widely distributed (see below) and whilst colonies are local and of varying density, it is unlikely that the population could be considered small as defined in Annex 5. Populations are always measured by numbers of settled / sessile colonies – larval populations after reproduction are likely to be very large.</p> <p>As red coral is able to reproduce from 2-5 years of age, nearly all population estimates will be of mature ‘individuals’ / effective population size. In biological terms, it does not make sense to count any other part of the population. The guidance in Annex 5 could be amended to reflect this and to make such assessments consistent with IUCN red list criteria. In addition, for colonial animals such as red coral, the guidance should indicate that population size should be inferred through the number and size of the colonies counted, given that different sizes of colonies contribute in a very different way to the reproduction of the population (as they contain a greater number of individual polyps).</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>No problem in applying or interpreting this criterion.</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>If considering the size of colonies as a base to assess population size, there is a clear decline on the natural populations. This criteria affects also to subpopulations.</p> <p>No problem in applying or interpreting this criterion</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>
<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>N/A</p>

<p>A)(v) a high vulnerability due to the species' biology or behaviour (including migration).</p>	<p>Slow growth rate and low fecundity are related . Small colonies contribute very little to population increase (page 11)</p> <p>No problem in applying or interpreting this criterion</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>No quantitative data available on the area of distribution. The species is widely, if locally, distributed through the Mediterranean and Iberian and North African Atlantic coasts and at depths from 5-300m, preferring submarine caves. The species seems unlikely to meet this criterion</p> <p>No problem in applying or interpreting this criterion</p>
<p>B)(i) fragmentation or occurrence at very few locations; or</p>	<p>N/A</p>
<p>B)(ii) large fluctuations in the area of distribution or the number of sub-populations; or</p>	<p>N/A</p>
<p>B)(iii) a high vulnerability due to the species' biology or behaviour (including migration); or</p>	<p>Slow growth rate and low fecundity are related . Small colonies contribute very little to population increase (page 11)</p> <p>No problem in applying or interpreting this 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>N/A</p>
<ul style="list-style-type: none"> • the area of habitat; or 	<p>N/A</p>

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<ul style="list-style-type: none"> the number of sub-populations; or 	N/A
<ul style="list-style-type: none"> the number of individuals; or 	<p>Slow growth rate and low fecundity are related . Small colonies contribute very little to population increase (page 11)</p> <p>No problem in applying or interpreting this criterion</p>
<ul style="list-style-type: none"> the quality of habitat; or 	N/A
<ul style="list-style-type: none"> the recruitment. 	<p>Slow growth rate and low fecundity are related . Small colonies contribute very little to population increase (page 11)</p> <p>No problem in applying or interpreting this criterion</p>

<p>C) A marked decline in population size in the wild, which has been either (see definitions below):</p>	<p>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.)</p> <p>Recent rate of decline - Characterize the recent (10-20 year) trends in population size or area of distribution (please specify which).</p> <p>There is no evidence of any decline in the overall area of distribution despite the long history of exploitation to which this species has been subject. Likewise, whilst exploitation has an impact on the size and age structure of populations, it rarely results in their extirpation, though colonies are slow to recover from exploitation. The major evidence for a decline in population is a decline in overall Mediterranean harvests of 40% from 1987 – 1996. This level of decline is insufficient to meet the guidelines for decline in commercially exploited aquatic species (to 5-20% of baseline) for Appendix I – even for a low productivity species. However, if considering the size of colonies as a base to assess population size, there is also a clear decline in the natural populations – because the reproductive individual is the polyp and not the colony. However, even incorporating this approach, it is not clear that the species meets the threshold for this decline criterion.</p> <p>No difficulty in interpreting the criterion <i>per se</i> – applying it to red coral is difficult because shallow water populations are not exploited (because they are of low value for jewelry) but deep water (high value) populations are targeted for harvesting. Populations therefore unlikely to reduce in range but there can be differential effects on populations within the same area. It should be taken into account that the reproductive individual is the polyp and not the colony. Thus whilst a population may remain extant, changes to its structure through harvesting (e.g. a shift from large colonies to small colonies), represents a decline in the number of individual polyps and thus reproductive potential / recruitment etc. Guidance in Annex 5 on measuring decline in colonial animals would be advantageous.</p>
<p>C)(i) observed as ongoing or as having occurred in the past (but with a potential to resume); or</p>	<p>Long history of exploitation but this has not resulted in a reduction in range or numbers of populations but it has had an impact on population dynamics and yield (see comments above on colony size). These at levels that do not indicate they meet Appendix I criteria.</p>

Review of applicability of the CITES criteria – *Corallium rubrum*

C)(ii) inferred or projected on the basis of any one of the following:	
<ul style="list-style-type: none"> • a decrease in area of habitat; or 	No
<ul style="list-style-type: none"> • a decrease in quality of habitat; or 	No
<ul style="list-style-type: none"> • levels or pattern of exploitation; or 	Whilst historically exploited for jewelry, the recently developed coral paste (coral powder mixed with synthetic resins) is made with coral of all sizes. This has, in fact, led to new patterns of exploitation (often illegal) which affect small colonies and the bases of coral colonies which are completely extracted from the substrate, resulting in a loss of individuals and substrate available (through being occupied by other organisms).
<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 	New threat from global warming which has adversely affected some shallow-water populations.
<ul style="list-style-type: none"> • a decreasing recruitment 	However, red coral has poor dispersal abilities and over-exploitation in a given area may reduce recruitment. Theory says that in sessile modular organisms in general, larger colonies have bigger reproduction capacity. The reduction in the size of many individual colonies due to harvesting is likely to lead to reduced recruitment.
D) If not included in Appendix I, is likely to satisfy one or more of criteria A-C within 5 years?	<p>Not on present trends and patterns of exploitation.</p> <p>No problem in applying or interpreting this criterion</p> <p>[There appears to be a inconsistency of logic between this criterion and criterion A for listing under Appendix II – see comments below.]</p>

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

X? low fecundity

slow growth rate

high age at first maturity

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- 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) See comments of C, ii, levels or patterns of exploitation, related to coral paste.

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 species be affected by trade?</p>	<p>Yes – as above</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>The species is unlikely to meet Appendix I criteria in the near future based on current trends and patterns of exploitation.</p> <p>See comments above re criterion D for Appendix I – there appears to be inconsistent logic between these two criteria. This criterion (A) suggests a species can qualify for Appendix II in order 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? For those species that may meet Appendix I criteria in the near future, these criteria then 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 fixed as 5-10 years (i.e. 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 up-listed to Appendix I) and this criterion (A) was used to add ‘new’, currently un-listed 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 species probably meets this criterion. Harvests have declined in recent decades to 40-50% of previous levels. The size and age structure of populations are affected by harvesting and full recovery may take many decades due to slow growth of red coral. In addition, the reduction in the size of colonies results in an overall decline in the number of individual polyps and thus of reproductive potential (as stated above). However, detailed information on population dynamics of exploited populations is limited.</p> <p>No problem in applying or interpreting this criterion</p>
<p>B)(ii) Reducing it to a population level at which its survival would be threatened by other influences.</p>	<p>The species does not appear to meet this criterion because shallow water populations are not exploited (but note recent shift towards harvesting for coral paste) and so remain as a potential source of recruits to exploited deep water populations; full recovery of deep water populations may take many decades but red coral are sexually mature at 2-5 years of age.</p>

	No problem in applying or interpreting this criterion
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>Yes – the species closely resembles other <i>Corallium</i> species found in the Pacific and which are also traded for jewelry and ornament.</p> <p>This criterion relatively simple to apply but further work needed here to assess the degree of similarity between these species.</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.	No.

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

- | | | |
|--|--|---|
| <input checked="" type="checkbox"/> low fecundity | <input type="checkbox"/> species associations such as symbiosis and other forms of co-dependency | <input checked="" type="checkbox"/> selectivity of removals (that may compromise recruitment) |
| <input checked="" type="checkbox"/> slow growth rate | <input type="checkbox"/> fragmentation and habitat loss | <input checked="" type="checkbox"/> Other (please specify) See comments of C, ii, (Appendix I) levels or patterns of exploitation., related to coral paste. |
| <input type="checkbox"/> high age at first maturity | <input checked="" 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 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 checked="" type="checkbox"/> low population density (for sessile or semi-sessile species) | <input checked="" type="checkbox"/> threats from rapid environmental change (e.g. climate regime shifts) | |
| <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)