

Amphibian Conservation Summit

Washington DC, 17-19 September 2005

Declaration

Background

The amphibians – frogs, salamanders and caecilians – stem from an ancient lineage of organisms and they play essential roles, both as predators and prey, in the ecosystems of the world. Adult amphibians regulate populations of insects that are pests on crops, or which transmit diseases. The tadpoles of many amphibians, as herbivores or filter feeders, play a major role in aquatic ecosystems. Their well-being, or conversely their population declines and extinctions, signals that changes are occurring in the biosphere that have begun to negatively impact humans today.

Since 1970, scientists have observed precipitous population declines and outright disappearances of entire amphibian species. The extent of these declines and extinctions is without precedent among any other group of species over the last few millennia, and it has increasingly been the focus of scientific research. These declines have spread geographically and increasing numbers of species are involved. Recent research indicates that:

- Nearly one-third (32%) of the world's 5,743 amphibian species have been classified as threatened with extinction, representing 1,856 species.
- 122 species, perhaps many more, appear to have gone extinct since 1980. Further research may increase this number, since 23% of all species were classified as Data Deficient.
- At least 43% of all species have undergone population declines, but less than one percent is increasing in population size.
- As much as 50% of the amphibian fauna remains undescribed, and the possibility exists of discovering new groups that are widely divergent from any so far known.
- Habitat loss is the greatest threat to amphibians, impacting almost 90% of threatened species.
- A newly recognized fungal disease, chytridiomycosis, causes catastrophic mortality in amphibian populations, and subsequent extinctions.

- Many species are declining for reasons, such as disease, climate change, invasive species, and over-harvesting, that cannot be readily addressed through traditional conservation strategies.
- Other issues, such as the role of environmental pollutants in amphibian declines, need to be more thoroughly addressed.

Since 1990, scientists have referred to amphibians as canaries in the coal mine; the Global Amphibian Assessment (GAA) shows that the canaries are dying. This underscores a weakness in current strategies for biodiversity conservation: that habitat conservation is essential but not sufficient. Existing protected areas alone are not sufficient to protect amphibians from a growing array of threats.

The Amphibian Conservation Summit was called because it is morally irresponsible to document amphibian declines and extinctions without also designing and promoting a response to this global crisis. To this end, the Amphibian Conservation Summit has designed the Amphibian Conservation Action Plan (ACAP), and commends it to governments, the business sector, civil society and the scientific community for urgent and immediate adoption and implementation.

Amphibian Conservation Action Plan (ACAP)

Four kinds of intervention are needed to conserve amphibians, all of which need to be started immediately:

1. Expanded understanding of the causes of declines and extinctions
2. Ongoing documentation of amphibian diversity, and how it is changing
3. Development and implementation of long-term conservation programmes
4. Emergency responses to immediate crises

1. Expanded understanding of the causes of declines and extinctions

A. Emerging amphibian diseases. Emerging diseases are a major threat to the survival of human populations globally. Diseases like SARS, HIV/AIDS, Ebola, and avian influenza emerge because of changes to the environment (e.g., encroachment into wildlife habitat) and human behaviour (e.g., trade and travel). At the same time, a series of wildlife diseases have emerged, threatening many species. These are products of the same underlying causes – anthropogenic environmental changes – and highlight the growing link between conservation of biodiversity and the protection of human health.

Of the diseases known from amphibians, one, chytridiomycosis, is clearly linked to population declines and extinctions. This fungal disease is appearing in new regions, causing rapid population disappearances in many amphibian species. It is the worst infectious disease ever recorded among vertebrates in terms of the number of species impacted, and its propensity to drive them to extinction.

A series of strategies to deal with disease in the field is needed. Research should focus on understanding why some species of amphibians become extinct in some regions and at certain times, while others do not. This will require studying the persistence of the pathogen, reservoir hosts, mechanisms of spread, interactions with climate change, and comparing disease dynamics between sites of declines and control sites where amphibians survive. Research is also urgently needed on the biology of this emerging pathogen, in particular on:

- how it causes death;
- how amphibians respond by developing immunity or changing behaviour;
- understanding the geographic distribution and dispersal of chytridiomycosis; and
- whether or not animals from decline and control sites differ in their responses to chytridiomycosis.

These research programmes should also consider possible interactions between disease and other factors involved in amphibian declines (such as climate change, habitat loss or contaminants) and mechanisms for dealing with them (such as captive breeding and reintroduction).

To implement this research on disease, *Regional Centers for Disease Diagnostics* will be set up in Latin America, North America, Europe, Australia, Asia and Africa. They will provide free testing to field research groups, and will manage the logistics for regionally based *Rapid Response Teams*. A seed funding system should be created to support imaginative approaches to stopping outbreaks from spreading and preventing extinction by infection.

B. Climate change. Evidence of a link between amphibian declines and climate change is growing. Changes in temperature or precipitation influence host-pathogen interactions, and short-term and seasonal patterns in amphibian behaviour. One consequence is an increase in the probability of outbreaks of lethal diseases such as chytridiomycosis. If efforts to address climate change remain inadequate, none of the other proposed conservation efforts can save amphibians in the long term. The current spate of extinctions might be the first wave in a more general, profound loss of biodiversity. Ultimately, preventing this requires greater political will to take all necessary measures to reduce human impact on the global climate.

Research is needed to understand how climate change affects amphibians, and why the impacts are greater today than they were historically. In particular, studies should focus on the impacts of climate change on disease dynamics, and should develop predictive models for future declines, thus enabling implementation of conservation measures. Research will also explore ways in which ecosystems could be made more resilient to climate change (such as measures to restore movement corridors that would ensure metapopulation functions or allow migration to new habitats), and whether or not there might be ways to manipulate local micro-scale climates.

C. Environmental contamination. Contaminants may have strong impacts on amphibian populations by negatively affecting immune function and causing infertility,

developmental malformations, feminization, endocrine disruption, and alterations in food webs. There is evidence that environmental contaminants can cause local amphibian declines and extinctions. The effects of contaminants on broader geographic scales such as watersheds are not well understood. An ecotoxicology consortium should be formed in order to determine: how contaminant loads differ between stable and declining populations; the relationship between declines and contaminants in all regions; the effects of major chemical classes on both the aquatic and terrestrial life stages of amphibians; the effects of sub-lethal exposure in the presence of other threats such as disease; the role of contamination in amphibian population declines at the landscape scale; whether or not present regulatory screening is adequate; approaches to minimize the movement of chemicals through the environment; and how well the future impacts of contaminants can be predicted. The research should be integrated with the work of the regional centers recommended for disease research and management.

2. Ongoing documentation of amphibian diversity, and how it is changing

A. Exploration and biodiversity evaluation. Without an understanding of the amphibian fauna, its history, and its distributional patterns, conservation priorities cannot be set rationally. Therefore it is essential that basic exploration and species descriptions continue. The rate of species description among amphibians is higher than it has ever been. However, in many parts of the world, especially in the tropics, knowledge of amphibian species, their distributions, and their requirements for survival is still too poor to enable reliable conservation priorities to be identified. The ACAP will implement a greatly enhanced programme to: name at least 1,000 new species in five years, and 2,500 species in ten years; understand species limits and resolve species complexes; and carry out inventories of amphibian faunas. The implementation of this programme will require major building of taxonomic capabilities in a number of tropical countries, with priority being given to poorly known areas, and areas of high endemism and diversity. To assist in identification of species, new field guides and internet resources should be produced. Innovative mechanisms should be developed to enable taxonomists to devote more time to high priority work. Research should also focus on: Data Deficient species; identification of unique and ancient evolutionary lineages; understanding the extent to which similarity in vulnerability to threats is determined by degree of relatedness between species; and whether genetic diversity of species relates to their ability to persist in the face of an array of threats.

B. Updating the Global Amphibian Assessment continuously. An accelerated programme of assessment must underpin the ACAP. To build on its initial success, the GAA needs to be maintained continuously by: establishing a new full-time GAA coordinating team; recording updates and corrections to the data; developing more efficient mechanisms within regions to update the data; making the data more widely available; maintaining and enhancing the GAA web site; and undertaking analyses and communicating findings. A complete update of the GAA should be finished by 2009. Particular emphasis should be given to improving discrimination between real and apparent declines.

3. Development and implementation of long-term conservation programmes

A. Protection of key sites for amphibian survival. Habitat loss and degradation are impacting nearly 90% of threatened amphibians. Most of these require habitat- or site-based conservation as the primary means to ensure their survival. Therefore, safeguarding key sites for threatened amphibians is the most urgent priority for the survival of many species. At least 940 amphibian species (422 of which are threatened with extinction) are not in any protected areas. An urgent priority of the ACAP is to identify the highest priority sites, using globally recognized, standardised, and quantified criteria, which are essential for the survival of threatened species that are currently receiving no effective conservation measures. These sites and their associated landscapes need urgent attention, such as protected area establishment, community level sustainable development, and local education and training. The ACAP will establish a site conservation programme with the following main elements: identifying the 120 highest priority sites; and applying appropriate conservation actions at each site, including the development and implementation of management plans, standardised monitoring and assessment protocols, and long-term sustainability plans for ongoing funding and management. Given that what goes on outside a key amphibian site will hugely impact the success of conserving that site, management plans should incorporate the need to protect ecosystem services at a broad ecological scale. This site conservation programme will involve governments, non-governmental organizations, community-based organizations and the business sector collaborating to bring about effective conservation in the highest priority sites, with the widest possible stakeholder support.

B. Reintroductions. The goal of reintroduction is to re-establish protected, viable amphibian populations in the wild where conventional habitat management and threat abatement alone are unlikely to result in population recovery. Many amphibian reintroductions will be needed once techniques for the management of chytridiomycosis and other threats become available. Experience and expertise in amphibian reintroductions need to be developed as a matter of urgency. The ACAP will determine which species will benefit from reintroduction programmes by developing and applying rigorous and objective criteria. Once the species have been selected, reintroduction programmes will be initiated. The animals used for reintroductions may either stem from captive breeding programmes or wild populations, depending on availability of stock and the nature of the circumstances. In the first instance, it is estimated that 20 species will be selected for reintroduction, but this may increase as funds and capacity are built.

C. Control of harvesting. In some parts of the world, especially in East and Southeast Asia, but also in some other tropical countries, unsustainable harvesting of amphibians, especially for food and medicines, has led to severe population declines. There are also instances of declines due to the international pet trade. The ACAP will establish a harvest management programme, concentrating on 15 countries that appear to be the focus of the heaviest levels of harvest. The programme will build management capacity in each of these countries to halt declines due to over-harvesting, with an emphasis on: the development of sustainable use projects (when the biology of the species permits this); the development and strict enforcement of appropriate legislation; monitoring the levels

of amphibian harvests and trade; the implementation of recovery plans for the most threatened species; the certification and regulation of commercial captive breeding operations with a proportion of profits returning to conservation in the wild; and raising awareness of the impacts of unsustainable use of amphibians. Commercial captive breeding facilities should only use species native to their regions to reduce the risk of the spread of disease and alien frogs. Species that are threatened by international trade should be listed on the appropriate appendices of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES).

4. Emergency responses to immediate crises

A. Rapid response capacity. The short timescale of many amphibian declines requires the capacity for immediate response, as already mentioned. The regionally based *Rapid Response Teams* required to react to disease outbreaks should be established and implemented urgently.

B. Captive survival assurance programmes. The ACAP recommends prioritized (as outlined below) captive survival assurance programmes that are primarily in-country, coupled with an obligation to deliver *in situ* threat mitigation and conservation programs. This is both a stopgap to buy time for species that would otherwise become extinct, and an integral component of other approaches to tackling amphibian declines. Guidelines for including species in captive survival assurance programmes will be based on predictive models of threats so that species are targeted proactively and representative populations are collected. Decision processes will involve consultation with representatives across the ACAP consortium and the range country will be the ultimate arbiter.

Several hundred amphibian species, perhaps more, are facing threats such as disease and climate change that cannot be addressed in the wild with currently available conservation management strategies. Since solutions for the conservation of these species in the wild are not currently available, a short-term solution is to breed them in captive survival assurance colonies to maintain options for reintroduction. Capacity to implement a major captive programme for amphibians does not currently exist anywhere in the world. Therefore this should be achieved through the establishment of an Amphibian Survival Alliance to coordinate this effort globally, involving rapid-response teams to collect disappearing species, short- and long-term captive management, training and capacity building for captive conservation programs in range countries, research on captive breeding and reproductive science, disease management, and education and outreach. Captive programs will include a variety of operations from rapid-response, portable units, to large-scale permanent facilities. The goal is to maintain and breed in captivity species at risk of extinction, which should be collected from places where declines have not yet occurred, as well as from places where animals need to be rescued urgently before they disappear.

C. Saving sites about to be lost. The integrity of some of the top priority sites for amphibian survival is under immediate threat. In some cases, habitats are reduced to tiny fragments that will disappear very soon. An “amphibian emergency fund” should be

established to implement immediate conservation measures in such sites before it is too late.

D. Saving harvested species about to disappear. Several species are close to extinction due to over-exploitation. The “amphibian emergency fund” should be used to address threats to these species.

Amphibian Action Fund

The implementation of the ACAP over the period 2006-2010 will cost approximately US\$ 400 million. To help support the implementation of the ACAP, the Amphibian Conservation Summit announced the formation of the Amphibian Action Fund and received initial pledges from donors.

The Amphibian Action Fund will support:

1. Expanded understanding of the causes of declines and extinctions
2. Ongoing documentation of amphibian diversity, and how it is changing
3. Development and implementation of long-term conservation programmes
4. Emergency responses to immediate crises

Supporting a network of amphibian experts

The ACAP cannot be implemented without a global network of scientists and conservationists who work on amphibians. To date, the IUCN Species Survival Commission (IUCN/SSC) has focused on decline-related research through the Declining Amphibian Populations Task Force (DAPTF), on promoting conservation through the Global Amphibian Specialist Group (GASG), and on monitoring and assessments through an informal network of scientists contributing data to the GAA. All three of these programmes have made significant achievements, but all of them are also struggling for resources, and are based on broadly the same network of experts. In view of the extraordinary nature of the crisis facing amphibians, the IUCN/SSC should bring these three programmes together in a single Amphibian Specialist Group (ASG) focused on conservation, research and assessment. The ASG needs to have sufficient resources and finances to lead the implementation of the ACAP.

Conclusion

The Amphibian Conservation Action Plan is the most ambitious programme ever developed to combat the extinction of species. This response is necessary because the amphibian extinction crisis is unlike anything that the modern world has previously experienced, and a large proportion of amphibian diversity remains undocumented. The ACAP requires the international community to enter uncharted territory and to take great risks. But the risks of inaction are even greater. The Amphibian Conservation Summit calls on all governments, corporations, civil society and the scientific community to respond to this unprecedented crisis. There needs to be unprecedented commitment to

implementing the Amphibian Conservation Action Plan with accompanying changes in international and local environmental policies that affect this class of vertebrate animals. They are indeed canaries in the global coalmine.