



GUIDELINES FOR APPROPRIATE USES OF IUCN RED LIST DATA

**Incorporating the Guidelines for Reporting on Proportion
Threatened and the Guidelines on Scientific Collecting of
Threatened Species**

Version 2 (July 2011)

Citation: IUCN. 2011. Guidelines for appropriate uses of IUCN Red List Data. Incorporating the Guidelines for Reporting on Proportion Threatened and the Guidelines on Scientific Collecting of Threatened Species. Version 2. Adopted by the IUCN Red List Committee and IUCN SSC Steering Committee. Downloadable from:

http://intranet.iucn.org/webfiles/doc/SpeciesProg/RL_Guidelines_Data_Use.pdf or
http://www.iucnredlist.org/documents/RL_Guidelines_Data_Use.pdf

GUIDELINES FOR APPROPRIATE USES OF RED LIST DATA

The IUCN Red List of Threatened Species™ is the world's most comprehensive data resource on the status of species, containing information and status assessments on over 40,000 species of animals, plants and fungi. As well as measuring the extinction risk faced by each species, the IUCN Red List includes detailed species-specific information on distribution, threats, conservation measures, and other relevant factors. The IUCN Red List of Threatened Species™ is increasingly used by scientists, governments, NGOs, businesses, and civil society for a wide variety of purposes.

These Guidelines are designed to encourage and facilitate the use of IUCN Red List data and information to tackle a broad range of important conservation issues. These Guidelines give a brief introduction to *The IUCN Red List of Threatened Species™* (hereafter called the IUCN Red List), the Red List Categories and Criteria, and the Red List Assessment process, followed by some key facts that all Red List users need to know to maximally take advantage of this resource. More detailed information on the IUCN Red List is available, and references are provided at the end of this document. Finally, these Guidelines include a table giving examples of the wide variety of uses to which IUCN Red List data and information can be utilized, and outlining a few common errors and pitfalls to avoid.

The IUCN Red List of Threatened Species™

The IUCN Red List is a searchable online database (www.iucnredlist.org), and users can register to freely download data. Only after the data have been through a transparent and thorough process of peer review, are they added to the database.

The IUCN Red List Assessment Process

The IUCN Red List is developed through contributions from a network of thousands of scientific experts around the world both within the IUCN community and beyond -- including universities, museums, and NGOs. It uses a scientific process based upon objective criteria. Assessments are impartial, independent, and not politically driven. This approach allows for a robust and rigorous peer review process of all incoming data. Assessments are periodically updated to ensure current information is available for users. The IUCN Red List is therefore a synthesis of the best available species knowledge from the top experts.

The IUCN Red List Categories and Criteria

The IUCN Red List Categories and Criteria are the world's most widely used system for gauging the extinction risk faced by species. Each species assessed is assigned to one of

eight different Categories (Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Near Threatened and Data Deficient), based on a series of quantitative Criteria (http://www.iucnredlist.org/info/categories_criteria2001). Species classified as Vulnerable, Endangered and Critically Endangered are regarded as 'threatened'. The IUCN Red List Criteria were developed following extensive consultation and testing with experts familiar with all kinds of different species from all over the world, and it can be used to assess any species (apart from microorganisms).

The IUCN Red List of Threatened Species™ – the key facts:

1. The IUCN Red List is much more than just a list – the Red List database includes information on population size and trends, distribution, ecology and habitat preferences, utilization, threats, and conservation measures in place and needed. For an increasingly large number of species on the IUCN Red List, spatial distribution maps (in digital format) are freely available.
2. The IUCN Red List includes more than threatened species and not all threatened species have been assessed; the IUCN Red List provides the threat status of the assessed species and therefore includes information on both threatened and non-threatened species.
3. The sample of species on the IUCN Red List are representative of the state of biodiversity, though not all species have been assessed:
 - a. Between 1.4 – 1.8 million species have been described, yet the estimates of the total number of species on earth range from 2 – 100 million. We are far from knowing the true status of the entire earth's biodiversity.
 - b. As of June 2011, 59,500 species have been assessed for inclusion on the IUCN Red List.
 - c. All known birds, amphibians, mammals, reef-building corals, freshwater crustaceans, conifers and cycads have been assessed.
 - d. Only a relatively small proportion of plants, invertebrates, and marine species have been assessed to date.
4. Red List Categories are broad – one Vulnerable species isn't necessarily identical in status to another Vulnerable species. A species can decline (or improve) in status without necessarily changing its Red List Category.
5. A species may change in Red List Category because better information becomes available – it does not necessarily mean the extinction risk of the species has changed.

6. The status of a species may be different at the global level and at the local level. In certain situations, a species may be listed as threatened on a national Red List even though it is considered Least Concern at the global level on the IUCN Red List.
7. The Red List Criteria were developed for large-scale assessments; they can be applied to broad-scale regional assessments, but by itself may not be appropriate at very small scales (for more information see the Red List Guidelines (<http://www.iucnredlist.org/documents/RedListGuidelines.pdf>) and Regional Red List Guidelines (http://www.iucnredlist.org/documents/reg_guidelines_en.pdf)).
8. The IUCN Red List of Threatened Species™ is not, on its own, a system for setting conservation priorities. Red List assessments simply measure the relative extinction risk faced by species, subspecies, or subpopulations. To set conservation priorities, additional information must be taken into account.
9. Many Red List assessments include spatial distribution maps. However, these are generalized maps and should be used primarily as an orientation tool, especially at the site level.
10. Red List assessments and criteria for each species reflect the best data available. However, it must be noted that there is a time lag between the collection of data and inclusion of the status of a species on the Red List. Therefore the information on the Red List refers to the time at which supporting data were gathered and not at the time it was published on the Red List.

The IUCN Red List of Threatened Species™ – appropriate and inappropriate uses

The following table gives an indication of the wide variety of uses to which the IUCN Red List (and data contained therein) can be utilized. Some examples of inappropriate applications are also given so that users of these data do not expend unnecessary resources on analyses that may prove to be counterproductive in the conservation arena – these examples should be taken as indicative rather than exhaustive.

Types of Use	Appropriate Uses	Inappropriate Uses
Policy and Legislation		
International/national/sub-national legislation and policy.	<p>Informing the development of:</p> <ul style="list-style-type: none"> • National/regional/sub-national threatened species lists • National Biodiversity Strategies and Action Plans. <p>Using the IUCN Red List Index to determine genuine changes in species status over time.</p>	<p>Automatically linking a legislative response to the inclusion of a species in a particular Red List Category e.g., enacting national law banning all trade of any species that is listed as threatened. Well-regulated trade can contribute positively to the conservation of some threatened species, and may be essential for human livelihoods.</p> <p>For information on IUCN's guidelines on scientific collecting of threatened species see Annex 2.</p>
International agreements.	<p>Guiding or informing decisions in international conventions, including:</p> <ul style="list-style-type: none"> • Convention on Biological Diversity (CBD) • Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) • Ramsar Convention on Wetlands • Convention on the Conservation of Migratory Species of Wild Animals (CMS), including the various CMS Regional Agreements • Fisheries agreements 	<p>Automatically including threatened species on lists without considering the underlying cause of the threat and other relevant factors e.g., including a threatened species on a CITES Appendix when it is not threatened by international trade and does not resemble any species that is threatened by trade.</p>
Development Planning and Environmental Review		
Regional and national resource management and development.	Guiding the management of natural resources at scales ranging from local to national development policies and legislation (e.g., in the areas of land-use planning, certification,	Relying solely on the global Red List status for local planning (e.g., developing a harvest plan for a local plant population based solely

	transport, energy, river-basin management, poverty reduction strategies).	on the global Red List status).
Site-level planning and Environmental Impact Assessment.	Guiding the site level evaluation, the Red List is a key input for an EIA. Evaluating the possible effects of large-scale, infrastructure development initiatives or assessing project impacts at site level.	Relying solely on Red List information without incorporating site level information e.g. assuming a site can be developed because, according to Red List maps, no threatened species appear to be present. The IUCN Red List can provide broad context, but cannot replace targeted site level investigations.

Conservation Planning

Informing conservation action for individual species.	Using Red List data (including information on habitat requirements, threats that need to be addressed, conservation actions that are recommended, etc.) to identify species that require specific conservation action, and to help determine the conservation measures that are needed.	Relying solely on the Red List Category without incorporating supporting information and/or additional relevant data sources.
Geographic priority setting: site-level, landscape/seascape level; and global level.	<p>Determining site-scale conservation priorities, such as Important Bird Areas, Important Plant Areas, Key Biodiversity Areas, and Alliance for Zero Extinction Sites, which can be used to inform protected areas gap analyses.</p> <p>Informing the conservation of wide-ranging species, and species threatened by broad-scale ecological processes, such as water quality.</p> <p>Informing the identification of global priorities, e.g., Endemic Bird Areas, biodiversity hotspots, etc.</p> <p>Setting geographical priorities for conservation funding, e.g. Global</p>	<p>Misinterpreting range map information presented on the IUCN Red List. It is important to be aware that IUCN Red List maps show species distribution on a broad scale – at the site level they provide a good indication of which species may be present, but this information needs to be verified through site surveys.</p> <p>It is always important to remember that not all species have been assessed.</p>

	Environment Facility System for Transparent Allocation of Resources (STAR) for country allocations.	
--	---	--

Monitoring and Evaluation

<p>Evaluating the state of biodiversity and monitoring changes in the state of biodiversity.</p> <p>Measuring the effectiveness and impact of conservation activities.</p>	<p>Answering important questions regarding the state of biodiversity, including: the overall status of biodiversity; the varying status of biodiversity between regions, countries and sub-national areas; the rate at which biodiversity is being lost; where biodiversity is being lost most rapidly; and the main drivers of decline and loss of biodiversity.</p> <p>A useful tool for tracking changes in species status over time is the IUCN Red List Index.</p>	<p>Assuming that the IUCN Red List provides a comprehensive picture of all the species that are threatened. So far, only some groups of species have been comprehensively assessed.</p> <p>It is important to recognize that species may change in Red List Category just because better information has become available; a category change does not necessarily mean that the species' status has changed.</p>
<p>Documenting extinction.</p>	<p>Determining extinction rates across globally and comprehensively assessed species groups.</p>	<p>Assuming that the number of Extinct and Extinct in the Wild species on the IUCN Red List represents a comprehensive global list of extinctions. Many extinctions go undocumented, and many species may have gone extinct before they could be formally described. Also, many extinctions took place before 1500 AD, the date from which extinctions are recorded on the IUCN Red List.</p>

Scientific Research

<p>Informing species-specific survey work and ecological studies.</p>	<p>Using data gaps identified in the assessment process (e.g., Data Deficient (DD) species or known data gaps for threatened species)</p>	
---	---	--

	to guide research and funding opportunities.	
Informing survey work and research into threatening processes across multiple species.	Using Red List data to highlight general overarching threatening processes, including emerging threats.	

Education, Communication and Awareness-raising

Education.	Informing academic work (e.g., school home-work assignments, undergraduate essays and dissertations, etc.).	
Media.	Promoting knowledge of the state of biodiversity, species-conservation issues, species at risk, etc.	
Fund-raising.	Providing a solid factual basis for funding proposals to engage in meaningful conservation work.	

Sources for additional information:

- [IUCN Red List Categories and Criteria](#)
- [RLI documents](#)
- [Red List Guidelines](#)
- [Regional Red List Guidelines](#)

Annex 1

Guidelines for Reporting on Proportion Threatened (Version 1.0) ¹

The uncertainty introduced by Data Deficient species

The true levels of threat we report for the taxa we assess are imperfectly known, because in most groups many species are categorized as Data Deficient (DD), meaning that there is insufficient information currently available to assess their risk of extinction. The uncertainty over the degree of threat to DD species introduces uncertainty to estimates of the proportion of species threatened in the group as a whole. One might expect a high proportion of DD species to be Least Concern (LC) in reality, given that if threats can be inferred from contextual information, this information should be used in assessments (often leading to a non-LC non-DD listing). On the other hand, given that many DD species are likely to have small ranges they might be expected to have an elevated risk of extinction.

Examining the fate of species formerly classified as DD and subsequently re-categorized in a category of threat provides some insight. Among birds, for example, 37 of 58 (64%) DD species that have been re-evaluated over time have been classified as LC or Near Threatened (NT), three (5%) were re-categorized as Endangered (EN), eight (14%) as Vulnerable (VU), with 10 (17%) no longer recognized due to taxonomic revision (Butchart and Bird 2010). Using all the available information on known records, contextual information on habitat condition and plausible threats, and inferences from congeners, Butchart and Bird (2010) posited that of the 63 current DD bird species, three (5%) are likely to prove to be hybrids, subspecies or taxonomically invalid, nine (14%) may be threatened, and 51 (81%) not threatened (NT or LC). In other words, in birds, DD species appear to very roughly have the same fraction of threatened species as data sufficient (i.e., non-DD) species.

However, it is not immediately evident whether this trend will hold in other taxa, particularly in groups with high discovery rates from regions experiencing high threat. Unfortunately, there is currently limited information available to assess this trend in other taxa. However, a reassessment of South African DD amphibians resulted in the reclassification of seven (of a total of eight) species classified as DD in 2004 into other categories: 4 (57%) were assessed as LC, 1 (14%) as NT and 2 (29%) as VU, again roughly the same fraction of threatened species as data sufficient species.

¹ These guidelines apply to taxa that have been completely assessed, or assessed by means of a random sampling approach (Baillie *et al.* 2008). It is not appropriate to report on proportion of species threatened in groups that have not been completely or randomly assessed.

As a result of the uncertainty that Data Deficient species introduce to estimates of proportions of species threatened, we have generally reported three values (not always publicly, but certainly in publications), as follows:

- Lower bound: percentage of threatened species among all species assessed, including Extinct and Extinct in the Wild, i.e., number of threatened species divided by the total number of species assessed $[(CR+EN+VU) / \text{Assessed}]$. This corresponds to the assumption that none of the Data Deficient species is threatened. This may be an intuitive measure for some, but more than likely underestimates risk of extinction.
- Mid-point: percentage of threatened species among those for which threat status could be determined, i.e., number of threatened species divided by the number of data sufficient species² $[(CR+EN+VU) / (\text{Assessed-DD})]$. This corresponds to the assumption that Data Deficient species have the same fraction of threatened species as data sufficient species. This represents a best estimate, and demonstrates that the true value lies somewhere between the upper and lower bound.
- Upper bound: percentage of threatened or Data Deficient species among those assessed, i.e., number of threatened species plus Data Deficient species, divided by the total number of species assessed $[(CR+EN+VU+DD) / \text{Assessed}]$. This corresponds to the assumption that all of the Data Deficient species are threatened. This is the most pessimistic estimate of extinction risk.

So, for example, based on groups that have been completely assessed, degree of uncertainty regarding the true level of threat is greatest in cartilaginous fishes (range=17-64%; mid-point=33%) and freshwater brachyurans (range=16-65%; mid-point=31%) and least in birds (range=12-13%; mid-point=12%).

Reporting proportion threatened

For academic purposes, we recommend reporting the lower bound, mid-point, and upper bound estimates, with the emphasis (e.g., in the abstract or conclusions) placed on the mid-point value as the main result, provided that this distinction is made clear and qualified (e.g., Schipper *et al.* 2008; Hoffmann *et al.* 2010³). Note further that Extinct (EX) species should now be excluded from all calculations of proportion of species threatened (but NOT Extinct in

²Where “data sufficient” species equates to all non-DD species.

³Both of these papers contain detailed explanations in their Supplementary Online Material regarding the practice of citing a mid-point estimate framed by a lower and upper bound. Either may, therefore, be used by way of explanation to academic editors of manuscripts who may be unfamiliar with the practice.

the Wild, which can be downlisted). In other words, revised formulas for calculating the lower, mid- and upper bounds are:

Lower bound: $(CR+EN+VU) / (\text{assessed} - EX)$

Mid-point: $(CR+EN+VU) / (\text{assessed} - EX - DD)$

Upper bound: $(CR+EN+VU+DD) / (\text{assessed} - EX)$

For communication purposes, it is appropriate to report the mid-point figure (“*xx% of extant species for which sufficient data are available are threatened*”) as the best estimate of extinction risk. Its underlying assumption that DD species are equally threatened as data sufficient species appears to be roughly borne out by available evidence from reassessed taxa, although this requires further investigation and may not necessarily hold true. It is essential to specify, in ‘notes to editors’, the mid-point figure, with the lower and upper bound figures as a range; for example, “*xx% of extant species are threatened, although the precise figure is uncertain and could lie between xx% (if all DD species are not threatened) and xx% (if all DD species are threatened)*”. Reporting proportions as fractions (e.g., one in three or one-quarter) is acceptable, provided that fractions are calculated according to the preceding guidance and using the same proposed language (e.g., *two in five extant amphibians for which sufficient data are available are threatened*).

Emphasis always should be on reporting the proportion “threatened”, but it may be appropriate to report the proportion of “species of elevated conservation concern” where this is defined as $(EW+CR+EN+VU+NT) / (\text{assessed} - DD)$. Use of the terminology “elevated risk of extinction” should be avoided.

Guidelines on reporting extinctions

In addition to reporting the proportion of species in a clade or taxonomic group threatened with extinction, it may also be appropriate to report the number of species documented as being formally Extinct and Extinct in the Wild. For example, “*in addition, xx species are known to have become Extinct since 1500, while yy survive only in captivity and are classified as Extinct in the Wild*”. However, according to the IUCN Guidelines for Using the IUCN Red List Categories and Criteria, “*an evidentiary approach to classifying extinctions is appropriate in order to encourage continuing conservation efforts until there is no reasonable doubt that the last individual of a species has died. However, if assessments of EX or EW are too evidentiary, then extinction rates based on the Red List are likely to be underestimated. To avoid this bias, it is necessary to include 'possibly extinct' species in estimates of numbers of extinct taxa...*” Critically Endangered species tagged as Possibly Extinct (or

Possibly Extinct in the Wild) are those considered likely to be extinct, but for which there remains some reasonable doubt that the last individual (in the wild) has died (Butchart *et al.* 2006). For this reason, we strongly encourage reporting both the confirmed documented number of extinctions as well as the number of species flagged as Possibly Extinct or Possibly Extinct in the Wild (for example, " *in addition, xx species are known (y species) or considered likely (z species) to have become Extinct since 1500, while yy are known or considered likely to survive only in captivity.*

References

Baillie, J.E.M., Collen, B., Amin, R., Akcakaya, H.R., Butchart, S.H.M., Brummitt, N., Meagher, T.R., Ram, M., Hilton-Taylor, C. and Mace, G.M. 2008. Toward monitoring global biodiversity. *Conservation Letters* 1(1): 18-26.

Butchart, S.H.M. and Bird, J.P. 2010. Data Deficient birds on the IUCN Red List: What don't we know and why does it matter? *Biological Conservation* 143: 239-247.

Butchart, S.H.M., Stattersfield, A. and Brooks, T.M. 2006. Going or gone: defining 'Possibly Extinct' species to give a truer picture of recent extinctions. *Bulletin of the British Ornithologists' Club* 126: 7-24.

Schipper, J. *et al.* 2008. The status of the world's land and marine mammals: Diversity, threat, and knowledge. *Science* 322: 225-230.

Hoffmann, M. *et al.* 2010. The impact of conservation on the status of the world's vertebrates. *Science* 330: 1503-1509.

Annex 2

Guidelines on the Implementation of the “IUCN Policy Statement on Research Involving Species at Risk of Extinction”⁴, with special reference to Scientific Collecting of Threatened Species (Version 1.0)

The IUCN Policy Statement on Research Involving Species at Risk of Extinction⁵ was approved at the 27th Meeting of IUCN Council, June 1989, and encourages basic and applied research on threatened species that contributes to the likelihood of their survival.

The current guidelines were called for in Resolution 3.013 "The Uses of the IUCN Red List of Threatened Species" of the 3rd World Conservation Congress in Bangkok in 2004, and Resolution 4.015 "Guidelines regarding research and scientific collecting of threatened species" of the 4th World Conservation Congress in Barcelona in 2008. These motions were tabled in response to an awareness that a) some governments are prohibiting the scientific collection of species included in the IUCN Red List and which may, in turn, be detrimental to the conservation of those particular species; and b) that many scientists are increasingly reluctant to provide data to the Red List process, due to the risk that the listing of a species in one of the threat categories will, in some cases, lead to government restrictions on scientific collecting or a requirement for expensive research permits. The current guidelines are, therefore, intended to better guide the development and implementation of legislation in response to the listing of a species by IUCN in a threatened category. They are also intended to promote responsible collecting of threatened species by researchers. These guidelines do not address the specific issue of taking live individuals (both whole organisms and 'living tissues') from the wild for maintenance in ex-situ collections⁶.

The guidelines focus solely on scientific collecting of threatened species (recognizing that such collecting is seldom the cause of the species becoming threatened in the first instance), and are not intended to represent comprehensive IUCN guidelines on the complex topic of collecting in general. These guidelines are developed mindful of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity, adopted by the Conference of the Parties to the Convention on Biological Diversity at its tenth meeting on 29 October 2010 in Nagoya, Japan⁷. All scientific collecting should take place in accordance with the provisions of the Nagoya Protocol.

⁴ http://intranet.iucn.org/webfiles/doc/SSC/SSCwebsite/Policy_statements/IUCN_Policy_Statement_on_Research_Involving_Species_at_Risk_of_Extinction.pdf

⁵ http://intranet.iucn.org/webfiles/doc/SSC/SSCwebsite/Policy_statements/IUCN_Policy_Statement_on_Research_Involving_Species_at_Risk_of_Extinction.pdf

⁶ A process is currently underway to revise the current IUCN Technical guidelines on the management of ex situ populations for conservation (http://intranet.iucn.org/webfiles/doc/SSC/SSCwebsite/Policy_statements/IUCN_Technical_Guidelines_on_the_Management_of_Ex_situ_populations_for_Conservation.pdf)

⁷ <http://www.cbd.int/abs/>

The IUCN Species Survival Commission recommends that:

1. Research and threatened species. In the spirit of the *IUCN Policy Statement on Research Involving Species at Risk of Extinction* (IUCN, 1989), governments and research institutions should encourage and facilitate research on globally threatened species by competent scientists to enhance understanding of the natural history and conservation needs of these species. Successful conservation programmes focusing on globally threatened species will normally need to be fully integrated with dedicated research programmes on these species, ideally led by scientists from the country or countries where the species occurs. In some cases, such research may require the collection of scientific specimens.

2. Legislative procedures. Blanket prohibitions on research and the collection (including lethal collection) of scientific specimens of globally threatened species can hinder conservation efforts, and it is recommended that governments should avoid imposing them unless essential. Although careful review of any scientific research application is important, complex or time-consuming procedures for issuing research, collecting and (in the case of specimens moving across international borders) export / import⁸ permits may discourage the implementation of such research. Permit-issuing agencies should attach high priority to the timely review of applications related to threatened species. Where appropriate, SSC encourages involving the national conservation community in an advisory role for permit decisions. Conversely, scientists should be aware that many permit-issuing agencies have very limited capacity and resources, and so applicants should understand the process for issuing permits and apply in a timely manner.

3. Non-lethal collecting. Much modern research involves analysis of material collected non-lethally from animals, plants and fungi, including body fluids, faeces, hair, feathers, scales, seeds, roots, and leaves. Governments are encouraged to minimize the administrative burden involved in the issuing of permits for non-lethal samples of species that IUCN has listed as threatened.

4. Responsible collecting. Scientists working on globally threatened species should act responsibly to ensure that their research is either directed towards enhancing the conservation status of the species that they are studying, or providing important information that will assist in the conservation of the species. They should ensure that:

(a) the material they need is not already available in museum or other institutional collections;

⁸ Including export, re-export, import and introduction from the sea

(b) they do not collect more than the minimum number of specimens necessary for the accomplishment of their research;

(c) they use non-lethal sampling methods instead of lethal collecting when the research objectives allow this, and employ preferential collection of post-reproductive individuals (or the life stage with the least reproductive value) when lethal collection is essential for enhancing the survival prospects of the species;

(d) they place all specimens collected in institutions where they can be preserved in perpetuity and be made available to other scientists, thus limiting the need for further collections; and

(e) they submit copies of reports and publications based on their research in a timely manner to permit-issuing agencies.

Several professional societies produce and regularly update guidelines regarding the use and treatment of wild species in research⁹, including scientific collecting, and scientists should consult and comply with these guidelines (and, obviously, any collecting must be in full accordance with the laws and regulations of the country, state, or province where the collecting is being conducted).

5. Small populations. In the case of species listed as Vulnerable under criterion D1 (less than 1,000 mature individuals and stable), or Endangered under criterion C (less than 2,500 mature individuals and declining), scientists should provide evidence to permit-issuing agencies that the number of specimens that they wish to collect lethally is very unlikely to increase the risk of extinction of the species in question, and that the research proposed is essential for assisting in the conservation of the species.

6. Very small populations. In the case of species listed as Critically Endangered under criteria C or D, and as Endangered under criterion D (in all these cases there are less than 250 mature individuals), the lethal collection of scientific specimens (i.e. collections that involve killing of wild individuals within the population) should not normally take place, and should only be permitted when it is clear that the research proposed is demonstrably essential for enhancing the survival prospects of the species.

7. Considerations for species with small populations. In issuing permits for the lethal scientific collection of species listed as Vulnerable under criterion D1, or as Endangered and / or Critically Endangered under criteria C or D, permit-issuing agencies should take into account the cumulative effects of scientific collecting within a generation of the species in question. If a permit has been granted for the lethal collection of scientific material from a

⁹ For example, the "Guidelines of the American Society of Mammalogists for the use of wild mammals in research" (<http://www.mammalsociety.org/uploads/Sikes%20et%20al%202011.pdf>), the "Guidelines for use of live amphibians and reptiles in field and laboratory research" (<http://www.asih.org/files/hacc-final.pdf>) of the American Society of Ichthyologists and Herpetologists, and the Marine Mammal Society's "Guidelines for the treatment of marine mammals in field research" (<http://onlinelibrary.wiley.com/doi/10.1111/j.1748-7692.2008.00279.x/pdf>)

threatened species, the results from that study should preferably be considered before issuing further collection permits for that species.

8. **CITES.** Finally, in instances where scientific collecting of threatened species involves the movement of specimens across international borders, IUCN State members and others are encouraged to make full use of the provisions agreed by CITES Parties to regulate and, where appropriate, facilitate the movement of specimens used in scientific research¹⁰.

¹⁰ Most cross-border movements of CITES-listed specimens will be for purposes which are not primarily commercial in nature. The purpose codes 'G' - Botanical gardens or 'S' - Scientific are likely to be used on CITES permits. Therefore, provided that the specimens have been legally acquired and that the Scientific Authority of the State of export has advised that their export will not be detrimental to the survival of the species, even Appendix I listed species can be imported and exported for scientific purposes. In addition, in the case of the non-commercial loan, donation or exchange of herbarium specimens, other preserved, dried or embedded museum specimens, and live plant material, the text of CITES provides a specific exemption from the CITES standard permitting requirements. Such specimens must be transferred between scientists or scientific institutions registered by a CITES Management Authority of their State and carry a label issued or approved by that Management Authority to be able to benefit from this exemption. The CITES Parties have adopted a resolution on this issue [Resolution Conf. 11.15 (Rev. CoP12)], which encourages scientific research on wild fauna and flora, where it may be of use in conserving species that are threatened with extinction or that may become so, but considers that museum needs for research specimens can also have an adverse impact on small populations of rare animals and plants. The Resolution also contains some standards for scientific institutions which may qualify for registration.

In other Resolutions, CITES Parties have also recommended that, even where entry into trade might otherwise have been considered detrimental to the survival of the species in the wild, international trade in salvaged specimens of Appendix-I and Appendix-II plants be permitted where all of the following conditions are met:

- i) such trade would clearly enhance the survival of the species, albeit not in the wild;
- ii) import is for the purposes of care and propagation of the species; and
- iii) import is by bona fide botanic garden or scientific institution.

Furthermore, the CITES Parties have agreed on the expedited processing of permits and certificates for trade in certain biological samples, where such trade will have a negligible impact, or none, on the conservation of the species concerned, and, the purpose of the transaction is, inter alia, in the interest of the conservation of the species concerned or other species listed in the Appendices. Full details of this provision can be found in Section XII and Annex 4 of Resolution Conf. 12.3 (Rev. CoP13) on Permits and certificates.