

ROBERT M. GRANT,^{1,2} SUSAN P. BUCHBINDER,³
JOHN P. MOORE,⁴ JAVIER R. LAMA,⁵ MYRON S.
COHEN,⁶ MARK A. WAINBERG,⁷ KATHLEEN M.
MACQUEEN⁸

¹Gladstone Institute of Virology and Immunology, 1650 Owens Street, San Francisco, CA 94158, USA. ²University of California, San Francisco. ³San Francisco Department of Public Health, 25 Van Ness Avenue, Suite 710, San Francisco, CA 94102, USA. ⁴Weill Medical College of Cornell University, New York, NY 10021, USA. ⁵Asociación Civil Impacta Salud y Educación, Grimaldo del Solar 805, Lima, Peru. ⁶University of North Carolina, 130 Mason Farm Road CB# 7030, Chapel Hill, NC, 27599, USA. ⁷McGill University AIDS Center, Montreal, QC H3T 1E2, Canada. ⁸Family Health International, Post Office Box 13950, Research Triangle Park, NC 27709, USA.

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Responding to Amphibian Loss

IN THEIR POLICY FORUM “CONFRONTING amphibian declines and extinctions” (7 July, p. 48), J. R. Mendelson III and colleagues offer a strategy for “stopping” the widespread losses of frogs, toads, and salamanders. Disease research and captive breeding figure prominently in their call for action.

Mendelson *et al.* imply that the main challenge, apart from curbing “familiar threats” such as habitat destruction, lies in combating the chytrid fungus *Batrachochytrium dendrobatidis*. This pathogen may well be a central proximate cause of mortality, but we question the belief that it spreads gradually across large regions, spelling doom for amphibian communities wherever it arrives (1–4). The observations that ostensibly support this “extinction-wave” model are open to interpretation, and the chytrid inhabits many places where major losses have not been observed (5–8). Furthermore, evidence suggests that climate change and other factors may contribute to declines by triggering disease outbreaks, which might travel varying distances in wave-like patterns (9–12). In any case, many populations survive such episodes (13) yet face an uncertain future as environments deteriorate, regionally and globally.

Protecting populations in centers for captive breeding may evoke Noah’s ark. In reality, these centers would be high-tech lifeboats, costly and of uncertain design, afloat indefinitely on perilous seas. Of the species that would obtain the inevitably limited seats, how many would make it home

again, or have a home worth returning to? Of course, some captive breeding is worthwhile, especially for research and education, but its efficacy in preserving nature should not be oversold.

There is no substitute for putting the Earth on a safe path. The Amphibian Conservation Action Plan recognizes this—stating, for example, that global warming must be addressed, and proclaiming amphibians “canaries in the global coal mine” (14). Mendelson *et al.*, however, say nothing about stemming environmental deterioration (besides habitat loss) and would instead put the canaries under intensive care. To suggest that this alone can halt the extinctions undermines scientific credibility and engenders false hope and complacency among voters and consumers.

Biodiversity loss warns that humanity’s life-support system is crumbling. Those who realize this may become responsible global citizens, demanding sound governance and accountability. Through outreach, we must foster an international “war on environmental deterioration” with initiatives on the scale of the Manhattan and Apollo projects. Society faces critical choices, and the clock is running.

J. ALAN POUNDS,^{1,*} ANA CAROLINA CARNAVAL,²
ROBERT PUSCHENDORF,³ CÉLIO F. B. HADDAD,⁴
KAREN L. MASTERS⁵

¹Monteverde Cloud Forest Preserve, Tropical Science Center, Santa Elena, Puntarenas 5655-73, Costa Rica. ²Museum of Vertebrate Zoology, University of California, Berkeley, Berkeley, CA 94720–3160, USA. ³School of Marine and Tropical Biology, James Cook University, Townsville, Queensland 4811, Australia. ⁴Departamento de Zoologia, I.B., UNESP, Av. 24 A, 1515, Bela Vista, 13506-900 Rio Claro, S.P., Brazil. ⁵Council for International Educational Exchange, Monteverde, Puntarenas 5655-26, Costa Rica.

*To whom correspondence should be addressed: E-mail: goldtoad@racsa.co.cr

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Response

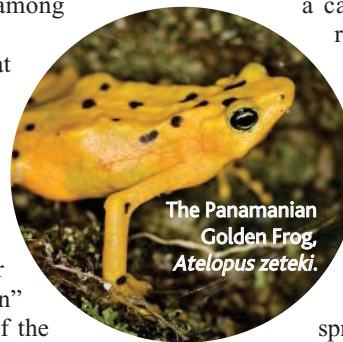
THE AMPHIBIAN CONSERVATION ACTION Plan (ACAP) reflects the need for a global, comprehensive response to amphibian extinctions and is a consensus position reached by 76 international scientists and conservationists (including two of the Letter’s authors, Pounds and Carnaval).

Our Policy Forum identified chytridiomycosis [caused by the fungus *Batrachochytrium dendrobatidis* (*Bd*)] as a case study because of its recent emergence, global distribution, and ability to cause extinction. We argued that captive husbandry is a necessary and timely response to this threat.

Pounds *et al.* (i) disagree with some spatio-temporal dynamics of *Bd* spread, not mentioned by us; (ii) are skeptical about captive breeding programs; and (iii) suggest that a focus on captive breeding would distract from other solutions to amphibian extinctions.

Pounds *et al.*’s citations (1–4) do not support their statement that where chytrid fungus is present, there are no major declines because these articles all report declines potentially attributable to chytridiomycosis. The loosely worded statement that “many populations survive such episodes” misrepresents the severity of declines. Strong evidence demonstrates that *Bd* is one of the few diseases capable of causing extinction of species (5), not just population extirpation. Nevertheless, we readily acknowledge instances where *Bd* was detected but where amphibian populations were little affected (6).

Pounds *et al.* exaggerate our focus on captive programs and suggest that captive programs “engender false hope and complacency among voters and consumers,” yet they offer no empirical support for these claims or provide alternative actions. Captive programs are a single tool representing a case-specific response that can forestall extinctions (7). Control of *Bd* in the wild is not currently possible, but it is likely to continue causing extinctions of amphibians; these realities warrant captive assurance colonies as a last resort for species



The Panamanian Golden Frog, *Atelopus zeteki*.

endangered by this disease.

We did not say that conservation should focus solely on chytridiomycosis, nor rely solely on captive programs. We endorse the ACAP Declaration, which clearly provides research and conservation priorities for all threats to amphibians.

We disagree with the vague call to reverse environmental deterioration “[t]hrough outreach” as a solution to amphibian extinctions. First, dealing with both the proximate and ultimate causes of amphibian extinctions is the most effective strategy. Pounds *et al.* seem to think that only addressing ultimate causes will prevent ongoing extinctions, but we disagree because many amphibians will go extinct before the global environment responds (8). Second, focused, forward-thinking plans are encouraging to the general public, policy-makers, and donors. Since publication of our Policy Forum, the ACAP has received endorsement from IUCN, unsolicited gifts from foundations, queries from the public, and coverage in the popular media. This attention broadly supports amphibian conservation, not specific causes or programs.

Both groups agree that “war on environ-

mental deterioration” would address the amphibian crisis, and that the clock is running, but even under the best-case scenario, that is a decades-long project, during which time many additional species may be lost (9). Our Policy Forum and ACAP offer specific, large-scale, immediate responses to conserve amphibians.

JOSEPH R. MENDELSON III,^{1*}

KAREN R. LIPS,² JAMES E. DIFFENDORFER,³

RONALD W. GAGLIARDO,⁴ GEORGE B. RABB,⁵

JAMES P. COLLINS,⁶ PETER DASZAK,⁷

ROBERTO IBÁÑEZ D.,⁸ KEVIN C. ZIPPEL,⁹

SIMON N. STUART,¹⁰ CLAUDE GASCON,¹¹

HÉLIO R. DA SILVA,¹² PATRÍCIA A. BURROWES,¹³

ROBERT C. LACY,¹⁴ FEDERICO BOLAÑOS,¹⁵

LUIS A. COLOMA,¹⁶ KEVIN M. WRIGHT,¹⁷

DAVID B. WAKE¹⁸

¹Zoo Atlanta, Atlanta, GA 30315, USA. ²Department of Zoology, Southern Illinois University, Carbondale, IL 62901-6501, USA. ³Illinois Natural History Survey, Champaign, IL 61820, USA. ⁴Atlanta Botanical Garden, Atlanta, GA 30309, USA. ⁵Chicago Zoological Society, Brookfield, IL 60513, USA. ⁶School of Life Sciences, Arizona State University, Tempe, AZ 85287-4501, USA. ⁷Consortium for Conservation Medicine, Wildlife Trust, New York, NY 10001, USA. ⁸Smithsonian Tropical Research Institute, Unit 0948, APO AA 34002-0948, USA, and Departamento de Zoología, Universidad de Panamá, Panamá, Republica de Panamá. ⁹IUCN/SSC Conservation

Breeding Specialist Group, Apple Valley, MN 55124, USA.

¹⁰IUCN/SSC-CI/CABS Biodiversity Assessment Unit, c/o Conservation International, Washington, DC 20036, USA.

¹¹Conservation International, Washington, DC 20036, USA.

¹²Universidade Federal Rural do Rio de Janeiro, IB-DBA, CxP 74524, CEP 23851-970, Seropédica, RJ, Brazil.

¹³Department of Biology, University of Puerto Rico, Piedras, San Juan, Puerto Rico 00931-3360.

¹⁴Department of Conservation Biology, Chicago Zoological Society, Brookfield, IL 60513, USA.

¹⁵Escuela de Biología, Universidad de Costa Rica, San Pedro, Costa Rica.

¹⁶Museo de Zoología, Centro de Biodiversidad y Ambiente, Escuela de Biología, Pontificia Universidad Católica del Ecuador, Apartado 17-01-2184, Quito, Ecuador.

¹⁷National Aquarium in Baltimore, Baltimore, MD 21202, USA.

¹⁸Museum of Vertebrate Zoology, University of California, Berkeley, Berkeley, CA 94720, USA.

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