Global Call to Save Amphibians

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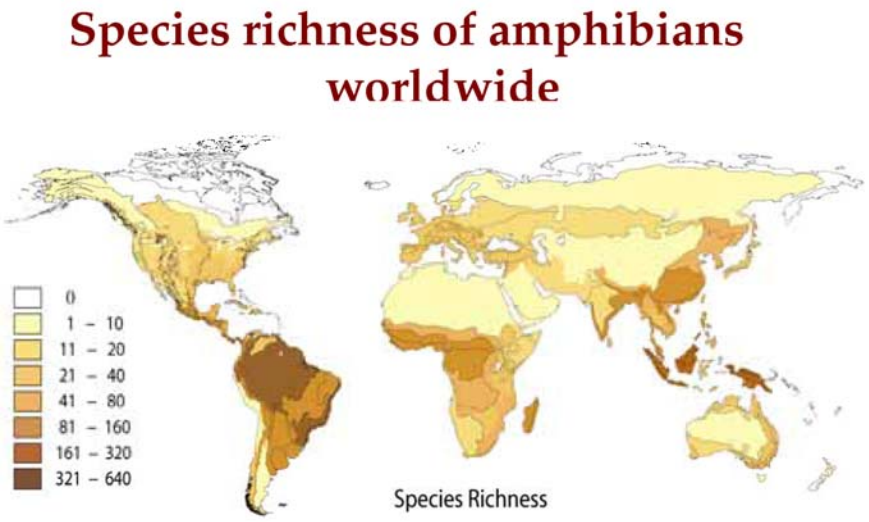
Let's try not to save the entire world's biodiveristy at one time, which is impossible. A more realistic approach is to focus on a single threatened species and its corresponding habitat. The population of amphibians in general depends upon factors like environmental variation, natural catastrophes, age structure and others.

Today, roughly 32 percent of 5918 described species (includes frogs, toads, salamanders and caecillian [legless amphibians]) are threatened with extinction more than mammals (25 percent) and birds (12.5 percent), while 34 amphibian species are officially extinct, as many as 130 species have gone unrecorded for many years and are possibly extinct (Figure 1).

Nearly a quarter of known species were deemed 'data deficient' with respect to conservation status in the recent global assessment. As amphibian species disappear we also lose biomedicine and biotechnology in general. According to Global Amphibian Assessment (GAA) around the world one third of amphibians species (32%) are classified as 'threatened' with extinction. Data deficient for 1300 species, most of which are also threatened. According to the experts only option today to most vulnerable species out of the wild are put them in captive facilities and breed them for possible restocking or reintroduction. However Dr. Gerardo Garcia, Head, Reptile Department at Durrell Wildlife Conservation Trust who has been also running a captive breeding programme of endangered Mountain chicken frogs since 2003, said that many species can't breed in captivity and for many very easy to breed said while at Jersey.

In order to build the capacity of amphibian biologists around the world a Amphibian Biodiveristy



Conservation training course of two weeks duration was organized during May-June 2006 by the Durrell Wildfire Conservation Trust, University of Kent, and Declining Amphibian Population Task Force – International, UK and Reptile Research Centre, Australia attended by 18 amphibian biologist from around the world. During the training , Prof. Trevor Bebe, Co-editor "Amphibia-Reptilia" working at Department of Biochemistry of Sussex University, UK pointed out that it is evident for example, 67% of the 100 species of Harlequin frog *(Atelopus)* endemic to region have died in past 20 years, due to pathogenic Chytrid fungus. The other species (*Bufoperigleness* and Southern gastric brooding frog *Rheobatrachussilus*) are also on verge of extinction *(Figure 2,3).* Scientist have also found that climatic change encourages outbreaks of Chytrid, in the region of Central and South America, as night time temperature in these areas are shifting closer to thermal optimum of *Batrachichytrium dendrobatidis* and increased daytime cloudiness prevents frogs from finding thermal refuges 'from the pathogen'.

The amphibian fauna functionally being an important component of most terrestrial and freshwater ecosystems contributes significantly to the biodiversity of a given area and serves as the best indicator of environmental health. India comprises of 129 (38%) of non endemic and 76 (62%) endemic species of the amphibians (Amphibian CAMP Handbook 2001) (Table 1).

Declining amphibian populations could have a major impact on other organisms including humans. Amphibians are integral components of many ecosystems, often contributing the highest fraction of vertebrate biomass. Moreover, amphibians are carnivores and are major consumers of invertebrates especially insects. They are also eaten by predators such as fish, snakes, birds and mammals. Thus the loss of amphibians in any ecosystem could profoundly affect the populations of the animals that they eat and the animals that eat them.

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As mentioned earlier, amphibians are also excellent indicators of environmental stresses. Their bimodal life exposes them to both aquatic and terrestrial pollutants- and they are particularly sensitive because of their highly permeable skin which can rapidly absorb toxic substances. Further, the egg stage is extremely susceptible to chemical pollutants and exposure to high concentrations of certain chemicals can result in developmental abnormalities. The growth rate of frogs and toads may be significantly affected by even short term exposures to acid conditions.

Human pressure on amphibian habitats is a reality. To some extent, law and force can protect our natural resources. But, in most cases, attempts to protect ecosystems have been futile. Not all species of amphibians, however, tend to dislike human interference. Niches provided by man have often attracted amphibians. Examples may be said of the street lamps and the visiting frogs and toads. Ecology of the species of amphibians that have invaded human modified habitats has to be looked at more carefully. They have lessons for conservation of species. Sanctuaries and refugia are not probably required for most amphibians. In much of our natural reserves, populations of amphibians are incidentally getting protected. However, many species are existing as isolated populations in island habitats.

Fungus (Chytrid) is the main cause

According to Andrew A. Cunningham of Institute of Zoology, Zoological Society of London across the South & Central America, Australia, Europe and in Africa all threatened species, most amphibians species is sensitive to the effects of habitat loss, land-use change, commercial over exploitation, climate change, invasive species and pollution both in terrestrial and aquatic environments.

Figure 2. *Bufo perigleness* from Central America– is nearly extinct in the wild as a result of habitat change, fungal diseases, trade, the species is currently maintained in several ex-situ facilities.

Figure 3. Highly endangered Southern Gastric brooding frog *Rheobatrachus silus* from Australia

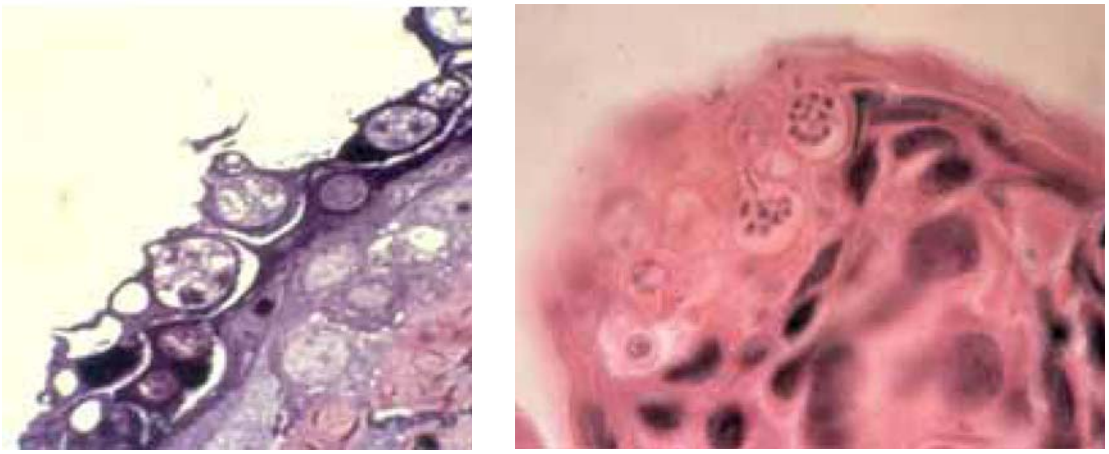

Figure 4, 5. Cutaneous Chytridmycosis – histology,causative agent Batrachochytrium dendrobatids– a non hyphal zoosporic chytrid fungus.

According to Gerry Marantelli, Director of the Amphibian Research Centre in Australia the main cause of species decline is believed to be a lethal skin fungus known as Chytididionmycosis caused by the fungus *Batrachichytrium dendrobatidis* (Figure 4, 5), first identified in 1998. This fungal disease kills the animal by damaging their sensitive skin, blocking the passage of air and moisture. The disease first emerged in 1970s. The oldest known host of *B. dendrobatidis* is African clawed frogs (Xenopus), first recorded in South Africa in 1938. Museum records suggest that the pathogen achieved a world wide distribution in the 1900's (Figure 6). So it seems that the expansion in one frog species through trade may have lead to the extinction of other amphibian species – a totally unexpected indirect consequence of human ingenuity.

Currently in various parts of the world for example Thailand, Singapore, Bolivia, Peru frogs are eaten as food by locals, even the largest frogs in the world – Gloath from Cameroon are hunted for food and there is a pet trade, with animals like Mantellas from Madagascar.

According to Dr. Tim Halliday, International Director, Declining Amphibian Populations Task Force the amphibians are directly in competition with human beings in many ways.

Dr. Mark Stanley Price, Director, Durrell Wildlife Conservation Trust, UK said that since most amphibians are depend on fresh water and immediately feels the effect of any pollution and reacts to its environment before any other forms of life including humans; their decline tells us that they are Earth's most critical life support system.

Declaration in 2005 during IUCN Conference, Scientists have agreed on Amphibian Conservation Action Plan (ACAP). A new, international body was recommended to coordinate and facilitate conservation programme for amphibians and to garner administer funds, so called The Amphibian Survival Alliance (ASA) led by the Amphibian Specialist Group of IUCN (World Conservation Union). ASA will engage Scientist to take initiative for conducting research in various fields by involving govt. agencies, zoos, universities, wildlife managers, captive breeding facilities as well as support central data base. The ASA model has been designed on the basis of ongoing Turtle Survival Alliance as a part of Global Environment Facility (GEF). It is imperative that support from individuals, government and the conservation community is required to stop further global loss of amphibian population. It is estimates that ASA to raise 400 million US dollars to save world's amphibians.

In our country we need to identify critical habitats, protect them and then enforce protection at the same time provide them protection under the Wild Life (Protection) Act, 1972 placing them under various Schedules of the Act.

The frogs worldwide are sending an alarm call to all concerned about the future of biodiversity and the need to protect the greatest of all open – access resources – the atmosphere.

I acknowledge the Durrel Wildlife Preservation Trust for all the photographs, illustrations and graphics used in this article.

• Endemics		• Non-endemic	
• Family	Species	• Family	Species
• Order: Salientia		• Order; Salientia	
• Bufonidae	14	• Bufonidae	8
• Ranidae	48	• Ranidae	32
• Rhacophoridae	39	• Rhacophoridae	16
• Microhylidae	8	• Microhylidae	9
• Pelobatidae	2	• Pelobatidae	8
• Order: Apoda		• Hylidae	1
• Caeciliidae	4	•	
• Icthyophidae	8	• Order:: Caudata	
• Uraeotyphliidae	4	• Salamandridae	1
• TOTAL	127	• TOTAL	76

Table 1. Endemic and Non-endemic amphibians in India