Guidelines for Reporting on Proportion Threatened

Version 1.2 (July 2022)

Citation: IUCN. 2022. Guidelines for Reporting on Proportion Threatened (Version 1.2). Annex 1 of the Guidelines for Appropriate Uses of IUCN Red List Data (Version 4.0). Approved by the IUCN Red List Committee in November 2017. Downloadable from: https://www.iucnredlist.org/resources/guidelines-for-appropriate-uses-of-red-list-data.

Guidelines for Reporting on Proportion Threatened (Version 1.2) [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.

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:

[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.

- 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) / 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 species[2] [(CR+EN+VU) / (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) / 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*. 2010[3]). Note further that Extinct (EX) species should now be excluded from all calculations of proportion of species threatened (but NOT Extinct in the Wild, which can be downlisted). Although Extinct in the Wild (EW) species are not considered to be "threatened", the Red List Committee agreed that they should be grouped with the threatened categories for reporting purposes, particularly when calculating the proportion threatened, because following a successful reintroduction an EW species would be downlisted to a threatened category. Hence, the revised formulas for calculating the lower, mid- and upper bounds are:

[2] Where "data sufficient" species equates to all non-DD species.

[3] Both 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.

Lower bound: (EW+CR+EN+VU) / (assessed – EX)

Mid-point: (EW+CR+EN+VU) / (assessed – EX – DD)

Upper bound: (EW+CR+EN+VU+DD) / (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) / (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 under-estimated. 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.*

A note on use of the term Red Listed

The use of the term “red-listed” is discouraged owing to ambiguity as to whether this includes Least Concern species or not, given that species assessed as Least Concern are included on the IUCN Red List. To refer to a set of species all of which have assessments on the IUCN Red List, the phrase “assessed for the IUCN Red List” can be used. To refer to threatened (i.e. Critically Endangered, Endangered and Vulnerable) plus Extinct in the Wild and Near Threatened species collectively, the phrase “species of elevated conservation concern” may be used

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.