**References**

1 Royama, T. (1992) *Analytical Population Dynamics*, Chapman & Hall
2 Johst, K. and Wissel, C. (1997) Extinction risk in a temporally correlated environment. *Theor. Popul. Biol.* 52, 91–100
3 McCarthy, M. and Lindenmayer, D.B. (2000) Spatially correlated extinction in a metapopulation model of Leadbeater's Possum. *Biodiv. Conserv.* 9, 47–63
4 Engen, S. *et al.* (2002) Migration and spatiotemporal variation in population dynamics in a heterogeneous environment. *Ecology* 83, 570–579
5 Engen, S. *et al.* (2002) The spatial scale of population fluctuation and quasi-extinction risk. *Am. Nat.* 160, 439–451
6 Gonzalez, A. and Holt, R.D. (2002) The inflationary effects of environmental fluctuations in source–sink systems. *Proc. Natl. Acad. Sci. U. S. A.* 99, 14872–14877
7 Pulliam, H.R. (1988) Sources, sinks, and population regulation. *Am. Nat.* 132, 652–661
8 Dias, P.C. (1996) Sources and sinks in population biology. *Trends Ecol. Evol.* 11, 326–330
9 Faaborg, J. *et al.* (1998) Understanding fragmented midwestern landscapes: the future. In *Avian Conservation: Research and Management* (Marzluff, J.M. and Sallabanks, R., eds) pp. 193–207, Island Press
10 Murphy, M.T. (2001) Source-sink dynamics of a declining Eastern Kingbird population and the value of sink habitats. *Conserv. Biol.* 15, 737–748
11 Holt, R.D. *et al.* Impacts of environmental variability in open populations and communities: inflation in sink environments. *Theor. Popul. Biol.* (in press)
12 Pulliam, H.R. and Danielson, B.J. (1991) Sources, sinks and habitat selection: a landscape perspective on population dynamics. *Am. Nat.* 137, S50–S66
13 Baillie, S.R. *et al.* (2000) Consequences of large-scale processes for the conservation of bird populations. *J. Appl. Ecol.* 37, 88–102
14 Gundersen, G. *et al.* (2001) Source-sink dynamics: how sinks affect demography of sources. *Ecol. Lett.* 4, 14–21
15 Harrison, S. *et al.* (1988) Distribution of the bay checkerspot butterfly, *Euphydryas editha bayensis*: evidence for a metapopulations model. *Am. Nat.* 132, 360–382
16 Stacey, P.B. and Taper, M. (1992) Environmental variation and the persistence of small populations. *Ecol. Appl.* 2, 18–29
17 Wootton, J.T. and Bell, D.A. (1992) A metapopulation model of the peregrine falcon in California: viability and management strategies. *Ecol. Appl.* 2, 307–321
18 Harrison, S. (1991) Local extinction in a metapopulation context: an empirical evaluation. In *Metapopulation dynamics: Empirical and Theoretical Investigations* (Gilpin, M.E. and Hanski, I., eds) pp. 73–88, Academic Press
19 Thomas, C.D. and Kunin, W.E. (1999) The spatial structure of populations. *J. Anim. Ecol.* 68, 647–657
20 Paradis, E. *et al.* (1999) Dispersal and spatial scale affect synchrony in spatial population dynamics. *Ecol. Lett.* 2, 114–120
21 Stacey, P.B. *et al.* (1997) Migration within metapopulations: the impacts upon local population dynamics. In *Metapopulation Biology: Ecology, Genetics, and Evolution* (Hanski, I. and Gilpin, M.E., eds) pp. 267–291, Academic Press
22 Schiegg, K. *et al.* (2002) The consequences of disrupted dispersal in fragmented red-cockaded woodpecker populations. *J. Anim. Ecol.* 71, 710–721
23 Matthysen, E. *et al.* (2001) Local recruitment of great and blue tits (*Parus major*, *P. caeruleus*) in relation to study plot size and degree of isolation. *Ecography* 24, 33–42
24 Hudson, P.J. and Cattadori, I.M. (1999) The Moran effect: a cause of population synchrony. *Trends Ecol. Evol.* 14, 1–2
25 Earn, D.J.D. *et al.* (1998) Persistence, chaos and synchrony in ecology and epidemiology. *Proc. R. Soc. Lond. Ser. B* 265, 7–10

0169-5347/03/$ - see front matter 
doi:10.1016/S0169-5347(03)00074-0

Letters

# Value of the IUCN Red List

**John Lamoreux[1], H. Resit Akçakaya[2], Leon Bennun[3], Nigel J. Collar[3], Luigi Boitani[4], David Brackett[5], Amie Bräutigam[6], Thomas M. Brooks[7], Gustavo A.B. da Fonseca[7], Russell A. Mittermeier[7], Anthony B. Rylands[7], Ulf Gärdenfors[8], Craig Hilton-Taylor[9], Georgina Mace[10], Bruce A. Stein[11] and Simon Stuart[12]**

[1]Department of Environmental Sciences, University of Virginia, Charlottesville, VA 22903, USA
[2]Applied Biomathematics, 100 North Country Road, Setauket, NY 11733, USA
[3]BirdLife International, Wellbrook Court, Girton Road, Cambridge, UK CB3 0NA
[4]Department of Animal and Human Biology, University of Rome 'La Sapienza', Viale Universita' 32, Roma 00185, Italy
[5]IUCN Species Survival Commission, c/o Canadian Wildlife Service, Ottawa, Ontario, Canada K1A 0H3
[6]The Ocean Conservancy, 1725 DeSales St NW, Suite 600, Washington, DC 20036, USA
[7]Center for Applied Biodiversity Science, Conservation International, 1919 M St NW, Suite 600, Washington, DC 20036, USA
[8]Swedish Species Information Centre, Box 7007, SLU, S-750 07 Uppsala, Sweden
[9]IUCN Species Program Office, 219c Huntingdon Road, Cambridge, UK CB3 0DL
[10]Zoological Society of London, Regent's Park, London, UK NW1 4RY
[11]NatureServe, 1101 Wilson Boulevard, 15th Floor, Arlington, VA 22209, USA
[12]IUCN/SSC Biodiversity Assessment Initiative, c/o Conservation International, 1919 M St NW, Suite 600, Washington, DC 20036, USA

Possingham *et al.* [1] have warned against the improper use of threatened species lists. However, their characterization of misuse masks the essential role of these lists in conservation. Although threatened species lists are indeed typically problematic, the IUCN Red List provides quantitative measures, rather than qualitative estimates, of extinction risk and, as such, is a major exception [2].

We agree with Possingham *et al.*'s [1] main point that '(i)t is naïve and counterproductive from all points of view to use threatened species lists alone to allocate resources

*Corresponding author:* John Lamoreux (lamoreux@virginia.edu).

for recovery, to guide reserve planning, or to constrain the use of the natural environment'. However, most recovery and planning efforts already avoid this danger by using a diverse array of information. The strongest evidence that they present of sole reliance on threatened species lists is the link between such lists and the allocation of funds for species recovery. Even where this is true, it does not support rejecting the use of threatened species lists to inform prioritization.

However, that is what Possingham *et al.* [1] appear to endorse when they declare '(i)t is inappropriate to use threatened species lists for resource allocation'. Contradictorily, the second half of the same paragraph states '(s)tatus is only part of the information required for resource allocation'. We can only assume that the authors realize the value of threatened species lists for prioritizing species recovery, but object to the allocation of resources to the most threatened species. However, in their attempt to highlight a particular misuse of threatened species lists, they manage to discredit the use of such lists in general.

Possingham *et al.* [1] draw attention to several genuine problems that can undermine the credibility of threatened species lists and invite misuse, which have also been raised by other authors [3]: that is, qualitative estimate of risk, political influence, uneven taxonomic or geographical coverage. That changes in the lists reflect changes in knowledge more often than do changes in status has also been discussed [4]. Over the past 15 years, the IUCN Red List has concentrated on overcoming these problems.

IUCN – The World Conservation Union has been producing Red Data Books and Red Lists since 1963 [5]. The current list (http://www.redlist.org), updated annually, is a product of the Species Survival Commission (SSC), a network of >7000 scientists who provide assessments with independent peer review. Transparency and accountability are the cornerstones; species assessors are named and data sources referenced. The listing protocol is clear and comprehensive, but flexible enough to handle uncertainty, and also incorporates detailed, quantitative data. Listings can be challenged, and the SSC seeks to facilitate the resolution of disagreements. The IUCN Red List is global, and strives for taxonomic completeness. BirdLife International (then ICBP) produced the first worldwide list of threatened birds in 1988 [6], and has revised it twice [7,8]. All mammals have been assessed since 1996 [9], and a comprehensive update is ongoing. An assessment of all amphibians, including range maps, is due in 2003.

The IUCN Red List database also records whether a species has been assessed for the first time and logs the reasons for any change in status. This information heightens the awareness of species groups for which real extinction risk has increased (e.g., albatrosses [10] and freshwater turtles of South East Asia [11]).

The IUCN Red List is one of the most effective sources of information for conservation planners. Possingham *et al.* [1] acknowledge the value of sound threatened species lists when they describe them as a tool that 'should be a part of the contributing information' [1], but this point deserves greater prominence. The IUCN Red List is unique in its efforts to be both quantitative and comprehensive to reduce the potential for misuse. Therefore, as the IUCN Red List continues to advance, it will remain an essential data set for informing conservation planning in all the ways outlined by Possingham *et al.* [1].

## References


1 Possingham, H.P. *et al.* (2002) Limits to the use of threatened species lists. *Trends Ecol. Evol.* 17, 503–507
2 Mace, G.M. and Stuart, S.N. (1991) Draft IUCN Red List categories, Version 2.2. *Species* 21–22, 13–24
3 Mace, G.M. and Lande, R. (1991) Assessing extinction threats: toward a reevaluation of IUCN threatened species categories. *Conserv. Biol.* 5, 148–157
4 Cuarón, A.D. (1993) Extinction rate estimates. *Nature* 366, 118
5 International Union for Conservation of Nature and Natural Resources. Survival Service Commission (1963) *Animals and Plants Threatened with Extinction*, IUCN
6 Collar, N.J. and Andrew, P. (1988) *Birds to Watch. The ICBP World Check-list of Threatened Birds*, ICBP Technical Publication No. 8. International Council for Bird Preservation
7 Collar, N.J. *et al.* (1994) *Birds to Watch 2. The World List of Threatened Birds*, BirdLife Conservation Series No. 4. BirdLife International
8 BirdLife International (2000) *Threatened Birds of the World*, Lynx Edicions
9 Baillie, J., Groombridge, B. eds (1996) *1996 IUCN Red List of Threatened Animals* IUCN
10 Thomas, R. (2000) Longlining: a major threat to the world's seabirds. *World Birdwatch* 22, 10–13
11 Gibbons, J.W. *et al.* (2000) The global decline of reptiles, déjà vu amphibians. *BioScience* 50, 653–666


0169-5347/03/$ - see front matter 
doi:10.1016/S0169-5347(03)00090-9

# Underwater ultraviolet


## Graeme D. Ruxton

IBLS, University of Glasgow, Graham Kerr Building, Glasgow G12 8QQ, UK


In a recent article in *TREE*, Paul and Gwynn-Jones [1] call for an integrated approach to the study of the ecological roles of ultra-violet (UV) radiation, as they suggest that the interface between UV vision and broader UV effects (such as cell damage from high UV-B exposure) remain unexplored. These authors, doubtless for reasons of compactness, considered only terrestrial ecosystems. However, recent work in aquatic ecosystems demonstrates just the integrated approach that they, rightly, champion.

UV radiation can damaging living cells, suggesting that

*Corresponding author:* Graeme D. Ruxton (gdr1m@udcf.gla.ac.uk).