

1 **Focal area: Reducing the rate of loss of the components of biodiversity,**
2 **including: (i) biomes, habitats and ecosystems; (ii) species and**
3 **populations; and (iii) genetic diversity**

4 **Indicator: Change in status of threatened species¹**

5 **1. Summary**

6 The IUCN Red List is recognized as the most authoritative and objective system for
7 classifying species at high risk of extinction. Red List Indices illustrate the relative rate at which
8 species in a particular group change in overall threat status (i.e. projected extinction risk), based
9 on population and range size and trends as quantified by Red List categories. The indices can be
10 calculated for any representative set of species that has been fully assessed at least twice. They
11 are calculated from the number of species in each Red List category, and the number changing
12 categories between assessments as a result of genuine improvement or deterioration in status. Red
13 List Indices show a fairly coarse level of resolution, but are uniquely representative, being based
14 on information from all species in a taxonomic group worldwide. The Red List Index for the
15 world's birds shows that their overall threat status has deteriorated steadily during 1988–
16 2004. A preliminary Red List Index for amphibians for 1980–2004 shows a similar rate of
17 decline. Indices are in development for other groups, including mammals, reptiles, freshwater
18 fish, sharks, rays and chimeras, freshwater molluscs.

19 A Sampled Red List Index is being developed, based on c.2,700 species from all major
20 taxonomic groups, realms, ecosystems, and Red List categories. This will provide trends in
21 extinction risk representative of all biodiversity.

22 **2. Relation of indicator to focal area**

23 Red List Indices complement indicators based on species population trends and habitat
24 extent for quantifying global trends in the status of biodiversity. They provide a measure of the
25 relative rate at which species in particular group are slipping towards extinction. Species
26 extinction is a natural process that occurs without the intervention of humans. However, there is
27 little doubt that humans have been the cause, either directly or indirectly, of a large number of
28 extinctions. The present, human-induced extinction rate is conservatively estimated to be 100 to
29 1000 times greater than the historical "background" rate.

30 The risk of extinction for taxonomic groups or biogeographic regions, which is assessed
31 through the Red List Indices, is a measure not only of species loss but indirectly also of the
32 drivers of species loss including habitat degradation, invasive species, pollution, climate change,
33 consumption and unsustainable use.

¹ This document is based on the following two manuscripts submitted for publication and should not be cited or quoted unless permission has been received from the authors (stuart.butchart@birdlife.org):

Butchart, S. H. M., A. J. Stattersfield, L. A. Bennun, S. M. Shutes, H. R. Akçakaya, J. E. M. Baillie, S. N. Stuart, C. Hilton-Taylor & G. M. Mace. Measuring global trends in the status of biodiversity: Red List Indices for birds. Manuscript submitted for publication in PLoS Biology (<http://www.plosbiology.org>).

Butchart, S. H. M. et al. Using IUCN Red List Indices to measure progress towards the 2010 target and beyond. Draft submitted to Philosophical Transactions of the Royal Society.

All figures in this document are from the first publication.

3. General description

The IUCN Red List is widely recognized as the most objective and authoritative listing of species that are globally at risk of extinction.² Species are assigned to Red List categories through detailed assessment of information against a set of objective, standard, quantitative criteria.³ Over the last few years, the IUCN Red List has been developed into a global programme to monitor the extent and rate of biodiversity degradation. One of the goals of the programme is to provide a global index of the changing state of biodiversity.⁴

A methodology for producing indices based on the IUCN Red List has recently been developed.⁵ The indices are robust, temporally sensitive, representative and comprehensive. They provide unique data on the rate of loss of biodiversity against which progress towards meeting the CBD 2010 target can be judged. They also allow finer-scale resolution of trends in particular biogeographic realms, ecosystems and habitats. These indices are based on the number of species in each Red List category, and the number changing categories between assessments as a result of genuine improvement or deterioration in status.

The total number of extant threatened and Near Threatened birds listed on the IUCN Red List has changed relatively little over the four complete assessments of all the world's birds, increasing from 1,664 species in 1988 to 1,990 species in 2004. However, large numbers of species have moved between categories. Most of these category changes have been a consequence of improved knowledge or revised taxonomy. However, a significant proportion of species (equating to 2.4–7.3% of threatened or Near Threatened species in each assessment) have moved between categories because of genuine improvement or deterioration in status.

The Red List Index for birds illustrates the combined effect of these genuine status changes, to provide a simple metric of the changing overall status of the world's birds, in terms of their relative projected extinction risk as estimated using the categories of the IUCN Red List. This shows that there has been a steady and continuing deterioration in the threat status of the world's birds between 1988 and 2004, with an overall change in the index value of -6.90% over this period (Figure 1).

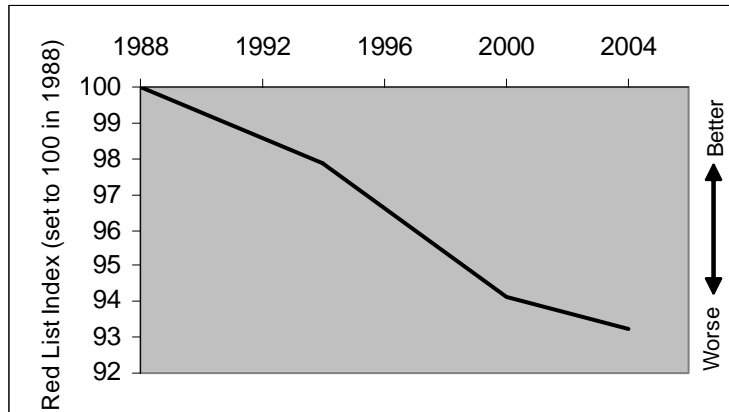
² Hambler, C. *Conservation*. Cambridge, U.K.: Cambridge University Press.

³ IUCN (2001) IUCN Red List categories and criteria: version 3.1. Gland, Switzerland and Cambridge, UK: IUCN SSC.

⁴ IUCN (2004) The IUCN Red List of threatened species. Available: <http://www.iucn.org/themes/ssc/red-lists.htm>

⁵ Butchart, S. H. M., A. J. Stattersfield, L. A. Bennun, S. M. Shutes, H. R. Akçakaya, J. E. M. Baillie, S. N. Stuart, C. Hilton-Taylor & G. M. Mace. Measuring global trends in the status of biodiversity: Red List Indices for bird. Manuscript submitted for publication in PLoS Biology (<http://www.plosbiology.org>).

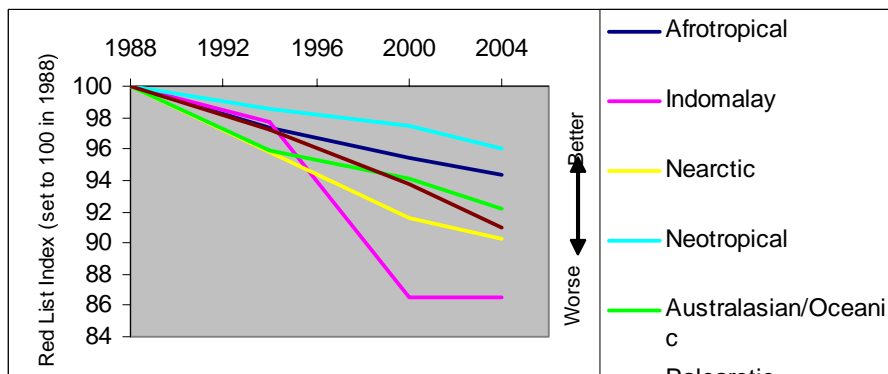
1 *Figure 1. The Red List Index for all bird species (n = 250 genuine status changes/2,469 species in*
 2 *categories EW to NT in at least one assessment).*



3
 4 No change would indicate that the average status of all bird species was the same as in
 5 1988. If 10% of species in the categories from Near Threatened to Critically Endangered had
 6 deteriorated in status sufficiently to be uplisted one category between 1988 and 2004, the index
 7 would have changed by -7.8%.

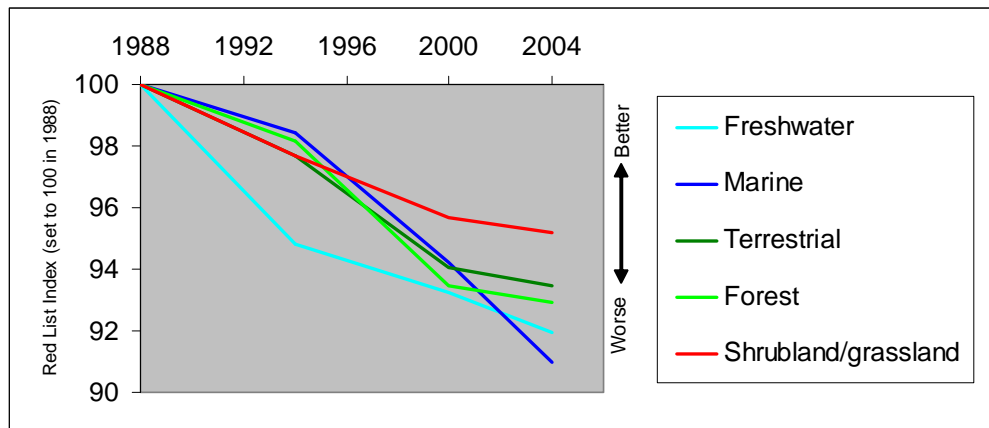
8 The Red List Index can be broken down by biogeographic realm, (Fig. 2), ecosystem and
 9 habitat type (Fig. 3), and for particular species groups. These show that the threat status of birds
 10 has deteriorated worldwide with a more-or-less similar rate and proportional extent of
 11 deterioration in the Nearctic, Neotropical, Palearctic, Afrotropical and Australasian/Oceanic
 12 realms. The Indomalayan realm shows a steeper rate of deterioration during the 1990s (Fig. 2).
 13 Declines in the index for three major ecosystems (terrestrial, freshwater and marine) and two
 14 terrestrial habitat types (forest and grassland-shrubland) all show a broadly similar pattern (Fig.
 15 3).

16 *Figure 2. Red List Indices for birds in different biogeographic realms. Sample sizes: Afrotropical*
 17 *= 41 genuine status changes/ 394 species in categories EW to NT in at least one assessment;*
 18 *Indomalayan = 100/585, Nearctic = 9/92, Neotropical = 49/834, Australasian/Oceanic = 53/614,*
 19 *Palearctic = 34/238).*



20
 21

1 *Figure 3. Red List Indices for birds in the marine, freshwater and terrestrial ecosystems, and for*
 2 *birds in forest and shrubland/grassland habitats. Sample sizes: Marine = 12 genuine status*
 3 *changes/ 133 species in categories EW to NT in at least one assessment; Freshwater = 31/226,*
 4 *Terrestrial = 206/2329, forest = 169/1513, shrubland/grassland = 45/481).*



5

6 **4. Policy relevance**

7 In accordance with Article 7 and Annex 1 of the Convention on Biological Diversity,
 8 Parties are requested to identify and monitor components of biological diversity important for
 9 conservation and sustainable use, including threatened species.

10 The Global Strategy for Plant Conservation considers threatened species in targets 7 and
 11 8:

- 12 • Target 7: 60 per cent of the world's threatened species conserved *in situ*
- 13 • Target 8: 60 per cent of threatened plant species in accessible *ex situ* collections,
 14 preferably in the country of origin, and 10 per cent of them included in recovery
 15 and restoration programmes

16 Threatened species are also specifically considered in the programmes of work on forest
 17 biological diversity (decision VI/22), inland water biological diversity (decision VII/4), marine
 18 and coastal biological diversity (decision VII/5), mountain biological diversity (decision VII/27)
 19 and protected areas (VII/28).

20 The framework to enhance the evaluation of achievements and progress in the
 21 implementation of the Strategic Plan of the CBD (decision VII/30) includes goals and sub-targets
 22 to facilitate coherence among the programmes of work, and to provide a flexible framework for
 23 national targets. The indicator is particularly relevant for Goal 2 (“Promote the conservation of
 24 species diversity”) and the two related sub-targets:

- 25 • Target 2.1: Restore, maintain, or reduce the decline of populations of species of
 26 selected taxonomic groups
- 27 • Target 2.2: Status of threatened species improved.

28 *Relevance to MDGs, WSSD etc.*

29 Although the indicator is relevant to assess progress towards Goal 7 of the MDGs
 30 (“Ensure environmental sustainability”) no species-specific indicator has been included among
 31 the Millennium indicators.

1 In its para 44 (f), the WSSD Plan of Implementation seeks to “Promote concrete
2 international support and partnership for the conservation and sustainable use of biodiversity,
3 including in ecosystems, at World Heritage sites and for the protection of endangered species, in
4 particular through the appropriate channelling of financial resources and technology to
5 developing countries and countries with economies in transition”.

6 *Relevance to other international agreements and conventions*

7 Red List Indices can be calculated for species groups that have specific conservation or
8 policy significance. There are several international conservation treaties targeting particular suites
9 of species (the Ramsar Convention on Wetlands, the Convention on Migratory Species, and the
10 Agreement on the Conservation of Albatrosses and Petrels under the CMS) for which
11 disaggregated Red List Indices provide a metric measure against which to judge their success in
12 improving the fortunes of the species involved.

13 As some of the threatened species which are subject to international trade are listed in the
14 CITES annexes, the Red List Indices are also relevant to the Convention on International Trade in
15 Endangered Species of Wild Fauna and Flora.

16 **5. Technical information**

17 *IUCN Red List assessments for birds*

18 BirdLife International has been responsible for providing the assessments of the world's
19 10,000 or so species for the IUCN Red List since 1963. Since 1988, BirdLife has assessed every
20 species of bird on a regular basis, and birds are regarded as the most comprehensively
21 documented class of organisms on the Red List.

22 The principal categories on the IUCN Red List are: Extinct (EX), Extinct in the Wild
23 (EW), Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT)
24 and Least Concern (LC).⁶ Since all bird species have been assessed, none is listed as Not
25 Evaluated (NE), and only 78 (0.8%) are listed as Data Deficient (DD). In addition, two terms
26 used by BirdLife have not yet been adopted for more general application in the IUCN Red List.
27 'Possibly Extinct' (PE) is a tag applied to those CR species that are, on the balance of evidence,
28 'likely to be extinct, but for which there is a small chance that they may still be extant, and hence
29 they should not be listed as Extinct until local or unconfirmed reports have been discounted, and
30 adequate surveys have failed to find the species'.⁷ As there are taxonomic revisions between
31 assessments, 'Not Recognised' (NR) is applied to taxa in those assessments when they were not
32 treated as full species.

33 Data from which to calculate the indices were derived from four complete assessments of
34 the status of the world's birds.^{8 9 10 11} Information was also taken from partial assessments
35 submitted by BirdLife to the 2002 and 2003 IUCN Red Lists.^{12 13}

⁶ IUCN (2001) IUCN Red List categories and criteria: version 3.1. Gland, Switzerland and
Cambridge, UK: IUCN SSC.

⁷ BirdLife International (2004) Threatened birds of the world 2004. CD-ROM. Cambridge, UK:
BirdLife International.

⁸ Collar, N J and Andrew, P (1988) Birds to watch: the ICBP world checklist of threatened birds.
Cambridge, UK: ICBP and IUCN.

⁹ Collar, NJ, Crosby, MJ and Stattersfield, AJ (1994) Birds to watch 2: the world list of threatened
birds. Cambridge, UK: BirdLife International.

1 *Tracking genuine status changes between Red List assessments*

2 Published lists of numbers of species in different Red List categories cannot simply be
3 used to calculate the index because many species move between categories owing simply to
4 improved knowledge or taxonomic revisions. To identify those species changing categories
5 between assessments for relevant reasons, a 'Reason for change' code was assigned for each
6 recategorization. These mutually exclusive codes were: (1) 'Recent genuine status change'; (2)
7 'Genuine status change since first assessment'; (3) 'Knowledge'; (4) 'Criteria revision' (applied in
8 cases when species changed category owing to revisions to the definitions of the IUCN Red List
9 criteria¹⁴; (5) 'Taxonomy' (applied in cases when species changed category owing to taxonomic
10 'lumping' or 'splitting' or for newly described species). These last two codes were used for
11 changes not relevant for calculating the indices.

12 *Calculating index values*

13 The number of species in each Red List category for each complete assessment and the
14 number of species that changed categories as a result of genuine status changes were used to
15 determine the index value in the following way: (1) For species assessed in two consecutive
16 assessments (i.e. excluding any listed as NR, NE or DD in either or both assessments), the total
17 numbers of species in each Red List category in the earlier assessment (excluding EX and PE, but
18 including retrospective category adjustments owing to category revisions identified as "genuine
19 status change since first assessment": see above) were multiplied by a weight, and these were
20 summed to give a total score, T , for each assessment. The weights were set as: NT = 1, VU = 2,
21 EN = 3, CR = 4, EW = 5 (see below). (2) Over each time period between complete assessments
22 (1988–1994, 1994–2000 and 2000–2004) the net number of genuine changes to the total in each
23 category was calculated, multiplied by the weights above (with PE and EX = 5), and summed to
24 give the % change in the total score, P . (3) The value of the index (I) was set to 100 in 1988. For
25 subsequent assessments I was calculated by multiplying $-P$ for the previous time period by the
26 previous index value.

27 Mathematically, the method can be described as follows, where T is total score; $N_c(t_i)$ is
28 the number of species in category c at time t_i , where t_i is the year of the i th assessment
29 (assessments are not necessarily made every year); W_c is the weight for category c ; P is
30 proportional genuine change; I_{t_i} is the value of the index at time t_i ; $Cat(t_i, s)$ is the category of
31 species s at time t_i ; W_c is the weight for category c ; $G_s = 1$ if change (from $t_{(i-1)}$ to t_i) in category of
32 species s is genuine (otherwise $G_s = 0$).

33
$$T_{t_i} = \sum_c W_c \cdot N_{c(t_i)}$$

¹⁰ BirdLife International (2000) Threatened birds of the world. Cambridge, UK and Barcelona, Spain: BirdLife International and Lynx Edicions.

¹¹ BirdLife International (2004) Threatened birds of the world 2004. CD-ROM. Cambridge, UK: BirdLife International.

¹² IUCN (2002) 2002 IUCN Red List of threatened species. Available: www.redlist.org

¹³ IUCN (2003) 2003 IUCN Red List of threatened species. Available: www.redlist.org

¹⁴ IUCN (2001) IUCN Red List categories and criteria: version 3.1. Gland, Switzerland and Cambridge, UK: IUCN SSC.

$$P_{t_i} = \sum_s [(W_{c(t_i,s)} - W_{c(t_{i-1},s)}) \cdot G_s] / T_{t_{i-1}}$$

$$I_{t_i} = I_{(t_{i-1})} \cdot (1 - P_{t_i})$$

where $I_{t_{i-1}} = 100$ for the first year of assessment.

The Red List categories are ordinal ranks, whereby each step from Least Concern to Extinct indicates that at least one measure of extinction risk has become worse. The 'equal steps' weights listed above reflect the ordinal ranks of the categories. However, the steps between lower categories (e.g. NT to VU) translate to smaller increases in extinction risk than steps between higher categories (e.g. EN to CR). Therefore the aggregated Red List Index using weights based on the relative extinction risk associated with each category was also calculated. Several of the quantitative thresholds in the Red List criteria can be used to obtain approximate values for the risk of extinction (for species at the lower boundary of that category). The most obvious is Criterion E, which is based on quantitative analysis of extinction probability. The quantitative thresholds in Criterion E change for both extinction probability and timeframe for the three categories, and depend on generation length (e.g. the threshold for EN is a probability of extinction in the wild >20% within 20 years or five generations). Taking a 3-generation timeframe, a generation length set arbitrarily at five years, and assuming a constant annual risk of extinction, the 3-generation probabilities are approximately 0.5, 0.13, and 0.016 for CR, EN, and VU, respectively.¹⁵ However, most extinctions do not occur as a result of random catastrophes, as implied by the assumption of the constant annual risk of extinction. Many are preceded by declines, resulting in sigmoid extinction risk curves (with probability of extinction as a function of time). For such cases, the 3-generation probabilities are approximately 0.5, 0.1, and 0.025 for CR, EN, and VU, respectively. Comparable extinction risks can also be calculated based on other Red List criteria (except A, for which there is no obvious method). Assuming that the number of mature individuals (in Criteria C1 and D), range or extent of occurrence (Criterion B1), and area of occupancy (Criterion B2) are inversely related to risk of extinction, and fixing the risk of extinction for CR at 0.5, it is possible to calculate the probabilities for categories EN and VU. Based on the geometric average of these estimates, the weights for CR, EN, and VU are determined as 0.5, 0.05, and 0.005. The weight for EX (and hence EW and PE) is by definition 1.0. The weight for NT is set at 0.0005, keeping the same proportion as among the weights for the three threatened categories.

31 *Disaggregating indices*

32 One of the purposes of the Red List Indices is to illustrate trends over time in the threat
 33 status of species in different biogeographic realms, ecosystems and families or species groups.
 34 Species were assigned (based on native distributions, excluding cases of vagrancy) to one or more
 35 biogeographic realms (Palearctic, Afrotropical, Indomalayan, Nearctic, Neotropical and
 36 Australasian/Oceanic).¹⁶ Where a species was assigned to more than one realm, it was included

¹⁵ H. R. Akçakaya unpublished data

¹⁶ following the boundaries mapped by Newton, I (2003) *The speciation and biogeography of birds*. London: Academic Press, except that Australasian was pooled with Oceanic, and Antarctic was excluded.

1 in calculating the score (T) for each of those realms. This is because a species could potentially
2 undergo genuine changes in status in any or all realms in which it occurs. However, so that trends
3 in indices for particular realms reflect changes in the threatening processes operating within each
4 particular realm (rather than threats operating elsewhere in the range of the species), species were
5 only included in the calculation of P for a particular realm if the genuine status change had been
6 driven by factors operating in that realm. The index was disaggregated for ecosystem (terrestrial,
7 marine, and freshwater) and for two terrestrial habitat types in a similar way. Species were
8 included in the calculation of T for all ecosystems and habitats for which they were scored, but
9 only included in the calculation of P for a particular ecosystem or habitat if the genuine status
10 change had been driven by threatening processes operating in that ecosystem or habitat. Species
11 were only assigned to a habitat type if this was of critical or major importance (i.e. the species
12 typically occurs in no other habitat, or just one other habitat at some point in its life-cycle).

13 To exemplify how the approach can be used for taxonomic subsets of species, Red List
14 Indices were also calculated for several high-profile species groups with specific conservation
15 interest-groups: raptors (Falconiformes), gamebirds (Galliformes) and parrots (Psittaciformes),
16 and for species groups relevant to particular international conservation treaties: waterbirds¹⁷
17 covered by the Ramsar convention, migrant species covered by the Convention on Migratory
18 Species (CMS), and albatrosses (Diomedidae) and large petrels (*Macronectes* spp. and
19 *Procellaria* spp.) covered by the Agreement on the Conservation of Albatrosses and Petrels
20 (ACAP) under the CMS.

21 *Strengths of and weaknesses of Red List Indices*

22 There are two key issues relating to the strengths and weaknesses of the Red List Indices
23 compared to other potential biodiversity indicators: representativeness and resolution.

24 *Representativeness*

25 The most significant strength of the Red List Indices described here is that they are based
26 on comprehensive assessments of *all* species in a taxonomic group across the world. Most other
27 global indicators based on population estimates are derived from sampled data biased towards
28 common, well-studied species in the developed world, particularly Europe and North America.
29 For example, in a global index based on data from 936 amphibian populations from 37 countries
30 around the world, 89% of populations (835) were from Europe or North America, and just 2.2%
31 (21) were from Asia and 5.5% (51) from South/Central America.¹⁸ By contrast, the Red List
32 Indices described here incorporate trends (as measured by IUCN Red List category changes) for
33 all the world's 10,000 birds and 5,700 amphibians. Red List Indices for other completely assessed
34 taxonomic groups are in development in order to expand the representativeness of the species
35 covered. However, in recognition that this will take some time (and that some groups will
36 probably never be completely assessed on a regular basis), a sampled index based on a broad
37 spectrum of taxa is also being developed. The Red List system is an effective way to make
38 meaningful inferences from data that are imprecise or incomplete. Thus Red List Indices can
39 incorporate information from species that are rare, localized, or difficult to survey, including
40 those most susceptible to extinction. This is in contrast to most indices based on species
41 population trends.

¹⁷ as listed in Wetlands International (2003) Waterbird population estimates. Third edition. Wageningen, Netherlands: Wetlands International.

¹⁸ Houlahan, JE, Findlay, CS, Schmidt, BR, Meyer, AH and Kuzmin, SL (2000) Quantitative evidence for global amphibian population declines. *Nature* 404: 752–755.

1 *Resolution*

2 Red List Indices show a fairly coarse level of resolution of status changes because of the
3 broad nature of Red List categories. Populations in the wild may have to undergo quite significant
4 changes in size, trend or distribution before crossing the thresholds to qualify for a higher or
5 lower Red List category, and hence before changing the Red List Index value. For example, a
6 species's population may have to decline from 10,000 individuals to 2,499 individuals, or its
7 range contract from 20,000 km² to 4,999 km² before the species is moved from Vulnerable to
8 Endangered. This is inherent in using the Red List categories rather than more precise parameters
9 such as estimates of population size. For this reason, Red List Indices are very complementary to
10 population based indices: the former are derived from (potentially) cruder data that can be
11 collected for all species in a taxonomic group, the latter are based on much more detailed
12 information that can practically only be collected for a small (and potentially biased) subset of
13 species. In some cases, status changes can be incorporated into the index without delay, because
14 the Red List criteria allow for species to be assessed as threatened on the basis of projected
15 declines (criterion A3). Thus changes in category can reflect new or emerging threats and small
16 population or range changes in anticipation that these will exceed the appropriate criteria
17 thresholds over specified time-frames.

18 However, there may also be time-lags between a species' population or range changing and this
19 being reflected in the Red List index value because of delays before detection of the change,
20 and/or before this knowledge becomes available to assessors. This is potentially more
21 problematic, but several factors act to mitigate it. The Red List Programme partners have a large
22 and expanding network of scientists across the world providing detailed and up-to-date
23 information for an increasing number of species. Furthermore, with improving channels of
24 communication (in particular, the increasing use of the world wide web to solicit information e.g.
25 BirdLife's web-based Globally Threatened Bird discussion forums), such delays will diminish.
26 *Sustainability, accuracy and representativeness of the data*

27 To ensure consistency in the application of the Red List criteria between different
28 taxonomic groups and over time, detailed guidelines have been produced¹⁹ and an informal users
29 group meets regularly to agree on common standards and approaches in Red List assessments.

30 In order to develop representative biodiversity indicators from the IUCN Red List, a major
31 expansion of the taxonomic coverage is a very high priority. By 2010, birds and hopefully
32 amphibians will have been reassessed once more, indices will have been developed for mammals
33 (1996–2005 at least), and a number of other groups will have been completely assessed at least
34 once, including reptiles (c.8,000 species, assessment initiated in 2004), freshwater fish (c.10,000
35 species, initiated in 2003), sharks, rays and chimeras (c.1,000 species, to be completed in 2005)
36 and freshwater molluscs (c.5,000 species, initiated in 2004). Similar targets exist for various plant
37 groups, although there is the much larger target of obtaining a preliminary assessment of all plant
38 species by 2010, which is part of the Global Strategy for Plant Conservation (decision VI/9). SSC
39 has also set in motion processes to identify priority taxonomic groups of plants, invertebrates and
40 marine organisms to ensure a more representative coverage on the Red List.²⁰

41

¹⁹ Red List Standards and Petitions Subcommittee (2003) Guidelines for using the IUCN Red List Categories and Criteria. Available: <http://www.iucn.org/themes/ssc/red-lists.htm>

²⁰ IUCN 2004 The IUCN Red List of threatened species. Available from <http://redlist.org/info/programme.html>

1 **6. Examples of use of indicator at national/regional level**

2 One of the purposes of the Red List Indices is to illustrate trends over time in the threat
3 status of species in different biogeographic realms or political regions. It is also possible to
4 calculate indices at the national level. However, since many globally threatened species have
5 ranges that span many countries, and nationally threatened species may be abundant elsewhere,
6 such indices are either problematic to develop or difficult to interpret.

7 **7. Suggestions for improvement of the indicator**

8 At present, data are only available for birds and amphibians to produce Red List indices.
9 By 2010, Red List Indices will also be available for all the world's mammals (c.5,000 species)
10 and potentially a number of other groups. Additional indices, and an aggregation of Red List
11 Index trends in multiple groups, will provide a more representative picture of the changing state
12 of biodiversity. In recognition that this will take some time to implement, the IUCN Red List
13 programme is also developing a Sampled Red List Index based on a sample of c.2,700 species
14 from all major taxonomic groups (initially: mammals, birds, reptiles, amphibians, fish, insects,
15 molluscs, crustaceans and plants), stratified by biogeographic realm, ecosystem, and Red List
16 category. This will provide an index that will be more representative of trends in the threat status
17 of all biodiversity worldwide. By 2010 it is anticipated that there will be an effective programme
18 delivering data for regular updates of the sampled Red List Index based on an increasingly
19 comprehensive taxonomic sample.