

Comment on “Status and Trends of Amphibian Declines and Extinctions Worldwide”

Threatened species lists are often used to evaluate the conservation status of species and habitats. Specialists are always consulted to yield and update lists and, as a rule, their opinions are respected and properly used. The lists produced are, therefore, reliable documents based on all information available. However, lists alone are being used to guide conservation efforts and to assess the health of the environment. One of the most serious problems regarding the misuse of such lists concerns data interpretation (1).

Stuart *et al.* (2) recently reported results from the Global Amphibian Assessment (GAA) (3), which indicate that 1856 species are being threatened worldwide [also see (4)]. However, the results published for Brazilian species largely differ from the categorization indicated by specialists (3, 5) [*Science* Online Material (SOM) Text]. Specialists indicate 24 Brazilian species as threatened, whereas the GAA shows 110 species (3, 5) (Table 1 and SOM Text). This overestimation occurred as a result of the misuse of IUCN–The World Conservation Union Red List criteria (6) during a “reevaluation” later performed by the GAA coordinating team (3, 5) (SOM Text).

The GAA team changed the specialists’ categorization of 95 Brazilian species by using the criteria based on geographic range (3). However, the GAA ignored the IUCN recommendation of using different thresholds for distribution range depending on the taxa in question and used the default values instead (6). These values were set by using taxa with broad and well-known distribution ranges (e.g., mammals and birds) and cannot be applied to animals in general without adjustments. The minimal area for a tiger, for example, is almost an endless space for a tiny leaf-litter frog. Moreover, the current knowledge on species’ distribution hinders this kind of assessment. Brazil houses the richest amphibian fauna of the world, with 776 species (7). Almost half of all species were described in the past 40 years (Fig. 1) (7). Before 1999, 101 species were known only from their type locality (the place where the original specimens were found). From 1999 to 2004, 29 species had their distributions expanded, but the description or revalidation of 86 species increased the number of restricted species to 109 (SOM Text). In just the past 2 years, four

species have been rediscovered (8–11). Even in areas that are frequently explored, new species are still being discovered (12–15). If the available data on taxonomy and distribution of Brazilian amphibians are deemed enough for making a detailed assessment of their conservation status, why do wider range extensions and many new species continue to be described?

Another problem with the Stuart *et al.* (2) analysis is related to the estimates of “rapidly declining” species (16). The use of threatened species lists to indicate changes in the state of populations is reliable only when comprehensive data on well-studied groups are maintained and continuously updated, thus allowing robust comparisons over time and space (17). That is not the case with Brazilian amphibians, as exemplified by two “rapidly declining species” indicated by the GAA (16). *Bokermannohyla claresignata* is known to exist in Serra dos Órgãos and Serra da Bocaina (18). However, this species is difficult to find because of its habit of occupying epiphyte bromeliads attached to tall, slender trees (18). Furthermore, recent extensive surveys at Serra da Bocaina have never been conducted, so it

is currently impossible to estimate population reductions. *Scinax heyeri* is known only from the four type specimens (specimens that identify a species) (19, 20). How can we evaluate its population trend if there is no information available? If the criterion used to include *S. heyeri* among the rapidly declining species were strictly followed, at least 55 other species of Brazilian amphibians known only from the type specimens (SOM Text) should also be considered as rapidly declining.

The existence of many different threatened species lists could have serious implications. First, multiple lists may affect the credibility of individual ones. Second, the extensive application of threatened species lists could cause the override of scientifically based criteria by economic or social criteria (17). Funding programs for research on threatened species are commonly carried out, but programs for “data-deficient” (DD) species have never been implemented, contradicting IUCN’s recommendation to give them the same degree of attention as threatened taxa (16). Using lists as the only tool for setting resource allocation priorities and favoring threatened species over DD forms may lead researchers to “inflate” the lists. The number of DD species is very large (22.5% of all species) (2), making it impossible to evaluate the real status of amphibians. Researchers should demand and support the creation of funding programs that focus on studying the taxonomy and distribution of DD species as well as threatened species. Third, in countries with restrictive laws concerning the study of wildlife, like Brazil, an

Table 1. Results of the three threatened amphibian lists available for Brazil. EX, extinct; CR, critically endangered; EN, endangered; VU, vulnerable; NT, near threatened; LC, least concern; DD, data deficient.

Category	Government list	Workshop Brazil	GAA evaluators
EX	1	1	1
CR	9	6	20
EN	3	6	38
VU	3	12	52
NT	–	21	21
LC	–	477	437
DD	90	205	159

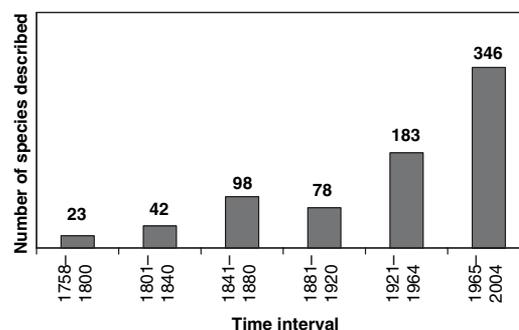


Fig. 1. Number of descriptions of amphibian species occurring in Brazil separated into ~40-year intervals. Almost half of all species were described between 1965 and 2004.

inflated list may cause a reduction in the study of threatened species, eventually precluding a realistic evaluation of their conservation status.

Gärdenfors (*J*) noted that the production of threatened species lists following the Red List Criteria would lead to a paradoxical situation: Biologists would not be needed to produce lists, because the lists could be produced by bureaucrats or other interested parties. However, if the task were left to nonspecialists, distortions could arise as a result of lack of experience and/or conflict of interest. Enhancement of the bidirectional transfer of information between specialists and conservationists could avoid misclassifications on threatened species lists.

The extensive problems observed on the categorization of Brazilian species put the conclusions of the GAA study in question. Megadiversity and high levels of endemism are characteristics shared by Brazil and other South American countries. Assuming that the data of all these other countries were also analyzed based on inadequate geographic range thresholds, we surmise that the number of threatened species worldwide has been overestimated. The results of the GAA study should be reviewed following IUCN's recommendation for the adequacy of thresholds. The use of the criteria as adopted by the GAA is a straitjacket that has artificially forced a great number of healthy species/populations into threatened categories. A proper assessment should take into account the ecological specificities of naturally endemic species that occupy a more restricted area, so as to mirror more realistically what probably is or is not a threatened species.

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References and Notes

1. U. Gärdenfors, *Trends Ecol. Evol.* **16**, 511 (2001).
2. S. N. Stuart *et al.*, *Science* **306**, 1783 (2004).
3. IUCN Species Survival Commission, Conservation International Center for Applied Biodiversity Science, NatureServe, *IUCN Global Amphibian Assessment* (www.globalamphibians.org) (2004).
4. B. E. Young, S. N. Stuart, J. S. Chanson, N. A. Cox, T. M. Boucher, "Disappearing Jewels: The Status of NewWorld Amphibians" (NatureServe, Arlington, Virginia, 2004) (www.natureserve.org/publications/disappearing_jewels.pdf).
5. *A Global Species Assessment*, J. E. M. Baillie, C. Hilton-Taylor, S. N. Stuart, Eds. (IUCN, Gland, Switzerland, and Cambridge, UK, 2004).
6. IUCN—The World Conservation Union, *IUCN Red List Categories and Criteria* (IUCN, Gland, Switzerland, and Cambridge, UK, 2001).

7. Sociedade Brasileira de Herpetologia, *Lista de espécies de anfíbios do Brasil* (www.sbherpetologia.org.br) (Sociedade Brasileira de Herpetologia, 2004).
8. R. N. Feio, B. V. S. Pimenta, D. L. Silvano, *Amphibia-Reptilia* **24**, 108 (2003).
9. M. Dixo, *Phyllomedusa* **3**, 77 (2004).
10. U. Caramaschi, O. L. Peixoto, M. T. Rodrigues, *Arq. Mus. Nac.* **62**, 191 (2004).
11. H. Zaher, E. Aguiar, J. P. Pombal Jr., *Arq. Mus. Nac.*, in press.
12. C. A. G. Cruz, U. Caramaschi, A. G. Dias, *Bol. Mus. Nac. N.S. Zool.* **434**, 1 (2000).
13. L. B. Nascimento, C. F. B. Haddad, J. P. Pombal Jr., *J. Zool.* **254**, 4 (2001).
14. C. F. B. Haddad, I. Sazima, *Zootaxa* **479**, 1 (2004).
15. A. Pugliese, J. P. Pombal Jr., I. Sazima, *Zootaxa* **688**, 1 (2004).
16. For further details, refer to the Supporting Online Material for (2).
17. H. P. Possingham *et al.*, *Trends Ecol. Evol.* **17** (11), 505 (2002).
18. B. Lutz, *Brazilian Species of Hyla* (Univ. of Texas Press, Austin, 1973).
19. O. L. Peixoto, P. Weygoldt, *Senck. Biol.* **68** (1/3), 1 (1987).
20. D. R. Frost, *Amphibian Species of the World: An Online Reference*; <http://research.amnh.org/herpetology/amphibia/index.html> (American Museum of Natural History, New York, 2004).
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Supporting Online Material

www.sciencemag.org/cgi/content/full/309/5743/1999b/DC1
SOM Text
Tables S1 to S5
Appendices S1 to S3
References and Notes

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